UC Santa Barbara
UC Santa Barbara Electronic Theses and Dissertations

Title

Teaching for the Future: Integration of Education for Sustainable Development within In-service Teacher Development Programs

Permalink

Author

Pihen González, Estefanía

Publication Date

2024

Peer reviewed|Thesis/dissertation

UNIVERSITY OF CALIFORNIA

Santa Barbara

Teaching for the Future: Integration of Education for Sustainable Development within

In-service Teacher Development Programs

A dissertation submitted in partial satisfaction of the

requirements for the degree Doctor of Philosophy

in Education

by

Estefanía Pihen González

Committee in charge:

Professor Diana Arya, Chair

Professor Timothy Dewar

Dr. Dorothy Chun, UCSB

March 2024

The dissertation of Estefanía Pihen González is approved.

_____

Diana J. Arya, Chair

_____

Dorothy Chun, Member

_____

Tim Dewar, Member

March 2024

Teaching for the Future: Integration of Education for Sustainable Development within

In-service Teacher Development Programs

by

Estefanía Pihen González

VITA OF ESTEFANIA PIHEN GONZALEZ
March 2024

EDUCATION

Bachelor of Biology, University of Costa Rica, San José, July 2005
Master of Business Administration, Colorado State University, Colorado, December 2017
Master of Education, University of California Santa Barbara, Santa Barbara, September 2022
Doctor of Philosophy in Education, University of California Santa Barbara, Santa Barbara, March 2024

PROFESSIONAL EMPLOYMENT

2009-2015: Founder and Executive Director, Guanacaste International Academy, Costa Rica
2016-2017: Teaching Assistant, School of Business, Colorado State University, Colorado
2016-2017: Research Fellow, Institute for the Built Environment, Colorado
2019-2023: Graduate Research Assistant, University of California Santa Barbara, Santa Barbara
2021-2023: Founder and Executive Director E4 Education LLC, Ventura
2023 to date: Program Director, Climate Action Pathways for Schools, San Francisco

PUBLICATIONS

"Green Schools in the Tropics: A toolkit for Schools on a Budget", Institute for the Built Environment, (2018).

"Towards Education for Sustainable Development: lessons from Asia & the Americas", Curriculum and Learning for Climate Action Towards SDG 4.7 Roadmap for Systems Change, (2021), 291-308.

"Understanding ESD: perceptions and views from Guatemalan, Nicaraguan and Costa Rican educators, Environmental Science Proceedings, (2022).

FIELDS OF STUDY

Major Field: Education for Sustainable Development

Studies in Education for Sustainable Development and In-Service Training Programs with Professor Diana Arya

ABSTRACT

Teaching for the Future: Integration of Education for Sustainable Development within

In-service Teacher Development Programs

by

Estefanía Pihen González

In the midst of current environmental and social crises we–educators and educational

scholars–have been called to prepare our youth with the skills, attitudes, and knowledge needed

to face and solve such crises. While mastery of academic content and relevant skills remain

key educational goals, teachers need to be prepared and equipped to instruct such content in

integration with information on the causes, consequences, and mechanics of local and global

sustainability issues; with information on the current innovations to mitigate and solve

sustainability issues; and how individual and collective action can be taken. Such learning for

social and environmental sustainability can be weaved into formal academics through the

alignment of teaching practices and curricular content with the internationally recognized

framework of Education for Sustainable Development (ESD)

My study was conducted with four elementary grade teachers from a public school in

the central coast of California. The study involved six phases, from late 2022 to mid 2023, that

included the implementation of a professional development (PD) event on ESD, class

observations prior and after the PD event, sessions with the participants to co-design an integrated lesson plan, a focus groups, and one-on-one interviews. My data sources largely included field notes and transcripts of audio recordings of the before mentioned phases. I used critical ethnography (Carspecken, 1996) to identify the affordances as well as the challenges that participants experienced when attempting to align their instruction with ESD and the forms of collaboration and resources that would support them best to achieve this alignment.

Findings from my analysis revealed multiple challenges that the participating teachers faced when attempting to create and deliver lessons that merged subject matter content with sustainability content. Reported challenges included: time constraints on planning and implementation; lack of time and resources necessary for increasing teachers' literacies about sustainability issues and science education; need for fostering students' foundational academic knowledge; the dominant presence of a test-score school culture; the preparation received during their pre-service years; and inadequate support from their school district to overcome diverse needs. Moreover, I found that participants expressed the desire for: having access to integrated teaching resources and to sustainability literacy resources; having district-adopted textbooks with integrated transdisciplinary content; and having ongoing support from a sustainability focused TOSA (teacher on special assignment) or coach. Results from my analysis also revealed specific features that a PD on ESD should have to effectively train teachers in the framework's design methods, learning goals, and pedagogies. These features include the architecture of the PD; the forms of support teachers should receive after the PD has been completed; the elements from ESD that serve teachers to build integrated lessons; and the content and activities that should be prioritized.

TABLE OF CONTENTS

Chapter 1. Introduction

Never in the history of humankind has our species been faced with not one but two existential threats. Biodiversity loss and climate change are now widely accepted across scientists and experts from all over the world as the two most pressing environmental issues that if unaddressed will generate unparalleled consequences in a short period of time. Connected with these crises are deeply rooted systemic social and economic injustices experienced by millions of culturally marginalized communities perpetuated by political structures and dominant cultural norms. More so, the effects of social, economic, and environmental issues are felt the most by those communities that have the least access to financial resources, education, and overall support. These affected groups include island nations and most countries in the now called 'Global South' or 'emerging economies'. Both biodiversity loss and climate change are driven by economic processes fueled by extractive and destructive practices that are led and done mainly by the countries from the 'Global North." The irony is that those who create the least amount of damage to the natural world suffer the greatest consequences from such damage, and continue to receive the least economic support while facing racial and other social injustices.

If one came from a distant planet and looked at our global society, I cannot help but think that the assessment would be that the way we do things is wrong. How we grow and produce our foods, how we manufacture our clothing, how we fuel our vehicles, and even how we educate our youth. For the most part, we are doing these things wrong. Then, what can we collectively do? In the face of two existential threats and multitude of social injustices, where do we begin to catalyze action? Having worked across the world as a marine biologist, a school

developer, an environmental educator, and, more recently, as a budding researcher, I can only think of one approach that can bring together young and old, individuals and communities across sociocultural divides, through a lens of action and hope. That is, education, not as traditionally delivered through standardized, diluted, and outdated content and ways of measuring and celebrating knowledge. I am talking about transformative education. An education that positions core academics as the foundation that all learners must acquire, but provides this knowledge through learning processes that value and recognize students' interests and ideas, and positions them as agents of change to imagine and enact ways of transforming how we are doing things. In the face of existential threats that can realistically alter the course of human history, and more importantly, radically affect the near future of our children and youth, the moral and ethical commitment from all of us working in education is to support a transformation in education.

As stated earlier, my work in the fields of education lies within the intersection of social, economic, and environmental sustainability, and involves efforts in the US and international contexts. Therefore, in the herein research, the global perspective on how to achieve transformative education has been closely taken into account. Moreover, the understandings of California-based school districts, school communities, and for teachers and students, have deeply guided the development of this study. This understanding includes the realization that California-based teachers need to be prepared in not just what causes climate change and other sustainability issues, but also how to teach highly rigorous core academics that allow students to learn about such issues. This means that the goals of classroom learning must include understanding the systemic structures that perpetuate these issues, critically

analyzing these structures, creatively proposing what actions can be taken, and collectively envisioning ways to make these actions a reality.

My study has been developed with the honest desire to contribute to the many efforts currently happening across California and the US to achieve transformative education within every school. While this is a paramount task, one that many say is impossible, we must take up the challenge with no hesitation. This study is a small but committed contribution to the advancement of an educational system that teaches our youth beyond traditional core subjects and thus provides skills, attitudes, knowledge, and tools to ensure a future that is fair, sustainable, and equitable to all living beings and societal groups. As core leaders and fundamental instruments in any school district, I focused my research on teachers. Specifically, on investigating how teachers can be adequately supported to deliver engaging, relevant, challenging, inclusive, and empowering lessons anchored in sustainability learning and developed through every core subject while ensuring academic standards are met. Such lessons are known as integrated lessons; and the main framework to guide the design of these is *Education for Sustainable Development* or ESD (UNESCO, 2022).

Initially, I had proposed conducting a professional development on ESD and exploring which challenges arose when participating teachers attempted to implement methods taught through the PD, along with examining the extent to which teachers developed integrated lessons. Nevertheless, only a few weeks into the study, my participants shared that their upcoming months would be heavily affected by the standardized tests their students would be taking. Amongst many effects, which will be amply described and discussed in the study, preparing the students for the standardized tests implied that the participants had an important

change in their availability and capacity to design integrated lessons by using what they learned through the PD. Consequently, they agreed to participate if I could support them as a sustainability education coach and thus lead three sessions throughout the year in order to co-design a lesson plan for one unit. The school principal approved this new plan, and allowed the teachers to count these sessions as part of their work time. This unanticipated development allowed me to work more closely with the participants after we had completed the ESD PD. Data was also collected and analyzed for these co-design sessions as described in the methods section. The study was hence developed with the following research question: **How can teachers be effectively supported to integrate ESD into their formal classroom instruction?** Guided by this overarching question, I pursued the following line of inquiry:

• What challenges did teachers face when attempting to implement integrated lessons?

• Which resources and forms of collaboration were identified as most needed to support the implementation of integrated lessons?

• What elements from a professional development on ESD did teachers identify as most important for their preparation?

• What elements from a professional development on ESD did teachers apply during design and implementation of integrated lessons?

In addition to answering the proposed lines of inquiry, I was able to create a clear map for how to bring ESD training to in-service teachers that are overwhelmed, poorly supported, and pressured to 'deliver' good test scores. My participating teachers are, like so many, deeply passionate about providing quality and meaningful education experiences to their students. I

learned how much they care and listen to their students who have expressed the desire to learn how they can help our planet and thus ourselves. I observed these teachers give their best to prepare their students for tests that measure little of what they truly know and are capable of doing. I also observed how they strived to carve time to learn how to teach their students action-oriented, contextualized, and hope-infused lessons. I observed these teachers deliver these lessons and many times acknowledge to their students not knowing enough about an issue, but inviting their students with pride and excitement to co-learn. This study will describe the obstacles that the teachers faced while creating integrated lessons and how transformative education became part of their day to day instruction. In addition, by considering the challenges that the teachers navigated, I created a detailed instrument and accompanying recommendations to support the adoption of transformative education practices to ensure integrated learning for all teachers and their students.

In what follows, I provide an account of my study, which begins with an explanation of key concepts and terms related to sustainable development and sustainability. Following, I describe how ESD evolved as an overarching education framework that includes environmental education, climate change education, global citizenship education, all of which together are commonly referred to as transformative education. Hence, ESD is a framework to achieve transformative education. I also provide arguments in favor of the adoption of ESD as the guiding framework to radically improve education systems. These arguments are followed by the rationale of why teachers must receive training on ESD and the design methods, learning goals, and pedagogies that it includes. I continue this section with an overview of the theoretical framework used for this study, through which I describe the processes, learning

goals, and pedagogies that are identified as foundational to ESD and thus that should be used to adequately implement the framework during formal classroom instruction. Chapter 4 follows, in which I describe the steps from critical ethnography that I used as the methodology to collect and analyze the data to draw findings. I conclude the study with a discussion of these findings, by providing reports from other scholars that align with my arguments. In addition, I provide a series of recommendations on how to support teachers in California to adopt ESD and consequently weave learning about and for sustainability issues into their formal classroom instruction.

Chapter 2. Sustainability, sustainable development, and education

2.1. The concept of sustainable development and sustainability

Sustainability and sustainable development are core concepts that guided how the herein presented research was structured and developed. While there are abundant technical definitions of both concepts, I want to first provide my own understanding of each one. Such understanding has been shaped by scholarly work, but also and most importantly, by work I have conducted with different schools and communities. Sustainability, as I understand it, is a crucial societal goal that we have as a direct consequence to the dominant economic models and ways of mass-producing goods and of providing services that emerged during the beginning of the Industrial Revolution. As a societal goal, I consider that sustainability is a state in which humans coexist with all societal groups while we restore and preserve every natural environment and we protect every living organism. In this state, our individual and collective actions are guided by the main goal of thriving alongside other humans and nature. This means that we rethink and evolve the way we produce our food, our clothing, how we move from place to place, how we power our homes, how we educate our youth, how we create opportunities for all social groups, how we implement policies that think of people and the planet first and foremost, and so much more. That conscious and calculated way of development is what I consider sustainable development. By no means, under my perspective, does sustainable development imply continuing to develop our lands by destroying habitats or excluding those most marginalized by traditional systems; neither does it imply that we continue valuing a nation's GDP as a true indicator of their development. Sustainable

development includes a rural community, in a small nation, that provides education to all their youth by centering their voices and preserving elder's traditional knowledge of how to live in balance with the resources they have; it also includes a city that equitably offers their residents low carbon transportation options. As reported by Agbedahin (2018) many scholars and practitioners contest the concept of sustainable development and share that it is a contradicting term and a vague slogan prone to being misused, with many claiming that development represents growth and growth cannot be done through sustainable approaches. I respectfully disagree. As a scientist and an educator, I have witnessed development that respects and includes all people and protects and restores nature. I also believe that many dominant discourses that criticize the concept of sustainable development are driven by individuals and organizations that cherish individuals' and nations' purchasing power as the best way to determine how developed, or not, a region or country is. The same economic system, and the political structures that enable it, that has put humans on the catastrophic route that we are in cannot be used as a ruler to determine development and thus describe sustainable development.

With the above clarification of my personal views on sustainability and sustainable development, it is important to provide a summary of the historical process through which both concepts came to exist. To begin, sustainability as a term was first coined in 1987 by the World Commission on Environment and Development (WCED), through the report Our Common Future (also known as the *Brundtland Report*). This marked the beginning of a new movement in education as the Brundtland Report did what no other international policy document had done before, it framed development from a focus of interconnected systems including education (Nolet, 2009). The Report allowed for the conceptualization of a new approach to

development, through which economic, social, and environmental impacts are considered at its core. Furthermore, the Report emphasized the environmental effects from the unchecked unsustainable patterns of consumption and the extractive and destructive methods of production to supply the goods demanded by nations from the Northern Hemisphere (Nolet, 2009). Until the Brundtland Report, the international education community, through the environmental education movement, had underscored the importance of providing students with information on the state of natural environments as a way to halt their degradation by anthropogenic actions. Sustainability, along with the concept of sustainable development, brought a new angle for delivering knowledge to the youth and the general public through ways that focused on the power that each individual has as a potential agent of change.

The inevitable questioning of how to operationalize sustainable development within fields such as politics, economics, and even education led to the creation of Agenda 21 during the United Nations Conference on Environment and Development (the Earth Summit) in Rio de Janeiro, Brazil in June 1992 (UNESCO, 2018). This document was set to serve as a global action plan for sustainable development and was produced with the endorsement of 170 different Heads of State (UNESCO, 2018). Shortly after the Earth Summit, UNESCO recognized that "the concept of sustainable development is not a simple one, and there is no road map to prescribe how we should proceed" (UNESCO, 1997, as cited in Rauch and Steiner, 2013), while also emphasizing that "sustainability is a paradigm for thinking about the future in which environmental, societal and economic considerations are balanced in the pursuit of an improved quality of life." (UNESCO, 2018, p. 11). When considering both of these claims by UNESCO, it becomes clear that sustainability and sustainable development are not meant

to provide exact steps to be followed. Both concepts are to be used as guiding principles and frameworks for undergoing a process that includes all sectors of society and that implies a constant searching, designing, learning, and application of new knowledge (Rauch and Steiner, 2013). Consequently, we have to understand and apply sustainable development as an open formula that demands for contextualization, for co-creating interests and goals that address and respect the particular needs, realities, and cultures of each societal group. In this way, through this social process, a sustainable society can be built (Rauch and Steiner, 2013).

Within the previously described open and broad definition of sustainable development is a key understanding that sustainable development has four intertwined dimensions–society, environment, culture, and economy; and that consequent to the interdependency between humans and natural environments we must always strive to conduct development in ways that no environmental, social, political or economic objective is met through the detriment of other objectives (UNESCO, 2002, as cited in Rauch and Steiner, 2013). Under the logic of providing a broad framework for achieving the paradigm change implied by sustainability, the World Commission on Environment and Development has defined sustainable development as "development that meets the needs of the present without compromising the ability of future generations to meet their own needs" (UNESCO, 2018). Due to my professional and personal lived experiences, I advocate for this flexible definition of sustainable development as I believe that it allows for different interpretations on how to integrate and thus adopt sustainability in a specific community, nation or region. By lacking a precise description and thus prescription, sustainability permits for innovative, dynamic, creative, and contextual approaches to ensure the present and future well-being of many generations to come, both of humans and all other

living species. Sustainable development presented in this way brings open notions and amplifies the range of possible manageable courses of action to be taken for tackling contemporary complex issues (Rauch and Steiner, 2013). In consequence, I firmly agree with the notion that both sustainability and sustainable development represent philosophical and analytical frameworks to guide society to build together the necessary routes to achieve a vision of a future that is desirable, realizable, and shared by all social groups (United States Teacher Education for Sustainable Development Network [USTESDNetwork], 2013).

2.2. Connecting education with sustainability

Under the premise that sustainable development shapes our individual and global actions to achieve a common desired future, it is inevitable to wonder under what mechanisms and processes could these actions be fostered. Considering that sustainable development implies deep systemic changes at the economic, social, and political levels, while also at the individual level, a one single model to achieve sustainability across nations seems unrealistic. How then can each person, family, community, societal group, and country collectively achieve the changes urgently needed to halt threatening environmental crises and build societies that thrive along each other and nature? Education, one that seeks transformational individual and collective growth through   academics that are rooted in relevant content and applicable knowledge, becomes an obvious answer. Education can reach youth and adults alike. Therefore, when learning provides students with lessons through which they can actively, responsibly, and creatively co-participate in the construction of a sustainable present and future, changes across generations and systems can be achieved. Many researchers and

practitioners before me had the realization that education is a powerful needle to thread sustainability through the economic, social, and even political fabric of nations. These common understanding helped to consolidate the connection between education and sustainability, and for that matter sustainable development. That connection is now days recognized and implemented as an overarching holistic education framework known as Education fro Sustainable Development (ESD). In this section, I provide a summary of the evolution of ESD.

In 1997, international practitioners from the education community joined efforts with professionals from diverse fields to ensure the implementation of Agenda 21. These efforts were launched through the program Earth Summit+5, during which the role of education for the advancement of sustainable development was agreed as critical to empower individuals to become and act as productive and responsible members of their society (McKeown and Hopkins, 2005). In alignment with the efforts from Earth+5, in 1998 the Commission on Sustainable Development requested UNESCO to create a series of guidelines to support the integration of sustainability within teacher education programs. The result of those two efforts was the development of the UNITWIN/UNESCO Chair on Reorienting Teacher Education to Address Sustainability, based at the York University in Toronto, Canada (McKeown and Hopkins, 2005). As a first step, the Chair established an International Network of 30 teacher-education institutions across 28 countries. Following shortly, the 2000 World Education Forum in Dakar proclaimed that education serves as the true basis for sustainable development (UNESCO, 2000, as cited in Rauch and Steiner, 2013). In 2002, the international community coined and formally launched the concept of education for sustainable development through the UN proclamation of the Decade of Education for Sustainable Development (DESD, from

2004-2015) (Rauch and Steiner, 2013). The DESD was launched by using 4 years of gathered and curated experiences and recommendations from 70 teacher education institutions from across the globe that worked collaboratively as part of the UNITWON/UNESCO network (McKeown and Hopkins, 2005). Following this period came UNESCO's Global Action Programme on Education for Sustainable Development (GAP), which ran from 2015-2019 with the general goal of scaling up ESD and accelerating programs that support its adoption, including those related to the education of student teachers (Evans et al., 2017). The most recent efforts to provide support, guidance, and assistance to all nations and institutions seeking to integrate ESD into their educational systems and structures include UNESCO's Education Strategy, launched from 2014 to 2021, and UNESCO's ESD 2030—Towards Achieving the SDG, launched in 2021 (Müller et al., 2021).

　　　With consideration to the many stages of growth that ESD has had since the 90s, the international education community now determines 4 basic thrusts for ESD: improving quality basic education; improving public awareness of sustainability and sustainability challenges; reorienting education to address sustainability; and providing training to many different sectors of society (McKeown and Hopkins, 2005). In terms of how to adopt ESD, most authorities in ESD widely support this be done through an approach known as whole-school sustainability (Bourn et al., 2017). This approach includes simultaneous processes that allow for the values, knowledge, and learning goals specific to ESD to be weaved into every core and non-core subject; that guide schools on how to offer courses specific to learning about and for sustainability issues; and that support making improvements and changes at the operations and administrative levels so schools can perform sustainably (Bourn et al., 2017).

Even though there are still many open discussions and arguments on whether ESD should be referred to as a synonym or as a different framework from education for sustainability, sustainability education or education for the future, there is international consensus on the set of issues, values, pedagogies, dispositions, mechanisms, knowledge, and skills that are specific to ESD. In terms of ideals and values, the consensus is that ESD addresses social equity, justice, and tolerance; environmental stewardship and agency; and quality of life for this generation and the next to come (McKeown and Hopkins, 2005). It is important to highlight that ESD, when adopted and applied in democratic societies, emphasizes calls for direct public participation and includes community-based decision-making processes (McKeown and Hopkins, 2005).

In terms of pedagogies, ESD promotes teaching mechanisms that allow teachers to merge both conceptual and hands-on learning by using multi-method approaches to teaching, ranging from debates to developing projects within or outside the school (Nolet, 2009). Even more so, learning for sustainability positions learners and educators as co-receivers of new knowledge and co-creators of visions, ideas, and wonderings for a more just and equitable future. In this way, the traditional model of teaching marked by the transmission of distilled knowledge from teacher to pupils, to be later evaluated under standardized assessments, is eradicated (Nolet, 2009). Students learning through ESD pedagogies are immersed in problem solving, critical thinking, and participatory learning; consequently, learners are empowered to make informed decisions and to take responsible actions that consider and strive for environmental conservation, a fair society, economic viability, and cultural preservation (Nolet, 2009; UNESCO, 2018). In essence, the knowledge, principles, pedagogies, skills, and

learning mechanisms promoted by ESD are transformational and thus focused at creating lifelong learners.

It is understandable that western societies have primarily struggled with the idea of sustainable development, its conceptualization, and even more its operationalization. Sustainable development does represent an intellectual challenge and even more so accepting with humility that too many of the ways we think and act don't consider others beyond our immediate social and physical contexts. The challenges we face demand that we solve problems that are complex, multi-faceted and multi-dimensional, and not everyone agrees about what are the relevant issues to address in the first place. Learning for sustainability is therefore a frame of mind that grounds our youth within the larger world in which they will have to function as active stewards of life on Earth. By understanding issues in their totality, from their mechanics, causes and consequences, to what is being done to address these issues, I firmly believe that learning for sustainability can act as a unifying, transformative force in education. Through ESD, students of all ages and from any type of educational system are seen as agents of change; and rather than imposing these changes on them, learning for sustainability permits students to critically inquire about the ways they can achieve the individual changes necessary for contributing to a more sustainable future (Bourn et al., 2017). In my own interpretation, ESD represents a holistic and integrating framework that promotes learning about and for economic, political, environmental, social, and cultural sustainability issues (local, regional, and/or global) through formal school curricula and after school programs. Furthermore, ESD welcomes learning activities that are grounded in content that students can

relate to and that they have even experienced or witnessed, thus fostering a unique realization that earned knowledge through schooling can be applicable beyond schoolwork.

Education is often claimed to be the key for solving the many sustainability challenges we face and, thus, central to the complex journey of building the necessary capacities to address the environmental and social justice crises (Bourn et al., 2017). It can also be said that traditional educational systems serve economic and political agendas that stray far from sustainability and consequently the need for reorienting education, including what we teach to pupils, to in-service teachers, and to student teachers, has never been more urgent (Bourn et al., 2017). Nevertheless, we cannot place this responsibility only in education as schools simply cannot alone create all the necessary motivations and changes within people, communities, and governments. Good governance, policy changes, direct civic involvement, participation and commitment by citizens from all working sectors and social groups is also fundamental (McKeown and Hopkins, 2005). For this study, my aim was to focus on how a group of elementary teachers may contribute to this bigger picture of collective organized action and systemic changes required to embed ESD as a key framework for transforming education.

2.3. Training the educator force in ESD

As discussed in the earlier chapter, education is a theoretical partner to sustainable development and sustainability. To ensure this partnership, it is paramount that systems in charge of preparing future and current educators integrate learning for sustainability. While other changes must also be done to properly partner sustainability with education, such as the way students are tested, on what content learners are evaluated, and what is included in official

16

curricula, training the educator force in ESD is crucial. In the following sections I provide an overview of arguments to advance ESD training for pre and in-service teachers from both an international perspective as well as a US one.

2.3.1. Training within the Global Context

It can be said that traditional educational systems serve economic and political agendas that stray very distant from sustainability and consequently the need for reorienting education, including what we teach to pupils, to in-service teachers, and to student teachers, has never been more urgent (Bourn et al., 2017). This reorientation has been claimed as the "priority of priorities" and it calls for preparing the educator force on the strategies, methods, and pedagogies suitable for teaching about and for sustainability during the instruction of core subject matter (McKeown and Hopkins, 2005).

The advancement of sustainability values, attitudes, behaviors, and ways of thinking cannot solely be done through legislation and market-based policy instruments (Andersson et al., 2013). These new norms and fundamental changes within citizens will only be properly cultivated and long-term sustained if education and thus teachers work with sustainability at its core. Furthermore, teachers cannot be requested to lead our students to become the future agents of systemic change if teachers in the first place do not have the skills, knowledge, and desire to instruct through ESD approaches. Teachers have an immense power in shaping our youth's world-views, their consumption patterns and choices; their involvement with their community and in national decision-making processes; their interactions with natural

environments; and their behaviors and attitudes towards others in their immediate and larger community (Andersson et al., 2013).

In order for teachers to perform the vital role of guides for our youth and thus support the changes needed to create a more sustainable society, a full compromise from educational institutions and governments is demanded. Arguments by those in the international education community that advocate for a reform in teacher education have highlighted that in order to reorient education so it can properly address sustainability during formal instruction, profound changes need to happen at the level of programs, practices and policies, along with increased awareness of, knowledge about, and acceptance of the sustainability paradigm by those working in education (Bourn et al., 2017). Moreover, intensive ESD teacher education for both teacher trainers and pre-service teachers, rather than orientation, is necessary in order to overcome the current fragmented approaches used to prepare teachers under ESD (Fien and Maclean, 2000).

The importance of including ESD training for student teachers and practicing teachers has been overly emphasized by international bodies such as UNESCO-UNEP, through international publications of curriculum guidelines and resources, and by scholarly publications that include examples of practice- based research projects and whole-school approaches for successful ESD integration within initial teacher education (Evans et al., 2017). Even more so, the DESD and the GAP specifically advocated for this integration (Evans et al., 2017). However, UNESCO reports that most initiatives to include at least the environmental component of sustainability within teacher preparation have been directed exclusively to the "converted", that is, teacher educators or in-service teachers that already posses a desire for or

have knowledge of sustainability. These efforts have not succeeded in mainstreaming sustainability at a whole- program level and through nationally mandated policies (Bourn et al., 2017). Nevertheless, these efforts do provide examples of good practices and can be used as references by TEPs, education departments, and schools seeking to adopt ESD. Bourn et al. (2017) emphasize that in order to mainstream sustainability into TEPs, a wide-scale adoption of content, processes, and mechanisms specific to teaching about and for sustainability must be accomplished within the pre-service teacher education system.

As denoted in the earlier section of this paper, one of the first thrusts of ESD is access to and retention of students in quality basic education. The availability of teachers and their general quality as instructors are key to this thrust. Efforts made globally to increase access to quality K-12 education have resulted in more students being able to, and wanting to, continue their secondary studies (Hurd and Ormsby, 2020). While this is a key component in a sustainable society, the supply of teachers has become a barrier for ensuring student retention and providing quality education. It is widely reported that in too many countries teachers are paid low salaries and provided with very little support while in-service; they also have to work within poor infrastructural conditions, and few opportunities for career advancement exist (Hurd and Ormsby, 2020). Even more so, research shows that there is an international trend for lowering academic requirements to TEPs, shortening their time for completion, and even the omission of teacher certifications for teaching jobs (Hurd and Ormsby, 2020). These challenges affect teacher enrollment, recruitment, and retention, and ultimately the education that is available to students. Consequently, the vital process of reorienting teacher education for it to integrate at the curriculum and practicum level content and processes specific to ESD

will also result in an increased availability of motivated, supported, and well-prepared educators for our youth.

An important but often ignored reason for the inclusion of ESD into both pre-service and in-service teacher preparation relates to the current trend of making green jobs essential components of economies (Hurd and Ormsby, 2020). Green jobs do not only refer to engineers with the skills to harness energy from the waves or with technologies related for energy conservation or for cleaner transportation. It also refers to the fact that every job, regardless of the field, can be done through more socially, economically, and environmentally friendly and mindful approaches (Hurd and Ormsby, 2020). Nevertheless, this requires that every citizen has a proper understanding and genuine commitment to the sustainability paradigm. It is argued that in order to accomplish this commitment in the current generation of workers, composed by citizens that did not receive sustainability education as part of their K-12 schooling, private companies and governmental institutions must bear the cost of sustainability training (Hurd and Ormsby, 2020). Unfortunately, the reality is that only companies with the financial ability and with an explicit social corporate responsibility actually do so (Hurd and Ormsby, 2020). The obvious answer for creating the new generation of citizens committed to sustainability, as individuals and as workers, is in providing a K-12 education infused by ESD.

Another argument in favor of integrating ESD within the preparation of the educator force is the alignment that exists between ESD as a framework and teacher education as a process. Successful teachers practice critical thinking, seek for opportunities to collaborate with colleagues, adequately balance key traditional teaching practices with innovative instructional approaches, and have strong reflective skills that allow for introspection of their

own teaching practices and of their students' learning (Nolet, 2013). These key traits in educators are concordant with several of the learning goals and teaching practices promoted by ESD, such as collaborative and hands-on learning, and critical and innovative thinking. It is important to highlight that many scholars such as Evans et al. (2017) consider that embedding ESD within teacher education is equivalent to including sustainability issues and current actions and solutions to address these issues within compulsory course content; including opportunities for learning and applying ESD pedagogies; and to adopting sustainability within the practices and policies of teacher education programs. Through this whole-program approach sustainability can be thoroughly and formally evidenced in the learning outcomes required for graduating pre-service teachers and can be later practiced by the in-service educator (Evans et al., 2017).

2.3.2. Training within the US Context

The magnitude and complexity of the challenges that humanity faces today are evidently linked to the ways we think; and the ways we think stem from the ways we have been educated through traditional instructional approaches and standardized content (Nolet, 2009). Moreover, research has amply demonstrated the role that industrialized nations have in economic, social, and environmental sustainability problems. Nolet (2013) calls this a " privileged entitlement" from industrialized areas of the world, which have overuse natural resources, practice polluting and socially unjust economical models, and create ever increasing amounts of non-treatable waste. In 1998, the Department of Economic and Social Affairs of the UN proved that consistently over the last several decades, 20% of the Earth's population living in the wealthiest

nations, including the US, had consumed more than 80% of the planet's nonrenewable resources (Nolet, 2009). To add to the contributions of the US to global sustainability issues, its per-capita production of carbon dioxide ranks second (Nolet, 2009). The evidence that wealthy nations such as the US have primary responsibility for planetary issues, like climate change, which are literally putting our species at risk, is clear, available to all, and becoming a widespread truth amongst the US youth. With these facts at hand, the case for reorienting teacher education within the US, so it can produce sustainability committed educators and provide its youth with the values and aptitudes demanded by the current sustainability crises, is undeniable.

Schools, colleges, and departments of education across the US are reportedly amongst the least active in incorporating sustainability. As detailed by The National Council for Science and the Environment, in 2012 only a dozen institutions of higher education had environmental and sustainability academic programs being offered through one of their schools, colleges, or departments of education (Andersson et al., 2013). Different barriers and challenges are reported by US higher education institutions when attempting to mainstream sustainability within their academic programs, including teacher education. Such barriers include an over-crowded curriculum, limited and in many occasions shrinking budgets, and pressures to generate educators that are capable of teaching within the many realities they will encounter, such as diverse students' learning needs, student language and cultural diversity, limited teaching resources and infrastructures, and even to the socio-economic features of the school's immediate community (Andersson et al., 2013; Nolet, 2009). Interestingly, the realities that future US teachers will have to face include some of the same sustainability issues that ESD

strives to tackle through its promoted content, learning activities, and instructional strategies. It seems only logical to provide ESD training to the educator force in the US. By doing so, teachers will be able to deliver to the youth the 21st century skills that will be critical for them to become active participants of society while also providing academic content through activities that are relevant, engaging, and most likely more conducive to higher academic performance (Andersson et al., 2013; MET, 2000).

Understanding the context of the US K-12 education system, the barriers it experiences, and the inequities that are perpetuated by the system is fundamental, is a fundamental requirement when analyzing the best approaches to reorient education for both pre-service and in-service teachers. Nolet (2013) explains that public schools in the US continue to be operated and structured under models of centralized administrative control from the last century; and that many inequities that existed at the society and economic levels were further preserved through reforms that were later introduced into the education sector. These reforms focused on the concept of efficiency, and thus, by applying them to the education sector, they resulted in standardization of school buildings, of the curricula being used through K-12, of the credentials for certifying teachers, and of the administrative functions (Nolet, 2013).

The inequities created by the standardization of so many components of the US education sector continue to exist up to date (Nolet, 2013). Several examples can illustrate this truth, such as the composition of the teaching force in the US, which is overwhelmingly white, female, middle class, and from suburban areas (Nolet, 2013). These percentages are shocking in consideration to the fact that every year the composition of the student population in the US is increasingly more diverse, in terms of culture, languages spoken, economic status, and

ethnicity (Nolet, 2013). As another example, large segments of the student population in the US that attend public schools are receiving their education in buildings that are in extremely deteriorated conditions and are learning from materials that are outdated and targeted to be learned by memorization (Nolet, 2013). To add to these conditions, those educators that have received the least preparation are the ones that are assigned to instruct at schools located in communities composed mainly of minorities and of low-income families (Nolet, 2013). Other statistics about inequalities created by the current structures within the US public education system include the composition of the schools labeled as "dropout factories", which is mainly Black and Hispanic; that the graduation rate for Black and Hispanic students is only 60%; or that almost 80% or more of Black and Hispanic fourth, 8th, and 12th grade students from public schools are unable to read or unable to perform mathematical problems for their grade level (Nolet, 2009; Nolet, 2013).

In consideration to the previous stated challenges experienced by the US public K-12 system, a much needed evolution of the system is evident. Within this transformative process, the inclusion of ESD training for pre-service and in-service teachers only seems reasonable. Supporters of an all level integration of ESD within US teaching education emphasize that this process does not imply a complete make-over of existing programs. Many of the practices, pedagogies and even content that is already being taught to student teachers can be restructured and delivered under an ESD context (Andersson et al., 2013). Moreover, the skills, knowledge, and teaching approaches promoted by ESD represent multiple points of entry and platforms for addressing many of the current challenges faced by the US teacher education sector (Nolet, 2013). Proponents also claim that the importance of reorienting the way teachers are trained in

24

the US is linked to the country's economic stability, its position as a global leader, and its ability to compete in world markets (Nolet, 2013). This conclusion is made from the logic that the more the US delays its transformation within its teacher education, the more the nation will be stuck with workers with practices and skills deemed of the past millennium; with economic practices and production models that will soon become outdated by more financially efficient ones; and consequently it will be left without the key position to lead forward into a new era of innovative technologies and economies that are aligned with sustainability (Andersson et al., 2013; Nolet, 2013).

While ESD is still becoming a framework to be known, understood, applied, and recognized for its immense value by the US education community, encouraging trends are now visible. Even though they are scarce, considering the vast size of the teaching community in the US, there are current models for integrating ESD into the professional development of US teachers (Andersson et al., 2013). In addition, several of the national efforts that have defined new competencies for US K-12 students have included language relatable to learning about and for sustainability. This is the case of the Common Core State Standards, Next Generation Science Standards, Partnership for 21st Century Skills, and the TASC Model Core Teaching Standards (Council of Chief State School Officers [CCSSO], 2011, as cited in Andersson et al., 2013). Even more importantly, research shows that more educators in the US are recognizing the vital importance of academic instruction weaved with learning about and for sustainability issues, such as climate change (Bourn et al., 2017). One key step towards this recognition is the understanding that the factors that generate inequalities in the US (e.g. classism and racism) also contribute to global issues such as climate change and different forms

of environmental degradation (Bourn et al., 2017). These trends can signalize a slow movement towards a national recognition to reorient US teacher education so aptitudes for teaching under ESD approaches and principles can be mandated as part of the requirements for teacher graduates, as part of the basic professional standards for educators, and as part of the criteria for accrediting teacher preparation programs in the United States (Bourn et al., 2017).

The previous chapters are the foundation and preparatory ground for the study I developed with a group of elementary school teachers from central California. These teachers were willing to explore how learning for sustainability could be integrated into their school's established program of studies through the application of strategies and methods learned through a professional development designed and developed for the study. Through the research conducted with these participants, I sought to better understand the challenges teachers face when attempting to adopt a new framework such as ESD, the resources that would support them best to do so, and the components in a professional development on ESD that would be most effective for preparing the teachers when they embark on creating an integrated lesson on their own.

Chapter 3. Theoretical Framework.

Education for Sustainable Development, the processes for its implementation and the learning goals it promotes, was used as the theoretical framework for this study. In one of the most recent publications on ESD, experts tasked by UNESCO eloquently explained that ESD,

Empowers learners with knowledge, skills, values and attitudes to take informed decisions and make responsible actions for environmental integrity, economic viability and a just society empowering people of all genders, for present and future generations, while respecting cultural diversity. ESD is a lifelong learning process and an integral part of quality education that enhances cognitive, social and emotional and behavioural dimensions of learning. It is holistic and transformational and encompasses learning content and outcomes, pedagogy and the learning environment itself (UNESCO, 2020)

In this section, I will describe the processes and learning principles recognized as key to ESD. To do so, I refer to the work conducted by Tilbury (2011) and Ferreira, J., Ryan, L., & Tilbury, D. (2006) for publications with UNESCO and the Australian Research Institute on Education for Sustainability respectively. Both publications continue to date to be referenced and used as foundational and guiding documents for work on ESD and learning for sustainability.

Processes of collaboration and dialogue (including multi-stakeholder and intercultural dialogue) are considered foundational to ESD as an overarching framework. These processes emphasize that all efforts to bring learning about and for sustainability, in formal and informal education, must seek to establish connections between the different social sectors that are affected by a sustainability issue and those that are contributing with its perpetuation. In

27

addition, processes which engage the 'whole system' are crucial for properly implementing ESD. These processes emphasize the need to focus on the integration of learning about and for sustainability issues within formal curricula; in addition, they also underscore the need to bring sustainability thinking and actioning to all sectors and organizations that support education, including local and regional communities, researchers and universities, ministries and even the private business sector. To add, processes which innovate curriculum as well as teaching and learning experiences should be implemented when adopting the ESD framework. Such innovation implies delivering during formal and informal instruction, learning activities that weave facts and information on the causes, consequences of, and solutions to sustainability issues within core subject matter content. In the same way, lessons should be designed and delivered by teachers through approaches that allow for hands-on, experiential and outdoor learning, that produce opportunities to debate and propose ideas, and to present and defend values and personal positions while students acquire core competencies. Similarly, the implementation of the ESD framework involves processes of active and participatory learning. This type of learning can be achieved through pedagogical approaches that include debates, group discussions, personal reflections, critical reading and writing, learning about a recent critical incident (local or global), problem-based learning, fieldwork and outdoor learning, through case studies, and even through role plays and simulations.

In regard to the learning goals that are foundational to ESD, authors agree that these should be treated as standards to be met in order to ensure that learning about and for sustainability is impactful. Learning to ask critical questions is the first goal. Teachers must make efforts to cultivate in students the habit of questioning the status quo of things–about

why current issues exist; about what was done correctly and incorrectly in the past in relation to current problems; and about what needs to be done differently in the future to avoid creating more sustainability challenges. Critical thinking supports strategic and futures thinking, which in turn can lead students and teachers to develop critical reflective acting. Learning to clarify one's own values is the second ESD goal. It allows students and teachers alike to respectfully present, discuss and defend their individual and community values, which in turn allows for a deeper understanding of each person's concerns and positioning. The next goal is learning to envision more positive and sustainable futures, so students and teachers can question the reasons why specific sustainability issues continue unaddressed and they can envision scenarios where these issues have been solved by proposing pathways to achieve such scenarios. Learning to think systemically as a learning goal seeks to ensure that students see the big picture in an issue and can understand the delicate connections that exist within natural environments along with the dependency that humans have on resources provided by these environments. Therefore, even the smallest individual action can be analyzed; the domino effect that this action has on other individuals and on nature is placed under scrutiny, thus allowing learners to identify what needs to be changed, implemented or stopped altogether in order to avoid negative effects from any and all actions done by humans.

Another ESD goal is promoting learning to respond through applied learning. This goal emphasizes the importance of students being embarked in learning processes that have formal and informal lessons anchored in applicable and relatable content and topics. Furthermore, it invites teachers to design lessons that allow students to actively utilize the knowledge recently acquired, for example, through a project-based activity, a design thinking assignment, or even

the proposal of an idea or innovation for a sustainability issue experienced at the school, community, country or even globally. The last ESD goal is learning to explore the dialectic between tradition and innovation, to allow learners to discuss and analyze the current ways of doing things, in politics, by economic models and by different sectors of society. This learning goal fosters creativity, ideation, and imagination focused on the end result being a new, more sustainable and innovative approach for a current social, political, cultural, or economic model, process or approach. In essence, this goal allows students to redesign traditional ways of doing things which have not produced sustainable and equitable realities, but that are perpetuating social injustices and environmental degradation.

In terms of ideals and values, ESD addresses social equity, justice and tolerance; environmental stewardship and agency; and quality of life for this generation and the next to come (McKeown and Hopkins, 2005). It is important to highlight that ESD, when adopted and applied in democratic societies, calls for direct public participation and includes community-based decision-making processes (McKeown and Hopkins, 2005).

It is agreed by most recognized scholars and experienced ESD practitioners that the framework fosters teaching and learning, within K-12 and higher education formal and informal settings, about and for environmental, societal, and economic issues through learning activities that are designed and implemented with local relevance and cultural alignment (e.g., de Haan et al., 2010; Nolet, 2013). Such issues can include deforestation; climate change; ocean pollution; indigenous rights; gender violence; access to democratic processes; gender inequalities; poverty; lack of access to food/water/waste management; access to quality education; lost of cultural values and customs; consumerism; extractive and destructive

economic models and production processes; loss of biodiversity, and all other issues that create inequalities for people, natural environments, and all living things. As an action-oriented educational framework, ESD cultivates skills, ways of thinking, and behaviors that can help bring an equitable balance to the aforementioned sustainability challenges (Nolet, 2013; Hopkins, 2013).

The unavoidable imperative and impactful nature of the ESD framework provides educators with the possibility to anchor everyday learning with the local context, empowering all members of a learning community to make small or big changes, at home, school, within a community or even globally (Briggs et al, 2018). It offers efficient design and teaching tools that support production of curricula and subject matter lessons that are highly relevant to students and thus engages them on several levels (Nolet, 2013). Such lessons expose them to local and global issues, motivating them to analyze its causes and to propose ways to mitigate these issues; this interest and engagement is achieved by providing an instruction that moves away from the traditional linear progression of textbooks and by structuring formal and informal learning around topics that matter to the students' present and future well-being. It is important to note that because ESD implies actioning and engagement at an individual and collective level in consideration to the wicked problems that are proper to a region or nation, I agree with scholars and practitioners that emphasize that there is no one single recipe on how to implement ESD at every school community of every nation; rather, there are a set of common processes, learning goals, design tools and teaching mechanisms within ESD.

ESD also makes the call for a complete transdisciplinary integration within formal curricula of elementary, secondary and tertiary educational institutions, of information,

concepts, facts and content specific to local, regional and global sustainability issues (Woo et al. 2012; McKeown and Nolet, 2013; Ramsey et al., 1992). The field is not specific to a single discipline as all subjects can contribute pedagogy and content toward getting ESD properly embedded throughout a curriculum (McKeown and Nolet, 2013).

ESD also promotes that in-school lessons contemplate the realities of learners and of the immediate school community while the principles that underpin sustainable development become integrated and thus examined, debated, and contextually applied (Nolet, 2009). Even more so, learning for sustainability positions learners and educators as co-receivers of new knowledge and co-creators of visions, ideas, and wonderings about what it would take to foster a more just and equitable future. In this way, the traditional model of teaching marked by the transmission of distilled knowledge from teacher to pupils, to be later evaluated under standardized assessments, is eradicated (Nolet, 2009). Students learning through ESD pedagogies are immersed in problem solving, critical thinking, and participatory learning; consequently, learners are empowered to make informed decisions and to take responsible actions that consider and strive for environmental conservation, a fair society, economic viability, and cultural preservation (Nolet, 2009; UNESCO, 2018). In essence, the knowledge, principles, pedagogies, skills, and learning mechanisms promoted by ESD are transformational and thus focused at creating lifelong learners.

Specific to the teaching approaches and pedagogies promoted by ESD, experts agree that these are not mutually exclusive but complementary practices (Evans et al., 2017). ESD teaching strategies are considered to be social constructivists approaches, were learning activities are guided by the teacher and centered on the student and thus are conducive for

group, cooperative, and inquiry-based learning (Drewes et al., 2018; Evans et al., 2017) As such, ESD pedagogies are based on constructivist learning theories such as Vygotsky and Dewey; and consequently they prioritize thinking, questioning, valuing, sharing, and actioning amongst the students (Evans et al., 2017). In essence, ESD teaching approaches promote exploratory and transformative learning. Rauch and Steiner (2013) emphasize that teachers need to understand that ESD pedagogies should always inspire optimism and a sense of possibility, rather than just presenting facts on the consequences of sustainability issues. Under the premise of sustainable development and the idea that it allows humans to envision new ways for existing respectfully with one another and with natural environments, it is possible to convey complex facts by giving students a sense that issues can be managed when using ESD pedagogies (Rauch and Steiner, 2013). This is key so learning about and for sustainability is meaningful and anchored, but also cultivates our youth's optimism about the future.

ESD pedagogies described by different authors include critical pedagogies such as action-oriented learning, critical reflective practices, and problem/issue-based inquiry (Bourn et al., 2017; Evans et al., 2017; USTESDNetwork, 2013). They also include experiential learning approaches such as outdoor or nature-based learning; responsible environmental behavior; and place-based education (Drewes et al., 2018). Systems thinking and innovative and creative thinking to ideate, propose, and imagine solutions, scenarios, and actions to tackle an issue or simply for the betterment of society are also detailed as part of the pedagogies used to teach under ESD (Sterling, 2003, as cited in Evans et al., 2017; Rauch and Steiner, 2013). In addition, collaborative pedagogies that encourage cooperation and sharing of knowledge, skills, and perspectives through group work, along with community based learning to allow

students to undertake action research and become involved with issues that are relevant to their local community are considered ESD teaching strategies (Ferreira et al., 2006; USTESDNetwork, 2013). Transdisciplinary approaches, to allow teachers to apply methodology and language from more than one discipline, are also considered a key teaching strategy to deliver ESD shaped lessons (Bourn et al., 2017). While it is not described as an ESD pedagogy, progressive forms of assessment is emphasized by the US Teacher Education for Sustainable Development Network as a key element that must accompany ESD teaching strategies. This organization argues that this is because when learning about and for sustainability students must demonstrate understanding of complex ideas and processes (USTESDNetwork, 2013).

To conclude this section on the theoretical framework used for this study, through figure 1 I provide a summary of the recommendations provided by several experts regarding the design considerations for professional development in ESD for in-service teachers. These recommendations include the content that should be discussed during sessions within a PD on ESD; the key understandings that the PD should ensure participants achieve upon completion of the PD; and the key practices and strategies that should be taught to the participants as part of the PD as described by McKeown and Hopkins (2005), Nolet (2009), USTESDNetwork (2013), UNESCO (2018). The below design recommendations guided the structure and content of the PD that I delivered to the participants.
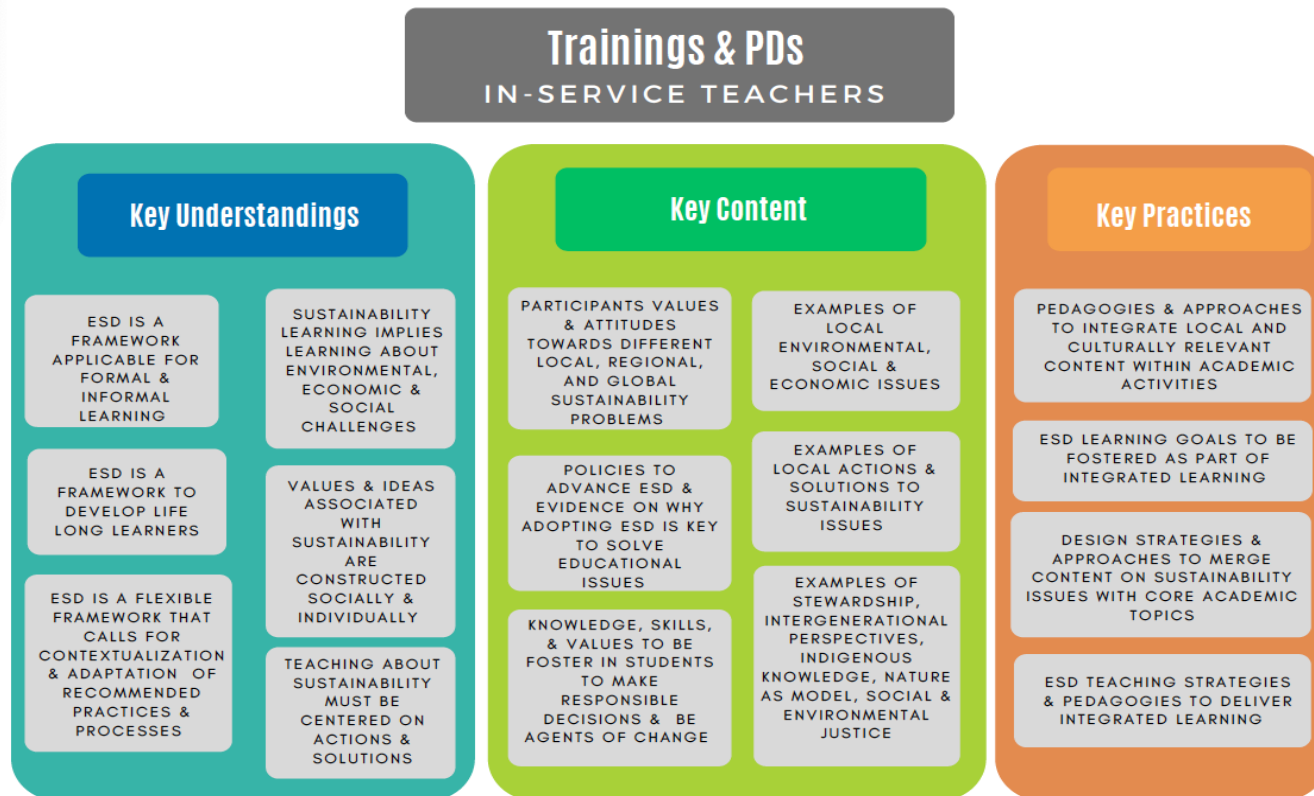
Trainings & PDs
IN-SERVICE TEACHERS

Key Understandings

ESD IS A FRAMEWORK APPLICABLE FOR FORMAL & INFORMAL LEARNING

SUSTAINABILITY LEARNING IMPLIES LEARNING ABOUT ENVIRONMENTAL, ECONOMIC & SOCIAL CHALLENGES

ESD IS A FRAMEWORK TO DEVELOP LIFE LONG LEARNERS

VALUES & IDEAS ASSOCIATED WITH SUSTAINABILITY ARE CONSTRUCTED SOCIALLY & INDIVIDUALLY

ESD IS A FLEXIBLE FRAMEWORK THAT CALLS FOR CONTEXTUALIZATION & ADAPTATION OF RECOMMENDED PRACTICES & PROCESSES

TEACHING ABOUT SUSTAINABILITY MUST BE CENTERED ON ACTIONS & SOLUTIONS

Key Content

PARTICIPANTS VALUES & ATTITUDES TOWARDS DIFFERENT LOCAL, REGIONAL, AND GLOBAL SUSTAINABILITY PROBLEMS

EXAMPLES OF LOCAL ENVIRONMENTAL, SOCIAL & ECONOMIC ISSUES

POLICIES TO ADVANCE ESD & EVIDENCE ON WHY ADOPTING ESD IS KEY TO SOLVE EDUCATIONAL ISSUES

EXAMPLES OF LOCAL ACTIONS & SOLUTIONS TO SUSTAINABILITY ISSUES

KNOWLEDGE, SKILLS, & VALUES TO BE FOSTER IN STUDENTS TO MAKE RESPONSIBLE DECISIONS & BE AGENTS OF CHANGE

EXAMPLES OF STEWARDSHIP, INTERGENERATIONAL PERSPECTIVES, INDIGENOUS KNOWLEDGE, NATURE AS MODEL, SOCIAL & ENVIRONMENTAL JUSTICE

Key Practices

PEDAGOGIES & APPROACHES TO INTEGRATE LOCAL AND CULTURALLY RELEVANT CONTENT WITHIN ACADEMIC ACTIVITIES

ESD LEARNING GOALS TO BE FOSTERED AS PART OF INTEGRATED LEARNING

DESIGN STRATEGIES & APPROACHES TO MERGE CONTENT ON SUSTAINABILITY ISSUES WITH CORE ACADEMIC TOPICS

ESD TEACHING STRATEGIES & PEDAGOGIES TO DELIVER INTEGRATED LEARNING

Figure #1. Framework for trainings to in-service teachers on ESD

Chapter 4. Methodology

4.1. Study Context

The study was conducted with Hawks Elementary[1] (HE), which is located near my university, hereon referred to as HE school. The school services 349 students from grades K to 6th and has a total of 17 teachers supporting these grades. HE serves a diverse population in terms of ethnic and socioeconomic backgrounds, which implies that students often join the school with academic needs such as learning English as a second language. In addition, the school's principal shared how the school's population consists of an important percentage of students from lower-income households. These characteristics of the student population as learners and of their families have to be taken into account by the school's administration and education team when designing and delivering the different academic programs and lessons. ESD as a framework that calls for an education that is contextualized to a school's cultural and socioeconomic features and to the population served, can thus provide great support to HE.

HE follows the International Baccalaureate (IB) framework, which provides the teachers with a program of inquiry composed of four key elements: theme, central idea, lines of inquiry, and key concepts. The program has six themes, and for each theme, there is one central idea, three to four lines of inquiry, and three key concepts. The themes are thus developed through lessons that follow under the central idea and that are designed along the lines of inquiry while covering the key concepts. The themes that guide school activities throughout the year are: *who are we; how we organize ourselves; where we are in place and*

---

[1] Pseudonym to protect participants' identities.

time; sharing the planet; how we express ourselves; and *how the world works*. In order for the participating teachers to successfully design lessons that instruct about subject matter and that are built in alignment with the program of inquiry, HE has an appointed IB coordinator.

In terms of other important considerations about HE, the school has a long-standing relationship with our university. Over the past 13 years, the school has welcomed researchers and students from our institution and has been working with the interdisciplinary literacy program Community Based Literacies (CBL) since 2016. The herein study was presented on fall 2022 to HE's leadership as part of the research study titled "Community-Based Literacies for the 21st Century" approved by our Office of Research (protocol # 5-22-0374). During September of 2022, I met with HE's principal and IB coordinator, supported by our department's outreach liaison with HE, to discuss my study. HE's leadership received a document prior to this meeting that explained the following about the proposed study:

The design tools and methods provided by ESD support teachers in the creation of learning processes where academic standards are fulfilled, grade competencies and skills are acquired, and knowledge about and for sustainability issues is earned. Furthermore, ESD provides teachers with mechanisms for designing meaningful, place-based literacy practices that are used to actively address a local or global sustainability problem. One key stewardship issue is climate change, which is a global threat that is weighing heavily on younger generations who are increasingly expressing a desire to become active agents in mitigating environmental impacts.

Similar to previous years, our CBL team aims to work with participating fourth grade classrooms and their teachers in a few neighborhood problems (e.g., plastic consumption and

ocean dumping) that reflects a national sustainability issue. Engagement in such place-based, real-world issues will garner committed interest that will have relevance to key core disciplinary standards and literacy skills. In such CBL-related activities, students are placed at the center of the learning process, shifting teachers from the traditional position of deliverer of information to facilitative guides and, in the true spirit of CBL, co-learning models of new information. Our proposal to add ESD as a key component of CBL programming is supported by previous research presented at the 2020 International Conference on Sustainable Development, which suggested greater benefits for teachers in developing transdisciplinary lessons and addressing core literacy standards.

During the meeting with HE's leadership, the IB coordinator offered to present the proposed study to the teachers; upon that presentation, four teachers confirmed their participation in the study.

In terms of the culture and educational mission of HE, its principal described that a main goal is to deliver action-oriented education to its students where *action is the glue that binds every type of learning done*. I was also familiarized with the school's learning culture as I visited the campus weekly during the 2022-2023 school year as part of my work as a graduate research assistant. In addition, the participants described the school's mission and learning culture during the PD, co-design sessions, and focus group. The descriptions provided by the participants regarding the school's learning culture include:

• School language with similar wording as stated in ESD learning goals.

- Agency and action are encouraged/forefront of school practices, promoted across all grade levels.

- Action-approach is encouraged and celebrated.

- Graduation requirement from the IB program from 6th grade includes an action-oriented capstone (research) project.

- Critical thinking is not a learning goal that is directly fostered as part of the learning culture.

4.2. Researcher Positionality

When I developed this study, I had completed close to 15 years of international work with schools in the integration of learning about and for sustainability within formal classroom instruction. I had also completed six years of graduate studies, three specific to the doctoral program for which this study was conducted. Consequently, when I began my work with the participants I had a strong conviction that ESD and teaching for sustainability through action oriented lessons is crucial for transforming education systems. Mainly, at that point I had witnessed many successful cases in which ESD had empowered students, teachers, and communities and therefore had worked as a guide for many teachers and school administrators. Therefore, before launching the first phase of the study I recognized the importance of separating my role as a researcher from my strong belief that ESD should be used as one of the tools to give students what they need to address the issues they will face as young adults. This realization and commitment was important to avoid presenting information to the participants in any way that could lead them into doing what I thought as an ESD practitioner, but instead

to allow the participants to organically implement what they learned through the study without any direct influence from me.

Before starting my study, I had conducted work at HE as a graduate assistant during two academic quarters. This work involved the study's participants that taught fourth grade and their students. Through this work I became very familiar with HE's physical spaces, its general learning culture, and its leadership team. As I had this familiarity, I was mindful to have an unbiased neutral position while I developed the study, mainly when working with the participants that taught fourth grade. Throughout the study, I assumed two main roles. First, I was a silent observer, specifically when I visited the fourth and fifth grade classrooms. Second, I was a sustainability education coach, when I delivered the PD and when I held meetings with the participants during which they co-designed an integrated lesson plan. When I assumed the role of a sustainability education coach I was mindful that all my recommendations were grounded in evidence-based information specific to the ESD framework and learning about and for sustainability. I was also careful that I did not provide recommendations that hinted that these were my opinions. In addition, I allowed the participants to provide their interpretations of what I had explained or taught and emphasized on adapting everything being taught to their own classroom's realities and in consideration to the challenges they face day to day.

4.3. Participants

Two fourth grade and two fifth grade teachers consented to participate in this study, which was offered through HE's leadership to the entire teaching staff. At the time of the study, the fourth grade teachers, from now on identified as participant A and participant B, were beginning their second year as educators. One of the fifth grade teachers, from now on identified as participant C, had previously taught literacy to lower grades for two years and was beginning her first year with fifth grade students. The second fifth grade teacher has more than five years of teaching experience, from now on identified as participant D.

All participants were provided with a consent form (see Appendix D) and met once with I prior to the beginning of the study to revise the schedule of activities proposed in the study and provide answers to any questions they had. During this meeting the participants also received access to an online survey to collect the participant's baseline knowledge on sustainability and ESD.

4.4. Data Sources

The sources of data that were gathered for my study are detailed in table 1.

Type of Data Source	Actor(s) reflected	Number/Duration
Online questionnaire	Participants A,B,C,D	10 questions
Field notes on HE	Social spaces & fourth & fifth grade classroom space	10 different days during which I visited HE for 2-4 hours
Field notes on classroom instruction	fourth & fifth grade students Participants A,B,C,D	Four 1-1.5 hour classroom observations for each participant
Recordings of observed classroom instruction	fourth & fifth grade students Participants A,B,C,D	Four 1-1.5 hour classroom observations for each participant
Recordings of one on one interviews	Participants A,B,C,D	1 hour recording for each participant's interview
Recording of focus group	Participants A,B,C,D, IB coordinator	1.5 hour recording
Recording of PD sessions	Participants A,B,C,D, IB coordinator	2.5 hour recording for each of the three PD sessions
Recordings of co-design sessions	Participants A,B	Two 1.5 hour sessions
Recording of co-design sessions	Participants C,D	One 1 hour virtual session and one 1 hour in-person session

Table 1. Data sources used for the study

The initial baseline data was gathered through a questionnaire that contained the following questions:

- Tell me about your experience as a teacher thus far. What have been the highlights?

- Tell me about your experience as a teacher thus far. What have been challenges?

- Based on your knowledge and experience, what does the concept of sustainability mean to you?

- In what ways does sustainability relate to your professional life?

- In what ways does sustainability relate to your personal life?

- Explain how your students are exposed during your classes to information on the causes and consequences of different sustainability issues.

- Explain how your students are exposed during your classes to information on current projects, efforts or solutions to address specific sustainability issues.

- Related to all the training and preparation you received about causes, consequences, and/or solutions to sustainability problems. How much training did you receive in your pre-service teaching program?

- Related to all the training and preparation you received about causes, consequences, and/or solutions to sustainability problems. How much training have you received as an in-service teacher?

- What support do you hope to receive as a result of our work in methods to integrate sustainability learning into your lessons?

4.5. Study Procedures

The study was conducted from October 2022 through June 2023. This time period coincided with HE 2022-2023 academic year. Table 2 details the dates for each phase of the study.

Phase	Description	Date
Phase A	**Scheduling and in-take survey**	
Phase A. Step 1	Meet participants to explain study stage's, time expectations, activities, and thank them for their participation.	10-26-2022
Phase A. Step 2	Distribute consent form and collect signed forms.	11-1 to 5-2022
Stage A. Step 3	Distribute online in-take questionnaire and collect answers.	11-8 to 11-18-2022
Phase B	**In-class observations of non-integrated lessons**	
Phase B. Step 1	Observe for each participant two classes developed for non-integrated lessons.	2-12 to 12-16-2022 1-9 to 1-11-2023
Phase C	**Professional development on ESD and integrated learning**	
Phase C. Step 1	Session 1 of professional development	1-12-2023
Phase C. Step 2	Session 2 of professional development	1-19-2023
Phase C. Step 3	Session 3 of professional development	1-26-2023
Phase D	**Co-design sessions**	
Phase D. Step 1	Two in-person meetings with the fourth grade teachers. One virtual meeting and one in-person meeting to co-design integrated lessons for the Science unit with the fifth grade teachers. Lessons for the fourth grade Science unit were co-designed between the researcher, participant A, and participant B; while lessons for the fifth grade Science unit were co-designed between the researcher, participant C, and participant D.	2-2023 to 3-2023
Phase E	**In-class observations of integrated lessons**	
Phase E. Step 1	Observation of two co-designed integrated lessons for each participant.	5-15 to 6-7-2023
Phase F	**Focus group and one-on-one interviews**	
Phase F. Step 1	One focus group and one 60 minute interview with each participant.	5-22 to 6-2-2023

Table 2. Structure and timeline of research study

As detailed in table 2, the study was conducted through six defined phases to collect the data necessary to answer the proposed research question. These phases and the steps within each are described in the following subsections.

Phase A, Introductions

During phase A, I met with the participants to introduce themselves; revise the time expectations; what they could expect from their involvement; the study's research question; and to receive the study's consent form. After completion of this meeting, the participants received a digital copy of the study consent form to be signed and returned to the researcher. The study consent form is found in Appendix D.

Phase B, Observations

During phase B of the study, I observed two class sessions for each participant. Each observation was done within three weeks of each other and during different days and times. Activities for Language Arts, Mathematics, and test prep were developed throughout all the observed classes. The activities were designed by the participants in previous years and improved during months prior to the first stage of the study. These activities were created as part of non-integrated lessons focused on covering mandated topics for Language Arts and Mathematics to be evaluated in the state's standardized assessments known as CAASPP.

Phase C, PD Sessions

During phase C of the study, I conducted a PD on ESD through three two-hour sessions. Sessions were conducted during after school hours throughout three consecutive weeks. The IB coordinator attended the sessions for varied time lengths. All participants attended each session.

The delivery of each session was conducted through a format that allowed me to introduce information while simultaneously providing the participants with space to ask questions and make comments. I emphasized that comments, questions, and insights about the introduced content were welcomed and encouraged. Such a structure permitted collection of valuable data regarding participant's professional views of the efficacy of introduced tools, methods, and strategies; as well as their opinions on whether the structure of the sessions was effective for preparing inexperienced educators in how to create their own integrated lessons. The structure, content, and learning objectives for each session are described below.

The content that was discussed during each session is included in Appendix C, which includes the slides that were used along with the description of what was discussed for each slide and during each of the three sessions. Figure 2 details the architecture of the PD and provides a summary of the content that was covered in each session. It is important to clarify that the PD and what I discussed and covered in each session included the key understandings, key concepts, and key practices detailed in figure 1 presented in the theoretical framework section.

SESSION 1

Review of participants' confidential answers on their understanding of sustainability ····▶ Concept of sustainability: interpretations & agreed definitions ····▶ 3 pillars of sustainability and examples of economic, environmental, social issues ····▶ Teacher-led discussion of local economic, environmental, social issues ····▶ Sustainable development: what it entails as a social process

ESD Learning Goals: what each goal fosters, how to meet each goal, examples of lessons that foster each goal ◀···· ESD Learning Goals: introduction & its applications in formal learning ◀···· ESD as an educational framework: key outcomes sought & implementations within formal learning ◀···· Evidence-based benefits of teaching under ESD ◀···· ESD: connection to SD, history & evolution

SESSION 2

ESD Teaching Strategies: how to use each ····▶ ESD Teaching Strategies: revision of lessons that use an ESD teaching strategy ····▶ Integrated Lessons: its academic value & general structure ····▶ SI.A.S Method: introduction, value & application for integrated lessons ····▶ SI.A.S Method: how to develop the SI step

Teacher-led discussion on the SI.A.S method: applicability to their needs & realities ◀···· Teacher-led edition of a 5th grade integrated lesson plan built with the SI.A.S method ◀···· Introduction to a 5th grade integrated lesson plan built with the SI.A.S method ◀···· SI.A.S Method: how to develop the S step ◀···· SI.A.S Method: how to develop the A step

SESSION 3

Practice session to build an integrated lesson with SI.A.S ····▶ SI step: selection of issue & gathering teaching resources ····▶ A step: selection of academic topic, type of lesson (1 subject vs transdisciplinary) ····▶ S step: creation of integrated & non-activities in alignment with CCSS & ESD goals ····▶ Teaching for climate change & ESD teaching resources & databases

Figure 2. Structure and summarized content included in each session of the implemented PD

Phase D: Adjustments to Scheduling

This stage was not in my original study plan. My initial focus was to deliver a PD on ESD and then evaluate the participant's intake of the content, methods, strategies, and processes taught during the PD. I planned on doing this by observing integrated lessons the participants were meant to design by themselves. In early January 2023, a couple of weeks after the PD, the participants shared that because of standardized testing they could not see how or when they would find the time to build an integrated lesson plan or even a short activity. Due to this realization, the participants and I decided to change the approach for building an integrated lesson. We agreed that I would support them such as a TOSA (teacher on a special assignment) or as a sustainability education coach would do. This implied that when the two participants for each grade met to plan their lesson, I would join them to guide but not direct their process. In practice, this unfolded with me asking questions to prompt their design process, such as asking them to revise the first steps in the SI.A.S method to identify the subject matter topics they would integrate with a sustainability issue. I also listened to them as they selected the sustainability issue and allowed them to make that final decision by using the strategies taught in the PD. My involvement in the co-design sessions did include that I gathered resources they could use as part of their lesson plan, such as lists of videos, readings, and illustrations. Nevertheless, the participants made the final decision on which resources to use, to ensure that they were practicing how to make these decisions by adhering to the strategies taught in the PD. In addition, the final structure of the lesson plan was defined by the participants, meaning the teaching strategies to be used and how the learning activities were organized was decided by them.

Meetings with the participants that taught fourth grade were held once through a virtual session and twice in-person at HE. During the first meeting, the participants explained that the lesson plan needed to be for the Science unit meant to be covered during the last academic trimester. They also decided that the lesson plan needed to be transdisciplinary and thus include contents from Language Arts and Mathematics. Their decision was made mainly because the fourth grade students required more support to strengthen their understanding of foundational grade level Mathematics concepts. The participants also shared that due to a wide range of abilities and levels in written and spoken English, the integrated lesson needed to include activities to practice several Language Arts topics. Through the three meetings, I guided the participants in a co-design process of a five-week integrated lesson anchored on the topic of natural resources with climate change weaved into it. The complete lesson is included as appendix 13. During each week, the lesson was developed through three 40-minute periods. The general distribution of topics across each week is detailed below:

- Week one:

  - One period to introduce action for climate change through a provocation activity.

  - Two periods to introduce and cover the foundational content on natural resources.

- Week two:

  - One period to finalize covering the topic of natural resources.

  - Two periods to introduce and cover the foundational content on natural environments.

- Week three:

  - Two periods to finalize the topic of natural environments.

  - One period to introduce the concept of sustainability.

- Week four:

  - One period to cover content on climate change, its mechanics, causes, consequences.

  - One period to present solutions, actions, and efforts to tackle the causes of climate change.

  - One period for writing ideas on how to help to tackle causes of climate change.

- Week five:

  - Two periods to finalize the opinion writing piece and produce a visual presentation of the proposed idea.

  - One period to screen the presentation and discuss the idea with the class and guests (teachers, researcher, IB coordinator).

    With the participants that teach fifth grade, I also met once through a virtual session and twice in-person at HE. These participants decided to focus their lesson plan exclusively in Science, on the topic of natural environments and interactions within these, with the issue of climate change weaved in it. More importantly, the participants decided to use a lesson plan that they had implemented in previous years, a lesson that they purchased through a website that sells lesson plans created by teachers. The participants had used this lesson plan before, but wanted my advice on how to contextualize it to California and mostly to Santa Barbara. I ensured that during the meetings to revise this lesson plan, the participants could visualize how

to adjust the lesson plan by using what they learned in the PD. The resulting suggested editions were revised during a subsequent meeting and the participants accepted those revisions that they considered as suitable for their students and learning goals. The co-design process for this purchased lesson plan focused on making editions to:

1. Integrate learning about and for climate change.

2. Change key content so students could learn about the kelp forest as an example of a local endangered environment instead of Yellowstone. The lesson plan was edited to be developed in 4 Science periods of thirty minutes across approximately three weeks. The final lesson, as provided to the participants upon their design process, is included as Appendix C. The general distribution of topics across each week is detailed below:

The participants that teach fifth grade decided that in addition to the edited lesson on natural environments, they wanted to co-create a shorter transdisciplinary two period lesson Reading, Writing, and Science topics. This lesson focused on introducing the students to a series of actions and efforts from across the world to tackle different sustainability issues, while fostering their reading and writing skills centered in conducting research. This lesson, as provided to the participants, is included as Appendix C. The general distribution is described as follows:

• Period One:

  • Acting for our Planet Film Festival, which included a series of short videos focused on five sustainability issues, affecting Santa Barbara, California, and the world.

  • Students complete a video guide.

- Period Two:

  - Students practice reading strategies for STAR test by reading three articles related to a common theme under the umbrella of actions and solutions to address one of the sustainability issues showcased during the Film Festival.

- Period Three:

  - Students practice writing strategies by producing an opinion essay related to the three articles read earlier.

  - Students investigate a social or environmental issue by using a provided research guide.

Phase E, Post PD Observations

In the next stage of the research period, I conducted two observations of a class period during which each participant developed part of their co-designed lesson plan. Consequently, I observed two lessons for each participant across three weeks.

Phase F, Final Focus Group

In the last stage of the research period, I conducted a 90-minute focus group with the four participants. In the four following weeks, I conducted a 60-minute one-on-one interview with each participant. During this discussion, I asked participants about their views on the applicability of the different sessions and content taught through the PD, how useful was the time we devoted to co-design the integrated lesson, what other resources they would need to help them move forward with an integrated lesson in the future, and the types of challenges

they experience when they attempted to design the integrated alone and they could foresee if they wanted to design such a lesson in the future. The interview protocol is included in Appendix D.

4.6. Analytic Framework

In this section, I will discuss how I used critical ethnography as the guiding methodology for the study. Critical ethnography is understood as a qualitative research method concerned with the inquiry of features from social life that cannot be quantifiable (Carspecken, 1996). Most importantly, this line of research focuses on social inequalities and attempts to clarify how and where forms of oppression happen and thus it is used by those interested in creating positive social change. Carspecken (1996) and Barton (2001) claim that critical ethnography is a methodology suitable for conducting research focused on social justice, empowerment, and participatory critique. It is therefore a methodological framework that provides the research with tools to conduct empirical research to expose, criticize, and transform the unequal conditions and factors that are associated with social structures and labeling devices such as gender, class, and race (Barton, 2001).

The tools that critical ethnography provides enable for inequalities to be examined and mutated, under the perspective and with direct participation from those suffering inequalities and forms of oppression (Barton, 2001). In educational research, these examinations include uncovering the many hegemonic practices that happen and that are normalized within the classroom or a nation's school culture. Consequently, through critical ethnography, unfair treatments that are part of a school system can be documented and avenues for empowering

oppressed sectors of student populations can be generated by embracing the histories, cultures, and even epistemologies of these students (Barton, 2001).

In relation to my study, critical ethnography was elected as the methodological framework under the understanding that the lack of ESD adoption at schools, particularly ones serving students that come from marginalized communities and lower income households such as HA, is indeed a form of systemic oppression. As explained earlier in this paper, marginalized communities are first to suffer the consequences from sustainability issues, including climate change. Furthermore, if the lack of ESD adoption stems from lack of teacher training on the type of content and the approaches that are suitable to efficiently teach about and for sustainability issues, then critical ethnography presents as the best methodology to understand why HE teachers are not prepared to teach about and for sustainability; what benefits are consequential from teachers being trained under the ESD framework; what barriers within and outside HE exist that impede teachers from teaching about and for sustainability even when trained under ESD; and what resources do exist that help them teach under ESD. Having answers to the aforementioned questions, along with understanding what components of an ESD training are most efficiently implemented by teachers that work within a traditional school structure, can help inform current and future efforts to improve teacher education programs and professional development efforts for in-service teachers. Such an improvement would include high quality preparation on the teaching strategies, design tools and content that is conducive for providing our youth with the skills and knowledge needed to face and address the environmental and social crises that have been created by the current adult generation.

Stages of critical ethnography and its applications in the proposed study

The process for applying critical ethnography is composed of a preliminary design stage and five distinct stages. These stages were applied as described by Carspecken (1996) to answer the study's research question. I provide in the following sections a description of how each stage was implemented during the data analysis stage.

Preliminary stage

This stage included building a list of specific items for examination and clarifying my own biases and values. The items that were examined included obtaining information on social routines that happen within the researched site; the distribution of such routines; the constraints and resources that affected social routines; and the cultural forms associated with such social routines. To obtain data on these items, I spent a significant time at HE Elementary during different days, months, and times of the day as an associate professor teaching and graduate research assistant during 3 different academic quarters.

As an additional step of the preliminary stage of critical ethnography, I also explored my own value orientations to identify potential biases that could influence the study's development and this thesis. By doing so, those reading this report will be able to see beyond the biases that could have influenced the analysis of findings and thus questioning of my findings can be welcomed. To support the exploration of my values before the beginning of the study, I met during several occasions with my supervisor, whom questioned me on the things I wanted or expected to find from the study and clarified that these should not cloud my decisions throughout the research.

55

Stage one: gathering data sources through 'intense' observations, thick notes, field recording, and passive observations

Stage one began with the production of a primary record and a field journal through passive observation during different days and months of classes instructed by each participant. My primary record was composed of thick notes and intense observations (Carspecken, 1996) or detailed descriptions of what was observed in each class period that I visited. To add to those observations, I also audio recorded these class visits which allowed me to generate a transcript of the conversations. A field journal was also gathered and it was composed of not too detailed recordings of events that occurred in spaces that are part of HE Elementary. Observations and the field journal were taken by hand. Appendix A includes all the audio recordings for the class observations done for each participant.

Passive observation was a key component of stage one, which allowed me to generate a detailed and thorough primary record. As recommended by Carspecken, the method of priority observation was used for observations. This method implied that I focused on one person, usually a student, involved in an interaction and everything that the person did and said was recorded as detailed as possible. The comments and actions from others involved were also recorded, but only as second priority; as a third priority, were the recordings of anything else that was happening in a specific setting or interaction. Approximately every five minutes, I switched to a new priority person in order to begin a new focused observation. Whenever something relevant happened with a second priority, this was thickly recorded, but I always returned to the first priority and completed the observation with the first priority student. As I was observing interactions happening within a classroom where there were many students, I

randomly selected students for observations. When I had interest in a smaller subgroup within the main group of students, then I applied the method of priority observation to the students within that subgroup. I conducted priority observations first on all acts of speed, body postures and body movements; once these notes were produced, I conducted priority observations focused on one category of behavior (e.g. I began with only facial gestures, then switched to intonation patterns, and then focus on body postures and movements). To support the notes taken through observations, I also recorded with my phone and then transcribed

Thick notes for the primary record were taken in third person and with abundant details. I did not become engaged in discussions or dialogues with the students that interacted in the visited classrooms. This meant that there were selected periods of intensive observation to generate thick notes, which served me later as an anchor for inferences made on less thickly gathered notes (those specific to the field journal). "Very thick" notes were gathered on certain observations, which were done while I also recorded the interactions with my smartphone.

Thick notes were produced by adhering to the following recommendations provided by Carspecken,

• I began thick notes with the context information- the time of arrival to the classroom and other comments specific to the situation that was observed (e.g., specific number of students in the class or comments made by a relevant person on the way to the classroom).

• All speech acts, body movements and body postures were described and noted.

• I used low-inference vocabulary when taking notes, focusing on taking verbatim notes and indicating intonations, body postures and movements; using "as if" expressions when finding

57

it difficult to make a note that was free from a subtle subjective or normative-evaluative reference.

- I used terms such as "as if, "appears to be", "it seems" when the person being observed has made a normative or subjective inference.

- I recorded the time for segments of interactions between observed students.

- I used the code "OC" to insert conjectures or educated guesses about the meaning of a specific interaction that was observed.

- I put in italics all verbatim speech acts.

- I made a typed record for each day of notes.

For compiling an appropriate thick record, I also conducted observations for no longer than two hours and conducted observations at different times of the day, during different days , and during two trimesters. In addition, the first observations were done as thickly as possible to sharpen my awareness of events or actions that could have been part of daily routines.

In addition to class observations, I held a six-hour PD event developed through three afternoons at the end of the first academic semester. After the PD and during the course of the second semester, I also met with each grade pair of participants to co-design an integrated lesson plan for a science unit, which was requested by the participants and not initially included in my observation plan. I also held a focus group with the four participants at the end of the school year and conducted a one-on-one interview with each participant also at the end of the school year. Therefore, in addition to class observations, my primary record also included the following:

- audio transcripts of the meetings held with the participants that taught fourth grade (Appendix E)

- audio transcripts of the meetings held with the participants that taught fifth grade (Appendix E)

- audio transcripts of the focus group (Appendix E)

- audio transcripts of the one-on-one meetings with participant A, B, C, and D (Appendix E)

- audio transcripts of the three sessions held for the PD (Appendix E)

In regard to the field journal which was complementary to the primary record, I selected time periods and settings different from those observed for creating the thick notes. The selected settings were related to the main setting (the classrooms of the participating teachers.

The data collection during stage one was done in alignment with Carspecken recommendations to comply with validity and also to have an adequate data set. This implied that I collected data on the explicit and implicit learnings that happened during formal instruction of a non-integrated lesson that the participants built prior to the PD event; and also on the explicit and implicit learnings that happened during formal instruction when the participants instructed the co-designed lesson plan. In addition, during the data collection, I made objective claims on actions, activities or lessons consequential to integrated lessons; on observed interactions between a participant and her students during and after an integrated lesson was delivered; and on observed interactions between the students and their reactions towards the information they received on a sustainability issue (learning about an issue) and about the current actions to address that issue (learning for sustainability). I also made objective

claims on the elements and content learned through the PD that the participants implemented and also that they did not implement during our co-design sessions; and on the reasons why the participants did not use an element or content learned through the PD during the instruction of the co-designed integrated lesson. To add, I identified tacit acknowledgments made by participants pertaining to the usability of strategies learned during the PD; and the usability of strategies learned during PDs provided by the district and their school leadership. I also made tacit acknowledgments pertaining to the challenges participants face when attempting to deliver educational activities shaped by ESD. Similarly, as I collected data I identified explicit acknowledgments made by participants pertaining to the usability of strategies learned during the PD I provided; and pertaining to the usability of strategies learned during PDs provided by the district and their school leadership.

Stage two. Preliminary reconstructive analysis

Preliminary reconstructive analysis is the second stage of critical ethnography and therefore the next stage I implemented to analyze my data. Stage two began with making speculations about the meanings of the interactions that were observed and recorded during the initial stage. I employed a series of methods to reconstruct the tacit cultural and subjective factors within observations into explicit discourses captured in my data sources. To do so, I applied a conceptual framework that involved using low-level (closely descriptive) coding, which served for doing initial meaning reconstruction of the selected and coded observations.

Coding started as soon as I had completed the primary record of gathered data sources. As I had an abundant amount of primary records composed of recordings during the PD

sessions, class observations, recordings of meetings to co-design lessons, recordings of interviews, and recordings of focus group discussions, which I separated into two sections. The first section was specific to the class observations while the second section included records pertaining to the PD sessions, work meetings with participants, interviews, and focus group discussions.

To begin coding each section of the primary record, I first got a sense of the possible underlying meanings by reading through the records and making mental notes of possible meanings. As my reading of data sources advanced, I noticed salient patterns and unusual tenets. At this point in my analysis, I used low-level coding to mark routine events and unusual events. These low-level codes were typed as explicitly as possible and by referencing mainly the objective features recorded in the primary record, such as phrases that described an activity that contained a participant's speech act of repeated use, or phrases that described speculations that I made for an observed act. I gave each of these data-derived codes a number and included beneath each one the file number and page location where I found an occurrence for the code, including the exact portion of the data (e.g. transcript or speculation I made from an observation). As my close reading of the primary record continued, I found that certain portions could be coded under a previously created code, which involved a modified version of that code; consequently, I added a subcode and gave it a letter and included it under an existing low level code. These produced low-level codes with subcodes, for which I continued to include the file, page, line reference, and data coded under each sub code. After this systematic process was completed, I produced a list of low-level codes for each of the two sections of my primary record. Appendix A has the low-level codes and subcodes that were produced for the primary

record of all the class observations and the low-level codes and subcodes produced for the transcripts of the focus group, interviews, co-design meetings, and the PD.

In the next step of the coding process, I went back to both lists of low-level codes to begin categorizing the codes with more alignment to my lines of inquiry. By doing so, I merged both lists of low-level codes into one document. This allowed me to group low-level codes that were the same but that were worded differently as they came from each initial list. In this way, I grouped relevant low-level codes and created a new list, included in Appendix A. With this new list, I was able to revise all initial codes and find alignment between the low-level codes and my lines of inquiry. This helped me to then extract the low-level codes that were relevant to each line of inquiry and thus I produced a list of low-level codes for each of the lines of inquiry. Low-level codes that I considered could serve to answer more than one line of inquiry were placed in each of those lines of inquiry. Appendix A has all the low-level codes that I assigned to each line of inquiry, along with the corresponding data from the primary record that was coded and analyzed as explained in the following paragraphs.

For the low-level codes produced for each line of inquiry, I conducted intensive analysis through explicit meaning and validity reconstruction. This process began first with reading again the data of the primary record included in each new document. When I found observations or transcripts that were representative of ideas, desires, and/or opinions that strongly aligned with, or seemed to directly address the line of inquiry, I would analyze that data under explicit meaning reconstruction. Meaning reconstruction entailed creating meaning fields for the notes that had been selected as salient. Meaning fields are in essence the range of all the possible meanings an act has on the actor, on other observers, and on others involved in

the act. To generate valid meaning fields, I used the statements "or", "and", "and/or" in order to include all the possibilities of meanings that an act had in all the involved actors. In addition, low-inference vocabulary was used to ensure that words were placed onto the observed actions, simulating as if the observed actor had conveyed the meaning of their actions verbally rather than tacitly through body movements, facial expressions, and intonations. Meaning fields were included in brackets, italics and the code "MF" was used to identify the content as specific to a meaning field. All generated meaning fields were included under each note taken during stage one.

Once meaning fields were generated, pragmatic horizon analysis was implemented by categorizing the different truth claims and references that I found throughout the meaning fields for the normative-evaluative, subjective or objective category. Objective-reference truth claims refer to claims that other people would agree with if they can make the same observation. Subjective-referenced truth claims refer to claims that would be confirmed only by the person whose emotions, feelings, desires have been observed and noted as a claim and only if this person is being honest about their own subjective states when confirming the claim. Normative-evaluative truth claims are claims that tacitly dictate what a person should conform to; people can either agree or disagree to say convention based on their own values and norms, their ideas of what is good, bad, right and wrong.

Vertical analysis was conducted to all generated meaning fields by identifying the possible reasons an actor could give to explain expressions within a carried act. Reasons that were immediately referenced in the original act were labeled as foregrounded, while reasons that were remotely referenced were labeled as backgrounded. The foreground of the meaning

horizon entails what a person is emphasizing, while the background is composed of complex assumptions made by the person about knowledge, beliefs, and values shared with people they are interacting with. In addition, as recommended by Carspecken I included in the labeling of foregrounded or backgrounded reasons if these were obvious (coded as "quite foregrounded, quite immediate"), less obvious (coded as " foregrounded, immediate") or not obvious (coded as "less foregrounded, less immediate"). To conclude this analysis, with subjective and objective claims produced, I then created 'possible' high-level codes by using the claims as guidance.

The following extract from my data analysis is provided to exemplify how the vertical analysis was conducted and the labels that were generated along with the 'draft' high-level codes that were produced. Appendix B Includes all the data analyzed for each line of inquiry with the draft high level codes that were generated.

MA-F1, b5, line 185- said "for like me, hmmm, I won't name names but I have worked, I have colleagues that I really respect, that say I'm just gonna make sure that my students know the formula for this type of essay, this type of essay and that type of essay because as long as they meet that structure they'll get a good score on the test:…and I'm like I DON'T CARE <she's mad at this point, remembering those conservations> my goal is that they can write well!"

[MF: MA conveys anger and frustration and looks over her colleagues and Mik not too concerned but also being cautious she does not use names (AND) "I know that what will help the students in the future is knowing how to actually write something meaningful and relevant not to memorize a formula, I care about their future, not the test scores and I am upset that other teachers focus on scores"].

Possible Subjective Claims

Quite Foregrounded, Quite Immediate

"I care about preparing my students holistically not merely to get good test score"

"I am disappointed by other educators care about test scores rather than developing their student's true writing and thinking skills"

Possible Objective Claims

Quite Foregrounded, Quite Immediate

"I want my students to be able to write meaningfully and holistically rather than get good test scores"

Possible Normative-Evaluative Claims

Quite Foregrounded, Quite Immediate

"It is wrong that teachers focus on test scores and leave out of the instruction skills that are the relevant ones for the students' lives and future"

Possible High Level Codes

Test scores as a pressure that pushes teachers into standardized education

All drafted or 'possible' high-level codes were written in ample detail as their intention was to eventually guide me to identify emergent sub themes and overarching themes. It is important to highlight that the high-level codes were written with this level of detail as it is the one recommended by Carspecken for critical ethnography, which is a much more in-depth level than when producing high-level codes through other coding procedures.

Once I had created all the draft or 'possible' higher-level codes for the data for a specific line of inquiry, I went back through the primary record included in that document to find other instances of these higher-level codes. Each instance that seemed to fit a higher-level code was carefully analyzed, in order to strengthen the rationale or wording of the code and also to determine if the instance fitted with the higher-level code. If I found the draft higher level code more than once or found another code that encompassed the same message, I included the code in a list that I began in a separate document, titled 'High Level Codes [Line of Inquiry]'. In this new document I was able to see all the draft higher-level codes together, which is presented as Appendix B. Some of the draft higher-level codes were redundant and even several intersected with others. By revising these grouped draft higher-level codes I was able to produce final higher-level codes. Once I had this clean and final list of higher-level codes I then began to reorganize them into a hierarchical scheme composed of overarching categories that were organically suggested by the higher-level codes. I called these categories Sub-themes. In addition, I organized these Sub-themes into the final Themes for each line of inquiry.

To develop stage two in alignment with Carspecken's recommendations, I made speculations from the recorded comments and reactions from students to the information they received through a lesson on the causes, consequences, and solutions to address a sustainability issue. In addition, I made speculations on the instructional or pedagogical reasons why participants chose to use, for the co-designed integrated lesson, specific elements and content learned during the PD; and I made speculations on the personal reasons why participants chose to use, for the co-designed integrated lesson, specific elements and content learned during the

PD. I also speculated on the potential barriers that inhibited the participants from implementing elements and content learned during the PD; and on identified explicit and tacit acknowledgments made by participants pertaining to the usability of strategies and methods learned during the PD. To conclude, I made subjective claims on observed interactions between a participant and her students during and after an integrated lesson was instructed; and on actions, activities or lessons consequential to integrated lessons.

Stage three: dialogical data generation

Following the second phase of high-level coding, I generated dialogical data (Carspecken, 1996) through one-on-one interviews and during one focus group that I facilitated with the four participants. During both, non-naturalistic dialogues happened between the participant teacher that was interviewed and myself, as I listened attentively to each participant and thus supported an exploration of feelings and opinions that does not normally happen in everyday situations. Interviews and group discussions began once I had compiled a thick record of observations. I led all interviews and group discussions by taking the role of a facilitator, someone that constructed a supportive and safe environment for sharing and exploring ideas and issues. I analyzed interviews by using the same modes of analysis described for stage two.

The dialogic data creation was done by adhering to the steps recommended by Carspecken. As a first step I made subjective claims to help validate or reinforce claims produced during stage two. In addition, I gathered data to make valid conclusions on how students felt about information specific to the causes and consequences of a sustainability issue, how they were motivated or moved by this information and therefore the realizations,

commitments, ideas, or even proposals that students had in regard to how individually and collectively a sustainability issue could be mitigated or solved. I also gathered valuable information on how students reacted to learning about an academic topic that would have been otherwise taught through a more traditionally structured lesson, one where ESD learning goals would have been missing. I acquired data adequate for making subjective claims on the benefits experienced by teachers from using one or more of the approaches and methods learned through the ESD PD; and I also gathered data to reinforce conclusions made on the reasons why specific components of the ESD training were explicitly identified by the participants as more relevant and more efficient for weaving learning about and for sustainability during formal instruction of subject matter content. Similarly, I acquired data to reinforce conclusions on the reasons why specific components of the ESD training were explicitly identified by the participants as less relevant and less efficient for weaving learning about and for sustainability during formal instruction. Furthermore, I gathered data to reinforce conclusions on the barriers that impeded teachers from implementing elements, methods, and strategies learned through the ESD training. To conclude, I acquired data on the types of professional development received during in-service years and provided by the school leadership and by the district; and on the teacher certification program undergone by each participant to identify the lack, or inclusion, of preparation on how to teach about and for sustainability during this preparation.

Final stages of analyses

Due to the extensive and rich data that was collected during the first few stages described above, I did not implement the final two stages of analysis described within the critical

ethnography framework used for my study. Carspecken recognizes and even recommends to implement only stages one through three when research questions do not require the analysis that would be conducted through stages four and five, both of which focus on larger systemic issues and hence require additional lines of inquiry. During stage four, one would identify the origin or cause of cultural themes observed during observations and find a fit between the reconstructions built during the previous stages and an existing social theory. Altogether, the analysis conducted on stages four and five would have allowed me to better understand, and thus identify, the causes that are generating barriers that impede in-service teachers working at the school I conducted my study as well as other public schools in the participating school's district from receiving quality training on teaching about and for sustainability. Consequently, stages four and five would have assisted with identifying factors that inhibit the implementation of sustainability integrated lessons during formal instruction in Santa Barbara K-12 schools. Stage five of the critical ethnographic method would have also supported the identification of the macro social theory behind the identified factors, therefore, uncovering the broader social, cultural, economic and/or political forces that work together and against the adoption of the ESD framework and its important pedagogical approaches, both within professional development of the pre-service and in-service educator force, as well as within classrooms in SBUSD.

As my research question did not expand into understanding the larger systemic barriers and institutional flaws that impede the participants and for that matter the school to implement ESD as a framework that would provide relevant action-oriented education to students from traditionally marginalized groups, I abstained from implementing stage four and five.

Nevertheless, discovering those systemic barriers and institutional flaws is a crucial next step to supporting the evolution of both the district and the teacher education program that prepare teachers, some of whom eventually join this school district. As such, I hope for others to continue this research or for future work that allows me to do such uncovering.

Unanticipated Developments

It is very important to share that an unanticipated development occurred halfway into the study. I will provide details of this event in the results section, but I will mention here that participatory critical ethnography was used to guide this development and thus how I interacted with the participants. These interactions were informed by Carspeken's recommendations to adapt critical ethnography when circumstances demand it. Furthermore, I took guidance from the study by Barton (2001) on which she applies critical ethnography through a participatory lens. This was done by including her research subjects, homeless children attending an after-school program she co-lead, in several stages of her study as co-creators of a tool to allow her to better understand the forms of oppression, injustices, and challenges experienced by the children. In my study, I remained as a quiet observant of the participant's classes after they had completed the PD. The participatory component was in the form of three 90 minute sessions with each pair of participants teaching the same grade, during which they co-designed an integrated lesson with my support as a sustainability coach. The data that was collected during these sessions was analyzed and coded as described before. In my discussions section I will explain how I used this data to add an additional layer to my findings and thus recommendations

Chapter 5. Findings

5.1. Participants' Baseline Information

Following I provide a summary overview of the participants' responses to the initial questionnaire, which was submitted in writing through an online survey format. Appendix D contains the complete answers for each question.

Q1. Tell me about your experience as a teacher thus far. What have been highlights?

Participants shared that building rapport with the students, building positive relationships with them, and working with their colleagues have been key moments from their teaching practice at HE.

Q2. Tell me about your experience as a teacher thus far. What have been challenges?

Participants detailed that teaching through the pandemic, managing time, balancing work demands with their personal lives, lack of meaningful professional development, and feeling comfortable teaching mandated content were pressing challenges.

Q3. Based on your knowledge and experience, what does the concept of sustainability mean to you? Participants described sustainability from the perspective of their teaching career to how we use natural resources and the impact we make on the environment and others.

Q4. In what ways does sustainability relate to your professional life? Participants answered that sustainability relates to having a balance between their work demands and keeping a thriving life outside school; to teaching students about small actions to lower our impacts on the natural world; and to informing as much as possible the students about how to enact agency.

Q5. In what ways does sustainability relate to your personal life? Participants detailed efforts such as avoiding non-recyclables, meat consumption, and fast fashion, supporting local businesses, being conscious about water consumption and their transportation choices.

Q6. Explain how your students are exposed during your classes to information on the causes and consequences of different sustainability issues. Participants detailed that they use teaching resources such as EPIC, CNN10, Newsela, and one Science unit dedicated to resources, environment, and sustainability.

Q7. Explain how your students are exposed during your classes to information on current projects, efforts or solutions to address specific sustainability issues. Participants explained doing a hands-on project on single use plastics and watching solutions through CNN10.

Question 8. Related to all the training and preparation you received about causes, consequences, and/or solutions to sustainability problems. How much training did you receive in your pre-service teaching program? Participants shared not recalling having any training specific to teaching for sustainability issues and having acquired their current knowledge on these issues from their own personal curiosities.

Q 9. Related to all the training and preparation you received about causes, consequences, and/or solutions to sustainability problems. How much training have you received as an in-service teacher? Participants detailed they have not received any training related to sustainability problems as in-service teachers.

Q 10. What support do you hope to receive as a result of our work in methods to integrate sustainability learning into your lessons? Participants detailed hoping to increase their awareness of scientifically accurate student friendly information, how to integrate

sustainability content into their lessons, and receiving resources to make more relevant learning activities.

5.2. Challenges for implementing ESD

Data collected through PD sessions, in-class observations, personal interviews, and a focus group was analyzed to identify the challenges that act as barriers when the participants attempt to implement ESD through the application of recommendations, methods, and/or strategies taught through the PD. This analysis focused on the implementation of ESD into formal classroom instruction and during assigned periods for lesson planning. The analysis of the data resulted in six main themes, 19 sub themes, and 97 high level codes. Each main theme contains subthemes which are further described by high level codes. Main themes represent an overarching group of challenges, sub themes represent categories within themes, and higher level codes are the challenges reported by the participants. The 97 higher level codes are found in pages one through three of Appendix B. These higher level codes were grouped into the following main themes:

- Time Constraints

- Dominant good test-score culture

- District's Inadequate Support

- TEP Preparation

- Teacher's Low Literacy

- Students' Low Foundational Knowledge

Table 5 details the themes and sub themes produced for the challenges reported by the participants as experienced when attempting to integrate learning about and for sustainability by using one or more components taught through the ESD PD. An example of an utterance for a sub theme is also provided.

Theme	Sub themes	Example Utterances
Time Constraints	Lack of class time	I feel like we just don't have the time…you know, having to redesign the lesson.. right now, I just have to get a lesson out…
	Test prep as priority	…we're feeling that pressure on our backs of like, oh, this is coming in, let me make sure they know how to do X, Y, and Z…. not even to ensure they aced the test. Because the reality is most of them aren't going to, but to ensure that they feel good taking it and they're not being blindsided. So ensuring that they've been exposed to it that they know the types of questions that they're going to be asked, that they know the expectations because it's really hard…
	Testing consumes substantial schooling time	…our testing blocks went long and several students didn't finish. And so then it's kind of like, okay, when did we do this when I have the majority of the students in,..
	Lack of prep time for ILPs	I mean, we have a PLC once a week where we're supposed, where we can work on (integrated) lesson planning and it's about three hours, but we also have meetings during that time…
Teacher's need and desire for literacy	In sustainability education	Global warming causes the…in the Pacific Ocean, I don't know what it's called.
	In science education	…teaching fifth grade science, is always hard for me…

Student's low foundational knowledge	Low reading skills	I had several students who didn't try to read it. But honestly, those students are the students that have it's usually my attention ADHD kids who are like, not have not been who have not qualified for SPED or have not been assessed and they should have and they're like, you know, it's hard for them. But this is a lot for quite a few of them. I would say at least 50%.
	Limited mastery of academic content	They were so lost! They're familiar with some of the organisms, but like, they're like, is the kelp a plant? Like trying to really grasp that and like, what is the decomposer? That was really challenging.

Dominance of Good-score culture	District's priority is test scores	The pressure is created by the district, which publicizes to the community the data on test scores-SB Unified has 50% lower literacy rates, which in turn is information that people/parents/the community reacts to. In turn, the district puts pressure on leadership and leadership puts pressure on the teachers.
		Standardized testing is the one measure to quality education which is imposed on us through a ladder, from the district to the principal to Mik to us.
		Really the biggest obstacle that I see to this is getting admin on site and district level on board. Because if they're not on board with this, they're filling our plate with other things, you know. But if they don't do it, it's like, when are we going to do it?
	Negative emotional and academic effects	They know it's coming up because they do it every year starting at third grad, so yeah it's stressful.
	Limited knowledge measured	…tests too many times focus on skills that are really not what the students need… so like for that to show up on the test, what are we really valuing here? I know that this is not a true measurement of these kids, but I feel the pressure.

	Non-equitable standardized testing	well they will say oh well you can have the Spanish-English dictionary tool added to it…last year I had a student…newcomers get a year gap for the language test…but..last year I had a student who his 1st year in the country was the zoom year..so yeah he didn't learn English at all. So really last year was his first year..and he had to take a test…a fifth grade reading test…and it's so hard, oh it's so dense!
TEP Preparation	**TEPs provide low preparation on Science education**	I just remember doing like little projects…But I felt like it wasn't really focused on teaching practices. And it was like one of the last classes in our program, so it just felt quick…
	TEPs lack courses on teaching strategies for diverse curricula	In general I didn't get much training for teaching different curricula.
	TEPs lack sustainability education related courses	I got nothing on sustainability. There was an extra course we could have taken on environmental education and I think a lot of that was focused on like outdoor education…
District's inadequate support	**Lack of support for integrated education**	That's something I've always wanted to do (teach about a local CA ecosystem). Because we always do Yellowstone because that's what's readily available and easy to go resources.
	Distrust on district's recommendations	…when you have that kind of unrest, and you have that going on, it's really hard to take, like for teachers to want to listen to the district when they're bringing something even if it's a great thing…
		[FOSS] I feel like it's outdated. As far as the content is not very kid friendly…it should be bright and exciting…you know, full of curiosity…it's like missing that, you know, that spark that Science I think has for kids.
	Lack of resources for diverse learning profiles	It would be nice if the slides were translated…I tried to do that with my slides and it's often it's hard you know, it's extra work for sure. But that's like ideal.

Table 3. Challenges reported by participants when attempting to integrate ESD by using methods and/or strategies taught through the PD

To further illustrate the subthemes and themes, following I provide descriptions for challenges that were amply discussed by the participants. In terms of the limited paid time to prepare new lessons such as integrated ones, the participants shared with dismay that even when they want to include sustainability content that is connected to the students' lives and communities, they simply do not have the paid time to do so. All in all, they shared that the district does not provide them with the needed paid time to plan creative and engaging lessons. Moreover, the participants explained that they do not get enough support from the district in terms of time during their official work schedule to lesson plan, even less to apply methods like the one taught through the PD I delivered. Participants also amply discussed testing as a barrier. Participant A described the extent to which some educators at her site will go for getting good tests by saying with a great deal of frustration *I won't name names but I have worked, I have colleagues that I really respect, that say I'm just gonna make sure that my students know the formula for this type of essay, this type of essay and that type of essay because as long as they meet that structure they'll get a good score on the test:…and I'm like I DON'T CARE!*

To add, participants also detailed how challenging it is to stay motivated and excited about teaching when the focus is test scores. A participant explained that one of the district's approaches to pressuring school principals, and thus teachers, is to share test results across sites. Principals received an email, which was shown to me by HE's principal, which contained a table with the name of each school and the scoring for each grade on each tested subject. Participants explained how their school site ranked amongst the lowest in the district and specifically their fourth grade students scored the worst across their site, bringing down the

77

school average. Participant B said *they compare sites, so now principals get to have their sites compared with one another so they feel that pressure and so I think that pressure gets transferred to us because I feel like that's definitely like the main focus*. This participant also added that her group's grades were highlighted as part of what brought down the school's average and that this was heartbreaking for her considering she had worked with a true commitment to her students 'preparation. Beyond this, was the fact that the participants received throughout the academic year multiple new students, all of which were BELs and none which could opt out of taking the tests. Participants explained that if a family chooses to have a student opt out, the school gets fined.

Participants also described how the district adopted textbooks they have to use for the core subjects also impose a challenge for adopting integrated lessons. They explained that the books contain heavy texts with little access to engaging content like visuals and interactive information; and only include standardized ways for students to practice introduced content, with these exercises being deficient in quantity and quality. These design flaws force the participants to constantly enrich what are supposed to be readily resources for practicing taught information. To add, part of that enrichment includes finding exercises and even core information that is suitable and accessible to students that require diverse forms of learning support. All these efforts consume substantial time and take away from having the capacity to design integrated lessons. Another design flaw explained by the participants is that in order to use the Science textbooks, they have to invest an important amount of time doing 'back work', meaning reading the teacher's guide and figuring out how the activities are meant to be

78

developed. Interestingly, the participants reported that they lack familiarity with textbooks as they have not received proper training on how to navigate and thus use them. Even for the veteran teacher in my study group, using the Science textbooks was reported as something that has always demanded back work. Participants described that the overall poor design in official textbooks leads to consumption of the limited time they have and thus takes away from their availability to embark on designing processes to build engaging integrated lesson plans.

The student's low foundational knowledge was also described by the participants as a challenge to include integrated lessons. This low foundational knowledge was described as students having little preparation and mastery on how to conceptualize new unfamiliar topics from any subject. While the participants did highlight that students have big gaps in their Science knowledge, the main concern that was reported was how difficult it is for the majority of their students to learn new concepts and conceptualize these. An example was provided by a participant from an activity that was part of the co-designed integrated lesson. In this lesson students learned about ecological roles and ecosystems through activities that included watching videos of the underwater kelp forest off the coast of Goleta. Students received a printed guide with the kelp forest and the living organisms within it; and with the teacher's help they checked the organisms they identified from the video in the guide. The students then discussed what jobs these organisms had and how these jobs relate to the needs that other organisms have. The participant explained that when she had to explain the role of certain underwater organisms as decomposers, giving a parallel with fungi in the forest, the students greatly struggled to understand how a decomposer could live under the water. They knew what fungi are and what they do to fallen wood, but could not conceptualize an underwater version

of a decomposer. The conceptualization of those underwater decomposers was part of a following activity in which the effects of human activities on the kelp forest were studied. The struggle to conceptualize a marine decomposer was such that the participant had to modify the lesson's content by excluding a key activity focused on analyzing the effects that human activities have on the kelp forest and ultimately on our health as a species.

Lastly, the participants detailed that they viewed the preparation received through their TEPs as a challenge for adopting ESD due the lack of courses offered on pedagogies for delivering new introduced curricula, as well as strategies for accessing such curricula. The participants explained that they did not consider that they had received a wide array of pedagogies. Whenever a new curriculum is introduced by the district, usually with little training, the participants reported feeling unprepared on how to interpret and thus deliver the content as it demands using different teaching strategies. They explained that this lack of well-rounded teaching strategies does influence how confident they feel to explore other new curricula, even more so if it was subject matter content integrated with sustainability content.

5.3. Resources needed to deliver lessons under ESD

The analysis for the second line of inquiry resulted in five themes, six sub themes and 28 higher level codes. The 28 higher level codes are found on page four of Appendix B and represent the resources reported by the participants as necessary for providing ESD-shaped lessons in consideration to experienced challenges. The main themes that resulted from the analysis are:

80

- Teaching resources

- Databases

- Resources to increase teacher's literacy on sustainability issues

- Textbooks and official curricular content

- Having a sustainability education TOSA/coach/experts available on-site

Theme	Subtheme	Examples of Utterances
Teaching resources	Pre-made resources	I'm all for it. Pre-made resources.. It takes a lot more time for me to adapt to the kids, by just having the general structure of a lesson is really helpful.
	ILPs (integrated lesson plans)	The resources that you provided for us for the environmental issues, the videos are awesome. The readings, I love the range, and you specified if it was for this issue and resources on what's being done…
		…the way that you did set it up with, like, the way that you organized it by week. And then like having the videos and having anchor charts, and having slides.
Databases	With key features	I think a reliable database of resources …Things have already been curated, and are approved to be appropriate for that age level. And they're concise… Child friendly, teacher friendly, and curated.
Sustainability literacy resources	To teach educators on sustainability issues	I think that a bulleted list like if it's shorter…You did a good job of saying like, the important understanding is this. I felt like I didn't have that hard of a time…they can't be too lengthy like the teacher background knowledge…the other FOSS ones, I can't, I don't even attempt to read them. Or I'll just scan him really fast because it's just too much.

Official textbooks and curricular content	Adequate architecture and integrated content	…that's the way it should be (transdisciplinary)…Yeah. I mean, I think about even with our history…why isn't our history content more integrated with the reading or the writing? Why hasn't that (a textbook) been invented?
Sustainability education TOSA/coach/expert	Ongoing form of support	Reminder of the practices (ESD) and also just being, like, finding resources…like what you did for us was extremely helpful, that saved us hours.

Table 4. Resources reported as necessary to successfully bring ESD into formal classroom instruction

In the next paragraphs I provide examples of how participants explained the type of resources that they would benefit from having in order to align their instruction with ESD. These descriptions are in essence the higher level codes that informed the subthemes that were identified.

In terms of the pre-made teaching materials and integrated lesson plans that participants reported, they explained that in consideration to the many challenges they have to face to deliver integrated learning they would be highly benefited from having access to teaching materials that have been built by an education expert. More importantly, the participants underscored the importance for these materials to be in formats and structures that can be adapted to each classroom's learning profiles and academic levels. To add, the participants explained that such teaching materials should have abundant samples of the expected student work. They explained that by having access to flexible pre-made materials with expected student work, they can more effectively include higher quality, diverse, and engaging activities as the foundation of the lesson would have been provided.

The participants also described that an ideal form of support would be having a TOSA or sustainability coach that would meet with them regularly to model integrated lessons and ESD teaching strategies that they have not used before. They explained that they envisioned that this person would also support them by showing how to select resources for integrated lessons and even with finding those resources for them. Participants also described that this TOSA or coach would assist them in the design of integrated lessons, by reminding them of the ESD pedagogies, design methods, and ESD learning goals that are available. The participants also mentioned that they could envision how this TOSA or coach could also provide mentorship at the end of their academic year and thus help them revise and improve integrated lesson plans they have used before and also help them to adapt pre-made integrated lessons. The participants described that they would benefit from having this person also provide support by bringing other quality teaching resources, not just exclusive to sustainability learning. Finally, they expressed a desire for a TOSA or coach that could provide them with the space to share questions and curiosities raised by the students in relation to sustainability topics, which would help them as teachers to continually improve their sustainability literacy. To conclude, the participants expressed that this TOSA or coach would not be meeting with each teacher, but with all the teachers in charge of the same grade or even with smaller groups of teachers that work across several grades.

In relation to what the participants described for ideal databases, they first underscored the need for such databases to be open access. Participants also detailed wanting integrated resources that are available at least in English and Spanish; that have reading resources that can be adapted to different comprehension levels and language proficiency; and that have key

content available as read out loud. Participants also underscored databases that have integrated learning resources curated for each grade and for each core subject and even categorized for specific key topics within a subject. Furthermore, they added that they would like to see databases with integrated lessons that detail what would be needed in terms of teaching resources (i.e. videos, articles, animations) with access to those resources, while also including every activity that should be developed as part of the whole integrated lesson. Lastly, participants explained that integrated lessons in such ideal databases should always include a list of people, organizations, and programs that are working locally on the sustainability issue(s) that the lesson is focused on.

5.4. Most relevant elements in a PD on ESD

The results from the analysis for the data collected to answer the third line of inquiry are detailed below in two categories. A first set of data was organized and analyzed to describe the features that participants considered inadequate in professional development and trainings provided by the district. A second set of data was organized and analyzed to describe the ideal type of PD that the participants would want to receive to be successfully prepared and equipped for creating and delivering integrated lessons.

Features of PDs provided by the district

Table 7 details the programmatic, content, and design features of PDs provided by the district that participants described as irrelevant, non-beneficial, or flawed. This data is relevant as it

relates to the ideal type of ESD focused PD described by the participants as it provides understanding on the features that should be avoided in an effective ESD PD.

The data was analyzed and two themes were identified, specifically, unsatisfactory and deficient PDs; and poor decisions made by the district regarding provided PDs. These themes are further described by 16 higher level codes found in Appendix B.

Theme	Subtheme	Examples of Utterances
Unsatisfactory and deficient PDs	Lack meaningful and relevant content	Oh, yeah, the district has not done very much…I've been part of the district's curriculum trainings that have happened over the years and nothing sticks.
	Deficient design	I hated when they'd be like, you're teaching this part. And I'm like, I don't even know what we're doing. You're expecting me to go face 27 kids right now And I don't even know, like, I just walked into the room, that would drive me crazy.
Poor district decisions for PDs		…there's a lot of repetitive professional development that happens… all of the professional development we have received for our math curriculum has felt like a waste of time.
		because there's so many pieces to try (in the Science curriculum) trying to figure it out on your own without ever having seen it.
		I feel like there's so much wrong with everything. Everyone is new that I work with the district. So everyone is, you know, trying to make their stand in their point and all these different areas in silos, and they're just like, rolling and pushing and like, no one's communicating, and nothing's cohesive. And it's very disjointed. And I'm a part of rolling out the district PDS, which is very uncomfortable because it is very disorganized.

Table 5. Features identified by participants within PDs provided by district

To further describe the subthemes that emerged through the higher level codes, I will detail what participants reported as flawed elements in PDs provided by the district. The first element reported was the lack of meaningful and relevant content and an overall poor design. In relation to the content, the participants reported that what is taught is not impactful because it is shallow content and teachers do not have the opportunity to dive deep into a smaller set of topics of their interest. In addition, the content in the PDs is often too focused on marketing a textbook or curricula, to which the participants said that it felt like the district was hiring PD providers that worked for the textbook publishers and not to train them on how to deliver content from official textbooks. Participants also detailed that for the majority of the PDs provided by the district, they did not remember most of what was taught, partially because the PDs deliver too much content in one session. In terms of the architecture used, the participants explained that the PDs rarely include time for them to practice introduced methods, lack opportunities to observe taught pedagogies in a live classroom, and lack sessions that are devoted to one specific topic. They also explained that these PDs lack sessions on how to access and navigate official curricula and textbooks and they force the participants to sit through unnecessary sessions.

Ideal PDs for delivering integrated education

Participants also provided ample information on the features that a PD on ESD should have. This data was analyzed and eight themes were identified, as described below:

- PDs was effective format

- PDs with practice/implementation time

- Support during and after PDs

- PDs with in-person or video demonstrations

- PDs that include evidence of impact and applicability of integrated learning

- PDs with sessions on new and different teaching strategies

- PDs with sessions to learn about sustainability issues

- Optional PDs rather than imposed

Theme	Examples of Utterances
PDs with an effective format	…I still don't like all day PDs. I feel like it's too much information, I feel like it'd be nice to split it up. And then in maybe two or three parts…
PDs with practice and/or implementation time	That framework of here's a mini lesson, try this strategy out, on it or report, come back then it kind of gives you that that time I'd like that idea, rather than, here's all of this information, eight hours worth of information…
Support during and after PDs	…it'd be really nice to either have a really small group with a like, you or a consultant or someone so that we can ask like specific questions and check, have some accountability for goals and maybe share outcomes.
PDs with in-person or video demonstrations	… a lot of teachers like to see in person demonstrations…my ideal would be to have a video, that's of an example of a teacher in a classroom… But it's basically just showing the important clips of how they're doing it. And then along with the video, there may be a really simple lesson plan to show you how they did it…and how they matched it with the standards…
PDs with evidence of value of integrated learning	…less is often more…. Especially like at a district level where you have so many veteran teachers that are resistant to change. People just need to know the why first, right? Like, why are you trying to change something I've been doing for so long, like that piece has to come. Because there are so many teachers that are just like I've been doing it for this many years, and it's fine.
PDs with sessions on new teaching strategies	I would say more of the strategies of what I can do in the classroom. I feel like I know a basic amount, but if it's something I can do on my own time, I would love to see more strategies, projects, things that the kids can do.

PDs with sessions to learn about sustainability issues	…it was helpful (learning about local issues), because I mean, when we talked more about the local issues, I'm not really familiar. So it was really, enlightening to understand and hear what's going on locally.
Optional PDs on ESD rather than imposed	…I was so jazzed, I was like, Yes, this is what we want to be doing. This is why we're here. But I think this would in our ideal world of professional development, it's a choice, like, you get to choose which sessions you go to. And so like, if this is on the menu of choices, you're gonna get the right teachers in to go to it, and enough of them are going to be jazzed about it that then they're going to want to talk to everybody else about it. And then the next round, more people are going to want to do it.

Table 6. Features identified by participants as key for an effective PD on ESD

To provide more context on the higher level codes that informed the subthemes following I detail what the participants reported as desired features in a PD on ESD. First, participants explained that these PDs should be delivered in short sessions, each one not too far apart. Second, they detailed that they would benefit from a PD that is delivered outside of their teaching time. They explained that many district-provided PDs happen when they are teaching and so they have to devote substantial time to create lessons for a sub teacher. They also added that an effective PD on ESD would be constantly reminding them of previously introduced content and would connect across sessions the key strategies, methods, and pedagogies taught. To this point, the participants mentioned the value of the PD I delivered as it had this particular feature. Participants also reported that an ideal PD on ESD would include opportunities for them to connect with other educators and schools that are also adopting the framework. They mentioned these connections could be in the form of professional events and conferences related to progressive educational methods and strategies. Such connections resonate with what was detailed before in terms of findings that confirmed that collaboration

between teachers embarking on ESD is a meaningful component for their preparation on integrated learning.

To add, participants underscored wanting to have time to analyze how they would implement ESD teaching strategies in their classroom contexts. They explained this would look like having devoted sessions, during the PD or as part of their paid time to lesson plan, so they can attempt a first draft of an integrated lesson by envisioning how they could use one or more pedagogies; so they can map the teaching strategies and methods that were taught against their daily instruction needs; and to discuss which ESD pedagogies would be suitable for their learners and for the subject matter content they are hoping to integrate with the sustainability issue. The participants highlighted that these sessions, or extra time, would be even more beneficial if it was done collaboratively, amongst the teachers that instruct the same grade or grades that are below and above theirs.

Participants also reported that in an ideal PD on ESD they should have time to collaboratively practice what they learned on ESD pedagogies. The participants highlighted that this extra time or added sessions for collaborative work should specifically happen as soon as they have undergone the training portion that instructs teachers about the causes, consequences, and solutions to sustainability issues. The participants highlighted that this extra time or added sessions for collaborative work should specifically happen as soon as they have undergone the training portion that instructs teachers about the causes, consequences, and solutions to sustainability issues. To add, participants said that practice time should include having the time to find the resources they would need to teach an integrated lesson.

Another desired component in a PD on ESD that was reported was having sufficient sessions or opportunities to practice the introduced ESD pedagogies with their peers, with a group of students or have devoted sessions where they can see how these pedagogies are being implemented in a live classroom. Participants also highlighted that if they cannot see ESD pedagogies being implemented live in a classroom, they would benefit from watching a short clip from the lesson that showcases key teaching moments in which ESD pedagogies are used. The participants added these clips could be shown during a PD while the teachers also revise the written version of the sample lesson. To conclude, the participants detailed that part of an ideal PD on ESD would be having a TOSA or a sustainability education specialist that is also knowledgeable on what the PD covered and thus that could provide ongoing support throughout the year. This support would include check-ins to guide the process of designing the integrated lessons should be modeled during the PD

5.5. Applied elements from the PD

The fourth line of inquiry that was proposed corresponds to examining the elements, or content, from the PD that participants applied during the co-design sessions and during the implementation of the integrated lesson plan. To answer this line of inquiry, I collected data from the sessions when we co-design the integrated lesson plan and also through observations of two periods during which each teacher taught a section of that lesson plan. As the PD focused on a design method for building integrated lesson plans that centers ESD learning goals and ESD teaching strategies as guiding tools to create such lessons, I analyzed the data to evaluate the following:

- The ESD learning goals that the participants used to guide their design process.

- The ESD learning goals that the participants highlighted as most significant after they had taught the lesson.

- The ESD teaching strategies that the participants proposed to help them co-design the integrated lesson plan.

- The ESD teaching strategies that were highlighted by the participants as most meaningful for their teaching practice.

- The key features of integrated lessons highlighted by the participants.

ESD Learning Goals

The analysis of the ESD learning goals that were used by the participants to guide their thinking when they were building their integrated lesson plan resulted in five themes, each specific to a specific ESD learning goal. I arrived at these five themes by grouping what the participants reported from using the ESD goals; nevertheless, they did not explicitly say each identified goal, therefore it was through 33 higher level codes, grouped into sub themes that I was able to identify each of the five goals. The grouping of the higher level codes resulted in sub themes that include the rationale for using the ESD goal (coded as *rationale*); and the exact way the participants wanted the ESD goal to be represented in an activity (coded as *desired*). The higher level codes can be found in Appendix B. The emerged themes include:

- Using local contexts (local citizenship)

- Critical thinking

- Personal values: student-led, opinion pieces, and sharing personal thoughts

- Systemic thinking

- Co-learning

Theme	Sub themes	Examples of Utterances
Using local contexts (local citizenship)	**Reason/rationale for using**	…the students are so passionate about the ocean and it is easy to draw their little empathetic hearts into the ocean.
	Desired	I liked the idea of making it as relevant as possible and having them look around their immediate community for examples, for solutions…I would just start small, because I think that's like, a good way for them to feel more powerful, because they're not able to develop the solution.
Critical thinking	**Desired**	…once they have learned interactions, kind of looking at the effect of removing one… we had all those dead birds like a year ago, like figuring out what factor was causing that…. giving them that opportunity to first wonder and then explore.
Systemic Thinking	**Desired**	I wonder if we can start with images to show like the before and after of like 50 years ago and then ask the students why do you think there are differences?
Personal values: student-led, opinion pieces, and sharing personal thoughts	**Reason/rationale for using**	It would be better if it is something action integrated because that is interesting to them.
	Desired	…maybe a proposal for something that we can do at HE… or a proposal to their families, that they could do at home…
Co-learning	**Desired**	…what we have done in the past for allowing students to get to the definition of ecosystem which is to show them slides with examples that are ecosystems and that are not… after all the slides have been shown they can create their own definition of an ecosystem.

	Reason/rationale for using	"Well, I'm always with this group. I was always surprised how passionate they are about, you know, climate change or how much they already knew. I mean, you saw it when I was doing the small groups, they're just pulling out things that they knew...so that was surprising and also really nice to see that they do know and they do care".

Table 7. ESD learning goals used during the co-design process

ESD Learning Goals highlighted after instruction

The analysis of the ESD learning goals that were highlighted by the participants after they had taught the lesson produced five themes, each one specific to an ESD learning goal. These themes were produced by grouping 24 higher level codes into sub themes, that include the rationale provided by the participants for fostering the ESD goal during instruction, the features from the goal that were valued by the participants, and the features of the goal participants wished to emphasize. These higher level codes are included in Appendix B. The themes, or ESD learning goals, that emerged from grouping the subthemes, include:

• Sharing personal values, ideas, and opinions

• Local and global citizenship

• Empathy and care

• Co-learning

• Curiosity

Theme	Subtheme	Examples of Utterances
Sharing personal values, ideas, and opinions	**Valued**	
	Rationale for using the goal	…it was something that really was meaningful in their life experience…I think it's because it was relevant to them…right now, when they're working, the times that they've gotten together with their group for the majority, you know, the most part they're engaged and participating. And they're contributing, which is important, you know, important and valuable.
Local and global citizenship	**Valued**	… they loved it. And I think it was really important that you included videos with kids and seeing them explain the issue and what they're doing too, so they feel like they can do the same things; they loved it.
	Rationale for using the goal	…they have control over it. When we talk about how we use our classroom resources, like the how much paper we're using, and why we can't just get another piece of paper and we should make best use of the one we're using. I think that connects it to, okay, well, what can I change? How can I change my behavior to impact the environment?
Empathy and care	**Emphasis on solutions**	…when it was talking about how much plastic, how many marine animals are killed every year from plastic pollution and they didn't know that they get entangled and then they saw pictures of like the birds entangled and they were just like, "AHHH." I mean, you can see it affected all of them… how did that make you feel?
Co-learning	**Valued**	…today (at home) I read an article about the La Niña and when we were reading the about the kelp forest it talked about storms. So I was like, Oh, guess what I learned ? I read this today…And then we actually started looking at what La Niña…
Curiosity	**Valued**	…they also they really liked seeing your underwater videos…They were just like, Oh, what is? Or is that X thing, you know, they were just excited to see the underwater world…

Table 8. ESD learning goals highlighted after instruction of the integrated lessons

In the next paragraphs I provide additional relevant findings related to what the participants reported as valuable and desired from using the ESD learning goals as part of the design process of an integrated lesson. In terms of local and global citizenship, as the participants designed their integrated lesson, they emphasized that by including examples that the students could relate to or that students had witnessed in their communities would guarantee that the students would be engaged from the get go. In addition, participants explained that such local examples would provide students with a way to see or somehow experience an issue. Even more so, the participants thought that by having content on local contexts, they could also include shorter activities that showed explicit connections between issues happening abroad with the local issue being studied. In relation to how the participants envisioned fostering local citizenship, they mentioned wanting to include activities that used the local community as a starting point so students could learn about the issue by imagining together potential solutions to that issue. One participant highlighted that having the students look at their immediate community for small actions to address the issue would be extremely engaging and will also give students the certainty that small steps are indeed powerful. The participants agreed to then include in their integrated lesson plan activities that positioned the students as co-architects for proposing feasible actions and solutions to the local issue being studied.

Participants also discussed having student-led activities so learners could share their personal values, ideas, and opinions regarding the sustainability issue being studied; and also so students could have a lead role in investigating the issue rather than learning the issue directly from the teacher. As the participants selected activities that would allow the students

to propose their ideas for actions that could be taken at school and at home. They also discussed including opinion-focused activities, as they had seen before the level of engagement that students have when they have an opportunity to share their values and their rationale for how they see or analyze specific things. Participants even discussed giving the students the option to select readings based on their interests, from a curated list created by the teachers. As the participants decided on how to shape their lesson and what to add, they highlighted the value of student-led activities to ensure that their students would have platforms to express what matters to them and even what concerns them. They also discussed how including student-led activities will engage learners of all academic abilities and therefore will be relevant to all the students.

The participants also discussed having activities that were centered on co-learning in order to engage their students in structured group discussions while cultivating a culture that welcomed curiosities and interests from all. Participants described that co-learning exposed the students to new content; and that it also gave them the opportunity to use new and unique teaching resources. One example provided was that after developing a group discussion on climate change and its effects on ocean temperatures, in which students shared what they knew as a way for the teacher to explain its impacts, they stumbled upon a free resource consisting of a live stream of an underwater diver in the kelp forest off the coast of California. Participant B explained that this was one of the most engaging moments she has shared collectively with her students, saying that *It was the coolest thing ever…we were so excited.*

To conclude, the participants explained that they saw the value of using an ESD learning goal as a tool to guide their decision process of what type of activities to include. They

96

detailed how they evidenced students producing high quality work through activities that honored their unique ways for finding information and for providing their ideas; and that they saw an invaluable level of engagement because students could actively contribute to their own learning process by voicing their opinions.

Key features of sustainability education highlighted by participants during the co-design sessions and after ILPs

The collected data was also analyzed to identify the key features of sustainability education that the participants highlighted as valuable for their overall classroom instruction. The analysis produced two themes, or key features of sustainability education, which resulted from grouping 24 higher level codes, which can be found in Appendix B. The two themes that emerged from the analysis include:

- Transdisciplinary focus in lessons

- Action-oriented nature of lessons

Theme	Subtheme	Examples of Utterances
Transdisciplinary	Desired	It's always helpful (transdisciplinary) like several subjects, because they'll start to see that, oh, I read this and now I'm learning about the scientific portion of climate change in science… we have curriculum that we have to follow so it's not always possible, but yeah, I mean, ideally, I love that idea.
	Reason/rationale for using	[Through a transdisciplinary lesson] we could devote more than just 2 lessons per week for Science if the content is weaved into the writing workshop and tied into our reading workshop.
Action-oriented	Desired	We designed an action-oriented activity so students had a choice of four different topics. So some of them did land rights, some did affordable housing, some did extreme weather and then the last one was public access. Groups researched issue and proposed a solution by writing a letter by using a template we did for them. The letter had them write about their issue, why it mattered to them and what they think could be done and they had to choose, at least from mine, they had to choose, is this something that the mayor would be more apt to work on? Or the senator?

Table 9. Key features of sustainability education highlighted by participants

To further the higher level codes specific to using a transdisciplinary and action oriented approach, following I provide key highlights by the participants. In relation to using the transdisciplinary approach participants reported that in consideration of the limited time they have to teach Science topics, by teaching through a transdisciplinary lesson they could go into Mathematics and Language Arts and still teach about science through writing, reading, and basic algebraic exercises. After having implemented the integrated lesson designed under the transdisciplinary approach, the participants expressed desire to have official teaching resources

with content from multiple subjects that meet official standards and foster relevant academic skills. In addition, the participants emphasized that the transdisciplinary approach provided them as designers with multiple opportunities to include information about solutions, as some were more related to Mathematics, others to the Social Sciences and others to science.

Regarding the action-oriented approach, this was reported by all the participants as very valuable. The participants actually detailed several teaching approaches that they viewed as suitable for ensuring that integrated lessons they do in the future are action-oriented. These approaches include activities in which students share their opinions and ideas for agency; activities that give students the choice to select which local agents of changes they would like to work with or research; and reading about exciting new technologies and innovations. Participants also mentioned activities to position students as agents of change at home, school and/or at their community; along with activities that guide students to propose and share their ideas for how to take individual and collective action while they can also explain their rationale for the proposed ideas. In addition, participants also reported including examples of young people taking action at home or at a larger scale and modeling actions at school was reported as an essential feature to ensure action-oriented lessons. From the integrated lesson they co-designed, the participants also reported value from having activities that gave the students the option to select their desired level of agency; activities that gave the students a general area from which they could research an issue rather than instructing which issue to investigate; and activities in which students could access a list of feasible options for agency so they could research which ones they could adopt.

Chapter 6. Discussion

In this section, I will discuss the study's results through sections that are specific to each proposed line of inquiry guided by the research question, which I restate here: ***How can teachers be effectively supported to integrate ESD into their formal classroom instruction?*** Specifically, I interpret findings that I presented in the previous chapter, with the intention of explaining the rationale behind the proposed conclusions that I provide at the end of this study. These conclusions are my contributions to current efforts for defining what a successful roadmap for adopting ESD across California school ecosystems should look like, with an emphasis on how to ensure that all in-service teachers can receive ongoing and high quality training on ESD and its transformative pedagogies. I organized my discussion according to the following lines of inquiry:

• What challenges did teachers face when attempting to implement integrated lessons?

• Which resources and forms of collaboration were identified as most needed to support the implementation of integrated lessons?

• What elements from a professional development on ESD did teachers identify as most important for their preparation?

• What elements from a professional development on ESD did teachers apply during design and implementation of integrated lessons?

6.1. Challenges experienced by the participants when attempting to implement integrated lessons

As specified earlier, the challenges reported by the participants are consistent with ample findings from research conducted with US and international schools and educators. To remind the reader, the challenges to implement integrated lessons that were reported by the teachers fell under six broad themes that include time constraints; inadequate support from the district; the preparation received through the participant's TEP; participants' low literacy level on sustainability content and on science topics; and the dominance of the 'good test-scores-culture. In this section, I will discuss these challenges as I provide my rationale for why they must be addressed if we strive to provide our youth with an education that can truly give them what they need to face the future they are inheriting from us and co-create a just and fair society.

As an important consideration for the reader I want to clarify that two of the challenges that will be discussed as reported by the participants relate to standardized testing. The effects that this accountability system has on the teachers 'capacity to even begin to consider new ways of teaching that differ from those used for test preparation were reported as many. Even more so, standardized testing itself had effects on my study, as it affected my participants' capacity to implement on their own and during all their classes what they had learned in the PD. As a consequence, I am forced to devote the first two subsections of the discussion on reported challenges to standardized testing and what components of it the participants reported as explicitly affecting their ability to bring integrated learning. I will discuss these components in conjunction with my rationale for why standardized testing should be removed if we seek to

produce the critical thinkers with skills and knowledge required to address threats like the climate crisis.

Before providing my discussion on how standardized testing affected the participants' ability to adopt elements from ESD, I want to underscore that the dominant practice of using standardized tests as a way for districts to 'scan' their schools and retroactively place support in the areas that are needed so curriculum and practices align with standards has long now been contested by many scholars. I particularly agree with the argument given by educational scholar McDermott (2013), that any system-level benefit from standardized testing is severely overrated; this scholar contends that students are tested as part of an orchestrated "corporate model of schooling" that positions the students as "data-producing machines to serve the Chamber of Commerce, the military industrial complex, and testing companies who promise (for a small fee) to bring solutions to the same problems they helped to create in the first place" (p. 84). I also believe that money is a driving force behind standardized testing and that testing companies, and even key textbook publishers that align with testing content, should be under scrutiny to reveal if coordinated ways of capitalizing from testing are in place. Scholars like Stovall (2021) and Croft et al. (2016) have also contended that adoption of standardized testing programs is guided by a market approach that follows a corporate model in which large textbook and test development companies influence what is taught in schools. Besides money, as I learned in my doctoral studies, such test development and practices reflect the surrounding systemic racism and oppressive practices that fuel the marginalization of those who have the least access to quality education and socio-economic resources.

6.1.1. Time Constraints

The first theme that I will discuss in terms of challenges to adopt ESD are the time constraints that were reported by the participants. These constraints are specific to lack of time to teach adequately and thus in-depth about sustainability issues; class time being heavily prioritized for test prep; the substantial amount of time that it takes the students to complete all the standardized tests; and the limited paid time that the participants receive for building quality lesson plans.

I believe that two main causes are influencing the lack of time that the participants reported having to teach about sustainability issues. First, the pressure from the district's office to deliver good scores for the state's standardized tests; and the second being the lack of interest or even recognition from the district on the academic and whole-system benefits from including action-oriented learning shaped under ESD. The district's priority on test scores directly influences the type of learning activities that are valued as well as the textbooks and teaching resources that are provided to the teachers. In addition, if the district is not interested in adopting ESD at any level, then teachers will continue to lack access to resources and training to infuse their instruction with sustainability learning and official textbooks will continue to lack an adequate transdisciplinary integration of content to learn about and for sustainability issues.

In regard to the reported lack of time to teach adequately and thus in-depth about sustainability issues, I believe that without a curriculum that already integrates learning about and for sustainability issues, teachers will be overwhelmed at the idea of having to teach sustainability content without the expertise on how to do so in connection with official subject

matter content and without adequate resources. Therefore, the lacking time to teach in depth about sustainability issues could be alleviated by providing an integrated curriculum or at least integrated activities that the teachers can plug into their current curricular content. This suggestion aligns with what research with what educational scholars Muranen (2014) and Connelly (2013) claim, which is, that educators will be deterred from teaching about and for sustainability issues through an integrated approach if they lack the time and the resources, guidance, and support to do so.

To add, the amount of time that has to be devoted for test prep also was also reported as having an important effect on the participants' ability to teach about and for sustainability issues. One of the classes that I observed involved students learning how to, for a lack of a better word, guess smartly which answer they should choose from a practice test. Later that day, during a meeting to co-design an integrated lesson, the participant that had taught that lesson shared with me how much she disliked having to devote two block periods to test prep rather than for science and, for that matter, for sustainability-related lessons. Participants were very vocal and passionate when they shared that test prep is so disruptive from their intended academic plan, that an important amount of key subject matter content has to be taught in a rush, if not completely omitted, as time is prioritized for test taking skills. As one participant explained, two months before standardized tests begin, teachers at their school have to focus on preparing the students on the areas that will be tested along with practicing how to take those tests.

By having to allocate so many block periods for test prep, participants have to create and deliver superficial lessons for subject matter content; they shared with me how instead

they wished they could construct lessons that are engaging and thus meaningful for the students. The same issue has been reported by California and US based teachers, including how educators have to give up time for creative and meaningful activities due to test prep (Monroe, 2016; Brown, 2019). I observed this issue in two classes in which I sat in, during which teachers explicitly told their students that they had to finish the sample CAASPP test before they could move on to working on an activity where the students will write a letter to their local government. I observed students voicing their discontent and a desire to work on something that, as stated by one, "is fun and important." It is a sad realization that quality learning, one that prioritizes student's direct participation rather than memorization, is pushed to the side and that this is known by the pupils themselves. How can we ask students to be excited about learning if our educational system represents a definition of learning that centers on knowing how to take a test? I believe that many teachers committed to relevant education, such as my participants, will continue efforts to find the time for engaging lessons, including sustainability-focused ones. Therefore, I call on state and district offices to reorganize their efforts and prioritize actions that enable sustainability learning during formal instruction. Unfortunately, the district's priority remains centered on standardized testing results rather than on transformative education.

In addition to test prep, the time taken for testing itself is another barrier for adopting integrated education as teachers have to give students as many block periods and days as they need to finish the tests. For my participants, there were seven additional days where 50% of their class time was given for test taking. By doing so, teachers have to take away time for lessons they had planned for official curricular content, let alone for something new like an

integrated lesson. I witnessed this situation unfold during my class observations, as I arrived several times to observe a class that was meant for the co-designed integrated lesson, but the students were still taking the test. Moreover, I witnessed how the integrated lessons were pushed aside as secondary priorities even though they were built to cover official curricular content and to meet all required CCSS. Participants ended up instructing fewer activities and giving less time to the integrated lessons. Many of the integrated activities had been selected to build upon each other and therefore the students missed out learning opportunities that connected topics from several subjects and that centered them in the process. I believe that unless higher level policies and regulations are set in place to prevent testing taking up quality instruction time, I cannot see how teachers working in a district that does not embrace the integration of learning for sustainability have the needed time and support for engaging in such transformative instruction.

The time required for testing also affects a teachers' ability to complete other key tasks, such as reflection and revisions of plans that directly support learning. Such missed opportunities were reported with great frustration by the participants, when they admitted that they had not been able to revise certain portions of their co-designed integrated lesson; as such, they encountered certain students having accessibility issues during the activity's implementation. It was surprising to me that even with ready-to-use integrated lessons, the participants had to devote so much time to support test taking that they lacked the energy and time to revise what they had already co-designed and even revised months prior. I believe testing is a barrier not only in the sense of taking away period blocks for instruction; it is also a barrier that drains students mentally and physically and consumes time and energy from

teachers that have the desire to deliver impactful learning. I cannot help but wonder if this level of time and energy consumption that directly translates in less quality learning is something that the district is aware of, or if it is ignored under the argument that testing is an important tool to measure the 'quality' of education provided at schools.

Lastly, I want to discuss how the reported limited paid time for conducting quality lesson planning in turn contributes to the participants' lack of ability to adequately adopt integrated education. As explained by the participants, they lacked sufficient time to learn at their own pace and implement methods and strategies to integrate sustainability-related content within official curricular content. This kind of time currently does not exist, as participants only get one day per year for planning for the entire academic year. As one teacher explained *we're supposed to get for every unit, which we have six units throughout the year, a whole day subbed off to do this planning… And we've gotten it twice this past year… none of the grades have been able to get consistent planning days… if we had two weeks to prep before school begins, that would be ideal*. Even during a normal week, when participants are meant to have free periods for lesson planning, they explained that they have to hold meetings with different school staff, including their IB coordinator. Participants also shared that with the limited free time they do get during school days, they truly do not have the ability to browse for pre-made integrated lessons even if these are readily available for their classroom instruction. Most of the time pre-made lessons, integrated or not, will demand that they analyze if the content and learning approaches fit their classroom's learning profiles. Even less likely is for teachers to have free time to look at their 'old' lesson plans and redesign these to weave activities to teach about and for sustainability.

107

All in all, teachers need to have an adequate amount of paid time to plan for lessons that include the creation of enriching activities to complement the textbooks expected to be used, and adapting activities and resources to the diverse learning profiles represented in a classroom. If given enough time, teachers would arguably have more flexibility to begin exploring existing lessons and making efforts to integrate sustainability content or to create a completely new integrated lesson. I also believe that paid time for lesson planning is a basic right of our teachers–what is taught is what is planned. If we demand good test scores, students with high academic abilities, and learners to have other skills such as critical thinking, then a teacher's schedule should have protected available time to plan their lessons. By providing teachers with such time for planning, districts would be recognizing the challenges that teachers face in their profession. Above all, providing teachers with the time and resources they need is crucial for our collective future as they are indeed shaping the next generations who will be facing ever greater environmental challenges.

6.1.2. Dominance of 'Good-Score' Culture

Another barrier reported by the participants that affected their ability to implement what they learned through the PD and deliver the integrated lesson was the dominance of a culture centered around good test scores. Participants explained that their district prioritizes high test scores over any other form of knowledge. As this reported barrier is in essence part of standardized testing, which was discussed previously, my intention with including how the 'good-score' curriculum affected the participants is to describe an additional layer from testing that transpires into blocking the adoption of ESD.

One of the ways in which participants reported that the dominance of a good-score culture affects their overall ability to implement integrated lessons is that the teaching resources and practices they use are to ensure those good scores. This looks like amply using memorization, worksheets, and repetition as teaching resources. In addition, teachers will most likely avoid using pedagogies that are not formative, but merely focused on teaching how to take a standardized test. In consequence transformative pedagogies like those promoted by ESD cannot be explored as they have to be given up in lieu of test prep. This situation was described by one of my participants who said,

M came up with this idea because we were just, it was just so sad, you know, seeing them just sitting on their desk, like doing the practice tests every day. So we put questions around the room and then you know, involve more movement while they're walking through each question and find it on their answer sheet...just to get things moving and do something different. Yeah. And it did help a little bit. But you know, it gets old eventually.

It is easy to see why the participants highlighted the dominant 'good-score' culture as a barrier to adopting critical pedagogies and innovative lesson planning methods like those promoted by ESD. Teaching approaches that are conducive to sustainability learning, which deter completely from memorization and repetition, are going to be ignored and rarely used as they do not help teachers to prepare the students on how to approach and answer standardized questions. Teaching to the test thus denies the participants opportunities to be creative and to enjoy their teaching practice. I contend that testing may deny teachers the possibility of doing what they thought they were aiming to do in the first place, that is, transforming young minds

through meaningful knowledge and learning experiences. For the students, learning through worksheets designed for tests erases any possibility for co-learning and systemic thinking. Even more dangerous, it removes the essence of learning, which is being curious and wanting to know more because what is taught is exciting and relevant.

Another example on how the district's demands for high test scores influences what happens in the classroom and how that affects the integration of sustainability content was provided by one of the participants when she explained that for a whole month for 30 to 60 minutes every day they only practiced a specific group of test taking techniques rather than devoting that time for activities that engage and spark curiosity in the students. Similarly, these high demands for test scores directly influenced the teachers' ability to commit to preparing and delivering an integrated lesson plan once they had undergone the PD that I delivered. The original intention was that once participants had learned how to design an integrated lesson, they would take on the task and build one for an upcoming unit. Nevertheless, only a few weeks after the PD they explained to me that they realized that even though they wanted to design the integrated lesson, they were not going to have the time to do so. The reason was standardized testing took place in May, hence the need to begin focusing classroom instruction and this limited free time for test prep. The participants expressed that this time of the year is always hectic for them and that attempting something new, like designing an integrated lesson plan, was challenging. Resonating with what this participant shared, is reporting by Brown (2019) consequent from a study with California teachers, in which he noted that his participants confirmed that much of their class time, up to 90%, was devoted to test preparation.

Similar to the effects of standardized testing on available teaching time and this being a barrier to adopting ESD, participants also detailed having to focus on testing content that does not include key topics from across all the core-subjects; does not foster skills for being proficient in different subject matter; and targets topics that are not relevant to the academic foundation that students need to move onto the next grade level. The limited content evaluated by standardized tests has been reported by researchers as a "narrowed curriculum" (Ladson-Billings, 2016; Hunter and Haines, 2019). Teachers are forced to focus most of their class time on this narrow set of topics, widely referred to as *teaching to the test* (Ladson-Billings, 2016; Hunter and Haines, 2019). Both pedagogy and content are thus heavily dictated by testing. I would argue then that if teachers have to teach a narrow set of topics, then they will have less entry points for weaving sustainability content. Even more, such narrowed taught content leaves out measuring crucial interdisciplinary skills such as critical and systemic thinking, which are crucial for developing agency and lifelong learners. To exemplify how narrowed the testing content is and how many valuable opportunities to merge sustainability content are lost, one of my participants said:

> *...tests too many times focus on skills that are really not what the students need, like plotting on a graph is less foundational than knowing their multiplication or fractions, and so like for that to show up on the test, and like great amounts of that, it's like, huh, like, what are we really valuing here? I know that this is not a true measurement of these kids, but I feel the pressure (to deliver good test scores).*

If the measurement of quality learning are test scores, and test scores exclude key content from tested subjects and completely ignore science and social studies, the reality is that

there are few if no venues at all for effectively weaving sustainability content into formal classroom instruction through frameworks like ESD. For the participants, and teachers that are undertaking sustainability education alone or with little support, finding the entry points to merge subject matter content and sustainability content is already a challenge. Even more so if their list of subject matter topics is reduced due to needing to teach to the test. To add, the participants also explained that the narrowed curriculum they have to teach for testing is taught through activities included in previous test versions and through worksheets. None of these resources have content that simultaneously teaches about a sustainability problem and about ways to tackle that problem. Teachers are already under great pressure to deliver good test scores and thus they will not risk adjusting or creating new resources to teach to the test so these lessons can also teach about and for sustainability. With limited topics to be taught, science and Social studies being a secondary priority, and forced to use teaching resources crafted for test prep, there are very limited organic opportunities for the participants to adopt ESD and bring sustainability learning into their daily instruction.

Regarding the position of the district on high test scores, participants explained that they consider that school principals and district officials are key for adopting transformative frameworks such as ESD. These claims align with reports that underscore the role that administration at both a school's and district level has for effectively adopting ESD and including sustainability education (UNESCO 2020). In the case of the participant's district I am concluding that it has no disposition or even acknowledgment of the importance of sustainability education. Looking into the district's efforts as I developed the study, none included a comprehensive approach or program to bring training to their teaching force on

112

innovative practices and curricula nor to enrich their official curricular offer so students are regularly immersed in learning processes that promote stewardship and agency. Therefore, if the dominant culture is one of good test scores and there is no recognition of the need to move away from this culture, ESD and the integrated learning that it produces will be a very difficult goal to include in HE's district work plan.

The position from HE's district is as reported by many scholars that have investigated the perspectives from district officials on standardized tests. For example, research by educational scholars Munter and Haines (2019) with district officials from the Northeast of the US found a series of arguments in favor of testing, none but one that truly are justifiable regarding direct benefits for learners. These arguments included the *formative feedback argument,* which refers to the use of test results for identifying and addressing instructional needs of students. This argument aligns with the U.S. Department of Education's perspective of standardized tests as diagnostic tools that can "provide timely, actionable feedback to students, parents, and educators that can be used to guide instruction and additional support for students" (p. 2). Interestingly, the participants also shared how they are expected to use the students' performance on practice tests as ways to improve their teaching practice and adjust to meet what the students need the most. Nevertheless, as one participant explained, the focus is not on mapping what the students truly need for an adequate and wholesome academic growth, but to identify which test topics they are scoring the lowest and in essence add more practice items, essentially via memorization of facts, related to those areas. Even more concerning is that this expectation consumes time, time which as discussed earlier, could be devoted for prepping and delivering integrated lessons. Consequently, if the district prioritizes

high test scores, the resources provided, including curriculum and training for teachers, will continue to be for the limited content that is tested. This content does not include topics from science or social studies. While sustainability learning can be easily weaved into Mathematics and Language Arts, for teachers with limited experience in integrated education, science and social studies include topics that are ripe for a more seamless integration with sustainability content. All in all, standardized testing represents a major barrier to adopt frameworks like ESD, a barrier that seemed to the participants impossible to overcome.

Lastly, I want to discuss another element from standardized testing that I consider is acting as a barrier to adopting ESD. This is the purpose of testing that was reported by the participants. They shared that their school's, and thus the district's, performance on standardized tests influences the level of state funding they receive as this is consequent to the number of enrolled families at their school, which is affected by how well the school is seen by the community. If parents believe test scores are crucial to their children's future and HE is ranked poorly in test scores, then less families are likely to enroll. With a lower number of families, the school receives a lower level of financial support. With less financial support, schools and districts will have less opportunities for bringing teaching resources and other forms of support such as professional development in ESD to increase the teachers' knowledge and skills for developing rich and high quality learning processes.

Addressing challenges 6.1.1 and 6.1.2 to support the adoption of ESD

Both the time constraints and the dominant good test-score culture reported by the participants are effects from standardized testing. This form of evaluating knowledge is then in itself a massive barrier to adopting ESD as it transpires in so many different ways as obstacles that teachers cannot overcome, as discussed earlier. Therefore, one of my main realizations from conducting this study is that if students are to become prepared to face and solve current existential threats then their teachers need to have the ability, capacity, and the resources to foster the development of the required knowledge and problem-solving skills to tackle these threats. In my opinion this means two plausible actions. One is that schools and school districts take a stance against standardized testing and hope that these efforts, along with support from the educational community, can push an unlikely state legislation to remove these tests altogether and replace them with other forms to evaluate and measure the quality of learning. I provide my suggestions on how schools and districts can take such a stance through figure 7.

The second option I can imagine for removing standardized testing's blocking effect to adopt ESD is to evolve these tests so that what is measured includes content that is about the mechanics, causes, and consequences of key sustainability issues. Even more important would be to evaluate student's mastery of key individual and larger level actions that should be taken to reduce contributions to an issue; and evaluate the students' knowledge on current innovations and careers that are positively impacting the causes and consequences of urgent issues. To add, these evolved tests should also measure students' ability to have empathy for how climate change, for example, affects communities and individuals; if students have taken

115

an interest in stewardship and agency; if students can creatively propose their ideas for how to address a small local issue through innovative and futures thinking; if students can analyze the systemic connections that drive the causes of an issue; if students can critically assess what actions and changes need to made to halt environmental treats; and if students have gained a sense of local and global belonging along. By including these standards as part of what students should master for a test, then schools would receive resources that foster lifelong learners with the interest and aptitudes needed to become citizens that could actively contribute to shaping the models of living, valuing, thinking, consuming, and producing that are contributors to major crises like biodiversity loss, climate change, and social injustices. An important note about the evolved version of standardized tests that I just described is that in parallel the evolution should include changes so the content is accessible to students from all linguistic proficiencies and changes to the structure of the questions to remove cultural biases. As it is not the focus of this study, and not my field of expertise, I will not suggest how to make those changes. I do want to mention that if tests were to be redesigned to include learning about issues and for issues it would be very contradictory if the tests continued to perpetuate the many problems it causes that stem from linguistic and cultural biases.

6.1.3. District's Inadequate Support

The third theme that I will discuss specific to the challenges experienced by the participants when they attempted to weave sustainability content into their instruction time is the reported inadequate support provided by the district. As this theme was identified through 4 sub themes I will discuss how each sub theme, or type of inadequate support, translates into

a barrier for adopting ESD and integrated education. I will also provide my recommendations on how the different forms of inadequate support can be addressed so teachers can be better supported to implement the strategies and methods provided by ESD.

The first sub theme that was identified is the lack of support from the district so participants can access resources to help them build integrated lesson plans. This barrier was explained by the participants as lacking time to access information, content, and resources (i.e. videos, news articles) about local issues and local solutions to these issues. My view is that if teachers cannot have readily available resources to teach content that is new for them, through teaching strategies that might be also new, the natural consequence is that with an overcrowded curriculum, little paid time to pay, and pressure to deliver good test scores, teachers will not look for resources to teach about and for sustainability. The same reporting has been shared by scholars such as Bolstad (2004), Muranen (2015) and Hurd and Ormsby (2020). Building any type of lesson plan requires time, but even more so creating activities through approaches that are different and were not taught during the participants' teacher education program and/or during professional development as in-service teachers. Therefore, it seems important for HE's district, and others, to recognize the value in making accessible other teaching resources, particularly those aimed for integrated education. In a later section of the discussion, I provide my recommendations on how districts can do this, but for now I will detail that the first step is to shift the focus from standardized tests, have deep and unbiased internal evaluations of the official textbooks, and collaborate with experts such as researchers from universities that can help to articulate the value of adopting ESD.

Another reported barrier to adopting ESD was the participants' distrust of their district's recommendations. As a summary of my findings, the participants detailed that even if the district would provide them with resources to teach about and for sustainability, they were certain that the majority of the teachers within the district would not fully welcome these resources due to their distrust towards the decision making by district's leadership. They also added that at the time of the study, any recommendations by the district, related to adopting integrated education or anything else, would probably be received with resistance across district teachers. This fractured relationship between teachers and the district's leadership has thus consequences on what flows down to the classrooms. This includes leaving out integrated lessons with action-oriented, place-based activities that adequately prepare students in subject matter content while also catalyzing actions that have real impacts in communities suffering from local and global sustainability issues (Tilbury, 2011; Hopkins, 2013). If teachers from the district cannot trust their leadership, then how will they ever find the support to evolve and enrich their teaching practices and provide transformative education to their students through the adoption of frameworks like ESD? Perhaps as suggested by scholars like Kwauk (2023) the lead needs to come from institutions like research universities, mainly those that prepare student teachers, which might be external from a district's ecosystem but are most certainly part of the larger community that a district serves.

Another form of inadequate support by the district that I will discuss as a barrier to adopting ESD is the official textbooks HE has to use. Two main elements were identified in regard to the textbooks and curricula imposed by the district in connection as barriers to

118

adopting ESD. The first is specific to the content within the textbooks used by the participants as mandated by the district. The second is the structure and overall design of these textbooks.

Before discussing what the participants shared about the official textbooks and curricula it is important to highlight that textbooks are a crucial tool for adopting sustainability education through every core subject. Textbooks that integrate information about and for sustainability within subject matter content will provide teachers with a powerful venue to deliver learning activities that foster sustainability and rigorous academic learning. In one of the most comprehensive reports that examined textbooks from over 10 different countries and across all core subjects to evaluate their inclusion of sustainability content, the policy paper produced by UNESCO for the Global Education Monitoring Report, underscores the critical role that textbooks have for advancing adoption of sustainability education:

"Few instruments shape children's and young people's minds more powerfully than the teaching and learning materials used in schools. Textbooks convey not only knowledge but also social values and political identities, and an understanding of history and the world. Teachers and students trust textbooks as authoritative and objective sources of information, assuming that they are accurate, balanced and based on the latest scientific findings and pedagogical practice… In most classrooms they determine what and how teachers teach." (UNESCO, 2016)

It is very interesting, but not surprising though, that the participants reported that an important barrier to delivering integrated education are the current textbooks they have to use for core subject instruction. As a reminder of my findings, the participants described that their official textbooks for Mathematics, science, social studies, and Language Arts have diluted

foundational subject matter content; and that even though the textbooks have a lot of material, most of it is not the right content to ensure that the students acquire the adequate level of knowledge and mastery on topics that are prerequisite for upper grade level content. My belief is that with such a diluted teaching content, the participants will likely find themselves without the many rich opportunities to integrate information about and for sustainability issues that are provided by academic topics from all subjects, which in turn deters them from effectively framing their instruction under ESD.

Scholars and leading international education organizations underscore that the most effective approach for schools and education systems to adopt ESD is by integrating content and information about and for sustainability issues across disciplines and grades, which can be accomplished through integrated textbooks and teaching resources (Manitoba Education and Training, 2000; Tilbury, 2011; Woo et al. 2012; Mwendwa, 2017). As ESD experts report, a complete transdisciplinary integration within official textbooks of information, concepts, facts, and content specific to local, regional, and global sustainability issues is key to allow schools to infuse traditional learning processes with integrated activities (Woo et al. 2012; McKeown and Nolet, 2013; Ramsey et al., 1992). As sustainability learning is not specific to a single discipline, all subjects can contribute pedagogy and content toward getting ESD properly adopted throughout any curriculum (McKeown and Nolet, 2013). Therefore, if official textbooks and curricula are deficient and lacking key subject matter content, their contribution for entry points to weave information about the causes, consequences, and ways to solve sustainability issues will be also deficient. Even more so, if official textbooks are superficial in content, the possibilities for teachers to identify how they can produce transdisciplinary

lesson plans will be limited if not non-existent. In a study conducted with four K-12 schools across the US, Hurd and Ormsby (2020) reported that principals, administrators, and teachers alike identified that lesson plans built in ways that include activities that merge content from several subjects along with information about and for sustainability issues was one of the most effective ways for adopting ESD.

Another feature in the official textbooks that was reported as a barrier to implement ESD was the nature of the content in the participants' social studies textbooks. Participants explained with a great deal of concern and even anger how official California social studies textbooks have content that is evidently written from a colonialist view. Even more concerning, is what participants described as blatantly racist language and wording in portions of the Social studies textbooks that are meant to be read by the students. In my opinion, both the colonialist view and racist wording used in official Social studies textbooks represent a direct barrier for delivering learning activities that foster ESD learning goals such as fostering a sense of global citizenship, sharing community values, and conducting critical and systemic thinking. Rather than inviting learners to question why historical accounts occurred, such as the brutal conquest and colonization of the Americas and slavery in the US, textbooks are directly omitting the lived experiences of Indigenous and Black communities. The social and cultural consequences that are still experienced by members of these communities, which stem back to the colonization and slavery times, will not be discussed, evaluated, and analyzed by the students, many of whom are members of traditionally marginalized communities. Therefore, the missing content and the view used in the official social studies textbooks is an important barrier to fostering learning processes were students can acquire skills and knowledge that will help them

121

to effectively present and defend their thoughts and opinions, skills like critical analysis of historical accounts and knowledge such as the systemic connections that are still embedded in the social fabric of the US context which perpetuate inequities and social injustices.

To address the lack of inclusive viewpoints and accurate and complete historical content in official textbooks, districts could embark on internal processes to evaluate the textbooks being used, rather than assuming that these are still effective. These processes could be developed in collaboration with external non-corporate parties, such as research institutions and departments of education within universities to ensure that the language, tone, wording, and historical information is such that it supports teachers to create inclusive, diverse, equitable, and just learning experiences. Reviews of official textbooks, such as Social studies, could be done with the aid of international reports such as the Global Education Monitoring Report (UNESCO, 2016), which provides a series of features that are to be considered as non-negotiable in textbooks if education systems and schools truly seek to deliver learning processes that are to promote sustainable development, including peace, human rights, and global citizenship. Part of those features are to avoid omitting relevant historical information; and to provide accurate portrayals of events (UNESCO, 2016*). Moreover, this report is one that has importantly informed documents later used to produce international agreements and efforts, such as the Declaration of Berlin, which are meant to move forward the adoption of ESD and transformative learning processes (UNESCO, 2022).

Another feature from the official textbook's content that was identified by the teachers as a barrier to bring integrated learning into their classrooms is the outdated content included in science textbooks. This outdated content was explained as omitting altogether key

sustainability issues or only providing superficial information about an issue's mechanism and causes with no content on up-to-date information produced by modern research. To emphasize how little change has been done to the science textbooks' content, the participants showed me the last edition date, which was from over 10 years ago.

Before providing my interpretation on how such diluted content in science textbooks acts as a barrier to adopting ESD, I want to highlight that similar to what the participants shared, a study conducted by Román and Busch (2016) showed that higher elementary grade science textbooks used across California included explicit language that provided learners with limited information on the causes of climate change, including that these causes are not agreed by all scientists, which is outdated and wrong information. These researchers also found that there was deficient information for teaching the processes and mechanics of climate change and thus its causes and consequences. Similar reporting on deficient sustainability content in science textbooks was done by Choi et al. (2010). These researchers conducted an examination of science textbooks used across the US and found that none emphasized the already undergoing environmental, social, and economic consequences from climate change. In a time when there is international scientific consensus on the anthropogenic causes and consequences of climate change, with comprehensive evidence-based reports like those produced by the IPCC (2023) being available to the public including textbook publishers, I believe it is unethical that this information is excluded from science textbooks and therefore consider it urgent for these textbooks to be amply edited. The same concern on diluted and outdated official science textbooks has been amply shared by experts working within the Environmental and Climate Change Literacy Projects (ECCLPs). ECCLPs is a statewide effort between the

CSU and UC system launched to transform California's curriculum and TEPs so these adequately include environmental literacy and climate change education. As the lead for the ECCLPs Research Committee, which collaborates with the PK-12 teaching committee, I can attest that experts working as professors at Education departments, climate scientists working with California districts, K-12 teachers, leaders of programs that certify principals, and researchers, all report that the status quo of science textbooks within California its outdated, superficial, and has deficient information on climate change, environmental literacy, and sustainability action.

Official science textbooks that lack up to date content on critical sustainability issues and activities to learn for these issues not only represent direct barriers to bringing learning about these issues, but they also take away any possibility for educators to teach how individual and collective action can and is being taken, both locally and globally. Similar to the recommendations I provided before for revising and improving social studies textbooks so these can contribute to the adoption of ESD, science textbooks can be amply improved with the support of many external stakeholders. From scientists that specialize in niches within climate change to experts in climate change education and curricular development, these individuals have unique knowledge on the most up to date data and information on the causes and consequences of climate change, but also on what is being done across nations and globally. To receive their expert support for improving science textbooks, districts first need to be willing to evaluate their official textbooks and include such evaluations as part of a larger process for improving their whole education system. This could imply that not only textbooks are revised, but also other resources and forms of support that are provided to teachers. Step

one in improving is recognizing the need for improvement. I do fear though that with standardized testing being such a dominant force that influences how education is valued by district leadership, recognition that textbooks need to be evaluated as they are blocking learning about and for critical issues like climate change might not happen. Nevertheless, researchers and others in the forefront of advancing ESD and transformative education can be the advocates for evaluating the language and content of official textbooks and lead the consequent evolution of these teaching tools.

The last barrier to adopting ESD that I want to discuss as part of the district's inadequate support is the reported lack of diverse resources and forms of support for BELs. My participants explained that they have no access to bilingual activities that position students in agency or that are student-centered. I believe that this deficiency can work together against the participants when attempting to align their instruction under ESD because providing students like BELs with accessible learning resources is time consuming, time that as reported before is lacking for the participants. Therefore, considering the type of resources BELs need to adequately grow their language skills as they simultaneously learn about and for sustainability issues is key to ensuring that all students alike have access to transformative learning activities such as those that are delivered when adopting ESD.

6.1.4. TEP Preparation

In this section I will discuss the reports by the participants on how the TEP preparation they received also contributes as a challenge for adopting ESD and for bringing integrated lessons into the classroom.

125

As a reminder of my findings, participants explained that their TEP program, which were two different for the entire group, did not provide them with an in-depth preparation on science education in terms of exposure to all the science topics meant for elementary grades or enough training on engaging and rigorous science teaching strategies. By believing that they have an inadequate literacy and mastery of science topics, participants are possibly deterred from teaching topics that are effective entry points for integrating sustainability content. This possible consequence aligns with a study by Feinstein et al. (2013) in which the researchers indicated that low background knowledge on scientific concepts that are essential for teaching for sustainability was reported as a barrier by teachers, as it limits their abilities and willingness to integrate environmental and sustainability topics into subject matter content. For the US, a 2022 study found that less than half of the surveyed 1st to 12th grade teachers felt they had adequate mastery on how to teach about climate change (NAAEE, 2022). While this finding does not indicate if the lack of preparation is exclusively due to the teachers 'training during their pre-service years, it can be argued that the teachers lacked adequate pre-service training on the mechanics, causes, and consequences of sustainability issues and how to teach about those issues as they are reporting feeling unprepared as in-service teachers. With this stated, I want to clarify that the recommendations and opinions I will provide for TEPs are for the preparation of elementary, middle, and high school students equally. In the face of climate change, biodiversity loss, and critical social injustices, we must prepare our future teachers to teach for these issues across all grades, mainly because this can be done effortlessly across all grades and as early as 1st grade. All subjects and all levels can contribute as entry points for integrated learning and as such we cannot offer courses on integrated teaching, ESD, and

126

sustainability issues only to future high school students. As exemplified by the transdisciplinary integrated lesson plans that my participants co-designed, it is not only plausible to teach about and for sustainability issues at the fourth and fifth grade level, but by doing so teachers can more rigorously connect academic topics from different subjects and support an interdisciplinary learning process. To remind the reader, these transdisciplinary integrated lesson plans are within Appendix C.

Another report from the participants' preparation as student teachers that contributes to not bringing integrated learning is the lack of exposure to courses or even content on sustainability education, that is, how to teach about the issues and how to solve and act on these issues in integration with core subject matter content. If the participants did not receive these courses they will lack the mastery on how to integrate learning for sustainability in their classroom instruction and most likely will not embark on the novel process of aligning their lesson with ESD. Therefore, I consider that by taking such courses, student teachers can gain the adequate level of literacy on mechanics, causes, consequences, and solutions to critical issues like climate change and biodiversity loss along with approaches on how to teach about and for these issues, thus giving the teachers the adequate mastery and confidence to teach these topics in integration with official subject matter content. Studies from Bolstad (2004), Henderson and Tilbury (2004), Feinsten et al. (2013), Muranen (2014), Kadji-Beltran et al. (2017), Mwendwa (2017) and Briggs et al. (2018) have similarly reported that low preparation during TEPs on ESD and teaching for sustainability causes teachers to have low confidence and less desire to venture into designing and delivering integrated lessons. These researchers found that teachers had poor understanding and capacity on the principles behind ESD and

environmental education, the goals for sustainability education, and the process for teaching about and for sustainability topics within their subject matter. In addition, the research produced by these scholars also detailed that a low literacy on foundational sustainability content and deficient mastery of environmental topics affected the teacher's ability and willingness to teach through integrated lessons. Feinstein et al. (2013) also reported that only a few teacher education programs in the US offer mandatory ESD training for pre-service teachers and that those programs that did offer such training were considered as poor even by their own participants. Not published yet but in alignment with the recommendations from Nolet (2009), a leading voice in ESD, are the current efforts from ECCLPs to support the inclusion of environmental education and ESD in the TEPs offered across the UC and CSU system. initial internal reporting details that only a handful of these programs have begun to envision how to include courses to prepare student teachers on ESD, including climate change education and environmental education.

In consideration to the findings I just discussed, my conclusion is that it is urgent for California based TEPs to include in their offer courses on sustainability issues, pedagogy to teach about and for sustainability, and design methods to build integrated lessons. This urgency has also been underscored by experts and leading organizations (Bourn et al., 2017; Evans et al., 2017; USTESDNetwork, 2013; UNESCO 2022), which claim that a starting point for TEPs is by including action-oriented pedagogies. Action-oriented pedagogies provide teachers with the structures to convey complex facts by giving students a sense that issues can be overcome through collective action (Rauch and Steiner, 2013). I believe that this could be of great value to an existing TEP program as action-oriented strategies could be used to teach topics from

any core subject and exemplify how a consequential learning activity would have academic rigor, teach about a sustainability issue, and foster a sense of optimism both in future teachers and students alike. Moreover, I have personally seen how action-oriented pedagogies allow teachers to bring in more creativity into the learning process, making both the design and the implementation of the lesson more enjoyable and valuable.

I also consider that it would be valuable for TEPs to include courses or insert into existing courses how subject matter content can be woven with sustainability content. This would help to improve student teachers 'opinions about their teaching content. As stated by Andersson (et al., 2013), a teacher's opinion on the content they instruct influences the practices they chose for instruction of that content; in addition, a teacher's interest in issues concerning the subject matter they teach affects the way a teacher interprets how relevant or not it is to instruct students on these issues (Andersson et al., 2013). If student teachers have a strong interest in their subject matter, there is a greater chance this will influence how they implement their training and thus how they perform as teachers. Therefore, if student teachers are taught how their subject matter can be strengthen by weaving learning about and for sustainability, and they understand how specific subject matter content can serve as entry points for merging sustainability content and mandated academic topics, student teachers will likely have a greater disposition to consider this type of learning as meaningful and purposeful to their students. In addition, if student teachers are taught how their subject's content can promote learning about and for sustainability, I believe there is a chance that they will be more interested in and be more passionate about their subject matter and thus they will be more likely

129

to use their training effectively, including training on ESD teaching strategies and instructional approaches (Andersson et al., 2013).

The different ways that the participants reported viewing their TEP preparation as a direct barrier for adopting ESD and integrated teaching can be seen as unique opportunities to improve existing programs to certify student teachers. The effect that TEPs have on a widespread and whole-district adoption of ESD has been underscored for close to two decades now by many scholars and leading institutions working in ESD and transformative education. Nolet (2009), one of the leading voices in teacher preparation in sustainability education, argued that if we were to expect schools and whole departments of education to provide students with the skills, knowledge, and attitudes needed to address critical sustainability issues, we needed to begin with preparing student teachers in frameworks like ESD. Since then, the recognition of this urgency has grown to the extent that Teacher Education for Sustainable Development has emerged as a field of practice and research to empower teachers to prepare learners to tackle socio-environmental challenges (Fischer, 2022). Similarly, ESD: A Roadmap (UNESCO, 2020) and the Berlin Declaration on ESD (UNESCO 2022) have been embraced by hundreds of ministries of education and thousands of education leaders and organizations as part of global efforts to transform education. Both of these documents explicitly detail that teacher education programs must be enriched with courses that can prepare future teachers on pedagogies, knowledge, and skills needed to deliver ESD. This need is so amply recognized that it is the third of five priority action areas, specially building the capacity of educators on ESD. Across the US states like Washington and New Jersey have already embarked on efforts focused on this priority action area. California, as I discussed earlier, is in

its earliest stages. Knowing what has not worked from TEPs to adequately prepare educators to adopt new and progressive ways of teaching, such as what was reported by the participants, is essential for mapping a successful roadmap. While this study was conducted with a small sample of teachers, I do provide at the end of the study my recommendations on how I believe the findings from the participants' preparation trough their TEP can help to inform a whole-system roadmap to support the adoption of ESD and ensure transformative education for all California-based students.

6.1.5. Teacher's need and desire for sustainability literacy

The next barrier to adopting ESD that was reported by the participants was the limited technical knowledge they have on the mechanics, causes, and consequences of sustainability issues along with their limited training on science education. Interestingly, there were so many instances in which the participants highlighted the need to have more mastery and knowledge about sustainability issues that my analysis produced a separate theme just on their need and desire to increase their sustainability literacy. How this low literacy, both in sustainability education and in science education affects the participants and their disposition to design and deliver integrated lessons under ESD was already discussed. Nevertheless, I want to add that I believe that these missing learning opportunities for teachers are not only consequential to the participants' preparation as student-teachers, but also to the support that is provided by the district during their time as in-service teachers. Once the participants joined the education force, they should have been able to confidently express to their principal and district that they needed more growth in science education. More so, the district should be interested in an

ongoing monitoring of the level of expertise and confidence that all teachers have regarding science education, regardless of whether they are new or veteran, so they can provide targeted forms of support, rather than PDs that are repetitive and that do not provide teachers what they need. These flawed features of district provided PDs will be more amply discussed in an upcoming section.

It is crucial that the district focuses their support on providing in-service teachers with training on innovative science education, not only because science is already pushed to the side in terms of how much time is given to its instruction across the entire academic year. It is also important because through science lessons teachers have ample opportunities to implement ESD pedagogies such as action-oriented learning, critical reflective practices, problem/issue-based inquiry, and experiential learning, all of which foster crucial skills for sustainable development such as systemic and innovative thinking (USTESDNetwork, 2013; Bourn et al., 2017; Evans et al., 2017; Drewes et al., 2018). In addition, PDs for in-service teachers that include non-standardized teaching approaches to science content, such as the pedagogies promoted by ESD, have been underscored as an essential form of support to teachers by sustainability education experts since over two decades now (McKeown and Hopkins, 2005). Such PDs provide teachers with training on how to teach official and foundational science content in integration with sustainability content and even in coordination with other core subjects through a transdisciplinary focus (McKeown and Hopkins, 2005; UNESCO, 2018).

To validate even more the urgency of providing California teachers with opportunities to earn adequate knowledge on sustainability issues, solutions and actions to tackle issues, and how to integrate sustainability content in their instruction, I want to refer to one of the most

132

recent studies conducted with US teachers on climate change education, which is included within ESD as it is an issue that overlaps within the social, economic, and environmental spheres. The study was conducted in 2022 by the renowned North American Association on Environmental Education (NAEE) with 707 elementary through high school teachers and 105 school and district administrators. The study reported that US teachers want to receive adequate preparation on the technicalities of climate change, with only 21% of teachers feeling "very informed" about climate change (NAEE, 2022). More concerning is that the study found that the least confident teachers are elementary teachers, with this group reporting not feeling prepared to teach about climate change. Feeling prepared to teach about a sustainability issue includes having the adequate understanding and knowledge of the causes and consequences of the issue and knowing how to teach about and for that issue. Therefore, I believe that we cannot focus PDs that include modules on sustainability literacy and sustainability education, resources for integrated teaching, and even TEP courses on ESD and on sustainability literacy just for middle and high school students. The need to prepare teachers across all grade levels has also been reported by multiple ESD scholars as teaching about and for sustainability issues like climate change can be done through every core subject (Nolet, 2009; McKweon and Hopkins, 2012). If we target only supporting the upper grade teachers we continue to perpetuate the misunderstanding that science is the only subject through which students can learn about critical issues. Moreover, if we fail at preparing elementary teachers on sustainability literacy and for that matter ESD, we are leaving out an entire generation of learners that will also be facing dire consequences from issues like climate change. Therefore, my recommendations provided thus far on how to support teachers 'growth in sustainability

literacy and also to improve their confidence to teach about and for sustainability issues applies for elementary, middle, and high school students. To add to the need to elevate all teachers' sustainability literacy and mastery integrated teaching, the NAAEE report found that across all the grade levels it was the elementary students that brought up more often and with more intensity their concerns about the climate crises and their desire to know how to act to help with it. In my study I also found vast instances of students talking about their desire to take action. While this data was not analyzed for this study, I did make it available on Appendix E.

6.1.6. Student's low foundational knowledge

The last challenge for adopting ESD that was reported is the student's poor knowledge on foundational subject matter content and their low mastery of key academic skills. The participants explained that there are two main areas in which the general student population in their groups was lacking key mastery. The first is related to language proficiency, including low reading skills and limited vocabulary; and the second is students having little preparation and mastery on how to conceptualize new unfamiliar topics from any subject. Both forms of low foundational knowledge affected the students 'ability to access several of the activities that were implemented by the participants as part of the integrated lesson. I observed, and the participants also reported, how reading content that was supposed to be equivalent to the students 'grade level could not be accessed by many students. For other integrated activities, the issue was the difficulty students were having with learning new information and conceptualizing new concepts. In all these instances, the students missed on important and engaging activities as they could not access content or conceptualize new topics. To support

such a diverse group of learners and to allow for every student to access content and activities about and for sustainability, schools should prioritize having in-house forms of support for their teachers that are not fully dependent on the district's leadership. This could look like a lead teacher, TOSA, or sustainability coach that also has experience in diverse learning profiles. I provide a detailed recommendation of this type of support through figure 4, which is described and discussed in the upcoming section.

6.1.7. Systemic connections across challenges

As an additional discussion point related to what was identified as challenges for adopting ESD and integrated lessons, I will refer to figure 3, which presents all the themes and subthemes that emerged through the data analysis. These were discussed in the sections before; therefore, my intention is to additionally provide my interpretation on the systemic connections I saw across the identified challenges. To summarize how I used figure 3, the subthemes that I consider as being connected or affected by subthemes from other higher themes are coded with the same coloring.

CHALLENGES

Time Constraints

Lack of time to teach in-depth about sust.issues

Class time for test prep is priority

Testing takes a lot of time from the school day

Limited paid time for quality lesson planning

Student's Low Foundational Knowledge

Low reading skills

Limited mastery of academic content

District's Indadequate Support

Distrust district's recommen-dations

Lack of resources for diverse learner profiles

Inadequate core subject official textbooks & curricula

Lack of support to access resources to build ILPs

TEP Preparation

Poor prep on Science ed

Lack training on transforma-tive pedagogies

Lack sufficient courses on how to teach curricular content

Lack sust. ed related courses

Teacher's Low Literacy

Sust ED

Science ED

Standarized Testing

District demands and values good test scores

Negative emotional and academic effects

Limited and non-relevant knowledge measured

Inequities within design of standard testing

Figure 3. Map of the themes and sub themes identified for the reported challenges experienced by participants when attempting to weave integrated lessons into their class instruction

To exemplify the systemic connections I observed, the sub themes in yellow come from four different overarching themes, time constraints, inadequate support from the district, TEP preparation, and teachers' low literacy. One of the sub themes in yellow, the lack of time to adequately teach about sustainability issues, can be exacerbated because the participants did not receive preparation through their TEPs on critical pedagogies to teach about sustainability issues during formal instruction. To add, many of the evident entry points to teach about sustainability issues can be found in science content. As the participants reported that their TEPs failed to train them on science education content and thus expose them to a wide array of science topics, it is evident that the participants may be deterred from teaching science topics that might seem too advanced and that could be excellent entry points for weaving sustainability content. In addition, the lack of support from the district to access resources for building integrated lessons contributes to the participants' low mastery on ESD pedagogies, as they continue to be blocked from meaningful samples of integrated lessons that could help them to, at their own pace, increase their repertoire of transformative pedagogies. Similarly, if the school does not offer courses devoted to sustainability education, then the participants may have little to no chance of crafting integrated lessons for their mandatory units.

I also noted other connections across sub themes. For example, the participants reported having a low level of trust of the district's recommendations and their PDs, which is fueled by actions by the district like paying them for only one entire day to prepare their lessons for the complete academic year. This unstable relationship will only continue to worsen if the teachers in the district work in a structure that lacks key support elements, such as adequate paid time

137

to construct quality lesson plans. To further exemplify the systemic connections across themes and thus challenges, the participants emphatically highlighted that the district failed at providing them with teaching resources that can serve their unique and diverse learning groups, which is compounded by the fact that the state standardized tests are designed without any meaningful consideration to the diverse language proficiency levels found across the student population that the participants teach.

Another evident connection I saw across themes from expressed challenges related to standardized tests. Participants reported that the district's office places a great deal of pressure on teachers and their principals to deliver good results in these tests. This pressure seems to reveal itself in practices that take away from quality, relevant, and engaging learning. Such practices were reported as having to prioritize test prep for the majority of the class time, through activities that focus on testing strategies rather than on learning content that is foundational and transformative to the students' academic and personal growth. To add, the participants reported that even if they have prepared meaningful lessons, it is common that testing ends up consuming a lot of their class time and thus takes away from such lessons. This process of having the students devote long hours to testing strategies followed by weeks filled with days focused on taking these tests, contributes to the cascade of negative emotions that participants reported for their students and as consequence from testing. Not only do students know that they must perform and succeed at applying the testing strategies they memorized through repetitive practice, they have to apply memorized strategies in evaluations that measure a limited set of topics and knowledge that is not engaging nor relevant to the students' lives and communities.

138

The systemic connections I detailed before, evidence the complexity of the system that HE is part of and in consequence that in-service teachers and students belong to. This means that in order to transform this system and bring in the adoption of ESD and its methods, pedagogies, and forms of knowledge, we need to foster a system of learning and teaching that integrates topics rather than framing content as siloed subjects. This would revitalize and evolve the education system so it emulates a thriving living ecosystem, where balance exists and functionality is at the core of every component. What is taught in TEPs has a partial but important role in what transpires to classrooms; and what is decided by the district's leadership affects principals, teachers, students, and even the community' well-being. TEPs, textbook publishers, district leadership, and school administrators have an enormous responsibility with our youth. This responsibility is not to ensure that students ace standardized tests and can repeat information delivered through lectures. All influential actors would do well by considering principles and practices essential for enriching minds with knowledge that is valuable, enjoyable, applicable, and that drives future decisions and ways of acting that are honorable to others and our natural world. To do so, those who work in transformative education practices and frameworks like ESD have to collaborate with TEPs, textbook publishers, and districts to provide feasible, actionable, and structured roadmaps to adopt ESD at all levels, from textbooks and teacher trainings to professional growth for in-service teachers and to what is taught in each classroom across California.

6.2. **Resources identified as most needed for including integrated lessons**

In this section I will discuss the resources that the participants identified would help them the most to include integrated lessons within their formal instruction time. As several resources were identified, I will discuss each one in a specific subsection, but I also provide my recommendations on how schools, districts, and education stakeholders can collaborate to make these resources available to California based teachers.

6.2.1. Teaching Materials and Databases

Access to non-integrated lessons, to integrated lessons, and to databases were identified through the data analysis as resources that would support the teachers in their inclusion of learning for sustainability during formal instruction. Even though these are distinct resources, they are connected as the purpose that each could serve to teachers aligns with one another; therefore, I explain my rationale for prioritizing access to them along with how the three could be part of one single effort.

The first resource that was reported was non-integrated lesson plans that have been built by an education expert. The features that participants reported for these ideal resources are described through the high level codes detailed in the findings section. To remind the reader though, the features include pre-made lessons with expected student work; and that are in formats and structures that can be adapted to each classroom's learning profiles and academic levels. I would also recommend to include in these requirements that the lesson details the standards that are to be met, includes activities that are provided without too much back end

140

work for the teachers, and that the lesson provides teachers with access to resources that will be used such as readings and videos used for specific activities.

Even though these pre-made lessons would not be integrated lessons, I agree that these resources can be extremely useful for adopting ESD. Considering that teachers have limited paid time to plan, a pre-made lesson plan can serve them as a strong foundation from which they can include activities that merge academic and sustainability content. In a pre-made lesson that has the features described earlier, the core academic activities would be provided and so teachers would only need to identify the subject matter content in which sustainability content could be woven into. Just as they learned through the SI.A.S method taught in the PD, once they know which topics will be merged teachers can use the ESD learning goals to enrich the lesson with activities to teach about and for sustainability through selected ESD pedagogies. To add, teachers could have extra time to focus on improving other important elements to provide a truly inclusive learning process, such as adjusting content to meet the different learning needs of all the students.

Having access to quality lesson plans seems crucial for a group of educators that reported abundant and deeply rooted challenges that trickle down into the quality of the lessons they deliver. In addition, these pre-made lessons could motivate teachers to edit a few activities to integrate learning about and for sustainability thus allowing them to earn mastery on building integrated lessons at their own pace. To provide access to pre-made lessons schools can either devote a small budget so each grade level can purchase two or three high quality pre-made lessons. Schools could also reach out to education organizations or research groups within universities or relevant institutions that are working in ESD, environmental education

and/or climate change education to request collaboration and jointly launch efforts in which university students, volunteers and/or interns with adequate knowledge could create a handful of pre-made non integrated lessons for grade levels. With available pre-made lessons, schools could have different options to train their teachers on how to edit those lessons and transform them into integrated lessons. An option could include that if there is one or more champion teachers that have successfully created their own integrated lesson before, then the school provides an internal training lead by these teachers for their colleagues. Another option could include that schools further their partnership with research groups within universities or relevant institutions working in ESD so these can provide trainers that will exemplify to the teachers how to edit a pre-made lesson into an integrated lesson. This exact step was one that I conducted with the participants teaching fifth grade. Our time devoted for editing a pre-made lesson that had been purchased in the past by participant C was extremely productive in terms of how much time we devoted; but also the participants were able to learn how they could analyze a pre-made lesson and apply the SI.A.S method and how to include content that was specific to the students 'local community. The result was an integrated lesson that was very relevant and engaging, as I observed its implementation, but also one that generated many additional teaching resources that were not in the original pre-made lesson, including videos, articles, and illustrations. With either of the options I suggest, schools would prevent having their teachers feeling overwhelmed at the idea of having to navigate these databases on their own to find lessons that fit or align with the topics they need to cover. In addition, teachers would have support on how to have to revise the lessons and guidance to conclude if the sustainability issue included in the resource would be relevant enough for their students.

As with pre-made lessons, the participant reported that an important resource to support them as they attempt to adopt ESD is to have access to integrated lessons that have been made by an expert teacher or sustainability educator. Before providing my suggestion on how to enable this access, I want to discuss two features that the participants highlighted as key in integrated lessons to be used and adapted by them. The first feature is the structure of the lesson, which would be one that includes access to mixed media and teaching resources; access to learning activities that avoid memorization; and a summary that highlights which resources are meant to be used to teach about an issue (causes, consequences) and which ones to teach for the issue (solutions, actions). When I compared these structural features with the ones detailed for the official textbooks they seemed to be opposing and in contrast. As such, I believe that the participants' reported ideal structure for accessible integrated lessons can evidence to some degree their desire and need to work with other types of resources that can support them to build inclusive and creative learning processes. For example, on several occasions when the participants were implementing the co-designed integrated lesson and a reading or a video was too hard for some students, they were able to search with the students for an alternative because they knew what the resources were meant to teach. Having the information within the integrated lesson on what the video or reading was for, meaning if it was to teach for the issue or about the issue, helped them to create a more inclusive learning process and to ensure that those students with lower linguistic skills could access the activity. I would then suggest that when teachers or schools are on the search for integrated lessons, they prioritize on those lessons that have the structure that I just described or at least that have some of the features,

143

with the understanding that those that are missing should be include through an edition process that can be lead by an appointed teacher or academic staff.

The second feature that I want to discuss is integrated lessons with abundant hands-on activities that are place-based or in connection with the local community and natural environments. I believe this reported feature speaks to the participants' lack of access to curriculum and teaching resources that have information that the students can relate to, including information on local communities, local issues, and local actions. As detailed in the introduction section of this paper, presenting subject matter content through activities that include content that is relevant to students can help teachers to foster learning processes that are creative, joyful, and engaging. To add, I think that place-based activities can help teachers that are new to ESD to avoid crafting lessons that only center on the causes and the consequences of a sustainability issue. As it will be discussed later, only emphasizing this information fosters cynicism, fatalism, a lack of hope, and a lack of desire to get involved. If students only learn about the doom and gloom, how can we expect them to want to take action if all we are telling them is that the issue is grand and terrifying and we are not teaching them how to tackle it? Activities that are anchored in content that is specific to student's natural environments and communities is amply reported to be a key combination for fostering values and knowledge that drive desire and ability to take action, now and in the future (Tilbury, 2011). Therefore, I will also recommend to teachers and schools that are searching for integrated lessons that they prioritize those that have information that is specific to their community, region or state. If this is not possible, then teachers can identify if the information

can be replaced by content that is specific to a local environment and/or an issue and/or action happening within their community.

The data analysis also identified that access to databases with integrated lessons would be a key resource to support their adoption of ESD. The participants' reporting aligns with current international and US based efforts to support teachers and schools in their adoption of ESD through quality integrated learning materials. It also echoes what leading organizations and experts identify as a key support mechanism for educators and schools seeking to weave sustainability education within their official curriculum (UNESCO, 2020). For example, ClimateToSubject is an initiative that provides free access to integrated lessons that connect content about and for climate change with subject matter content. Its support to educators has been so powerful that the organization's database is in continuous growth since its first launch. From my personal experiences, I have witnessed for many years the need for open source databases with integrated learning resources. Similar to ClimateToSubject is Mission 4.7, founded in 2022 by Global Schools and the SDG Academy, both flagship programs of the UN Sustainable Development Solutions Network, in partnership with the Ban Ki-moon Centre for Global Citizens, UNESCO, and the Center for Sustainable Development at Columbia University. This initiative consists of an impressive collection of digital free access teaching resources that integrate subject matter content with sustainability content to support schools and educational systems as they switch to transformative education, the umbrella term that includes ESD.

While the databases mentioned before are rich in integrated lessons, I consider that there is a bigger issue that needs to be addressed first, specifically, how to support teachers so

they become aware of these databases and they know how to use them for their classroom's goals and needs. With consideration to the many challenges that have been so far reported for my participants, I would suggest that schools adopting ESD invest in one or two academic staff appointed to find open source databases and then sharing and explaining these during internal meetings or trainings. This could then be coupled with my earlier suggestions of having one or two ESD champion teachers demonstrate how to modify an available integrated lesson to adapt the activities to a classroom's needs and to include local and relevant content. Beyond these two steps, I would also highly encourage that schools consider building their own internal databases. This can look as simple as a shared digital folder that contains sections for each grade and core subject. Within these, a devoted educator or group of educators appointed by the district or a school could gather these pre-made integrated lessons that have been used and edited by local teachers to fit their official curriculum and particular student population. If teachers do not find the time to do the edition process, then this appointed team of educators could be in charge of creating locally adapted integrated lessons; taking them to teachers; having the teachers use the lessons; provide feedback; and conduct a final round of editions. In this way, powerful databases like ClimateToSubject and Mission 4.7 could be amply used to support the adaptation of their high quality resources for integrated learning. Such an adaptation would ensure that teachers use these resources, as they align with their state's curriculum, standards, to local contexts, and have features needed by their specific student populations, like being available in two languages. A district wide database of adapted versions of pre-made integrated lessons could then be formed and continuously fed by new lessons

uploaded from the larger databases. Learning for sustainability is not only about including

content that is contextualized to the local issues and solutions; it is also about taking what is

already available and adjusting it so it fits the different needs and requirements within school

districts.

The participants highlighted several distinct features as essential in databases that

would support them to frame their instruction under ESD and thus to deliver integrated

education, which are detailed in the findings section. There are two features that were reported

by the participants that I want to discuss as I consider these key and foundational to any

database with integrated lessons that is meant to serve California based teachers. The first

feature is to include integrated resources that are available at least in both English and Spanish;

and that have reading resources that can be adapted to different comprehension levels and

language proficiency with the option of having key content as a read out loud. These resources

relate to accessibility to diverse learning profiles and English proficiency levels and directly

connect to one of the challenges that the participants reported as a barrier to weaving integrated

learning into their classroom instruction. Having bilingual integrated lessons within open

source databases would support not only my participants but most likely thousands of other

teachers across the state that are committed to devoting their limited available time for lesson

planning for finding and/or adjusting resources for BELs and students with special learning

needs. Bilingual integrated lesson plans would also ensure that the rich, engaging, and relevant

activities they contain are enjoyed by all students, which would further help schools to deliver

an inclusive education. The second feature reported by the participants that I want to highlight

as foundational for databases is the inclusion of integrated lessons that consistently detail or

provide a list of people, organizations, and programs that are working locally on the sustainability issue(s) that the lesson is focused on. Having this information can help users to remember that ESD shaped lessons must be anchored in solutions or action oriented content and that a crucial learning goal is to engage students and center them in activities that either help them to envision and propose agency or ideally to be actively involved in agency.

6.2.2. Resources for teacher's sustainability literacy

Another resource to support participants' adoption of ESD that was identified through the data analysis are resources that teachers can use to increase their sustainability literacy. As discussed earlier, the participants' low literacy on sustainability issues, including basic mechanics of crises like climate change, was reported as an important barrier that deters them from producing integrated lessons. The resources that participants identified that would help them to increase their sustainability literacy include elements within pre-made integrated lessons and external resources they could use on their own time.

As for the elements within pre-made integrated lessons, the participants reported that a short short bulleted list with the key sustainability information that should be mastered by the teacher and an introductory list of the teaching resources (e.g. readings and videos) included in the lesson would serve them to improve their understandings on key concepts related to the sustainability issue covered. These elements would enable teachers to quickly identify what they need to master and determine if based on their literacy level they need to use the readings and articles along with other sources to have an adequate understanding of the issue. With consideration to the limited time teachers have to plan and the different levels of individual

interest that might be exposing teachers to sources of information on sustainability issues, a summarized section geared for teachers seems like an effective tool to improve their sustainability literacy. When I worked with the participants and provided our final co-designed lessons, I decided to include such summaries, in a different format though. Therefore, the core idea for these summaries as forms of support might have been inspired by what they received from me; nevertheless, the fact that all the participants highlighted it as a crucial component in the integrated lessons was relevant and worth noting as one of the ways to support their growth in sustainability literacy and confidence in their mastery and ability to teach sustainability topics. In addition, I can envision how the bulleted summary explained before could be used in pair with the list of teaching resources as a guide for the teachers to know what they should master while providing them with content to learn about it. If a teacher goes over the bulleted list of topics to be mastered and finds only a handful of topics that they are not proficient in, they can then use those artifacts included in the list of teaching resources to learn about them. If after watching or reading the resource they still want to learn more, they can devote more time to go deeper by looking for more robust resources.

I would suggest then that schools that are embarking on a process of acquiring integrated lesson plans and/or training their teachers on ESD consider integrated resources that have these two elements. I would also suggest to those that are leading the design and construction of open access integrated lessons that these elements are not only included but highlighted so teachers and users can know that they can also be used to improve their sustainability literacy and even point them in the right direction to find other sources of information relevant to the issue covered by the lesson.

149

The last two resources that were identified through the data analysis as forms of support to increase the teacher's sustainability literacy were having access to a curated list of short tutorials about and for sustainability issues; and of short tutorials on emerging and contemporary data on sustainability issues. These resources would allow teachers to increase their sustainability literacy at their own pace and during the time that best suits their schedules. I also believe that these tutorials would represent important sources from which teachers could draw content for future integrated lessons they craft from scratch or to edit a non-integrated lesson and thus weave sustainability content within it. As already presented throughout this study, educators from around the world amply underscore that it is not their lack of willingness to deliver lessons that engage the students through academically rigorous lessons that also teach them how to act for a sustainability problem. As it has been evidenced throughout the study, It is their own understanding of the foundations of those problems, how they work, what causes, and knowing what is being done in their communities, country, and the world to tackle these issues that blocks teachers so substantially from adopting integrated lessons and ESD. Even more concerning is that if teachers do not understand the foundations of sustainability issues they will lack the ability to see how academic topics that are specific to their subject and grade level can be connected to specific information of a sustainability issue. Therefore, I recommend that those schools and districts committed to adopting at some degree ESD include the before mentioned tutorials as part of the resources that teachers receive for their classrooms, that is, include sustainability tutorials along with official textbooks and thus prioritize the cost to acquire these tutorials within the school's budget.

6.2.3. Official textbooks

The next resource that was identified as key for supporting teachers' intake of ESD and implementation of integrated lessons was the district adopted textbooks and curriculum that have two specific features, which I will refer to hereon as official textbooks. First, the participants detailed that textbooks should have units or modules with relevant teaching resources, such as slides, practice handouts, and other. They also described the benefit from using official textbooks that have been designed completely under a transdisciplinary lens, where units include topics from several core subjects and this content is connected. Regarding this last feature, I have already detailed how transdisciplinarity is one of the most underscored features of ESD and how experts have continued to argue for curricular content and textbooks that avoid presenting subject matter in silo (Ramsey et al., 1992; Woo et al. 2012; McKeown and Nolet, 2013; UNESCO 2020). Mainly, this argument stems from the fact that even though ESD, its methods and benefits, have at this point been amply researched, many schools, educators, and other practitioners continue to misunderstand it as an homologous of environmental education and thus often treat it as a non-core subject rather than an educational framework. This misconception adds to the confusion in terms of which values does ESD bring to formal classroom instruction, including official textbooks (McKeown & Hopkins, 2003).

One of the key benefits that I consider from tackling the integration of sustainability learning through a transdisciplinary approach is that it allows students to see the applicability of what they are learning. Let's imagine a unit within a textbook meant to be developed during 4 weeks through multiple activities and focused on reading graphs, opinion writing, agricultural practices based in geographical regions, and natural resources. This imagined

lesson would have included these topics because based on the official curriculum, all should be taught around the same time of the academic year. Rather than teaching each separately, this ideal unit would have the students first read about geographic regions and research the natural resources available in each. Students could watch short videos with a video guide to learn about the agricultural practices in each region. They could then learn the key aspects from opinion writing, through examples that focus on sustainable agriculture and sustainable management of natural resources. They would then practice writing their own opinion piece after watching a series of clips that present numerical information on different case studies that compare communities where sustainable versus a non sustainable management of natural resources is done. Following, students could be introduced to the mathematical foundations for reading and interpreting graphs. Examples could have been built by using the same values that the students learned through the case studies. To build in practice, students could be provided short stories of sustainable agricultural practices that through numbers explain the benefits to the community; using those values students would have to build and then discuss produced graphs. In no way would this unit be lacking academic rigor or not meeting the standards meant for those core topics. Besides ensuring that students master these topics, the evident applicability of what they are learning would be warranted. When learning is relevant and applicable students enjoy the process, their curiosities and interests for other topics increase, and classrooms become centers for true intellectual growth. All this would be happening while students learn about a sustainability issue, that is pervasive agricultural practices, through a lens of action and with content that is focused on solutions.

While attempts exist on providing units and lesson plans that connect several subjects, these continue to exist as individual pieces that can be implemented if all the topics match what a teacher is meant to cover based on the official curriculum. For the US, finding ways for all students to have access to such transdisciplinary textbooks seems almost impossible due to the political pressures that drive educational content and practices in many states. For California, and the time being, efforts could be rolled out to form a group of experts, from publishers, to curriculum writers, researchers, teacher trainers, student teacher educators, to teachers, tasked with building a first round of official transdisciplinary textbooks for a handful of grades. These textbooks would have to be designed without the shadow of standardized testing looking over decisions on architecture and type of practice exercises included. Even though no US-based research has yet proven the direct link between learning through action-oriented transdisciplinary integrated lessons with higher performance on standardized testing, there is multitude of findings that prove that academic performance in general as disposition for learning is increased through the adoption of ESD and inclusion of lessons focused on environmental education (Monroe et al., 2001; Lieberman et al., 2005; Laurie et al., 2016).

This ideal effort could be initially launched through a private funding or a state-wide grant and the produced textbooks could be used with a group of California based schools willing to use them and also have their students take the mandatory standardized texts. Performance in tests would have to be properly recorded along with the academic and sustainability learning outcomes, such as projects, actions, and proposals created by students and faculty specific to sustainability issues of their concern. This would be a first step in the right direction to prove through evidence-based conclusions that even if tests demand students

to read complex instructions and master very narrow core topics, students would perform adequately without the emotional burden implied in test prep while teachers are working with creative, engaging, and empowering educational resources. Abundant evidence exists of Finnish students succeeding in standardized testing when they have gone through an education system that aligns with ESD and that is free from the pressures from standardized that excludes the narrowed content and pedagogies used to teach to these tests. Finnish students year after year have proven to succeed at traditional testing done at abroad universities even after going through their country's educational system, which avoids testing of any type (until their last year to expose students to these instruments) and embraces learning for sustainability through core subjects (Zareva, 2016). Perhaps it is time for California education leaders and expert institutions to take the reins of the transformative of the state's educational system, by looking abroad and also looking at what their youth and teachers are capable of doing when they are adequately empowered through quality and meaningful education, such as ESD.

6.2.3. Sustainability education TOSA or coach

The last resource that was identified as a key for supporting teachers to increase their implementation of integrated lessons is having the support from a dedicated TOSA (teacher on a special assignment) or coach that specializes in education for sustainability. TOSAs are used commonly across California districts, including SBUSD. The participants in my study reported that HE has a TOSA for reading and for special learning needs. Experts on operationalization of ESD into formal classroom instruction that are hired to guide schools and teachers are also

154

an element that I have found across multiple K-12 schools that I have collaborated with through projects outside my doctoral studies.

The features described by the participants for this TOSA or coach, which are detailed in the findings section, are in alignment with what other studies with teachers working to adopt ESD have found. Hurm and Ormsby (2020) reported that at four US-based schools where learning for sustainability is actively being integrated, teachers confirmed that having instructional coaches model sustainability lessons in the classroom had greatly supported them. This study along with Barr et al. (2014) found that teacher collaboration through grade-level meetings was a meaningful influence on teacher's desire for adopting sustainability learning and also in having an adequate mastery of its approaches. In my recent role as lead for the Research Committee of ECCLPs, I have learned from the executive team that works with the PK-12 Committee not only about teachers 'and administrators 'desire to have sustainability education TOSAs, but also about budding efforts to make this a reality across a handful of southern California districts. These efforts and the fact that ECCLPs executive team has as a priority to support the establishment of sustainability TOSAs across as many California based districts as possible echo what the participants in my study identified as meaningful support. To provide my own recommendation on what an ideal TOSA or sustainability coach would like I produced figure 4 which includes suggestions by the participants and effective elements I have witnessed through my professional work.
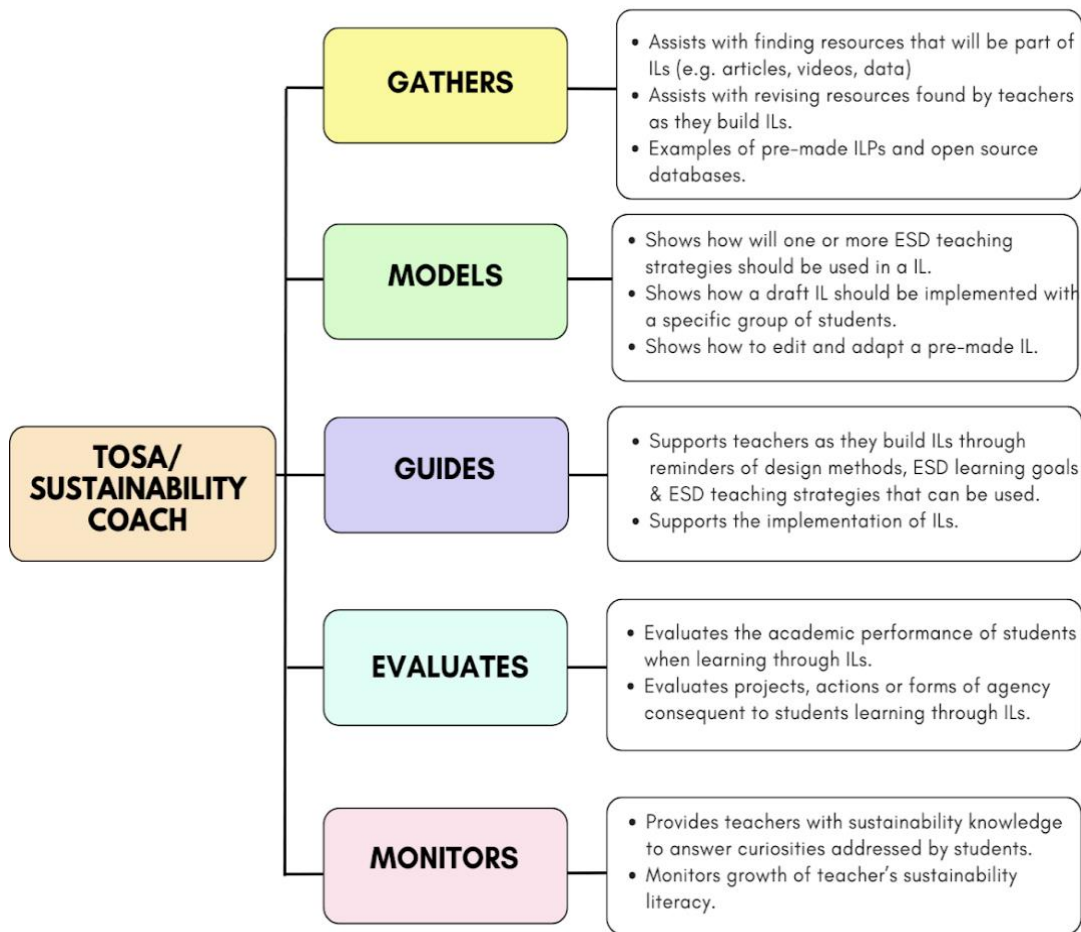
Figure 4. Role of a TOSA or sustainability education coach as a form of support to adopt ESD

6.3. Most relevant elements in a PD on ESD

In this section, I will discuss certain features that the participants reported would be most useful

in a PD on ESD so they effectively acquire and implement learned content and strategies. The

features I discuss are those that I found most relevant and in connection to my findings on the

challenges experienced by the participants. I discuss these features by providing my

interpretations on why the participants reported them as beneficial while also including

conclusions from research on ESD training. In addition, I treat these highlighted features as

components that should be foundational to the architecture of a PD on ESD and thus are reflected in the recommendations that I provide in this section through figure 5. It is important to mention that the reported features were provided once the participants had completed my PD and thus they have had a chance to reflect on what worked once they went back to their classrooms and faced daily challenges. To remind the reader of the findings, the features reported by the participants include elements specific to general architecture and how to implement a PD on ESD; forms of support that should be included as part of the PD; and specific activities that should be embedded in the PD.

The first feature that was reported by the participants for a PD on ESD that caught my attention is having sessions to collaboratively plan a draft of an integrated lesson and to map and discuss applicability of ESD pedagogies for their classroom's needs and goals. The desire for collaborative work aligns with a report from the USTESDNetwork (2013) in which school administrators highlighted that it was essential that teachers were given the chance to plan a sample integrated lesson plan as soon as they have been taught design strategies through a PD on ESD. These two desired features have also been reported by studies with US teachers attempting to adopt ESD. Hurm and Orsby (2020) and Barr et al. (2014) found that educators learning how to infuse their instruction with sustainability content through the ESD framework wanted time to collaborate with their peers with these sessions happening soon after PDs. These sessions or allocated time to collaborate was reported as having a meaningful influence on the teachers 'beliefs and knowledge about how to weave sustainability education into their official curriculum (Barr et al. 2014). Similarly, grade-level meetings and opportunities for

157

teachers to collaborate on how to merge courses with a sustainability theme or issue were also reported as a key practice within PDs on ESD (USTESDNetwork, 2013).

An additional feature reported by the participants was to have time to practice what they learned about ESD pedagogies, with these sessions being held right after they have completed the PD. This desired feature in a PD on ESD aligns with the participant's low sustainability literacy level that was discussed earlier, as it reflects how the participants recognize the need to become much more proficient in causes, consequences, and solutions for addressing an issue, but also on information that can help them navigate controversial conversations within and outside the classroom in relation to the scientific validity of the impact from specific issues like climate change. Moreover, I believe that wanting to practice the ESD pedagogies as soon as they have completed the training on sustainability issues is evidence of the participants' desire to increase their literacy through applied work, one that will produce instruments designed by them for their particular student populations. It also underscores the importance of receiving training that engages the teachers and the importance of having time to implement what they are learning when they are together and with the expert in charge of the training. Similarly, the participants reported they would benefit from having sessions or opportunities that are part of a PD through which they can implement the ESD pedagogies taught through the PD with colleagues, students from their school, or observe the implementation with students from another school. This feature aligns with the challenges that were reported for the participants, but also with the findings from studies I discussed in previous sections which report how teacher's low confidence on their mastery of new design

158

methods and pedagogies, such as those promoted by ESD, can be an important deterrent from attempting to design an integrated activity or lesson plan.

In regards to having the opportunity to observe how pedagogies taught through a PD would be implemented in a classroom context, the United States Teacher Education for Sustainable Development Network (USTESDNetwork) underscores this need as a crucial component for training on ESD with in-service teachers. In a study conducted with four USA-based schools operating under the framework of whole-school sustainability, USTESDNetwork found that educators and administrators alike reported needing time to apply ESD teaching strategies or observe these strategies in action soon after they had learned them through a PD (USTESDNetwork, 2013). In my professional experience with California based teachers through the California Global Education Project and through my work with ECCLPs, I have heard the exact same requests from teachers working with elementary, middle, and high school grades. This seems logical when we consider that a common component in TEPs is providing student teachers with time to work in real classrooms and implement pedagogical approaches. For in-service teachers, who have never been exposed to learning processes shaped by ESD, it is even more paramount to showcase ESD pedagogies as not only these are new for them; it would not be uncommon that teachers would be hesitant to use them if they cannot see for themselves how they can serve them to also instruct about subject matter content through high quality and rigorous academics.

An interesting alternative to live presentations that was discussed by the participants was including short clips related to ESD during PDs; such clips would showcase the implementation of an integrated activity with a real group of students. In my opinion, these

159

short clips would be a perfect replacement for live demonstrations if these are not possible due to the many intricacies related to scheduling a live observation of students. Even though live observations are powerful, I believe that the clips could have added value such as giving the trainer time to pause when a pedagogy has been introduced and giving the teachers the chance to refer to training materials as they watch the pedagogies being used. Rich discussions on the applicability of activities within that lesson or the teaching strategy that is shown could be developed. These discussions could in turn provide the teachers with more opportunities to visualize how the content they are learning about can be used for instruction of subject matter; and which teaching strategies suit their students best.

A third feature reported by participants related to forms of support that should be embedded during the PD and offered after the PD. The participants shared that having a TOSA or sustainability coach would be an important added element in a PD on ESD. This desired form of support aligns with findings from the USTESDNetwork (2013), which highlight that educators embarking on ESD wish to have a designated specialist teacher or expert guide them during or after a training on how to ideate and construct an integrated lesson. Moreover, it was reported that the process of designing the integrated lessons should be modeled during the PD, which was done during one of the three sessions of the PD that I delivered. The reporting from the USTESDNetwork also includes that once the teachers have seen how to build an integrated lesson, time between a sustainability education specialist and teachers should be carved out in order to support the educator in the steps for designing an integrated lesson on their own. This recommendation was also fulfilled in my study. As I explained in an earlier section, due to the pressures from standardized testing and time constraints, once the PD was completed, I

provided support to each pair of participants through guidance during sessions in which they co-designed one integrated lesson plan. Moreover, I believe that the participant's report on wanting a TOSA or sustainability education coach is an evident commitment to providing their students with transformative education through ESD. Not only does this desire demonstrate that teachers fear not being able to have the time to use relevant strategies taught through a PD, it also speaks to the participant's limited paid time for quality lesson planning and to their recognition that they need to have opportunities to see the implementation of pedagogies taught through training.

Another feature that was reported by the participants related to the inclusion within the PDs content about evidence on the academic, stewardship, and whole-system benefits from adopting ESD in schools. I believe that including this type of evidence is useful for those teachers that are already committed environmental stewards, as they are more likely to advocate for ESD approaches and frameworks and gain valuable results from using integrated lessons that they can in turn share with colleagues. Such exchanges with other teachers who might be skeptical of ESD may lead to changes in viewpoints and to new forms of teaching. Such knowledge would empower these ESD-champion teachers and would help to bring other teachers on board. It will also allow these teachers to navigate conversations with district officials and provide reasons for adopting ESD and integrated lessons not as a personal desire, but as recommendations provided by evidence-based research. This needed ESD literacy for teachers reminds me of what educational scholar Nolet (2009) underscored, that ESD should be part of content in pre-service teacher courses, which is, information that would allow student teachers to be conversant in national policies and efforts specific to guaranteeing sustainability

education across all education levels. Furthermore, buy-in from all teachers and from the district is essential for a whole-system adoption of ESD as it is a framework that is still viewed by many school principals and boards of education as an example of adjectival education or of extracurricular nature (Bolstad, 2004). Therefore, including evidence on the benefits of ESD and of including integrated lessons would help to drive a whole-system transformation.

The last two features that participants identified as key in PDs on ESD highlight the importance of (1) designing PDs with a central focus on ESD teaching strategies; and (2) time during sessions that provide opportunities for teachers to talk about and learn from each other about local, regional, and global sustainability issues. Participants explained that they want to increase their toolkit of pedagogies, and participate in PDs that strengthen teaching strategies and activities that showcase how to use ESD pedagogies for topics from across subjects. Such responses echoed the participants' desire of having textbooks or materials that center on sustainability content across all subjects. Their responses also resonate with what participants shared in terms of not feeling like they have mastery of enough teaching strategies. I also believe this is a tacit request to learn new ways to teach to their diverse student populations and to ensure everyone is engaged, enjoying learning, and seeing the applicability of what they are learning. To add, I did not find it surprising that the participants reported that having time to talk about sustainability issues happening locally and globally would be meaningful to them. Participant responses seem to underscore their desire to have more access to quality and concise information on the causes, mechanism consequences, and solutions to sustainability issues. In addition, as with students, I think that by anchoring their teaching to issues that are relevant to them or that they have interest in, the teachers perhaps find more joy and desire to

plan a lesson. As an example of a response that underscored the participants' desire to have access to concise sustainability information Participant B said *I would rely on the* [sustainability] *tutorials like videos…the challenge is, there's a lot of* [sustainability] *information. And I can imagine even after you've done it a couple of years, there's always new research, there's always new vocabulary, you know, so you always want to keep up with what's happening currently. And so it seems like it's an ongoing learning curve, right?* Participant C shared that she would like to *have* [access to] *quick blurbs of like what is ocean acidification... You know, something like, what should I know in order to teach the kids what I want them to know*. Participant D said [I want to] *have access to a list of resources for organizations and programs that are doing things locally*.

As already discussed, the features that were reported by the participants for an ideal PD on ESD align with many of the recommendations provided by scholars for effective structures and content within training for in-service teachers. The importance of reorienting training and support for the in-service force so it is adequately prepared to teach about and for sustainability issues in integrating with core subjects has been amply presented in chapter 2 of this study. By using the findings I have just discussed, the findings on the elements from PDs provided by the district that the participants reported as flawed, and the recommendations detailed in chapter 2, I provide through figure 5 my suggestions on the architecture and content for successful PDs on ESD. Moreover, in the last section of this study I provide my recommendations for how to secure PDs on ESD for California based teachers.
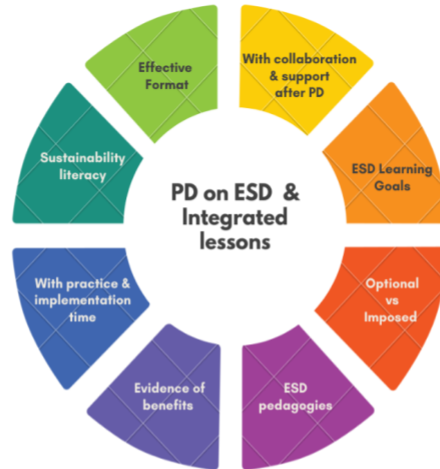
Effective Format

- Deliver short sessions that happen close to each other.
- Avoid one day PDs.
- Deliver PD outside of teacher's class time.
- Include opportunities for teachers to connect and/or interact with others practicing ESD.
- Avoid asking teachers to implement ESD before having sufficient practice sessions.
- Provide constant reminders of what has been taught.

ESD Learning Goals

- Introduce goals through short examples of ILs that foster the goal.
- Pair the written version of a shown ILs with clips that show the activity that fosters the IL.
- Provide lists of open source databases & websites where teachers can find pre-made ILs.

ESD Pedagogies

- Introduce ESD pedagogies as tools to ensure action-oriented activities.
- Showcase ESD pedagogies through clips.
- Showcase ESD pedagogies in a classroom setting.
- Allow teachers to map learned ESD pedagogies against their students learning profiles & the learning needs.
- Exemplify transdisciplinary integrated activities that can be built with one or more ESD pedagogies.

Practice & Implementation Time

- Sessions to practice methods for designing ILs such as SI.A.S.
  - Practice identifying the academic topic(s) that will be merged with the sustainability issue.
  - Practice selecting activities to be included by using ESD learning & pedagogies as a guide.
- Sessions to model/practice ESD pedagogies.
  - Practice ESD pedagogies in a classroom setting.
  - Have participants model ESD pedagogies with colleagues.
- Sessions to practice building a IL
  - Time to analyze how to use ESD pedagogies based on academic topics and sustainability issue to be merged.
  - Time to find resources to teach about & for the issue.
- Sessions to analyze & discuss teacher's key sustainability interests, curiosities & discuss pre-earned knowledge.
- Sessions to reflect on & report about implementation of IL with colleagues and/or TOSA/coach.

With collaboration & support after PD

- Ongoing support throughout year from a TOSA/coach or through collaborative work amongst teachers to guide planning of ILs.
- Include short check-ins with TOSA, coach or school champion to guide the construction of new ILs & adaptation of pre-made ILs.
- Include sessions with TOSA/coach to reflect & analyze the implementation of ILs.

Optional vs Imposed

- To reach all teachers.
- To support current passionate teachers.
- To respect teacher's requests to select trainings that suit their needs.
- To ensure that learned teaching strategies and methods are used.
- To get skeptical teachers on board.

Evidence of Benefits

- Include information on the academic & whole-school benefits from aligned education processes with ESD & from including ILs during formal instruction.
- Discuss benefits from always centering ILs on action-oriented & hopeful content.

Sustainability Literacy

- Include discussions on causes & consequences of local, regional & global sustainability issues.
- Include concise videos on mechanics of sustainability issues.
- Include descriptions & discussions on actions, programs, efforts & innovations.
- Have teachers co-create ILs soon after sessions on sustainability issues.
- Provide list of resources such as websites that
  - teachers can independently use to increase their sustainability literacy.
  - teachers can use for content on an issue when building a new IL.

Figure 5. Components for an effective PD on ESD

164

6.4. Elements from the PD that were applied by the participants during instruction

In this section I will discuss specific elements that were taught through the PD that in turn were used by the participants during the design process of their lesson plan, as well as during the instruction of it. While I collected data on the ESD pedagogies and the ESD learning goals as key elements taught through the PD, I decided to focus the discussion on the latter. This is because the participants learned through the SI.A.S method how to use the ESD learning goals as tools to guide their selection of activities and thus pedagogies as they craft an integrated lesson. Therefore, the ESD learning goals were presented and taught to the participants as a foundational strategy for weaving learning about and for sustainability within subject matter content. The exact mechanics on how to do so are explained on Appendix C in which the SI.A.S method is described.

Through the discussion of the data collected for the fourth line of inquiry I intend to explore plausible explanations about why the participants selected certain ESD learning goals and how these selections are a reflection of the challenges they face when attempting to infuse their instruction with integrated learning. In turn, I will discuss why I believe that the ESD learning goals that transpired into the design of the integrated lesson and the classroom instruction served their intended purpose of supporting the teachers to include integrated activities and therefore should be viewed as key elements in both professional development on ESD as in resources to teach under ESD.

Global and local citizenship was one of the goals that participants highlighted during their co-design meetings, which seemed to help them select specific activities featured in their final lesson plan. I believe that the participants organically, without my input, selected this

ESD learning goal as the official curricular content and the demands from standardized testing removes opportunities for HE students to truly learn about their communities. Learning about their communities goes beyond the consequences of local issues and includes information such as who in the community is engaged in social, environmental and/or economic sustainability work and why this work is being done. Having role models of local agency is empowering, especially for students that are part of traditionally marginalized communities, like many of the students at HE. It is empowering to have such role models because it tells the youth that even against many forces acting against you and your people, one can still find a path to make an impact, whether it is small or large. What may be far more powerful is when those making the impacts look like you, talk like you, and have gone through struggles similar to the ones you and your family are going through. I believe that it is no coincidence that the participants positioned local citizenship as a key ESD learning goal to be met. The participants know their students and know how little inspiration is given by the lessons that they have to teach for the standardized tests and from the filtered and outdated content in their official textbooks. As an example excerpt on how the participants viewed using local citizenship to guide the kind of activities they would select for their integrated lesson Participant B said *I think that connects it to, okay, well, what can I change? How can I change my behavior to impact the environment? So I think those are the things that are most meaningful, when they can connect it to their life and what they have control over it… Similarly,* Participant C shared her thoughts on bringing activities to foster local and global citizenship and said *I kind of liked the idea of making it as relevant as possible and having them look around their immediate community for examples, and just to look around our immediate community for solutions to… But if it was, if it was just*

166

up to me, I would just start with, you know, start small, because I think that that's like, a good

way for them to feel more powerful, because they're not able to develop the solution. If here at

school, they see something that could be done, they actually could possibly make up a solution

that gets you know, implemented.

Continuing my discussion on the value of embedding local citizenship in formal learning, as I have asked several times throughout this study, what else should education be than a force that inspires and transforms young people to become what they want to be in the world? If our educational system focused on and cultivated students' aspirations while making our youth masterful in mathematics, language arts, geography, history, politics, science and so forth, then I firmly believe those of us working in education could be more successful in supporting the societal transformations needed for sustainability. Until then, it is my position that we should emphatically deny and fight to remove any form of teaching, content, or educational standards that do the opposite of fostering civic action and agency within our youth.

The second ESD learning goal of sharing personal values through student-led work such as opinion pieces was clearly a rare occurrence at the participants' school, as teaching to the test and other test prep activities were a top priority. As already discussed, the participants did not have official textbooks or curricular content that highlighted student-led learning. Therefore, it was not surprising that the participants leaned into activities that would foster the ESD goal of sharing personal values. Examples of such activities are included in Appendix C and included introducing a new topic like how climate change is caused by creating a collective explanation that wove students' pre-earned knowledge, their reactions to the information

received, and their opinions on why harmful human activities continue. Other activities participants highlighted served them best for fostering this ESD goal included guided independent research combined with short opinion writing; and activities that allowed the students to identify issues that were directly impacting their lives. The participants' choice on activities to share their personal values is not only a testament to the certainty that the participants have about how little opportunities their students have to learn through activities that center them and their ideas; it is also, in my opinion, evidence of the teachers' desire to instruct through approaches that also allow them to be creative and to include content that is also inspiring for them.

It is my belief that student-led activities that allow learners to share their values and ideas are key elements in inclusive quality education and are essential for adopting ESD. Regardless of a student's academic proficiencies, pre-earned knowledge, and lived experiences, student-led activities position learners' viewpoints as important to the learning process. Standardized tests and teaching over and over from a textbook that does not include the ESD framework reduces the likelihood of supporting inclusive, critically engaged. Moreover, sharing personal values is powerful because students with any learning style and academic level will have a learning moment that is not demanding academic proficiency, but asking for what they think, what they care about, and their rationale for doing so. Through student-led activities, we can cultivate the confidence and ability within students to share their thoughts and values. Confidence leads to wanting to take risks and to dream, to be fearless in imagining something more for themselves. This is something that lessons on how to take a standardized test can never do. A thriving society, one that can imagine innovative and

exciting ways to co-exist without causing harm to the very ecosystems we depend on, requires confident individuals who, through their schooling, have been given ongoing opportunities to explore their ideas, to listen to the ideas of others, and to explore the value of having different but respectful ways of thinking. As a species that lives in constructed diverse societies, we will never cease to have a million different ways of seeing things, of interpreting what matters and what not. An important goal within transforming education that centers on ESD should be to give youth learning opportunities in which valuing and understanding such differences are also modeled. These opportunities can be created through student-led activities. As mentioned in the findings section, by using student-led activities that allowed students to share their opinions, the participants offered unique activities that resulted in students feeling proud and excited about their work, with even those struggling with disciplinary learning goals, and academically producing remarkable, high-quality results. To exemplify the effect from student-led activities, Participant A said *students were really proud* [of an independent research on a sustainability issue they selected]. *And it was awesome, because they could…we really had to push them to get them* [final projects] *done before open house. It was just the reality. Like you got to have something for open house…they had to share their project with their parents. And they were like, all of them were pretty proud. It was really awesome, even Darby's was really quite exceptional*.

The ESD learning goal of systemic thinking was taken up, but somewhat compromised due to testing priorities. As with critical thinking, analysis by stepping back and seeing all the connected components that have an effect on larger systems is simply not possible through memorization, worksheets, repetition, and test prep. I think that it is possible that the

169

participants selected activities that would have the students analyze information through a systemic lens to avoid teacher-focused explanations and memorization. In connection with systemic thinking, co-learning was the other ESD learning goal that the participants used. Through both systemic thinking and co-learning, the participants were able to bring some knowledge they had earned as individuals and thus to share their own curiosities and interests with the class, which is something that is not always available to them when instructing with non-integrated and diluted curricular content. I consider that by having the students learn together with the participants, the teachers experienced ways of instruction that honor who they truly are, including being individuals that have unique social and environmental passions and concerns. I believe that systemic thinking and co-learning can help shift the position of teachers as the owners of knowledge, inviting students to share with their teachers knowledge they have learned outside of the classroom and perhaps even teach their teachers something new. Such co-learning helps to normalize the idea that while teachers are the experts, they are also continually learning. In my position, what I just described should be a foundational trait of a learning community such as a classroom that daily learns with one single teacher.

The other ESD learning goal highlighted by the participants during their meetings was empathy. As described in the findings section, the participants used empathy not only to foster curiosity on what is being done to help those affected by an issue, what systems in place are perpetuating the issue, and who else or which other natural environment is being affected; they also used empathy to remind themselves that learning about sustainability issues can generate an emotional reaction in their students and therefore they should always pair information about an issue with how to act on that issue. Their main conclusion was that hope and action are more

powerful for fostering care and empathy than fear of the consequences of critical sustainability issues. An example of this realization was shared by participant D who said in relation to an activity in their integrated lesson that focused on the effects of climate change that *somebody asked something and that kind of led us to talk about the impact on us… And so I was looking around at their little faces. And I'm like, Oh, like this is like, when are we getting to the happy ending? But when we stopped and we talked about how, like, you know, there, it wasn't like everything is lost, there was still hope… and then I think we started talking about well, what would you do think, what's your solution? It was really like, it was a lot… but it definitely sparked something!*

What is interesting for me is that the participants decided on their own that they would implement empathy for an additional use beyond the uses I explained through the PD. I think that by using empathy for an additional use in their design process the teachers implicitly implemented a recommendation I often gave them, which was that ESD is a framework that has distinct features such as specific pedagogies, learning goals, and design methods, but it also encourages those that adopt it to find ways to implement it so it serves their learning population. I believe that it is likely that the participants took this recommendation to adapt the use of empathy as they were taught through the PD so they could meet their students' needs of learning about solutions to an issue as they observed how concerned students were when they discussed the consequences of the issue, as exemplified in the example excerpt provided before. By focusing on empathy, the participants seemed to help their students gain a sense of hope and possibility, as expressed by participant D who said, *that's what we ended up talking a little bit about what would you do differently? You know, like, just we saw this* [consequences]

but like people are being active... But I could see it in their faces [their concern]... *I know, this looks terrible but things are being done and now we're gonna learn more...Well, I broke their hearts and then put them back together. Let me tell you there is hope.*

Moreover, I also believe that using empathy as a reminder to include examples of actions and innovations could eventually lead the teachers to expose the students to different sustainability careers and professions; and how in these careers skills and knowledge like the ones students are learning in class are used. Such applicable learning is key, not only to make learning relevant to the students, but also to show learners from traditionally marginalized communities that they can be part of careers and trades that are making changes for people and the natural world. In alignment with my point of view is the reporting from multiple scholars and education institutions that underscore the urgency to expose young students from communities disproportionately suffering from social and environmental issues to knowledge and even work opportunities specific to green careers. These scholars' claims include that such exposure is crucial for achieving a just and an equitable green transition in which individuals from all socio-economic and racial backgrounds are part of thriving sustainable industries and thus we move away from our current extractive and destructive models of production and consumption (Kwauk & Casey, 2022; Kwauk et al., 2023; UNICEF, 2024).

While the focus of my study is on teachers and not their students, it was unavoidable to capture student reactions while observing class activities and as such, I have integrated some of these anecdotal comments that may shed more light on my participants' experiences. Consequently, I did collect data in the form of transcripts and note fields on these student reactions as I observed classes during which integrated activities were delivered. This data

was not analyzed, but I hope to utilize it for publications that will branch out from this study. For now, through figure 6, I want to provide examples of such anecdotal comments that seem to reflect the ESD learning goals that I just discussed as used by the participants. My intention with sharing these excerpted comments is to further exemplify how the goals served participants' purpose of learning about activities that instructed subject matter and sustainability content while fostering creativity, curiosity, desire for agency, and critical and systemic thinking.

ESD GOALS

During Design Session & Instruction ILP
- Local Citizenship
- Critical Thinking
- Personal Values
- Systemic Thinking
- Co-learning

Highlighted after ILP
- Personal Values
- Local Citizenship
- Empathy & Care
- Co-learning
- Curiosity

Reflected in student's comments during ILP

Systemic Thinking

"Well, people who eat fish a lot, right? Like certain people from certain places, eat lots of fish they eat a lot of fish. So what happens when like, they, they fish have too much like they have enough fish to last them for weeks and months, but then just keep on fishing. And then there's no more fish to go around. Which means other animals will die in the ocean after those died. Other animals will die too…So we wont have seafood in the entire ocean"

"…because it helps them not to emit greenhouse gases…in Singapore they are planting a lot of plants on buildings, on the side of buildings on top of them to like, push away heat from the sun. Both are relatively good space to be in because they plant a lot of plants and they don't emit a lot of pollution"

"the problem with food waste going to the landfill is that it takes up more land…it also pollutes the air"

Critical Thinking

"I feel like if humans weren't here would have a much better time like being able to survive"

"we are we are releasing CO2, which is killing off multiple animals. Even though we don't need that much you don't need we don't necessarily need factories right now because we already have a lot of phones, cars and a lot of things and stuff"

Answered to if these are natural resources "No, because plastic is made out of fossil fuels and these are non nonliving. But a table was one living but now is not. And notebooks and books were once living and now they are not".

Local Citizenship

"If we grow more plants we can stop global warming".

"it is important that we find a solution to this problem. We can start having droughts and start losing more water"

"something that is good is that companies are now responsible for paying for putting their product in compostable or recyclable material"

"because it helps them… cause it is gonna help Earth"

Personal Values

"We encourage you to take action!"

"If we grow more plants we can stop global warming".

"There is so much plastic in our environment is insane! It is killing our environments… Earth is not your trash can!"

Figure 6. ESD learning goals reflected in student's comments during delivery of integrated activities

To conclude this section of the discussion specific to the fourth line of inquiry, I will elaborate on two additional themes–transdisciplinary teaching and action-oriented lessons–that emerged from the data analysis that are relevant to my research question. These themes are not specific to the ESD learning goals that were used by the participants as they were taught through the PD but are foundational features of ESD and to teaching about and for sustainability. These two themes were reported abundantly by the participants through both the lesson planning sessions and during our meetings after they had instructed their lessons. Therefore, I will discuss how these two reported themes align with arguments provided by international scholars on the value of transdisciplinary and action-oriented lessons and teaching resources to support the adoption of ESD.

To remind the reader, the participants decided to co-design a transdisciplinary integrated lesson plan. After lesson implementation, the participants reported the value of this approach, as a powerful tool to deliver effective teaching that allows students to see the applicability of skills acquired and content learned from different subjects. One participant said about using a transdisciplinary that *It's always helpful like, use several subjects, because they'll start to see that, oh, I read this and reading and now I'm learning about, like, the scientific portion of climate change and science… we have curriculum that we have to follow. It's not always possible, but yeah, I mean, ideally, I love that idea.* The importance of transdisciplinary teaching to deliver quality learning about and for sustainability issues and thus align teaching with ESD has been amply underscored and validated by scholars, practitioners, and leading institutions since the earliest stages of ESD to date (McKeown and Hopkins, 2005; Tilbury, 2011; UNESCO 2022).

175

Through transdisciplinary integrated lessons, teachers can provide students with opportunities to learn about solutions and actions to address an issue as a continuum across subjects rather than independently through each subject or even less ideal only though one. By doing so, teachers can weave in one sustainability issue across multiple subjects, which I believe increases their chances to successfully adopt ESD. By weaving activities into existing curricula, teachers have multiple entry points to connect different pieces of sustainability information and thus will be less deterred from including learning for an issue during the formal instruction time.

Relevant to the second theme of action-oriented approaches to ESD learning, the participants reported that such activities were beneficial aspects of integrated lessons. As detailed in the findings section, the participants reported that such activities allowed the students to lead their learning about actions, innovations, and programs to tackle climate change. As an example, participant B explained how their integrated lesson had a solution oriented component and thus it was action-oriented, she said [the students] *had a choice of four different topics. So some of them did land rights, some did affordable housing, some did extreme weather and then the last one was public access Groups researched an issue and proposed a solution by writing a letter by using a template we did for them. The letter had them write about their issue, why it mattered to them and what they think could be done and they had to choose is this something that the mayor would be more willing to work on? Or the senator?* Action-oriented lessons by nature are solution-centered because they include at some level information about solutions. Learning about solutions is widely reported as key for catalyzing agency, which is a core element of ESD, hence solution-oriented lessons are crucial

for adopting ESD (Kelsey, 2020). Examples from reported benefits of a solution-centered education include that when individuals learn through content about actions and ways that people are working to solve a problem, rather than just learning about catastrophic future scenarios if problems were not addressed, what is most immediately remembered is that there is hope (Kelsey, 2020). Hope in turn fosters confidence in one's abilities and even ideas, which drives individuals to take chances and to experiment. These last two have been demonstrated to affect better performance, including academic, and well-being amongst youth and adults (Kelsey, 2020). In conclusion, the participants' positive reporting about using an action-oriented lens to guide their design process is in alignment with what many scholars have identified as an approach that teachers need to master if education is meant to be reoriented to include learning about and for sustainability.

One additional point that I want to discuss is that I believe that the participants most likely used the action-oriented approach because I continually reminded them during the PD that they needed to be very cautious to not exclude content on solutions and actions to tackle the issue they would be teaching about. These reminders were not only through comments; I provided such reminders through the steps they learned in the SI.A.S method (Sustainability Issue. Academic Topic. Standards) I taught them to produce integrated lessons. Therefore, using an action-oriented lens was a central message in the PD. My reasoning for doing so is not only because international authorities in ESD underscore using action-oriented approaches to lesson plan design, but greatly because of what I have witnessed through many of my professional experiences. During these experiences, which include domestic and international work with K-12 teachers, I have observed how easy it is for teachers to exclude content on

177

solutions and/or actions when they are building an integrated lesson, which seemed to only focus on the consequences of the issue.

Educators that are concerned about the impacts of climate change and know that their students are concerned about it and want to learn about it, can become too focused on all the data and information that is out there on the consequences. The dominant articulation of the urgency to act on critical issues like climate change and biodiversity loss, racial injustices or extreme poverty, is through messages that passionately tell others how bad these problems are. Nevertheless, let's imagine being ten years old again and hearing that we have ten years to stop our current greenhouse gas emissions or the world will not be the same. I know from experiences as a school principal, teacher, aunt, and friend of young individuals, that no matter what we teach after having shared information on dire consequences from an issue, all that young people remember is how little time we have to solve the issue. To exemplify this, the journal *Current Psychiatry* recently published a report that found that 82% of interviewed US children, ages ten to twelve, expressed anger, fear, and sadness when they had to talk about or learn about environmental problems (Kelsey, 2020). Consequently, the content in the PD that I delivered to the teachers emphasized that they should learn first and foremost about what is being done in their communities, states, country, and beyond. My rationale for doing so includes my belief that if teachers feel hopeful and excited about the many ways people are innovating and even learn about new careers that are emerging in sustainability and climate action, then they will organically focus their lesson design around solution and action-oriented content which in turn will allow them to effectively adopt ESD.

178

To conclude, transdisciplinary and action-oriented approaches for designing a lesson plan were reported by my participants, as reported by many ESD scholars, as beneficial for adopting the framework as they support the production of high quality integrated lessons. Therefore, it is my position that these two approaches should be considered foundational to ESD trainings and professional development for in-service teachers, as well as to resources to increase teacher's sustainability literacy, and to teaching resources such as pre-made integrated lesson plans and any content that is meant to be used as part of an integrated lesson.

Final Recommendations

Throughout this study, I have made ample claims on the urgency to transform education systems in order to prepare our youth with the knowledge, values, skills, and moral compass to make decisions, envision ideas, and act in ways that are critical to halt the causes and mitigate the consequences from environmental, economic, and social crises. Therefore, in this final section, I provide my recommendations for how to adopt ESD, as a framework used by myriad schools and education systems, and moreover, considered internationally as crucial for providing many of the tools and processes needed to transform education practices. Such transformation requires changes at overlapping and discrete layers and components of education systems, from educational policies and regulations to the courses that are included in the preparation of future teachers and how core subjects are instructed to students. It is out of the scope of this study to address the many changes required in all the different layers that must undergo a radical evolution. Therefore, I focus my recommendations on how to begin aligning educational processes with ESD through resources and forms of support for teachers,

schools, and districts. While my research question centered on teachers, I do extrapolate my recommendations to schools, districts, and even the state level as it is impossible to envision forms of support for teachers that do not overlap and connect with these other components of the larger ecosystem of education within California.

My recommendations for a roadmap to adopt ESD by California-based schools and districts are summarized in Figure 7. I include many recommendations that emerged through this study, but I also include a substantial number based on my professional experiences within and outside my doctoral studies. I draw from my current work with seven school districts that have embarked in the inclusion of climate change education through processes that align with ESD; my international work as a curriculum developer and designer of trainings on ESD; my work through Community Based Literacies at UCSB; and my domestic work in sustainability education with in-service teachers.

The recommendations provided on figure 7 are meant to serve teachers that are working alone in ESD or sustainability education, groups of educators and administrators embarking or hoping to embark on ESD, and school districts that are hesitant about or already committed to ESD. I also include recommendations for the larger education community in California. I consider that this community is composed of research universities, education instructions, and NGOs working in education, sustainability education, and climate change education. Moreover, I consider that the education community, in particular research universities and departments of education, are intrinsically connected to schools and districts and thus have a massive responsibility to catalyze and drive forward processes to evolve and transform education. In consequence, I have included recommendations for the larger education

community, along with those provided for schools and districts. I have also added my recommendations for actions at a state level, with the understanding that in order for these to become a reality a massive coordination and cooperation from stakeholders within the California education ecosystem is required.

Figure 7 should be read as a menu of recommendations as part of a larger proposed roadmap for adopting ESD across California. The top of the roadmap details the end user and the recommendations provided for each type of user are detailed from top to bottom. Readers should focus on the type of user they work with or are part of. Schools, districts or members from the educational community will each be in different stages of inclusion of transformative education through implementation of frameworks like ESD. Therefore, each recommendation should be taken if it fits the needs, profile, resources, and stage of the user. For example, if a school has a new budget that can include training on ESD but lacks other resources, then this school can focus only on the recommendation I provide on how to bring effective training on ESD. In addition, the left side of the roadmap details the challenges that are addressed by the recommendations detailed on the right. As one reads the recommendations from left to right, across users, the focus will remain the same challenges detailed on the left, but the recommended forms of support to advance the adoption of ESD will be specific to each user. Throughout the recommendations, I also provide references to further details found in figures 4 through 6. Lastly, I also detail the ideal actions that should be taken at the state level to ensure that all students, teachers, schools, and districts are benefited by the alignment of the education provided with ESD.

My intention with providing the set of recommendations in Figure 7 is to contribute to the many ongoing efforts to advance the transformation of education within California. It is also my intention to use these recommendations in future research in my role as lead of the UC-CSU ECCLPs Research committee; and also in my current role as CAPS program director in which I get to design and lead internship programs for juniors and seniors through which they build for their school districts climate action plans. Most importantly, the recommendations in figure 7, and in essence this study, are my honest attempt to leave something that can be accessible and understandable by teachers like my participants, who understand the importance of adopting ESD and of including integrated education in the formal instruction, but are navigating countless challenges that take their energy and focus from this goal. I hope that what emerged from this study and the will of my participants to embark in it can help guide teachers and schools wishing to transform and evolve the learning experiences and education provided to students. As I have stated before, it is our collective professional and ethical responsibility to support the much-needed transformation of education so our youth can face the challenges that are part of our inheritance and they can collectively create a future that is more fair, just, and honorable than the present we have crafted.

SCHOOLS	DISTRICTS	ED COMMUNITY	STATE

• Welcome the adoption of ESD
  ○ Share with district
  ○ Share with community
	• Explicitly advocate for & communicate support to the adoption of ESD	• Explicitly advocate for the advancement of school systems transformation
		  ○ Conduct research on academic & whole-system benefits from ESD
		  ○ Provide districts & schools information on approaches to adopt ESD
			• State wide mandate to integrate climate change ed, environmental ed & sustainability ed within formal official curriculum

• ID & appoint internal champions for
  ○ Integrated lessons
  ○ Sustainability literacy
  ○ Transdisciplinary ed
	• Appoint sustainability ed team or lead staff.
	  ○ Connect with current roles
	  ○ Create new role(s): TOSA or sustainability coach
		• Communicate available mechanisms to support school's and district's sustainability ed teams	• Guarantee budget to support sustainability ed teams at schools & districts

• Budget in PDs & trainings on ESD & integrated ed from external providers–see fig.8
  ○ ID support from research universities
  ○ ID NGOs, social enterprises, universities
• Block time for internally provided trainings on ESD
  ○ By champion teachers
	• Provide regular PDs & trainings for ESD & integrated ed
	  ○ Hire externally
	  ○ Build internal team
	  ○ ID support from research universities
		• Universities support
		  ○ projects to deliver trainings on ESD and sustainability ed to schools & district staff/teams
		  ○ research on benefits & results from ESD trainings
			• Mandate that all districts provide ESD trainings
			  ○ Guarantee budget
			  ○ ID providers
			    ▪ Universities
			    ▪ NGOs
			    ▪ Socially oriented enterprises

• Create internal database of integrated lessons
  ○ Internal team collects & curates samples
  ○ Collect internally created integrated lessons (ILs)
	• Support creation of internal school databases
	  ○ Training for set-up
	  ○ Provide sample ILs
	  ○ Enable exchange of ILs between schools
		• NGOs and networks that host larger databases
		  ○ Prioritize reach out to & work with schools & districts
		  ○ Include teacher curated integrated resources
			• Guarantee budget for internal school databases
			• Build statewide database of ILs

• Prioritize transdisciplinary integrated lessons & projects to ensure adequate time for science & social studies ed
 	
• Structure schedules to provide teachers with time exclusive for planning integrated lessons
	• Mandate that schools need to meet a minimum time for
	  ○ Science ed
	  ○ For lessons not directed to test prep: ILs & not ILs
	• Structure budgets to include paid time for planning quality integrated lessons
		• Research universities & relevant NGOs
		  ○ Provide evidence to schools & districts on the academic impacts from adequate Science ed
		  ○ Provide evidence on benefits from integrated lessons
			• State wide mandate to warranty that Science & Social Studies are taught in equal amounts to Math & LA across 1st-12th grade
			
			• State wide mandate to guarantee adequate length for paid time to plan lessons

• Explicitly communicate the value of non- test prep activities
  ○ Prioritize instruction for quality non-test prep lessons
  ○ Closely support teachers & students during test prep
  ○ Avoid comparing test results with other schools
  ○ Actively look for resources that teach test taking skills but that use engaging, relevant content
	• Explicitly advocate for alternative measurements of quality education
	  ○ Work with researchers to advance alternative forms
	  ○ Support schools with finding resources that teach test taking skills but that use engaging, relevant content
		• Research universities, institutions & relevant NGOs
		  ○ Support research & development of alternative forms of measuring quality education
		  ○ Support schools & districts by providing & piloting alternative forms for measuring education
			• State wide mandate to deprioritize standardized tests& include new innovative alternative forms to measure education processes across schools
			• Guarantee funding to research & develop alternative forms to measure education processes

• Demand from district, official textbooks that include sustainability content and relevant activities through transdisciplinarity	• Prioritize transition to sustainability integrated transdisciplinary textbooks
	  ○ Look for new providers
	  ○ Ed. community
		• Support research, development & piloting of sustainability integrated transdisciplinary textbooks	• State wide mandate to transition to official textbooks for all core subjects that include sustainability integrated content & activities

• Include in-house sessions to collectively learn about causes & consequences of sustainability issues & current actions & solutions	• Provide district wide trainings on causes, consequences & solutions to address local & global sustainability issues	• Evolve TEPs to include ESD & climate change ed
		• Provide sustainability literacy trainings for in-service teachers
			• State wide mandate
			  ○ TEPs must include ESD & climate change ed
			  ○ Sustainability literacy for in-service teachers

Figure 7. A roadmap for adoption of ESD within the California context

Appendix A

Low level codes available here: <u>https://tinyurl.com/mywhs6z8</u>

Appendix B

Line of Inquiry 1. Challenges for implementing ESD

<u>**(a) Lack of time**</u>

MA-F10, t1:02:4-explained "Yeah. And like, letting them kind of explore and they've been exposed. Like they watch CNN 10 on a pretty regular basis. And so they see a lot of the environmental stuff going on, and even just other sustainable sustainability issues going on. Just it's like, it's not very much so we don't go very in depth with it. But they are exposed to a lot. And they're very, yeah, can we watch?"

[MF: *MA explains with excitement to convey that even if they do not have formal sustainability content within their mandated curriculum she exposes students as she recognizes how much learning about these issues matters to them*]

Possible Subjective Claims
Foregrounded, Immediate
"I want my students to be exposed to some extent to issues as I care about them acquiring meaningful knowledge"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I expose my students to information on sustainability issues as they want to learn about these even if it's not part of the official curriculum"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important that students learn about issues that are part of their present and future"

Possible High Level Codes
Lack of time to teach in-depth about issues

ME-F11,20:22- "yeah, we can I think we can clarify because we had, we had like, Yeah, we should do, we should do that. We did have like a weathering unit in the beginning of the year, where we could have also I think we I also touched briefly on it, but we didn't go in depth"
[MF: *ME conveys excitement as the idea of finding time to explain CC and GW more in depth and with engaging resources*]

Possible Subjective Claims

Foregrounded, Immediate
"I am willing to figure out how to insert learning about CC and GW in units that do not specifically include it even if I do not have expertise or training"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I want to go in depth into CC and GW during our weathering unit because it is possible to do so"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important to use the existing curriculum to insert topics like CC and GW"

Possible High Level Codes
Find Time to Insert Learning About Issues

ME-F19, t47:57- explained that "now that we are out of testing I was going through I spent a good amount of like, like lunchtime and looking through to try and that's like, my goal is to really actually now figure out exactly what we're going to be doing."
[MF: *"I am now out of testing and finally have time to go through the resources you built for us because I really have had no time to look at what you did for us from our meetings" (AND/OR) "I dislike that it is until now that I can actually have proper time to do something as essential as revising the resources you did for us"*]

Possible Subjective Claims
Less Foregrounded
"I wish I had time to properly revise and study what you wrote for us so I could edit the LPs and the resources"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Testing took all my attention and time so I have not gone through the resources and ILPs"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important to have time to analyze quality teaching resources and testing should not be a barrier to have that time"

Possible High Level Codes
Lack of time to prep because of testing
Lack of time to revise and study how to use lessons because of testing

ME-F19, t51:41- as we were revising the remaining lessons in the unit I advised which ones could be skipped and which ones were necessary because of the summative and we notice that the experiments

were important and she asked to offer the students an alternative to what I had for ocean acidification "What if I give each student can I just give? I mean, what if we had the students do this?"

[MF: I know we are going to have less time than what you expect or hope us to have for the experiments so let me propose an alternative so I can at least have the students do some hands on work]

ME-F19, t16:08-I asked if she thinks she will have time during the year to open the ESD goals and think how she can re-shape and improve old LPs so they foster a goal and she can integrate some sust content and she said that "I mean, we have a PLC once a week where we're supposed where we can work on lesson planning and it's about three hours, but we also have meetings during that time. And like we're supposed to be meeting with, you know, like Mik comes in and wants to check in about, like, making sure we're like, doing all of our IB stuff. And then Mart is coming in for checking on our assessment scores. And so no, we don't I mean, a lot of this, that's what I would like to do. But it's, it's, you know…"

[MF: *"Leadership expects us to plan and use that time to make great quality transdisciplinary lessons that integrate sustainability content but in reality that time is taken for other things so we never really have time to work on planning which is the one thing I truly need and want"].*

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish we had the 3 hours that in theory we have for prepping lessons so we could produce high quality lessons"

Less Foregrounded, Less Immediate
"If I had those 3 hours I would make great lesson plans"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My school's leadership sets time for us to prep lessons but this time is used for other things"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"My school should respect the 3 hours we have for lesson planning"

Possible High Level Codes
Lack of time to prep quality lessons

ME-F18, t1:05:47- said "I was really stoked on on after the training. And like, all of that I was really excited. And I printed out and even laminated like, the, you know, all of the principles and like, the different frameworks and stuff. But unfortunately, yeah, I just felt like, I didn't have the time to integrate it. But I want I would like to." And "I feel like we just don't have the time."

[MF: She conveys frustration (AND) "I am frustrated because the PD motivated me and I see the value of the goals and pedagogies and I can use them for my planning but the reality is that I have no time to plan or use these resources I got and what I learned from the PD"].

Possible Subjective Claims
Foregrounded, Immediate
"I wish we had the 3 hours that in theory we have for prepping lessons so we could produce high quality lessons"

Less Foregrounded, Less Immediate
"If I had those 3 hours I would make great lesson plans"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My school's leadership sets time for us to prep lessons but this time is used for other things"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"My school should respect the 3 hours we have for lesson planning"

Possible High Level Codes
Lack of time to prep quality lessons

AU-F18, t1:06:10- said that "I loved the ideas. I love. I did have the paper for a while next to me. But yeah, there's just, we didn't get to apply as much".
[MF: "The PD made sense and I could see how to use the resources and I wanted to use them but the reality is that we do not have time to implement something new or even use tools to edit lesson plans or create new lesson plans].

ME-F18, t1:06:39-I asked if they used the goals to shape or edit activities in lessons and she said "Yeah I feel like we just don't have the time…like, because and I think like redesign, you know, having to redesign the lesson or it's…it's like, I feel like for me, at least, right now. It's like, I just have to get a lesson out. And then like, the, you know, the level of quality depends on like, how much time I have and all the time it just like, okay, get like, cover this content."
[MF: She conveys frustration and disappointment at the understanding that she could produce great integrated lessons but the pressure on admin is to cover mandated curricular content that does not integrate sustainability learning (AND) "I am overwhelmed with what we have to cover based on the textbooks and curriculum and even though I want to produce integrated lessons by using resources like the goals I simply cannot afford to use my limited time to edit previous lessons and even less to create new ones"]

Possible Subjective Claims
Foregrounded, Immediate

"I wish I had the time to use resources and knowledge like the one gained through the PD cause I know I would produce great lessons"
"I wish I did not have the demand to us the mandated textbooks and curriculum"

Less Foregrounded, Less Immediate
"If I did not have to follow the mandated curriculum I could make integrated lessons"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I have to focus on making lessons for the mandated curriculum and I do not have time to redesign lessons to make them integrated"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
I should have the time to edit previous lessons and make them integrated"

Possible High Level Codes
Lack of time to redesign lessons into integrated
Lack of time to make ILPs

ME- F1, d3, line 4- said she "got in trouble one time for using her teaching time to lesson plan as they are expected to do this during their free time such as Sundays".
[MF: She conveyed frustration (AND) "It is crazy that they would reprimand me for using teaching time to make good lessons if I had everything under control and they think I am devoting my personal time to planning"].

KA-F12-t40:36-when revising how many week would be devoted to integrated science unit she shared that they actually have 3 core days for school work/instruction and every other week is 4 core days, the 5th is the enrichment day, and WHIP actually takes every week half of one class so on that day they really cannot intro or do important stuff so she described that situation as "that's the only other thing that kind of gets thrown, throws a wrench into our plans some of the times"

MA-F10, t32:29- explained that for science they have class from 1:15 to 2:40, 3 days a week.
[MF: "Science is not a priority in the schedule, we barely get periods and they are short].

ME-F15, t35:37- shared that "you know what will be awesome. If we, I mean, really, teachers need like two teachers, I mean, classes need to… I feel like it takes like one it's like a full time job, just to do big lesson planning, and do it well. And then there it's really a full time job just to be a herder of children. You know, I mean, I'm so burnt out with these kids. At the end of the day. I'm like, I cannot."
[MF: ME conveys stress and burnout and feeling exhausted and not supported (AND/OR) I cannot do this anymore (AND) "My dream is to have someone do the detailed lesson plans students deserve so we can integrate sustainability and meaningful content because that is simply a lot of work, doing quality lesson plans"].

AU-F23,t41:21-I asked if the most dominant element is the curriculum or what Maddie has taught/done in the past and she said "Yeah, it's both. So the curriculum and also, I follow what Maddie has done,

188

because I think it's her fifth grade, fifth year…Which was really helpful for me as my first year and yeah, took a lot of stress out of having to create a year."
[MF: "I am new so I am just using what MA thinks is the best and I basically do not have to worry about creating lesson plans because I do not have time or the expertise yet"]

ME-F11, t 28:23,- explained that because of test prep they only get 2 30min science blocks per week (which is the trimester when they do science)
[MF: "We only teach Science during 3 months which is unacceptable"].

MA-F18t-1:05:31- explained that she did not even look at the goals at any time after the PD because she has too much in her mind and there is overlap with the IB lens.
[MF: "I am going to stick to the IB lens because my principal wants that and I am overwhelmed with teaching mandated content for which I already have lessons made"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I cannot use my time right now for implementing what you taught us"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I have to focus on the testing prep and many other things and do not have time redesign or create new ILPs "

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"The IB lens has some overlap with ESD goals so this should help me somehow to foster the goals"

Possible High Level Codes
Lack of time to use ESD goals
Lack of time to create ILPs

AU-F23,t37:49-I asked if finding the right resources to teach about and for an issue in integration with subject matter content is a big deterrent to do integrated teaching and she said "Yeah, the finding of resources. Definitely. Yeah."

Final High Level Codes
Lack of time to create ILPs
Lack of time to weave sustainability learning
Lack of time to find resources for ILs

(b) Teacher's low literacy

Low literacy on science topics and content
KA-F9, p4- said that "fruits come from natural resources" without clarifying that fruits are also a NR.

KA-F9, p5- said "so the sun is a natural resource" rather than explaining that the sunlight is. She asked "the sun in general or something specific about the sun?" But failed to clarify that is the sunlight not the sun as a celestial body.

KA-F9, t 7:11- asked BELs to explain NR "cuando yo voy a caminar me puedo encontrar un lápiz naciendo de un arbusto o lo voy a cortar de un árbol o lo voy a sacar de un río?"

ME-F14-t6:13-a student answered houses as an example of non-living thing in an environment and she said "not really, it has to be natural, like from nature".

(c) Low preparation on engaging science pedagogy

ME-F14, t 16:22- ME said "Okay, we're almost we're almost done about learning more about environments" a*s if thinking "this is hard to teach, they are not engaged, please bare with me?"*
[MF: ME conveys stress and feeling overwhelmed (AND) "This topic is not engaging them and I wish I had better knowledge so I could use the resources and the content in the slide more effectively"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I know you are not engaged and I am also having a hard time teaching this topic"

Less Foregrounded, Less Immediate
"I wish I knew more about this topic because I want the students to be engaged"

Possible Objective Claims
Foregrounded, Immediate
"I have to finish covering these slides even though I am having a hard time teaching their content"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is important we learn about ecosystems even if I am having a hard time teaching the topic"

Possible High Level Codes
Lack of well-rounded literacy on science topics

ME-F14,t24:13-after doing the tide pool slide on interactions and moving onto the garden slide, and having students answer for examples of living and non-living she asked students " But let's let's make up our own interaction. What is the sun doing to the water?" Then she asked "How did the plants interact with the sun?We learned about it in the garden. But what is the sun and plants? How do they interact?"

KA-F9, t 13:51- during her explanation of what kind of definition they would want to create for NR she said "what's something that we can say about all of these words was something that we can apply? I can use this to kind of describe all of these things."

KA-F9, t16:432-said as part of her questioning to lead students to co-definition of NR "What are the things that you would say Oh, this is what these things are?" Then she jumped to questions about the things on their list running out.

(d) Low preparation on pedagogy for teaching about and for sustainability issues

AU-F2, t14:09- confirmed student's comment on not needing meat by saying "There's more sustainable options that we could be using that are taking away from these rules with the little resources we have available"- [OC:Could have explained how meat is connected to deforestation].

AU-t14:59-students were talking about being vegan and she said "for environmental reasons some people choose to be more plant based. You don't to help you don't even have to cut out meat completely just eat less meat"- [OC: could have explained why for environmental reasons].

AU-t18:40-reminded students that bio loss is "animals dying off or land not having a lot of variety of resources and plants and the animals that we used to".

AU-F12, t20:54-said exactly right to S3 inaccurate explanation of who causes overfishing.

AU-F12, t29:21-did not dig deeper when student said "global warming causes the...the..and in the Pacific Ocean, I don't know what it's called."

AU-F12, t35:53: said when doing exercise about consequences of lack of clean transport "right so I'm going to underline that sentence in the US traffic is the largest source of greenhouse gas emissions that's something we can write for consequence to…" [OC: DOES NOT FINISH IDEA]"

AU-F12, t36:31- S10 who is not un group said in response to the above comment that "but Mrs.A aren't some power plants fossil fuel by like don't they use some power plants use fossil fuel like to power off?" [OC: AU does not correct him or dive deeper, asks questions or simply engage].

AU-F12, t46:19-s10 said "don't buses and trains make FF or GHG?" and AU simply said "uhumm...what yeah". [OC: AU was unsure...really obvious she was not sure of the answer she should give]. After S9 jumped in and said "well they can kind of help" she replied "that's true yeah, using buses and trains it means less people on the road drive"

MA-F13-t 19:50- MA was fostering a back to back discussion on effects of food waste in landfills and she asked students how does food waste in landfills pollute the air and student explained "because they used gases, they use a factory". MA then asked "who uses a big factory?" and did not explain methane emissions as the cause of the pollution but clarified the factory piece as an additional source.

(e) Student's low foundational knowledge

MA-F20, t12:38-explained that the kelp forest LP did not work because the students are simply not familiar with that ecosystem and the animals in it. She also explained that "the ecosystems unit is always tricky because it's not so hands on, except for the part of sorting animals, and so because it's text heavy many students struggle with it, but it's mainly because of the nature of the content". She added "They just weren't as engaged as I wanted them to be, but again, it could have just been that it was too abstract as soon as we switched over to Yellowstone, and they were, you know, they had enough background knowledge to access it. They were a little bit more in as soon as we could, like, you know, look at plants and like, put a sweet potato in a cup of water and see those roots grow like they're more in tangible and relatable.

[MF: MA conveys frustration that there is such an evident lack of organic or embedded ability to connect with content that is abstract as a consequence of the way students have learned over the years (AND) "I am used to this happening, that is why I use activities and the YS lesson as I have tried these before and they work because it is easy for students to conceptualize a fox and a wolf but not a seal and the kelp forest even with videos and pictures, it is just the reality of their foundational knowledge and the way they learn"].

Possible Subjective Claims
Foregrounded, Immediate
"I know that abstracts concepts are difficult for my students because they have many academic gaps"

Foregrounded, Immediate
"I want to use examples from our community but the students needed content that they could visualize as familiar and the kelp forest is very alien for them"

Possible Objective Claims
Foregrounded, Immediate
"My students are not ready for advanced systemic thinking so I rather use content that considers their limited background knowledge"

"My students benefit from hands-on learning when new unfamiliar concepts are presented"

"I want to use content that students can easily conceptualize even if it's not connected to our local ecosystems"

Possible Normative-Evaluative Claims
Foregrounded, Immediate

"It is important to use content that builds on their existing background knowledge"

Possible High Level Codes
Limited background knowledge on foundational science topics

MA-F20, t15:34- explained about the kelp LP that "They were so lost!" they're familiar with some of the organisms, but like, and they're like, but is the kelp a plant? Or is it this or, you know, and like trying to really grasp that and like, what is the decomposer? Yeah, no, like, that was really challenging."
[MF: "It was challenging for me because I had to help them conceptualize organisms that are alien for them and that takes time (AND) I" wish they were exposed to these organisms before and it would not be so alien for them to learn about seals and the kelp"].

MA-F20, t16:20-explained that the part of the LP that had them research was too broad, they need more specific details on what to search or focus on so she directed them to the Monterey Bay Aquarium. She explained that " it was just so broad for them that they needed a lot more direction. And so eventually, I put the brakes on. I said, Let's do this together…. so I put it up on the TV. Hmm. Like we kind of worked through it together."
[MF: "They need very specific short tasks with almost step by step guidance"].

MA-F20-t17:08-explained that "the video on kelp forests as natural solutions to CC was great, but that the article was hard because it was difficult for them to get their brains around the concept of carbon and thus carbon sequestration". She agreed that a video to exemplify carbon and how it is made would have been great. She also agreed that "they need to visualize concepts first then introduce readings then introduce research".
[MF: "The students come with very low academic foundations plus they do not learn enough through active systemic thinking so they are going to have a hard time understanding concepts they cannot really see or touch].

Possible Subjective Claims
Foregrounded, Immediate
"I care about my students and recognize their limited skills and background knowledge for learning new unfamiliar concepts"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I know my students have low science background knowledge"

"I know my students need to visualize new concepts as a first step"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is important that even if they have low background knowledge I use engaging resources to help them visualize new ideas and topics"

Possible High Level Codes
Low science foundational knowledge
Low preparation in conceptualizing new unfamiliar topics

MA-F20,t18:17-explained that "it was interesting, like when they were doing their sustainability projects. Yeah. All of the like, all the topics were like, like they, most of the kids showed a pretty solid understanding except for biodiversity loss" She added "They were straight up, like, I got to pick up trash. So the animals don't die…" And added "Are you just like making stuff up that you think you've heard somewhere at some point in your life? Like, literally, they're drawing, like environments with trash? And then like, how do we address it? We pick up the trash so that the environment is clean for the animals? And I'm like, biodiversity loss. Did you watch the videos? We read the article together…"
[MF: MA conveys frustration that even with all the resources she used the students still struggle with such an important and seemingly straightforward concept and they simply using pre-earned knowledge that somehow seemed related to biodiversity loss]

MA-F20, t19:26- explained that "They got climate change. Still hard. It was hard, but because they had the choice of topics. The way it ended up was those students with enough background knowledge and just ability in general are the ones that selected it…"
[MF: "Harder topics are chosen by the students that have better background knowledge, the others would not have selected that topic because they know it would be too hard for them"].

ME-F19, t31:06- I asked here she was in the LP and she said " I think testing was a big thing. And then also, I think we shared the other day that a lot some of the content is is a little advanced." She added that she skipped the too advanced lessons and "I chose to do different lessons instead that I knew would be like the students would be able to, you know, access a little better….I skipped the whole lesson and in some just a piece of the lesson and did the rest".
[MF: "I selected what was at the students' level even though I knew we will be missing some content"]

ME-F19, t36:05-explained that the texts on that LP were too long and too advanced not for everyone but many would definitely struggle others would push against trying; she mentioned the research was also too advanced and mentioned that would be great for 5th grade and "And also it depends on the class. You know, I hear that like, there's this one class that's moving into third grade right now. That's a grade that's like very high. So you know, like it could they could then be able to use it."
[MF: "I wished we could have used all the resources, but I did not have time to revise them before the classes and so I encountered too advanced texts and tasks for the level the students have, which is low." (AND) "It does not mean we won't use them in the future, if we receive students that don't have so many academic gaps in foundational knowledge"].

ME-F19, t37:06- explained that the texts for her current students should be a simple not condensed one pager and that even the Chew on This "I had several students who didn't try to read it. But honestly, those students are the students that have it's usually my attention ADHD kids who are like, not have not been who have not qualified for SPED or have not been assessed and they should have and they're

like, you know, it's hard for them. But this is this is a lot for quite a few of them. I would say at least 50% Yeah."

[MF: "The systems in place have failed to a lot of of the students and teachers as students that need extra support are not receiving it and so I simply cannot push them to read something they are not equipped to read. I also acknowledge that even those students without reading difficulties have low reading abilities for these texts"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I am upset that many of my students are not receiving the support they need and so they cannot access this type of reading content"

"I wish even my non SPED could access the texts and that level of content but their foundational knowledge and skills are not there yet"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Many of my students are struggling as they do not receive the proper support to navigate learning with their unique learning profiles"

"Half of my students cannot access the content level due to their reading skills and foundational knowledge"

Less Foregrounded, Les Immediate
"The students bring low skills and knowledge and so this limits the content we can read"

"I am excited about working with students that can access this level of reading content"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is crucial that the school qualifies all the students that need additional support for reading as it is a huge barrier to my teaching"

Possible High Level Codes
Low reading abilities and skills
Poor support from admin for students with diverse reading abilities

ME-F19, t37:50- pointed out words that for her EL students is too advanced like "edible cutlery" or "entangled" and even for her EOs; she added that "it would have to be half the volume or it would have to be the language. So it has to be more basic"
[MF: ME conveys frustration as she wants the resources to increase students' vocabulary so they can access rich content and advanced texts related to sustainability].

KA-F22,t31:14-explaining the reading portions of the LP "we didn't get through the whole the all of the reading. It's well, and it's even for my very good readers like, or at least my the higher readers. And my my very, very good readers were not here today. But the other two that are right up there. It was a little bit some of the vocabulary was a little challenging. But what I did is I shared a copy of the-instead of printing- because I said, you know, I was going to print it out for you guys. But then I was like, why are we going to use resources on a paper? Let's just, I shared it with them on a clear Google Drive. And I said, so you will have your iPad, and you can read it there. And I'll mirror it. And we read it together. And then we discussed like, the vocabulary and what does that mean to you? Like, you know, what does that look like?"

[MF: I have to be creative and use technologies I have available to make texts accessible to the students, because having them read the texts alone would have not worked, they have too basic of a vocabulary and reading abilities.]

Ka-f22,t45:10: She added about the level of the texts included in the LP "And as far as like the the level of the reading, I wouldn't necessarily want to make it where I'm adjusting the level, okay? Because they still need that exposure to the language…. the thing that has to change there is that it's not something that they can read on their own. For that to be effective than it has to be their small group, or whole group, right, so that I'm participating in the reading, and I can help with the words they get stuck on, and we can talk about what it means and, you know, and make other connections or trends, you know, whatever we need to do to make sure that they're understanding what we're reading. So level text is great. Only if you're thinking, Okay, I'm gonna hand this to you, I want you to read it like, and then tell me what you read about or work in your small group. And there's a place and a time for that. But I but I value having the text that is a little bit more academic and challenging. But I recognize that that's not something that I can send them off and be successful on their own. But when they get a standardized test, that's what they're going to face. So I would much rather have that be the thing that we work with, even if we have to struggle through it. Because then we can practice like, yeah, use your context…. they'll feel less fearful when they encounter it later on. So I think it's one of those it's like a double edged sword, right? Yes. Like, yes, it's challenging. And the challenge is making sure that we have time, we meaning me, alone, or me with other help in the classroom, to make sure that every child is able to follow along and you're addressing, kind of, you know, checking for comprehension? So that we all kind of leave Having read it like, okay, I get IT"

[MF: "I do not want to dumb it down for them because they will be tested with texts and readings that are too advanced for them (AND) "I want to have the resources and time to make sure we use advanced texts and each one gets the support they need to read through the texts and understand every word and the know how to use context and other clues to understand what they are reading."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I care about my students and want to give them the best resources even if they have low reading abilities"

"I care about my students and understand they need me to guide them when reading complex content"

ME-F18-t7:08-And then also, some of the learning experiences have been a little too, have had a little too much text. And the level of text also is too high for many of the students."

ME-F18-13:46- I asked for more details on how was the content too advanced and she said " I mean, volume, and I mean, reading level, okay. I mean, the, like, for example, I can, I think it was one of the first ones that we have, I have to pull it up. But I would say only about five of my students can really read that."

MA-F18-t14:02- added to ME's above comment "I agree in our resources, like the ones for the sustainability issues were more accessible because they were more there was more of a range of articles but like when we were like doing like the climate change ones, the water and everything, those were really challenging, we had to go into them as a class"
[MF: "I could not have them read the articles individually as they do not have the skills and vocabulary"]

MA-F18, t14:2- added about complexity of texts "vocabulary was hard and the concepts are hard, like talking about how the water moves like how the ocean and temperature changes like that's on its own hard for kids to wrap their minds around. And so then just having a text about it with a high level of vocabulary is challenging. Like I feel like I read it a couple times through prior to make sure like I was like fully, my understanding was clear."
[MF: "We do not have extra time or resources to increase the students' level so they can understand Science concepts that are not part of the curriculum but that are part of sustainability content" (AND) "The students have very low vocabulary" (AND) "I never teach these science concepts and thus it was also difficult for me"]

197

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish they could access complex interesting science texts but they do not have the skills and knowledge yet"

Less Foregrounded, Less Immediate
"I simply can't teach so many things at the same time, from vocabulary and advanced science topics, to how to access a complex text"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I know the reality of my students' foundational knowledge and reading abilities and it is very low"

"I can't provide complex science texts because the students will not be able to understand the science and will not know how to access the texts"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"We should be teaching science more effectively as my students do not have grade level science knowledge "

Possible High Level Codes
Low science literacy and reading abilities

AU-F23,t47:11-I asked for student comments and reactions from the readings including in the Festival LP and she said "Some of them were..umm were too hard…I read them in groups with them, independently I think it would have been too hard."
[MF: She conveys submission to the reality that her students simply do not have the skills and the vocabulary to do individual reading of these texts].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish they could read on their own but that is not the reality"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The students do not have reading skills to access this type of texts on their own"

Less Foregrounded, Less Immediate
"I can't give them texts with high level science because they can't even access the texts on their own"

Possible Normative-Evaluative Claims
Foregrounded, Immediate

"It is important that the students' low reading abilities and foundational knowledge is remediated somehow"

Possible High Level Codes
Low science foundational knowledge and reading abilities

MA-F20t57:25- we were talking about how even with the kelp forest LP that didn't work she felt it was a success because they ID the basic foundation the students really need, from basic interactions like a crab does what and lives where to how it is under the surface of the ocean.
[MF: "Now we know what other knowledge gaps they have and that these are really foundational"]

Final High Level Codes
Student's low science foundational knowledge
Student's low reading abilities and limited vocabulary

(f) Lack of efficient integrated teaching resources
ME-F19, t40:06-agreed with me when I said that an issue is that even with all the resources out there, they have not been tailored/made to a particular class and teachers don't have the time to edit the language and vocab in each.
[MF: ME conveys satisfaction that I understand that there are not proper resources for them to use because their students have unique learning needs.]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish I had the time to explore all the resources available for free and adapt them to my students"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The integrated resources need to be adapted and edited no matter what and that takes time"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is important that our school has someone in charge of accessing these resources and helping us adapt them to our class"

Possible High Level Codes
Lack of support to access and edit available integrated resources

MA-F20t57:25- we were talking about how even with the kelp forest LP and she agreed A LOT when I said "So it's like it's almost like an obligation for research centers and universities that have those resources. Okay, you should provide that to schools as well. The field trips the underwater footage, the

live you know, session with the dudes that go underwater and can be talking like yeah, Stanford has a virtual reality program right now. Amazing. Kids are literally experiencing being under the kelp."
[MF: "Yes, why are schools and teachers not receiving efficient resources to help our diverse students and their diverse knowledge?"]

MA-F10, t16:51-said in response to my question if they start with local ecosystems "NO, that's something I've always wanted to do. Because we always do Yellowstone because that's what's readily available and easy to go resources"
[MF: "I am going to use what I know works and that implies not having to look for extra resources because that takes time and I don't have them accessible"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish I could use content on local ecosystems but I do not have time to find and adapt relevant content"

Less Foregrounded, Less Immediate
"I wish we had the support and the time to use teaching resources that expose our students to local ecosystems"

Possible Objective Claims
Foregrounded, Immediate
"I know my students will benefit from learning through content that is relevant to our local ecosystems"

"I use what I have available because I have time constraints"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is important that we receive support to access teaching resources that expose students to local contexts"

Possible High Level Codes
Lack of support and time to access content and resources on local contexts

Final High Level Codes
Lack of support and time to access and edit integrated and contextualized teaching resources

(g) Standardized testing

ME-F15, t54:42- I was saying "oh we demand that they teach these kids how to design the new machine that will save the world and how to fix racism" and ME said "and then have like, everyone amazing test scores".

Possible Subjective Claims
Foregrounded, Immediate
"I wish admin could see how impossible it is to deliver quality ed when we focus so much on testing"

Less Foregrounded, Less Immediate
"I wish we would not focus on acing tests but in preparing them on how to take action on issues"

Possible Objective Claims
Foregrounded, Immediate
"The reality of our and all schools in SBUD is that testing is what drives how and what is taught"

Less Foregrounded, Less Immediate
"We can't teach them how to be agents of change if we have testing imposed on us as a measure of quality"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is crucial that we acknowledge that testing cannot determine what and how content is taught"

Possible High Level Codes
Good test scores is the dominant priority from admin
Standardized testing determines content and pedagogy in classrooms

ME-F19,**t**0:44-talking about how ideal it would be for all sites in SB Unified to do integrated ed she asked "do you have data on this that supports like, better testing? I'm like, I don't care about that stuff… if you can, if you can assess the kids. Yeah, you should, the before and after."
[MF: ME conveys excitement and almost hope at the fact that data showing the benefits of IE in standardized tests could be a way to get the district on board].

MA-F10,t0:53- said that they do the whole content for SS during Fall because that is the only way they con cover all the standards.
[MF: MA explains matter of fact (AND) "Priority is covering the standards so that guides what we do"].

MA-F10, t 1:10:41-explained that 1-2 months before stand test they are also "pulling their most recent reading assessment and figuring out what were the biggest holes are and really hammering those before the test" and "use that data to kind of help plan for the push prior to May testing".

ME-F19, t59:30- I asked her what would she need to convince your principal to make more more of an effort to help them to do more integrated learning and she answered "testing" frustrated with the answer.

"Like, yeah, testing causality and correlation...Yeah. Unfortunately, yeah". She then added "by the way, you know what else actually Veronica that's not actually completely fair. She is very she, the student, the action thing is really important to her. And I think that that is something that would get her excited. And also the global perspective, just because I think especially for Veronica, this aligns so well with IB, yeah, that that's definitely something that is Positive."

[MF: ME conveys frustration and sadness when she refers to the relevance of standardized tests over any other type of learning. She acknowledges the positives of VE's goals for the learning at HE, but recognizes the pressure on her from standardized testing].

Possible Subjective Claims
Foregrounded, Immediate
"I wish testing scores were not used as the measure that indicates quality learning"

Less Foregrounded, Less Immediate
"I wish we could integrate sustainability learning but testing scores is what matters, even if our principal values action-oriented learning"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Good test scores is the priority even at a school that values and wants action-oriented learning"

Less Foregrounded, Less Immediate
"Our principal wants integrated education through action-oriented lessons but she has to push us to deliver good test scores"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Testing needs to be become less of a priority so we can prioritize on delivering action-oriented lessons"

Possible High Level Codes
Preparing students for testing is a barrier for implementing integrated learning

MA, AU, KA, MA- F1, b5, line 201- nod and look at each other nodding in response to my comment that test scores might be a barrier to infusing learning for sustainability during class time as this new content could be seen as taking time from test prep.

[MF: " You said it, we know it and we have to deal with this"].

Possible Subjective Claims
Foregrounded, Immediate
"We wish there was more acknowledgment of testing as a barrier to overall quality and less standardized education"

Less Foregrounded, Less Immediate
"We want to say this to admin but we are not sure how and if we should"

Possible Objective Claims

Quite Foregrounded, Quite Immediate
"As long as we have to prepare students for testing there will be minimal time for other types of lessons"

Possible Normative-Evaluative Claims
Background Foregrounded, Immediate
"It is important to find ways to integrate sustainability learning even with testing as a priority"

Possible High Level Codes
Test scores as a priority over integrated learning

KA-F18, t6:05-I asked where they are in the co-created LP and to explain barriers and she said "I mean, not doing all of the activities or all of the step by step. And I don't think I will finish like all of them just because we're running out of time. Some of the barriers, and the reasons why we're a little behind is one, it was the our testing blocks went long, and several students didn't finish. And so then it's, it's kind of like, okay, when did we do this when I have the majority of the students in, but if I missing 10 children that didn't make sense to really do an activity that was supposed to be for everybody. So that was the biggest barrier."
[MF: KA conveys frustration at the hurdles that she has to face from testing (AND) "I can't teach rich in-depth lessons if I am missing students that are still testing"].

Possible Subjective Claims
Foregrounded, Immediate
"I care about my students and want each of them to be exposed to quality integrated lessons so if one is missing due to testing I am not going to develop the integrated lesson"

Less Foregrounded, Less Immediate
"I wish testing did not take so much valuable teaching time"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"If testing did not take so long we could focus on developing a whole unit with rich lessons"

Less Foregrounded, Less Immediate
"Students have different abilities for standardized testing so many will take longer which will block my ability to develop with the entire group meaningful lessons"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"Testing consumes too many teaching periods that could be used for integrated learning"

Possible High Level Codes
Testing takes away time for quality meaningful education
Testing disrupts integrated and quality teaching processes

MA-F20, t9:49-said that if I had come in Fall they would have had more time and less pressure, explaining that "I mean, like, we feel that pressure. But it's like, honestly, the day's like, up until like, the couple of weeks prior to the test that the days stay the same. It's just we're feeling that pressure on our backs of like, oh, this is coming in, let me make sure they know how to do X, Y, and Z….not even to ensure they aced the test. Because the reality is, is most of them aren't but to ensure that they feel good taking it and they're not being blindsided. So ensuring that they've been exposed to it that they know the types of questions that they're going to be asked that they know the expectations because it's really hard….They've seen the format of it. And they know that when it says select two answers the two best, you have to select two, not three, not one, just that sort of stuff. But like the reading the directions are like, this is what the questions look like, this is how you pull the numbers over. Because there's just a lot of different functions within it."

[MF: "I know the knowledge the students have is not what is going be tested but rather their testing skills and so I want to give them enough practice on that even though that is not relevant learning, I care about them and I want them to feel proud of their efforts" (AND) "It is very stressful for me and for the students, the tests do not give anything to their learning"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I care about my students and so I take the time to teach them test taking skills so they try their best and they feel good about their efforts regardless of their scores"

"I feel pressured to provide my students with sufficient tools to help them navigate the test's questions"

"I care that the students feel they can read and interpret the questions, more than their scores"

Less Foregrounded, Less Immediate
"I wish testing wasn't so tricky because my students suffer when they encounter questions that they have never seen before"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I focus on preparing the students on test tasking skills which takes time"

Foregrounded, Immediate
"I do not like devoting so much time to test taking skills when I could be doing meaningful lessons"

Less Foregrounded, Less Immediate
"Preparing students on test taking skills is not quality or meaningful learning"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"Testing is about knowing how to interpret questions correctly"

Possible High Level Codes
Test prep as a priority that takes away time from quality integrated education

ME-F18-t7:08-I asked where they are in co-constructed LP and barriers and she explained "I think just testing because I feel like when testing is happening, it's like we go down to the bears, I feel like science ends up getting kind of booted a little bit because of the reading and the math, I feel like often takes priority. So that was a barrier."
[MF: ME conveys sadness when explaining that Science is not a priority simply because the tests focus on math and reading (AND) "I wish I could teach them more Science but I have to focus on the testing skills"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish we wouldn't have to devote so much time to test prep because we have to ignore teaching crucial content like science and integrated lessons"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I now that during test prep time my students will not get quality science or even less integrated lessons"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"The priority at our school is to devote enough time for test prep rather than for science or integrated learning"

Possible High Level Codes
Test prep takes priority over science and integrating lessons

MA-F1, b5, line 185- said "for like me, hmmm, I won't name names but I have worked, I have colleagues that I really respect, that say I'm just gonna make sure that my students know the formula for this type of essay, this type of essay and that type of essay because as long as they meet that structure they'll get a good score on the test:…and I'm like I DON'T CARE <she's mad at this point, remembering those conservations> my goal is that they can write well!"
[MF: MA conveys anger and frustration and looks over her colleagues and Mik not too concerned but also being cautious she does not use names (AND) "I know that what will help the students in the future is knowing how to actually write something meaningful and relevant not to memorize a formula, I care about their future, not the test scores and I am upset that other teachers focus on scores"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I care about preparing my students holistically not merely to get good test score"

"I am disappointed by other educators care about test scores rather than developing their student's true writing and thinking skills"

205

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I want my students to be able to write meaningfully and holistically rather than get good test scores"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is wrong that teachers focus on test scores and leave out of the instruction skills that are the relevant ones for the students' lives and future"

Possible High Level Codes
Test scores as a pressure that pushes teachers into standardized education

MA & ME- F1, b4, last line- "standardized testing is the one measure to quality education which is imposed on us through a "ladder": from the district to the principal to Mik to us".
[MF: They all convey frustration but they are looking at MI as they say this (AND) "Good scores is what matters to our principal because that is what matter to the district"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"WE wish our principal would not be pressured by the district on getting good scores"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"We understand that our principal is pressured by the district and so she pressures us"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Is wrong that good test scores is used by the district as the measure to ensure quality education"

Possible High Level Codes
District's demands for good test scores

MA- F1, b5, line 190- agrees with me that what matters is that students can do critical and systemic thinking not memorizing essay formulas.
[MF: MA agrees with her head and looking frustrated at the idea that the test take that opportunity to foster those things].

MA-F1, b5, line 191- said that tests not measuring valuable metrics is frustrating for her as she was one of those students that tested poorly.
[MF: MA she explains with emotion when she refers to how bad she was in standardized tests.

MA-F1, b5, line 194- said "yeah so I think there is SO MUCH else that needs to be valued! In this specific moment and time".
[MF: "Our students are going to face very serious threats and we are not preparing them for that, but on test taking skills"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I am worried that our students are not receding enough transformative education that prepares the for the future"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I know that test prep is taking away from teaching our students about and for current historical crises"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is wrong that test scores are a priority over teaching students about and for sustainability issues"

Possible High Level Codes
Test scores as a barrier to deliver integrated and transformative education
Tests fail to measure relevant knowledge

ME-F1, b5, line 242- said "STAR and CAST do no give credit for work shown, which is RIDICULOUS".
[MF: "These are absurd tests that do not measure how well a student has learned concepts"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I am mad that these tests do not measure what my students know, their ideas, and opinions"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Tests do not measure how well a students masters concepts"

"Tests do not credit the many valuable elements of mastering knowledge"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Tests should credit how a student arrived to an answer as this shows more of their true knowledge"

Possible High Level Codes
Standardized tests measure a small set of skills

MA- F1, b5, line 246- said in response to my question that they can create their own internal tests but that those scores/data does not matter to the district, said "that data does not matter to them!"
[MF: "The district cares about score and data, not what we measure even if that is agency and critical thinking and things of such nature"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"We wish our report cards mattered more as we do measure valuable skills and knowledge"

Foregrounded, Immediate
"We wish the district would value our expertise and thus what we measure in our students"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Our internal measurements do not matter in the grand scale of what is validated as quality education by the district"

Foregrounded, Immediate
"Even if we measured agency, the district would not value that and thus this type of learning gets pushed out"

Less Foregrounded, Less Immediate
"The district does not value our opinion and thus what we believe should be measure as part of quality education"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Agency and other skills related to integrated education need to be valued by the district "

Possible High Level Codes
District prioritizes test scores over measuring integrated skills and knowledge

ME-F1, B5, line 252- said that the district looks more at scores in standardized tests than the report cards-internal grades.
[MF: "The district cares about score and data, not what we measure"].

MA-F20, t7:10- explained that "tests too many times focus on skills that are really not what the students need, like plotting on a graph is less foundational than knowing their multiplication or fractions. She said "And so like for that to show up on the test, and like great amounts, it's like, huh, like, what are we really valuing here? + "I know that this is not a true measurement of these kids, but I feel the pressure".
[MF: "The tests measure things that do not matter to the student's learning and their growth and this is frustrating and painful because we devote so much time preparing them and the questions turn out to be not grade appropriate concepts"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It makes me mad and it drains me that the tests measure mastery of random and irrelevant content for their grade level"

"I wish the tests would measure what the students truly know"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The tests are poor measurements of our students' relevant knowledge"

"The tests measure knowledge and skills above grade level"

Foregrounded, Immediate
"Our students are not measured on grade level content"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Our students need to be measure on grade level content""

Possible High Level Codes
Tests measure non-foundational knowledge

AU-F23,t27:00- it seems the tests measure their ability to follow instructions rather than showing how much they have learned and she said "Yeah, exactly [strong agreement, as if isn't that bizarre]" *[MF: " I do not understand why the focus is on test taking skills"].*

OC-F10, p39-VE said she doesn't want a unit done in X number of periods, she wants a unit to be developed through each period while the standards are being covered so they can prepare for the tests. *[MF: " The tests are the priority so I want lessons for a whole unit that prepare the students for the tests"].*

Possible Subjective Claims
Less Foregrounded, Less Immediate
"I am pressured to deliver good tests scores so I need my teachers to develop units as means to prepare students for the tests "

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Lessons for each unit need to prepare students for tests as well"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Tests scores are a top priority"

Possible High Level Codes
Test scores drive pedagogy and lesson's structure

MA, KA, ME-F1, b4, last line- said that there are no available adaptations for these students that are BEL or that need other types of learning arrangements, only available to students that have immediately arrived to the US. She said "haha well they will say oh well you can have the Spanish-English dictionary

tool added to it" and "so last year I had a student…newcomers get a year gap for the language test…but..last year I had a student who's 1st year in the country was the zoom year..so yeah he didn't learn English AT ALL. So really last year was his first year..and he had to take a test…a 5th grade reading test…and it's so hard OHHH it's so dense!!"
[MF: " The so call accommodations are not equitable, useful, and truly inclusive and the result is having students that cannot read English take these tests that are already heavy for EOs"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I am anger at the fact that tests are inequitable for our diverse student population"

"I am anger how the tests are designed only for native English speakers"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The tests are hard already for native English speakers"

"The tests do not consider our BELs needs for reading native English level texts"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is wrong that tests exclude our BELs and leave them unsupported"

"It is wrong that our BELs have to take native English level tests as they will struggle"

Possible High Level Codes
Standardized testing is inequitable and does not consider a diverse student population
BELs students are not supported properly for taking standardized tests

ME, F1, b5, line 125- said that they would be lucky if they get to geometry in 3rd trimester as they are other priorities like preparing students for state tests.
[MF: " We would like to cover key subject matter content but the priority is preparing students for how to take these tests successfully so the scores are what the school needs"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish we could cover foundational subject matter content but we have to use time for test taking skills"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Preparing students in test taking skills is a priority over key grade level subject matter content"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate

"We need to have time to cover grade level subject matter content"

Possible High Level Codes
Test taking prep as a priority over key subject matter content

ME- F1, b5, line 148- said that leadership does not go over their unit planners so much as to check for CCSS covered, they are interested in test scores.

MA-F2, T35:02-agreed when I said that one of the main issues I have with stand testing is that it doesn't allow the teachers to go back to something they taught two trimesters ago.

ME-F18, t12:38- said "I don't think testing, I don't think there's anything to do really about testing, I think it's just like, for those two weeks, it's just going to be a difficult scheduling a lot of lessons at that time, unless anyone, I don't know how to work around for that." + " I don't really get anything much of anything done".
[MF: "ME conveys frustration at the reality that when testing is coming and happening there is no time for real learning"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I have to surrender to the reality that test prep takes over my instruction time"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Test prep takes over classroom instruction for several weeks"

"Nothing else can be taught but test prep during several weeks"
Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Test prep is the priority for several weeks even though it is not a measure of quality education"

Possible High Level Codes
Test prep as a priority during classroom instruction
Test prep as a barrier for delivering relevant education

MA-F18, t12:54- added to ME's above comment that "when it comes to testing, it's like they give and give and give in the morning, and then you just kinda have to like let them decompress".
[MF: MA conveys sadness when explaining that the students need to decompress (AND)"The tests drain the students so we cannot expect them to be ready to jump into learning even if it's fun because they are exhausted"].

Possible Subjective Claims
Foregrounded, Immediate
"It angers me to see how much tests drain our students"

Less Foregrounded, Less Immediate
"It frustrates me that testing drains our students and we cannot jump into meaningful learning afterwards"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Students are drained from imposed testing"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"During testing we have to give our students time to rest before we teach anything else"

Possible High Level Codes
Testing takes time from meaningful lessons
Testing affects students negatively

ME & MA- F1, b5, line 160-said NO NO NO in response to my question if their main concerns as committed teachers is to deliver good test scores.
[MF: They both say it loudly and almost yelling to be sure I understand this is not their main goal].

Possible Subjective Claims
Foregrounded, Immediate
"I am proud that I value other type of learning above standardized testing"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I do not value standardized testing"

Less Foregrounded, Less Immediate
"I do not use standardized testing as the measure of how good my instruction is"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is wrong to have standardized testing as the measure to the quality of one's teaching"

Possible High Level Codes
Test scores are not a priority for passionate teachers

MA-F1, b5, line 161- said don't tell my principal I said NO (related to caring about test scores).
[MF: "I know she cares so much because she has pressures on her as well so she doesn't want to hear this from her teachers"].

MA-F1, b5, line 165- said they know there's a big data push but that's not what's most important to them as teachers.

MA-F1, b5, line 187- said " I have colleagues that I really respect, that say Im just gonna make sure that my students know the formula for this type of essay, this type of essay and that type of essay because as long as they meet that structure because as long as they meet that structure they'll get a good score on the test:…and I'm like I DON'T CARE <she's mad at this point, remembering those conservations> my goal is that they can write well!"
[MF: MA conveys anger and disbelief at remembering those conversations (AND) "I cannot believe that people I work with actually do that if that is not what teaching is about" (AND) "I care about the students learning not having test taking skills"].

MA-F10, t 1:11:27-answered yes very emphatically when I asked if students get stressed because of stand testing.

AU-F10, 1:11:46-said "they know it's coming up... Yeah. Cuz they do it every year starting at third grade? So? Yeah it is "it's stressful".
[MF: "It is something that is so stressful that they actually remember and know it is coming"].

MA-F10, t1:11:51- said that they can feel the stress in their students, they don't say it but they hate it. They express that hate, through annoyed and frustrated expressions "because it's a lot. It's hard. I hate it".
[MF: "We all hate these tests, they are negative in every sense and they give nothing to us as teachers or to the students as learners"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"We all wished we did not have to deal with standardized tests"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Standardized tests create heavy negative emotions on teachers and students alike"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is wrong that imposed standardized testing is such a negative element in the education process"

Possible High Level Codes
Standardized testing as a negative force over students and teachers

MA, F1, b5, line 170- said that "the pressure is created by the district, which publicizes to the community the data on test scores-SB Unified has 50% lower literacy rates, which in turn is information that people/parents/the community reacts to. In turn, the district puts pressure on leadership and leadership puts pressure on teachers". She said "I don't even think is our site, I think is downtown..the district..that's what publicized..and that's what the community and the people see..well SB unified has 50% lower literacy rates <imitating a note/voice of a critical person> so they are failing our children…so that's the feedback that downtown gets…so downtown goes 'well our data matches that so we are going to start breathing down the teachers or admin necks about getting the data, so the admin worries about that".

[MF: "The district is the one that exerts the pressure because their reference is data from test scores, tests that do not measure any relevant learning, but this is still their reference and what the community is communicated on and so if a school has low grades the message is the school is not doing a proper job and the pressure is on the principal and the teachers so we have to focus on those grades because this is what is used as the measure of quality education"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It angers me that the community is misinformed on what counts as quality education"

"It angers me that the district values so much test scores data"

"It angers me that the district excepts pressure on principals to deliver high test scores instead of demanding other forms of knowledge"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The district wrongly informs the community about how schools are performing by using exclusively test scores"

"Teachers and administrators are pressure by the district based on test scores and nothing else"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is wrong that families and the community is told that test scores are what reflects quality education and how schools are doing"

Less Foregrounded, Less Immediate

"It is wrong that teachers and principals have to be under pressure to focus on test prep rather than quality relevant education?

Possible High Level Codes
Test scores as the standards of quality education
Test scores as drivers of what teachers focus on
Test scores as the measures of a school's education

ME, F1, b5, line 175- said "so yeah and then they compare sites <sighs annoyed> so now principals get to have their sites compared with one another so they feel that pressure and so I THINK THAT pressure gets transferred to us because I feel like that's definitely like the main focus."
[MF: ME conveys feeling annoyed at the fact that the scores are shared (AND) "If the district did not share scores each school could have their principal focusing on their site based on their realities and their students" (AND) "It is unfair and illogical that test scores are shared"].

214

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I am upset that the district thinks is valuable to share test scores across sites"

Less Foregrounded, Less Immediate

"I disagree that the focus and thus pressure should be on test scores"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The district uses test scores as a cruel tool to put pressure on principals"

"The district values test scores over any other form of knowledge"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is wrong that the district shares tests scores as a way to pressure principals and teachers"

"It is wrong that the district values tests score over anything else"

Possible High Level Codes
Districts priority on high tests scores as a barrier to valuing any other form of knowledge

ME, F1, b5, line 180- shows great excitement when I explain that we will focus on creating LPs that also do test prep.
[MF: "Great, that way VE won't give us a hard time (AND/OR) "Great that way we can prepare them for those test while they actually do some important learning"].

ME- F1, b5, line 290- I asked if their funding is related to their scores and she said "It can, it's correlated. Because what happens is test scores are released..and families and might not either want to enroll their kids here…" and " but we do get money from the state depending on how many students we have …so if we have low scores parents won't want their kids to come here".
[MF: "The scores have ripple effects beyond taking time from meaningful learning and stressing our students, it also affects our funding, so the impact is extremely big"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish test scores would not have ripple effects including number of enrolled families and thus resources we get from the state"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Test scores affect how much support we get from the state"
Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate

215

"It is wrong that tests scores affect the level of support a school receives from the state"

Possible High Level Codes
Test scores affects level of state support to schools

MA-F1, b5, line 293- said "this year they are starting to fine the schools for every student that doesn't take the test..if a parent decides that their kid doesn't take the test the school gets fined".
[MF: MA conveys disbelief at the extent of the actions taken by the district].

MA-F1, b5, line 297- said "he should be in a moderate severe special ed program..he is NOOt….umm he's at about a K-1 level..and he's a lot of his emotional struggles come from his academic pressures and this becomes not a great situation for anybody and he shouldn't…he's subjective to that…"
[MF: MA conveys sadness and a genuine and very concerned tone for this student (AND) "Why do we have to subject our students to these tests if they have these negative impacts on their emotional health"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I am anger and saddened by how testing even affects our students emotionally"

Less Foregrounded, Less Immediate
"I wish I could protect my students from the emotional damage inflicted by imposed testing"

Possible Objective Claims
Foregrounded, Quite Immediate
"Our students emotional health is affected by imposed testing"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is wrong and cruel to subject our students to emotional distress from imposed testing"

Possible High Level Codes
Testing affects students at an emotional level

MA-F1, b5, line 299- said "so last year I had a student…newcomers get a year gap for the language test…but..last year I had a student who's 1st year in the country was the zoom year..so yeah he didn't learn English AT ALL. So really last year was his first year..and he had to take a test…a 5th grade reading tests…and it's so hard OHHH it's so dense!!"

MA-F1, b5, line 302- said that BELs can have the Spanish-English dictionary feature but that it is absurd to have them take a test by using the dictionary and translate every word.
[MF: MA conveys disbelief at the absurdity of the so call resource to help BELs access the tests].

ME-F1, be, line 308- said "I also have a student like that…that's at a kinder level..Memo..yeah…others students too that should not be testing…"

216

[MF: ME conveys a motherly look with sadness as she explains this situation as if she remembers the students taking the test and how hard that was for them (AND) "Why are they forced to take the tests is something I do not understand and it makes me very upset as a teacher that cares for my students"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I am distressed and angered from the reality that even students with special needs have to take standardized testing"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Students that do no have grade level skills and have special learning needs are forced to take the tests"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is wrong and cruel to force these tests on students with special learning needs"

Possible High Level Codes
Standardized testing is not inclusive of students with special learning needs
Standardized testing is not inclusive of diverse student populations

AU-F23-t23:28-I asked how the flow of the year is in consideration to the tests and she explained "I mean, no I don't, I don't start the year thinking, Oh, I'm gonna make sure my kids pass the test [OC: laughs almost as if she wants to highlight this fact]. I do, we do think about it more, maybe like a month or two before just because, you know, in the beginning, it's that community building that's more important. And just making sure they really understand the content of what we're teaching versus, you know, the test strategies, we we really hammer those down, just like a month because it it's so it's hard. And it's, it's tedious. It's not fun for me to teach. It's not fun for the kids to learn….Yeah [OC: as if, it is NOT worth spending time on that but we gotta do it]".
[MF: "I try to devote as much time possible on meaningful teaching and learning, but we do have to devote 2 months to test strategies because these tests are hard for the students. Teaching test strategies is lame for everyone, students and myself, but that is the reality, we have to devote 2 months to that"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish I did not have to devote so much time to test taking skills over engaging learning"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Test taking is tedious, boring and not relevant education"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is wrong that we have to devote so much time to test taking skills"

Possible High Level Codes

217

AU-F23,t24:33-I asked if any of the texts they read in the practice tests are somehow engaging and she said "nooooo [OC: as if, all of it is not engaging] yeah, it's not fun…Maddie had, she came up with this idea because we were just, it was just so sad, you know, seeing them just sitting on their desk, like doing the practice tests every day. So we put we'll put questions around the room and then you know, involve more movement while they're walking through each question and find it on their answer sheet...just to get things moving and do something different. Yeah. And it did help a little bit. But you know, it gets got old eventually".

[MF: AU conveys a genuine feeling of care and sadness when she explains that seeing her students taking practice tests over and over is heartbreaking (AND) "Practice test taking is impossibly boring and unfair as it simply does not engage or teach them anything relevant and the students know it because their demeanors while doing these practices show it" (AND) "We try to make it fun but the practice tests are just structured to be draining, boring, and dreadful"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It breaks my heart as a committed teacher to see how boring and non-engaging test taking prep is for our students"

"It makes me sad how much time we have to give to repetitive practice that has no real relevance on quality learning"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I have no choice but to devote time to tedious repetitive test taking practice over meaningful engaging learning"

"My students do not find test taking practice meaningful or engaging"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is wrong that we have to put so much time to tedious and receptive test taking practice rather to engaging quality learning"

Possible High Level Codes
Test prep as a barrier to delivering meaningful and engaging quality lessons

AU-F23,t25:18-explained that for a whole month for 30-60min every day they practice with test taking techniques and said "And it's the same. It's multiple choice or it's a short answer, but it's always the same, like structure we're trying to teach…. like, how would you respond? You know, or really just looking at...Yeah, what is the question asking and then turning that into the response. So restating the question and just really making sure they cite their sources. And I mean, I feel like the kids, they, they did well this year, so I was able to see them, right. I mean, citing the sources, so I was like, okay…if it's a vocabulary, word, which one would fit? And then a lot of them is also choose two

or three, you know, just making sure if you don't, if you need to choose 2, if one of the options that you circled was right, but you only did one that's automatically wrong. It would need to have exactly what they're looking for… following instructions, reading directions carefully".

[MF: AU explains with a sad face the techniques they have to practice (AND) "All we focus on is how to answer these structured questions that are always the same, how to navigate the questions so they can guess correctly if they need, it is not about content and relevant knowledge and skills, tests measure ability to take tests"].

MA-F20-t8:55-explained that techniques like RACE is used throughout the year-trickles down-and actual test prep she starts in Feb-March, but they do take paretic tests every couple of months and the actual content they cover it throughout the first trimesters.

ME-F11, t2:35- confirmed that for next year it would be amazing to have an integrated LP also focus on practice for ST.

KA-F11, t5:33- when revising CCSS to cover for our co-designed LP she shared that "in fifth grade, I think there's a review of fourth grade standards, because they're tested on science".

Final High Level Codes
Test scores as a barrier to deliver meaningful and relevant education
Test taking skills as a priority over transformative skills and subject matter content
Test scores as a force that dictates pedagogy and content
Test scores as a negative force over student's emotional health
Test scores are district's main focus
Test scores as the measure used by SBUSD for quality education
SBUSD values tests scores over meaningful and relevant and transformative knowledge
Standardized testing is not inclusive of diverse student populations
SBUSD uses test scores as measure to except pressure on schools
Test scores affect resources given to schools

(g) Admin and district
ME-F19,t19:22- I explained some ideas on how Mik could support them by sorting and editing existing integrated resources for each grade and she said "really the biggest obstacle that I see to this is getting admin on site and district level on board. Because if, if they're not on board with this, they're filling our plate with other things, you know… So it would have to be Veronica already has certain pedagogies that she is really amped about. So it's like, I feel like we would need to have the buy in of our site admin and the district admin, obviously they have to approve it to be able, to do any of this stuff. But I feel like, that's really important. And and also, I think we all know that like, the principal sets the tone and culture of the school. So if we have a principal that's like just doing kind of what, like, oh, yeah, this is like whatever the district wants us to do another thing that it's not gonna get implemented well, but that the biggest barrier to that is because I'm thinking I'm like, Oh, this would be so awesome. If you know, Santa Barbara Unified would make this priority." She also added that "But if they don't do it, it's like, when are we going to do it? [OC: frustrated tone, as if "they won't do it"]

[MF: ME conveys certainty and also frustration that the district has the final power to get IE into classrooms (AND) "The district will never prioritize on IE if they are not fully convinced and thus they will continue focusing on imposing other things to us teachers that take all our time and energy" (AND) "Veronica could spear that IE becomes part of our classroom instruction because she has that power"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I fear that even though IE is essential schools won't implement it unless the district tells them to do so"

"It concerns me that we won't get to teach about and for sustainability in our classroom time because if the district is not on board with it they will continue to give schools other PDs and curricula"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The most effective way to get all schools in SBUD to implement IE is if the district imposes it"

"First the school's principal needs to want to implement IE and then the district has to be on board"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is crucial that districts want their schools implementing IE as it is the best way to get it to all schools"

Possible High Level Codes
District needs to value IE so it can be integrated within schools
Principals and districts are the key to get IE implemented at schools

ME-F19, t28:01- I asked if she thinks most teachers consider sust ed something complex to be integrated and she said "I think a lot of teachers don't do that. And a lot of schools are not as focused on doing transdisciplinary education."
[MF: "The district does not prioritize or even have curricula or PDs on this so if you are not an IB school then IE is really something that does not get to average schools"].

ME- F1, b5, line 148- said that leadership does not go over their unit planners so much as to check for CCSS covered, they are interested in test scores.
[MF: She explains matter of fact that tests scores is what matters not how have designed a lesson].

MA-F20,t 35:36- I asked what else would the district need to do so they have what they need to deliver integrated teaching and she explained that "they need to actually valued it, they can say that they care as much as they want. And they can throw random modules that we have to complete about racism at us, actual development of lesson plans, you know, demonstrating any sort of empathy, and listening to the teachers when they say, This is what our students are in need of and not just what they feel like doing or whatever fits their, whatever their journey currently is at [OC: very frustrated]. And so I think, like, I think it's so important. And I think they recognize the importance. But they have not known how

to approach it in a way that is meaningful. And so they've just kind of tossed the ball and hired consultants to try to address these issues. And then that hasn't really worked. Because it's not coming from a sincere place necessarily."

[MF: "The district pretends they care that racism and issues like that are understood and taught by the teachers but in reality they are not making a sincere effort as they really do not value that students learn about these issues" (AND) "The district has other interests and people within it get benefits from having the district impose certain PDs and curriculum"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I know that IE is key but I fear that the district does not care enough about bringing sustainability issues as part of core curriculum"

"It makes me mad that the district does not hear what teachers know the students need and what is meaningful education"

Foregrounded, Immediate
"I wish we had more of a saying on what and how we are supported as teachers"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The district does not consider what teachers explain is needed for giving students quality education and for me that includes IE"

"The district does not support us with effective resources"

"The district provides resources that fit their own internal agenda rather than what the students need"

Less Foregrounded, Less Immediate
"The districts efforts to support teachers are not sincere"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is wrong that the district does not consider what the teachers explain they need"

"It is important that the district takes IE and sustainability issues seriously and they make sincere efforts to support teachers to teach about and for these issues"

Possible High Level Codes
District is not truly committed to IE and sustainability learning
District provides ineffective resources for teachers to include sustainability education and to address sustainability issues happening within the school

ME-F18, t58:15- to KA comment above she said "it depends on what the state if the state isn't prioritizing it and valuing it as like, Okay, this is something that you need to know as teachers or this is something that we need to learn as students. I mean, even though I think there are like, obviously, there are science standards, but as we saw during like COVID, like science and social studies got thrown

out the window, and the testing, except for fifth grade testing is just math and reading. So it's like that and writing." And added "I feel like it's hard because then districts aren't going to prioritize that. Because right, they're not going to be getting as easy money for for, you know, sustainable sustainability (education)".

[MF: "The districts are interested in prioritizing education approaches that somehow generates them money. Standardized testing does that, they can hire specific companies for trainings and textbooks and everyone is making money. If a district is not honest and valuing what is best for the students holistically then frameworks like ESD or SE are not going to be sought for and thus TEPs are not going to be including them" (AND) "Testing is what dominates everything to the point that science and social studies can become non-core and secondary subjects because testing does not include them"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It angers me that because testing excludes science and social studies then these subjects have become of secondary priority in our instruction"

"It makes me angry that SE will only be included in TEPs if the district sees monetary value in it"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"If the districts can see how SE will make them make money then they will adopt ESD and include SE and that would force TEPs to include training on ESD"

Possible Normative-Evaluative Claims
Quite Foregrounded, Less Immediate
"To include SE in TEPs district need to see the value of it"

Possible High Level Codes
Districts value forms of education that provide them with opportunities for making money

MA-F20, t37:05-I asked for an example of how the district gives resources in theory to support them and she explained that "So like, the mental health issues, right? They completely flubbed the, like, contract for our mental health providers this year. So like we have been out without a counselor. All the schools have been struggling with like not having enough mental health resources, all of our kids are in trauma. And so as a fix, they sent us a module that we should complete about how to help kids, and identify when kids are struggling… And it's like, but also like, that's not as sincere.... like, attempt to solve the problem. We know what can solve the problem. They just need to pony up the money. And do it and actually prioritize it, not just say that they're gonna prioritize; and I feel like that trickles down to curriculum."

[MF: "If the district can't even give schools a counselor when students have just gone through a pandemic but instead send the teachers some useless modules so we do the counselor's work, of course teaching about and for sustainability issues is not going to be included in the mandatory curricula because the districts does not make real efforts or provides real solutions/resources to serious needs"].

222

MA-F20, t38:21: as we discussed about lack of proper resources, she added "they're not willing to negotiate with us. They have like, they're negotiating on some things and like, but they're not giving any long term solution. So like, we asked for smaller class sizes like to maintain where we're at right now, because we're still technically under our COVID cap of 25… which is a ratio even so you have to up to 33. But as long as another class has 17, you're fine. And in the grade level band, so from fourth to sixth, we're supposed to be at a ratio of 25 to one, but if a class one class is at 17… Yeah. Anyway, so they agreed to negotiate with us about that. But they only agreed to extend it for one year. Like it's not as sincere. Like, oh, we see the value. Yes. Yeah. And then like when we brought up salary, they said absolutely not. We will not discuss salary. You agree to a contract For three years, We will not discuss it until that contract is up."

[MF: "The district is not sincere, they are not with the teachers or even work for the teachers and the students; they do not listen to us who are in the classrooms needing basic things like manageable class size"].

MA-F20, t40:28-speaking about the contracts and low salaries in SB she added "So yeah, it's crazy. So that's been a big, and you know, when you have that kind of unrest, and you have that going on, it's really hard to take, like for teachers to want to listen to the district when they're bringing even if it's a great thing… when you have that kind of unrest at the top, and makes it really difficult of the district, like trying to bring it back like to, for if the district strike even something really good and positive, it's hard to really want to dedicate yourself to it. Like we're all going to show up to the summer training for the new curriculum but…"

[MF: "We the teachers do not trust any of the districts resources or programs or curricula they tell us to use so even if it was IE it would be hard to get all teachers on board as now the relationships between district and teachers are not good"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I fear that teachers do not trust or want to embrace new things coming from the district even if it was resources to implement IE"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Teachers currently have a distrustful relationship with the district and are not motivated to work using their resources and recommendations"

"Even if IE was demanded by the district it would be difficult to get teachers on board merely becomes it is coming from the district"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is unfortunate that because the district has acted so poorly towards teachers and their work now teachers distrust anything coming from the district "

MA-F20, t50:49-talking about how this year was hard I asked why and she said "Because they dismantled the GROW program without any transition plan..that was the like, emotionally disturbed program...And then like, didn't come up with a transition plan for the kids, even though we were screaming.... Like, you got to figure something out…because they didn't have a teacher anymore, because they hired the teacher to be a administrator at another school."

[MF: "I have to teach a group that needs emotional support from experts and the district took that from us and left us with nothing. How do we do more meaningful teaching when we have to deal with issues like students without an emotional support program"].

MA-F20, t52:11-explaining about how it has been without GROW and 1 particular student "we definitely changed his supports this year. Yeah, make sure that there are systems in place… And while he is doing much better, still not an easy situation, it's very disruptive to learning for everybody else…" She added how they talk with 4th and 6th grader teachers as they are receiving and giving students respectively to those grades and added "They know. They know. Yeah. They know what's coming. Yeah. And like, we're really purposeful and like, where we place and who we place them with. And making sure like for me this year was really about like making sure there were supports in place for those students for next year…"

[MF: "We help each other and we work together to give those students the needed emotional support even if the district leaves us with no resources"].

ME-F2, t58:24-explained that if the pullout is a special ed then the other teacher can cover the same content/they continue with the content but is often hard as science and social studies connect, mainly science, needs to be fit into readers workshop-LA as there is not enough time to properly teach science content, so if they fit science into LA the students in a pullout miss that content as they simply have to continue with the lessons.

[MF: ME conveys frustration as she explains the complexity of their situation "Science is being pushed into reader's workshop so we can at least give it more time/periods, but pullouts are during reading workshops so these students in the end miss Science content which is when we could also bring sustainability content"].

(h) No time to lesson plan

ME-F19, 14:03- she explained that they get paid one day to lesson plan for the entire year, saying that "Yeah, it's ridiculous. Because I know all of us are here many days before that working because that's not enough." And added that "I mean, personally, I would like I mean, it'd be nice to have two weeks to get paid… it really feels like that two weeks would be I mean, if you're working all day, like a week paid would be I feel like at least reasonable. A little more. But yeah, one day it's ridiculous… And then but also just administrative stuff. I mean, it's just like, you know, the 1000 little things that you have to do to get ready for all the systems you have to reset and yeah…"

[MF: ME conveys frustration and exhaustion (AND) "I am over this ridiculous system that drains teachers while they demand us to do and deliver. There is too much we have to do besides teaching and it is unfair we have to do it in our personal time if it's part of our work"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I feel drained and overwhelmed at the amount of tasks implied merely for starting the year, even more for reliving quality lessons"

"I feel angered at the fact that we do not get sufficient and proper paid time to do an essential task which is quality lesson planning"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Teachers do not get enough paid time to lesson plan and look for quality teaching resources"

"Teachers have to prepare their lessons during their free time"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is unfair for us and our students that we do not get proper paid time to do quality lesson planing "

Possible High Level Codes
Insufficient paid time for quality lesson planning

ME-F19, t28:53- said that "we're supposed to get every six every unit, which we have six units throughout the year. We're supposed to have a whole day subbed off to do this planning… And we've gotten it twice this past year… Yeah, because we don't have subs. We don't have enough subs… We need two subs. But and we and Subs have been we there's been like a major sub shortage since the since COVID. And I don't think it's back to where it was before COVID… So none of the grades have been able to get consistent planning days… or if we had two weeks to prep or two weeks to you know before school. Yeah, yeah before school started." Agreed that if they had subs and they got their planning days they could definitely use the IAS and create at least 1 integrated LP for 1 unit.

[MF: " f we had logical and adequate time to lesson plan I would use the IAS method and deliver IE but our reality is different as we do not even get what we are supposed to in terms of days to plan as there are not even enough subs in the district]."

Possible Subjective Claims

Quite Foregrounded, Quite Immediate
"I would love to have adequate time to lesson plan which would allow me to implement resources like the IAS method"

Less Foregrounded, Less Immediate
"It frustrates me that because the district does not have subs we have to lose our limited available paid time for lesson planning"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"We cannot access our paid time for lesson planning because the district does not have enough subs"

Less Foregrounded, Less Immediate
"If I can't have time to do the basic lesson planning I can't have time to explore planning with the IAS method"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is wrong that the district can't provide schools with sufficient subs so teachers can use their paid time to lesson plan"

Possible High Level Codes
Lack of district support to access paid time for lesson planning
Lack of paid time for lesson planning with new resources like I.A.S

ME-F15, t 36:08- added "And I do my best, but I feel like, after five years, I will have had enough time to make good lessons. But it's just like, it's so nice. Having like your help".
[MF: "I wish we had this help all the time.]"

Final Higher Level Codes
Lack of sufficient paid time for quality lesson planning
Lack of support from district to access available paid time for lesson planning

(i) Imposed curricula and textbooks
MA-F20, t43:54-explaining about the new LA curriculum, I asked how many days of training for this new curriculum she explained that "in terms of training? ONE!!!! [LAUGHS] one day, that's all they're offering us! That's all they can afford… Yeah. I mean, I assume I shouldn't assume but I would guess there will probably be more trainings throughout the year. But then it's like, you know, you're learning how to build the plane while you're flying it….[this new curriculum is for] and every school in Santa Barbara, not Goleta. Ventura does their own thing."
[MF: The district brings new curriculum and we are taught how to use it through a short one day training, which forces us to start using it while we are still learning how to use it]

226

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It is frustrating that the district does not provide teachers with effective trainings to teach us how to use a new imposed curriculum"

Less Foregrounded, Less Immediate
"It angers me that I am going to have to begin using a new imposed curriculum without really being familiar with it or having had time to lesson plan for it"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"We are going to have to use a new curriculum that is unfamiliar to us and for which we have not prepared properly"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is crucial that the district provides teachers with many day trainings for new imposed curriculum so we can learn how to use it and plan for it"

Possible High Level Codes
Lack of training to familiarize with new imposed curricula
Lack of knowledge on new imposed curricula
Imposed new curricula that is unfamiliar to teachers

MA-F20, t 44:45: about new LA curriculum she added "So like, yeah, like we're gonna show up and we're gonna do the training and we're going to attempt it, but I think like we would be more jazzed about it if we felt respected."

ME-F2, t57:42-explained in response to a question I made on how much flexibility they have to choose what happens during the different hours of the day/how much space they would have to integrate different sustainability issues that their schedule is very regimented because they have so much content to cover and also their lessons have to be done in alignment with the other 4th grade group plus they have so many pullouts and they want every student to have as much time as they need to learn and practice introduced content. "I think it's pretty. It's pretty in my opinion. regimented, because we have so many we're supposed to align with our other classroom. And also, we have so many pullouts that we want to make sure that you know, the students are getting enough time on the…"
[MF: "The curricular content imposed by the district and thus mandated by VE is a lot so we have to regiment our schedules to be able to cover all the content in the official textbooks, plus we have many students being pulled out and so we need to find time to give those students extra time, so no we have no extra time to bring in sustainability content through integrated lessons because the official content does not include it"].

• Negative, related to the content and the wording and language used

227

ME- F1, d3, line 7- said that "the Social studies textbooks provided by district still use the term "Indians" when referring to Native Americans".
[MF: ME conveys anger and frustration and she rolls her eyes with a disgusted face].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It angers me that California uses official textbooks that have demeaning and racists terms"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Our official textbooks use racial terms and language and our students have to read that"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is beyond wrong that our official textbooks have strong racist language"

Possible High Level Codes
Official textbooks with racist language

ME- F1, d3, line 8- said that the "Social studies textbooks provided by district use wild language about how the Chumash were treated" and said that "the Social studies textbooks provided by district are outdated (2002) and useless for my teaching".
[MF: ME explains with anger and frustration (AND) "It is unbelievable that official CA textbooks have filtered and inaccurate content about such an imperative truth" (AND) I should not be forced to use these textbooks"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It angers me that I have to use textbooks that are outdated and have inappropriate language and inaccurate historical content"

Less Foregrounded, Less Immediate
"I feel embarrassed that our official textbooks have racist and filtered historical content"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I do want to use official SS textbooks when they have omitted the historical facts and truth"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is wrong that our students have to read SS textbooks that teach them inaccurate facts with racist language"

Possible High Level Codes
Biased, filtered, and inaccurate content in official textbooks

ME- F1, d3, line 10- said that "when using the Social studies textbooks provided by district I always pause to clarify on the content and the language-vocabulary included in the texts they read".
[MF: "I have to make sure the students know that not only I disagree with many things in the book, but these are not 100% accurate and are incomplete"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It makes me angry that part of my teaching has to be to clarify that what the textbook is telling the students is wrong and that I disagree with it"

Less Foregrounded, Less Immediate
"I feel embarrassed that part of my job is to rectify the wrong biased content in official textbooks"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I have to make the time to ensure that my students know that what they are reading is not 100% accurate and that the language used is wrong"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"I can't let my students think that the history of Native Americans is as described by the textbook"

"I can't let my students think that working and vocabulary used in official textbooks is right, but that it is racist"

Possible High Level Codes
Biased, filtered, and inaccurate content in official textbooks

ME-F2-T9:40-laughs agreeing but upset as a response to my comment that the SS curriculum is so positively framed.

MA-F10, 1:49- said that the Math curriculum "we have is not super attentional on being integrated."

MA-F10, t2:59-explained that they use the district's Math curriculum to go over foundational knowledge, but that "the practice is very minimal. So like, we pull supplemental stuff for practice."
[MF: MA conveys this as a matter of fact, part of their reality working with diluted textbooks and little resources provided by the district].
Diluted official curriculum that lacks crucial teaching content

KA-F11,t7:34-said "FOSS is not a good textbook", they do not like it even though it is what the district gives them and it has been in theory designed to meet the standards. She explained that "Why you see, there's, it's very, I feel like it's outdated. As far as the content is not very kid friendly. Science, to me is like fun and, like, it should be bright and exciting. And like, you know, full of curiosity and FOSS just

makes it really like, it's like, yes, like, if you have like that scientific brain is sequence and it's, there's order and, but it's like missing that, you know, that like spark up that science I think has for Kids"
[MF: "It is all wording and texts rather than hands on Science that engages the students, but the district mandates it"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It is frustrating to have to use an outdated Science textbook that does not allow us to deliver activities that are engaging and fun and interesting"

"I wish we had a SC textbook that would allow us to deliver science classes that foster curiosity and imagination and important things related to science learning"

Less Foregrounded, Less Immediate
"It makes me sad that the official SC textbook takes away the possibility of doing meaningful science learning"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The official SC textbook is outdated, lame, and does not provide a structure to deliver quality science lessons"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"We need to use SC textbooks that give us the tools and content to deliver meaningful and engaging science lessons"

Possible High Level Codes
Non-engaging and outdated official textbooks

ME-F11, t 8:22- explained that "FOSS is apparently, was known for a long time as being the most exploratory and interactive of any of the science curriculums. Like there's a ton a ton of investigations. Yeah, my issue with FOSS is that it takes there's so many it just takes so much time to set up the investigation. It's a lot of back end work on the teachers." But added that "Usually science is like one of their favorite classes because they just love doing investigations."
[MF: "The book has hands on work but the reality is that we are not doing them all or if we do one we don't do everything in it because it takes so much time for us to prepare the experiment/activity and we do not have that time. We need activities that we can set up quickly because the students love hands on work"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It is exhausting to have an official textbook that consumes a lot time merely to set what is needed to teach a hands on lesson"

Less Foregrounded, Less Immediate

"I do not understand how a SC curriculum that is considered to be the most hands demands hours and hours just to set up an investigation"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The official SC textbook attempts to give teachers with confetti deliver hands on lessons but setting them up is extremely time consuming and that alone deters us from doing the lessons"

"It is unfortunate that the official SC textbook is so poorly designed because our students love doing hands-onSC"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"A SC textbook should give teachers with structured and concise content to deliver hands on, engaging, and interactive lessons"

Possible High Level Codes
Poorly designed official textbooks
Official textbooks that demand too much back end work

KA-F11, t 9:030- explained that they use FOSS investigations "the best that we feel like okay, this is doable within the constricts of the time that we have."

MA-F20, t54:45-I explained that ideally we have a textbook that is built in consultancy with districts and teachers and she said "That's the problem like with the incoming curriculum, like it's national, it doesn't align with our like, our teaching, I'm teaching the Civil War next year. I'm like, Excuse you. And fourth grade. How's the American Revolution? I'm like, that's mine. So Wow. Oh, yeah, it's it's interesting because it's just not California history framework is not the same. And so Oh, well, we'll see how it goes."
[MF: MA conveys frustration at the fact that yet another imposed curriculum has many red flags (AND) "I will use it and do my best, but I already know that it is going to be complicated to use it as it is not CA contextualized"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It angers me that yet again we got an imposed curriculum that already seems to be unaligned with our teaching sequences"

"It angers me that new imposed curriculum continue to be rolled out without any consultation with teachers and schools"

Less Foregrounded, Less Immediate
"I hope this new curriculum does work but I am not feeling optimistic about it"

Possible Objective Claims
Quite Foregrounded, Quite Immediate

231

"The new SS curriculum is national and thus does not align with CA SS framework"

"Because the new SS curriculum does not align with CC SS framework I fear that it will be another failed imposed curriculum"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is crucial to consult with teachers and schools before rolling out a new curriculum that does not align with the state's framework"

Possible High Level Codes
New imposed curriculum that does not align with state's teaching framework
New imposed curriculum rolled out without consulting teachers and schools
New unopposed curriculum that does not align and thus will be inefficient

AU-F23,t42:12-I asked about her thoughts on official curriculum and she said "I mean, we work on curriculum. And I think it's because we're an IB school. I mean, that's what they say. We're an IB school. So we have a little bit more freedom to work around the curriculum. And we just, we do what's best for the kids because the Lucy Hawkins was just way too, it was too hard. And too, it was not structured enough. So I think, yeah, that was a big reason why we couldn't really follow it…they need the structure of Okay, so this is how an introduction goes. And today We're just going to write the introduction. Yeah, yeah. And this is how a body paragraph goes. And like, they're, like, piece it out. But in, like, the curriculum, they'll have them like Flash draft... essay, or it was just a lot more. Or too much. Freedom. I don't know how to describe it.
[MF: "As teachers we have to adjust what we are imposed to use to the reality of our students, their gaps and what they need, so the district might impose a curriculum but thankfully as an IB school we have more freedom to veer away from that"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It tires me that as a teacher I have to use official curriculum that is not effective for our student population "

Less Foregrounded, Less Immediate
"I wish we had a better curriculum and more time to work to use the freedom we have as an IB school "

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Even as an IB school which gives us freedom to move around an imposed curriculum we encounter official content that is just not effective for our classroom instruction"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate

"We need to have official curriculum that considers and includes the many levels of language proficiency"

MA-F10, t5:30- explained that when she first joined the district there was no Math curriculum, she simply received a binder with tasks and was told figuratively to figure it out on her own. HE then offered to pilot IM and now they have beee using that for over 3 years.

ME-F1, T 30:1- said that Science unit on NR in FOSS book " natural resources was is covered very, very little by the actual this actual text".
[MF: "The book in itself, the teaching material, is very filtered and diluted"].

MA-F10,t7:05- said that Tosa has created a website with like, supplemental worksheets they can pull from but that most of them just pull from the internet on their own.
[MF: "It is something we are now used to, find resources on our way during our free time"].

MA-F10-t11:39-said that the current LA curriculum is very poor but that the new one might be less because of the feedback they've gotten from all the teachers.
[MF: "Finally they listened to the teachers and decided to find a better LA curriculum"].

MA-f10, t6:16-said that IM "it's pretty heavy language, which makes it kind of challenging for a lot of our students. And there's not a ton of practice, which is really hard. And that's where we have to supplement it as well." AND "the district expects they are using IM for basics and to supplement as needed.
[MF: "it is a poor quality curriculum that demands that we find more efficient resources, rather than giving us a good foundation we have to go out and find resources we can actually use" (AND) "The district knows it is not a whole package curriculum and does expect that as part of our job we find the time to enrich it"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It is upsetting that the district gives us official curriculum that we can't use as is"

"It is upsetting that we have to devote time to improve and enrich official curriculum"

"It drains us that the district expects us to enrich their imposed curriculum because it is only useful for the basics"

Less Foregrounded, Less Immediate
"I wish we could have an official curriculum that served us at 100%"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Our math curriculum is not an effective teaching tool"

233

"We have to devote time to adapt the math curriculum and find meaningful teaching resources because it is poor in content for practice"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is crucial that official curriculum includes adequate content for practice and that it is considerate of all learning levels"

Less Foregrounded, Less Immediate
"The district needs to find a new math curriculum that is not basic and that includes everything we need as teachers"

Possible High Level Codes
Official curriculum does not include sufficient practice content
Official curriculum demands time to enrich it
Official curriculum demands time to adapt it to students
District fails at providing resourceful and adequate official curriculum

ME-F11, t11:37- on FOSS "there's definitely like a little bit on sustainability in this book, but I don't see it."

ME-F11, t12:20- on FOSS "the teacher books are really, really I feel like too much information. So I like to start with the teaching slides, because that gives me an easy idea of like, what the they think the lesson should look like. And then I'll usually usually make some changes to them. But and then and then I'll kind of go to the book if I need more clarification."
[MF: "Rather than giving me what I need or concise structured material, there's too much that I have to rake through, decide what works, and then edit"].

Possible Subjective Claims
Foregrounded, Immediate
"It drains me to have to figure out how to use official curriculum and its resources"

"I feel unmotivated to se the official curriculum as it demands time to go through the dense amount of information"

Less Foregrounded, Less Immediate
"I wish the official curriculum was concise and structured in a way that teachers could access it for classroom use right away"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The SC curriculum has too much information that does not serve us teachers but makes using the textbooks and resources challenging and time consuming"

Possible Normative-Evaluative Claims

234

Quite Foregrounded, Immediate
"We need official SC textbooks that have teaching content and resources structured in ways that we can access it effectively without demanding time from us"

KA-F11, t 30:55-reinforces her previous comment on FOSS not having enough content they can use to teach.
[MF: "The book has too much material but not the right one to teach. It demands time to decide what to use and in the end there is not enough material to teach"].

Possible Subjective Claims
Foregrounded, Immediate
"It upsets me that our official SC curriculum is so poor and diluted in teaching content"

Less Foregrounded, Less Immediate
"I wish the official curriculum had enough adequate teaching content because as of now it has too much information we rarely use"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The SC curriculum lacks sufficient content to adequately teach all the key SC topics and themes"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is important that we get official SC curriculum that has the content to teach all the SC topics and themes that our students should learn and master"

Possible High Level Codes
Diluted official curriculum that lacks crucial teaching content

ME-F11, t31:00-agreed with KA previous comment "oh, there's a ton missing. I mean, our entire science year is this big." Showing the book which is very thin. She then added "So there's not a lot. So it's very condensed."
[MF: ME conveys frustration at the reality that the Science book contains basic and very little teaching content and so the students get just the minimum when they already learn Science only for 3 months out of the year].

Possible Subjective Claims
Foregrounded, Immediate
"It upsets me that our official SC curriculum is so diluted and condensed"

Less Foregrounded, Less Immediate

235

"It angers me to know that I barely teach SC content to my students as our official textbook is so poor in teaching content"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The SC curriculum is condense and poor in the content that we should be teaching to cover all the meaningful SC topics"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"We need official SC textbooks that are rich in the teaching content that our students need to master key SC topics"

Possible High Level Codes
Official textbooks are condensed and poor in relevant teaching content
Official textbooks do not serve teachers to deliver all the information and knowledge students should acquire

KA-F11, t32:01- agreed while laughing when I said that FOSS book has a very boring format.

ME-F12, t59:42- said it was crazy how long the FOSS investigations take, for example one class just to set up and that they include many readings they do not do, as in the past a 6 session investigation they have done 2.

ME-F12, t1:05:23- while deciding if to include brime shrimp investigation she said "you can take the entire school day and just do this, you know," and replied "we know no one follows it here" when I said that it will take several days because it has many readings". She added that "You just kind of pick and you pick and choose".
[MF: " It is only useful to find an investigation, then decide which of the many pieces you want and can teach and ignore the rest. All that though takes time to do"].

MA-F20, t32:54- I asked about what else could do the school be doing to help them deliver integrated lessons and she said "they made all these lessons for the DELD (developmental expressive language disorder) that align with the FOSS lessons, without taking into consideration when people teach FOSS how often people teach FOSS, are the lessons even engaging? They made the most bland, unattainable curriculum possible. It was like the same strategies over and over. And it also like you had to be doing the science every single day. You can't do the science every single day."
[MF: "What the district gave us is not useful for teaching Science in a meaningful, engaging and efficient way that considers how the students need and want to learn and how much time we have for teaching Science"].

Possible Subjective Claims
Foregrounded, Immediate
"It is frustrating that the district puts resources into making lessons for our DELD students that in the end are not useful"

"It is upsetting that we still do not have an efficient and engaging SC curriculum four DELD students"

"It is upsetting that once again the district ignores what teachers need based on their realities and their students"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The district fails when they create lessons without including teachers' opinions, knowledge, and expertise"

"The district's SC lessons for DELD students are not useful and are not engaging"

"We can't cover all the SC lessons for DELD students created by the district"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"The district must provide our DELD students with engaging lessons that can be used and covered in the time we have"

Possible High Level Codes
District imposes lessons for DELD students that are non-engaging
District imposes lessons for DELD students that are not adequate for the time constraints

KA-F12, t54:06-added that if they do choose a FOSS investigation it would be difficult because they take time to set up.

ME-F12, t54:15-added to above comment that they "would need a whole separate science teacher and and more time for science during".
 [MF: "As it is, the FOSS book is not useful or used as the authors intended"].

ME-F15, t2:33- confirmed that last year for the NR unit they used the FOSS book as the main instructional material "shared reading, and then I'm sure we did a few videos. And we did chop talks and that kind of thing, but just kind of basic stuff."
[MF: "Teaching with FOSS was not relevant, just useful to teach the basics"].

Final High Level Codes
District provides official curricula and textbooks that do not consider the diverse lending profiles and needs
District provides official curricula and textbooks that do not consider teacher's opinions
District provides official curricula and textbooks that include offensive, racially biased, and historically inaccurate content
District provides official curricula and textbooks that are condensed and diluted in quality teaching content necessary to cover key subject matter content
District provides official curricula and textbooks that does not include sufficient practice resources

237

District provides official curricula and textbooks that demand extensive editions and enrichments by teachers
Lack of training to familiarize with new imposed curricula
District provides official outdated and non-engaging curricula and textbooks
District provides official curricula and textbooks that lack easy to access teaching content and resources

(j) Factual about curricula
ME-F1, b5, line 91-said that they make sure that CCSS is the main structure their lessons meet
MA-F1, b5, line 93-said they also use CCSS as main reference to what needs to be covered
MA-F1, b5, line 97- said that a lot of the curriculum is from textbooks they use already
ME-F1, b5. Line 99- said that a lot of the curriculum does a natural correlation with CCSS
MI-F1, b5, line 101- said that last year they had units with CCSS already considered
KA & MA-F1, b5, line 103- said that Math curriculum (IAM) covers CCSS
ME, F1, b5, line 106- said that for Science district dictates to use FOSS; ELA is Units of Study and Lucy Hawkings and for SS it varies
KA-F1, b5, line 108- said that they rely on units of study to cover CCSS
KA, ME, MA, AU- F1, b5, line 110- said they all can create a bulleted list of the topics they have to cover for each unit for each subject (in relation to A-step)
MA-F10, t8:00-said that for other subjects not Math they go on their own way but making sure that they cover the topics the standards detail
MA-F10, t8:16-said that for LA they use the reading time to cover the LA CCSS
ME-F11, t6:59-confirmed that IB framework is the dominant and then they fit the topics demanded by CCSS within the IB and their units so they don't follow the CCSS in chronological order
ME-F11, t7:06- reminded me that they rely on FOSS for the Science curriculum, meaning they fuse that content as the guide to what they teach but that they do not follow the FOSS sequence
MA- F1, b5, line 143- said that the curriculum the district provides ensures that CCSS are covered and thus quality of content
MA-F20, t41:50-speaking about the new LA curriculum "the teachers, eight years ago, when they first implemented ago, seven years ago, something like yeah, and from the first day, the first training, we said, this is not going to work for our population… because there was no language foundation being taught. It was all assuming that they have had life experiences, assumed that they would learn grammar from reading books, assuming that they have a wealth of knowledge to draw from to write about….But they picked a new curriculum that is supposed to align with what they are calling the science of reading, which is supposed to be a more structured and better approach. So we have a new like, it's like, you know, new teacher guides new…"
[MF: "I hope they finally learned that listening to the teachers about curriculum is key. The last LA curriculum was a disaster and hopefully the new one is what we and our students need"].

(k) Need to teach in two languages without proper resources

Karla-F18-t08:30-added to her explanation on barriers to deliver the entire ILP that "because this year I had 4 newcomers, I had to often stop and just do a little recap in Spanish, so that I wasn't you know, so they weren't just sitting there not understanding. And so I, that takes time. One because I have to find the right language. It was exciting, because they also shared but then I have to say what they said in Spanish in English to the rest of the class. So there was a lot of additional time that I needed, just

for the conversation so that everybody understood both sides, because they also have some monolinguals that needed that so it just seemed that was that was a big barrier for me too."

[MF: "I am not going to leave my BELs on the side, I will take the time needed to include them in the class discussions and because I am alone this takes time and ideal ILPs like the one you wrote will take much more longer than expected"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I want to always include my BELs in the class discussions and share their comments with the rest of the students"

"I feel the obligation to take the time to translate quality activities and rich class discussions"

Possible Objective Claims
Quite Foregrounded, Quite Immediate

"It takes time to make an inclusive learning environment especially with activities that generate interest and curiosity amongst students"

"Bilingual groups will demand more time for activities that are engaging and interesting"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is crucial that I devote the proper time to translate discussions and comments so that every student is part of the learning even if that means not covering a whole lesson"

Possible High Level Codes
Time to translate IL and engaging activities

ME-F18-t9:23- explained that "it would be nice if the slides were translated. I mean, that's how I mean... You know, I tried to do that with my slides and it's often it's hard you know, it's it's extra work for sure. But that's like ideal".

[MF: "If we had bilingual teaching resources our teaching would be so much more efficient because we need to have accessible resources for every student"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish we had support to translate meaningful teaching resources like the ILs"

"It concerns me that I don't always have the ability to translate meaningful teaching resources like the ILs"

Possible Objective Claims
Quite Foregrounded, Quite Immediate

"Meaningful teaching resources like the ILs need to be translated so all students can properly engaged with the content"

"It takes time and effort that I don't have to translate meaningful teaching resources like the ILs"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is crucial that our school and/or district provides us with support and/or time for translating meaningful teaching resources like the ILs"

Possible High Level Codes
Need to have translated teaching resources like ILs
Time to translate teaching resources like ILs

Negative, related to lack of meaningful resources for students
MA-F1, b5, line 11-said in response to my question of available resources that they only get headphones.

MA-F18, t10:13- explained that "Last year I had one (new BEL). And more was like, he would get left behind. Like, we would give him what we could like I was able to get all the math in Spanish or like, we'd find resources in Spanish." She explained this in relation to the fact that she is not bilingual. She added that "like math we have available in Spanish, but you have to go and make all the copies and make the workbooks separately." + "Elementary schools don't have EL support, we now have our Spanish teacher who it's not her job at all. Like it's not her job. But she works with newcomers. But it's not like the district doesn't have ELL support in the elementary space. There's one district employee who covers elementary through high school for ELL." + "And usually what ends up happening is first day of school, the kids figure it out, and the really strong Spanish speakers gravitate to the newcomers. And like just act as a personal interpreter. And like, take upon themselves of like, I'm gonna tell them everything".

[MF: MA conveys pride when she explains that the students themselves take on the role of helping newcomers but also conveys frustration and anger that there are not enough resources to support these students (AND) "We have to figure out how we support them because the district in essence provides no real BEL support to elementary schools so we are alone in this important/essential task"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish our district would understand how crucial it is to have ELL support for each elementary school"

"It upsets me that we do not have access to quality bilingual resources, readily available for us"

"It is heartwarming to watch how new BELs figure out that they should stick close to the bilingual students"

"It is heartwarming to watch how bilingual students are proud and happy to help with interpretation for the new BELs"

Mercedes-F18, t11:47- added to MA's last comments that "I know, I know, other teachers do this too, as a personal like, we'll make a point of sending a strong bilingual student next to one of the newcomers. And tell them OK if you can like, please, you know, okay, this is".

Critical, related to resources provided to teachers

MA- F1, b5, line 16-said that FOSS is for legally designated English development language time, but that they tried it and they didn't like it.

AU- f1, b5, line 19- said that she tried FOSS with students from pullout groups and it was a very boring curriculum.

MA-F1, b5, line 21- said that they "have to find their own resources for BELs".
[MF: MA conveys frustration].

ME-F1, b5, line 28- said Spanish teacher found HELLO on her own.
[MF: "She knew that she will not receive support from district so she found that resource in her own free time as she is a committed teacher"].

Factual, related to resources provided to teachers by district and/or HE
ME-F1, b5, line 14- said in response to MA comment that they do receive more than headphones, specifically FOSS.

ME-F1, b5, line 22- said that site provides suggestions and sporadic PLC.

MA-F1, b5, line 23- said that "district thinks we are using FOSS".

241

MI-F1, b5, line 28-said they have a Spanish teacher that uses HELLO.

MA-F10, t 38:25- said that they have a designated language development time of the day; reading passages at different levels, and students get different levels of support to get through those passages; there's different supports in the room as well.
[MF: "This helps us with BELs, at least is something that does work and does help our students"].

MA-F10, t39:04-explained that in the past she has needed to put definitions in both languages.

Final High Level Codes
Time needed to translate IL and engaging activities
Need for accessible bilingual teaching resources
Need for BEL support staff for the entire school

(l) TEP Preparation
(a) Negative, related to TEP preparation
MA-F1, line 15- Maddie laughs when I ask if they were prepared on action-oriented learning during their TEP.
[MF: "Of course we did not learn about action-oriented education that is too out of the box"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I makes me sad to recognize that something as important as action-oriented education wasn't even in my TEP's radar"

Foregrounded, Immediate
"I wish we had learned in my TEP how to deliver action oriented lessons"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
My TEP did not include pedagogy and teaching methods to deliver action-oriented education"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is crucial for TEPs to include pedagogy and teaching methods for action-oriented education"

Possible High Level Codes
Need for TEPs to include pedagogy for action-oriented education

AU-F10, t9:25-said that she feels like "in general I didn't get much training teaching different curricula".

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish I was better trained on how to teach curricula"

Less Foregrounded, Less Immediate
"I feel unprepared every time I have to learn by myself how to teach official curricula when we barely get support from the district"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I am lacking well-rounded training on how to implement something as essential as the official curricula"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is crucial for TEPs to properly prepare pre-service teachers on how to deliver content included in different curricula and how to use curricular resources"

Possible High Level Codes
Need for TEPs to prepare teachers on how to access and use different curricula
Need for TEPs to prepare teachers on pedagogy for delivering different curricula

ME-F19, t06:05-I asked if she received any courses on sustainability ed or sust in general during her tEP and she said "I got nothing on sustainability. There was an extra course we could have taken on environmental education. And I think a lot of that was focused on like, outdoor education. So I don't know how much of it even. I mean, I think obviously. So I don't know how exactly focused and direct it was on sustainability. But there was like an extra course you could have taken on. Yeah, but no, we didn't. We didn't get any."
[MF: "The one extra course was outdoor education and I know that is not all there is to sustainability education, so I can say that my TEP does not include SE or IE"].

Possible Subjective Claims
Less Foregrounded, Less Immediate
"I wish my TEP had included specific courses on sustainability and how to teach for sustainability"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My TEP only offered an environmental education course that was not focused on teaching for sustainability"

Possible Normative-Evaluative Claims
Foregrounded, Immediate

243

"It would be important that my TEP adds to their courses something on sustainability education beyond merely outdoor environmental education"

ME-F19, t7:22-confirmed that her TEP at Antioch did not teach her how to integrate CC, environmental injustices, etc or even taught her about those issues in general, did not include sust literacy for teachers, adding that Antioch is "actually like, probably the most progressive program that was here". She did said that "not like it was never mentioned, but there was definitely not a like an emphasis" referring to environmental issues".

[MF: "They are the most progressive TEP but they fail at teaching us the basics of issues like CC, we never heard about any environmental issue"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"It is confusing that my TEP claims to be the most progressive but they never exposed us to climate change education or had any courses on environmental issues"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My TEP is the most progressive and even they lacked courses in environmental sustainability"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"If Antioch's TEP is supposed to be the most progressive then it should include courses on how to teach about and for environmental issues"

Possible High Level Codes
Progressive TEPs should include courses and emphasis on environmental sustainability

AU-F23, t02:29-I asked about her science class and teaching methods and she explained "I just remember doing like little projects. So we did do kind of like a roller coaster was very simple, much simpler than what we are doing now in the classroom…. We like made that mixture with. Is it cornstarch and water? We did that we observed slugs… I mean, it was fun. But I felt like it, it wasn't really focused on teaching practices. And it was like one of the last classes in our program. So it just felt quick and just kind of like, breezed through it. Science is already like, one of my stretches, just always growing up. So then, yeah, having to teach science. I mean, fifth grade science. It's not that. But um, yeah, it was it was new. They didn't have to teach science and student teaching either. So. But I mean, luckily, the the lessons that we use that Maddie has used, it was all just laid out…"

[MF: "I was not adequately prepared on how to teach Science, I only did fun little experiments not related to actual Science teaching methods which left me unprepared as it is already hard for me to teach Science and I wish they had taught me proper Science teaching methods." (AND) "Because I

was not prepared properly on how to teach Science I am just sticking to premade LPs that MA has used in the past and I trust those are good enough to teach Science"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish my TEP had taught me proper science teaching methods"

"It stressed me that my TEP did not teach me in-depth science teaching methods but that our preparation was minor and very short"

"I feel stressed that I do not have proper knowledge on how to teach science when I have always struggled with science content"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My TEP failed at properly preparing me on science teaching methods"

"My TEP trained us on how to teach science through poor quality and irrelevant activities not aligned with adequate science teaching methods"

"Because I was not prepared properly on how to teach Science I am just sticking to premade LPs that MA has used in the past and I trust those are good enough to teach Science"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"It is wrong that my TEP taught us how to teach science through basic hands on activities rather than through in-depth courses on adequate teaching methods"

Possible High Level Codes
Poor and short TEP preparation on adequate science teaching methods
Lack of confidence to teach science through new teaching methods

AU-F23, t5:08-explained that "for some (Science) topics I have to go back and read-teach myself so I can then teach the students".
[MF: "Perhaps my program was too short and not too in depth in actual subject matter content"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish my TEP had exposed me to relevant and in-depth science content"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I often have to teach myself the science content because I was not taught about it during my TEP"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate

"It is important that TEPs expose teachers to relevant and in-depth science content and topics so they are prepared when they have to teach these to the students"

Possible High Level Codes
TEPs fail to expose teachers to grade appropriate science topics and content

AU-F23,t6:16-agreed with me that 12 months of her TEP including the on-site work was too fast. She confirmed that the program was as I described "it was a combination between courses and on site work and you perform more like as an assistant to the main teacher." And added that "then you have your take over. Toward the end of your year".
[MF: "Now that I am a teacher I realize 12 months is not enough to become properly trained as a teacher"].

AU-F23,t8:19-I asked if at some point in her TEP she was taught about climate change and how to teach about and for it and she said "So Antioch, they specialize in social justice. And they call it ecological literacy. So throughout our student teaching, we'd have to collect artifacts, things that related to those two topics. So it was kind of just like, woven throughout the program, like what we are doing to address, yeah, social justice and ecological literacy, I think. I don't remember if we had specific classes for those subjects".
[MF: "They sold me the idea that the program focused on preparing me how to teach with a lens of social justice and environmental literacy, but I was not taught about CC or GW. The intention is there but it is not fully achieving preparing us a sustainability literate teachers"].

Possible Subjective Claims
Less Foregrounded, Immediate
"I wish my TEP had done a better job at training me on how to teach through a social justice lens because the focus was more on having us identify what we were doing to address social justice rather how to teach it"

Backgrounded
"I do not feel as prepared in social justice and environmental literacy as my TEP should have prepared me considering it claims to be their specialty"

Possible Objective Claims
Foregrounded, Quite Immediate
"My TEP had us collect instruments that were examples of actions to address social issues, but I was not exposed to pedagogy and design methods to teach about those issues during my classroom time"

Less Foregrounded, Less Immediate
"My TEP's speciality is not preparing us on social justice pedagogy and design methods, mostly to make us aware and knowledgeable about thing that are being done to address some social issues"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate

246

"My TEP needs to improve their speciality because the way we learned about how to teach for social justice did not make a real mark on my preparation to teach for social issues"

Possible High Level Codes
Specialized TEP should include pedagogy and design methods for integrated social justice education
Specialized TEP only includes learning about social justice actions not how to integrate social justice education

MA-F20,t00:40-said that her program was in Cal Poly and that "The most relevant was the student teaching experience, and like learning management skills, and building that toolbox up and getting the sense of what the day to day is like. But I feel like there's only so much a program can do because each district is so different, and it's just not universal. I feel like my program really focused on our practice and like our time in the classroom and allowed us to prioritize that and prepping for that in accordance with whatever our cooperating teacher was asking of us, whereas my UCSB, student teachers have a lot of like random paperwork and just random lesson plans that they're being forced to complete. That. That's just not the reality. Yeah. And it takes away from them being able to focus on the day to day. And like the little things that come up in the classroom".
[MF: "My TEP was not perfect but had good things mainly giving me the general tools to address the day to day reality, not so much the teaching content per se. The day to day is the most challenging and I see how poor the UCSB TEP students are being prepared on that aspect as in reality we do not have time to write extended and detailed LPs, which is what they seem to be practicing a lot"].

MA-F20, t3:38- said that in her program at Cal Poly they built a sense of collaboration and she really liked the program in general and added that "they really instilled valuing reflection a lot, which I feel like has really helped me a lot through the years and bettering myself as a teacher."
[MF: MA conveys pride (AND) "I am glad I got that instilled in me, reflect how I am doing as a teacher to improve"].

ME-F19, t6:30-explained that her TEP did teach her "how to create a classroom culture that supported you know, all all those things…diversity".
[MF: ME conveys disappointment as she wishes she had learned how to integrate sustainability content while promoting an inclusive and equitable classroom culture and learning environment"].

Possible Subjective Claims
Less Foregrounded, Immediate
"I wish we had learned beyond how to to create an inclusive classroom culture"

Possible Objective Claims
Foregrounded, Quite Immediate
"My TEP taught us about using a social justice lens to support all students, but not how to teach about and for social issues through core subject matter"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate

247

"It would be important for my TEP to evolve towards including pedagogy and design methods for social justice education and beyond just the piece of creating culturally inclusive learning environments"

KA-F22, t01:26- I asked how much preparation she got at Antioch to integrate social and environmental issues in her classes and she said "Yeah, I think so. I mean, Antioch does a wonderful job of doing social justice issues. And but they we didn't have anything that was directly connected to like environmental issues. The only reason why I felt like I have a little bit of a background, and it's very little, because I self selected to take during my, my undergrad work to take a class in the environment, a environmental studies class. And then it's just sometimes out of my own curiosity, but the program didn't have anything that was specific to like environmental studies".
[MF: "The program does cover social issues, but they fail to cover environmental issues and how to integrate them in our teaching. I am passionate about these issues so I learn on my own and I also have the foundations from 1 course that I took as an undergrad"].

Possible Subjective Claims
Foregrounded, Immediate
"While I appreciate the social justice focus of my TEP, I wish I had also been trained on environmental issues and how to teach about these"

"I am glad that I have background knowledge and that I am passionate about learning about environmental issues so I can teach about those"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I liked the social justice emphasis of my tEP, but they did not train me on environmental issues and how teach about and for those"

"It is because of my own personal interest in environmental issues that I learn about these and feel I can bring this content into my lessons"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"My TEP would benefit from including training on how to teach about and for environmental issues"

KA-F18-t57:53- said that " the teacher preparation programs, if they could include in this right, in.... But the thing with that is, you know, I can see where people would be like, No, let's get done with this because you're working. But you're not getting paid for any work when you're doing your student teaching. Right? So if we like rolled backlash".

248

ME-F18, t58:15- to KA comment above she said "it depends on what the state if the state isn't prioritizing it and valuing it as like, Okay, this is something that you need to know as teachers or this is something that we need to learn as students. I mean, even though I think there are like, obviously, there are science standards, but as we saw during like COVID, like science and social studies got thrown out the window, and the testing, except for fifth grade testing is just math and reading. So it's like that and writing." And added "I feel like it's hard because then districts aren't going to prioritize that. Because right, they're not going to be getting as easy money for for, you know, sustainable sustainability (education)".

[MF: "The districts are interested in prioritizing education approaches that somehow generates them money. Standardized testing does that, they can hire specific companies for trainings and textbooks and everyone is making money. If a district is not honest and valuing what is best for the students holistically then frameworks like ESD or SE are not going to be sought for and thus TEPs are not going to be including them" (AND) "Testing is what dominates everything to the point that science and social studies can become non-core and secondary subjects because testing does not include them"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"It angers me that because testing excludes science and social studies then these subjects have become of secondary priority in our instruction"

"It makes me angry that SE will only be included in TEPs if the district sees monetary value in it"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"If the districts can see how SE will make them make money then they will adopt ESD and include SE and that would force TEPs to include training on ESD"

Possible Normative-Evaluative Claims
Quite Foregrounded, Less Immediate
"To include SE in TEPs district need to see the value of it"

Possible High Level Codes
Districts dictate the type of education that is prioritized and valued at schools and thus influence what is included in TEPs

Final High Level Codes
Specialized TEPs must include pedagogy and design methods to integrate social justice education
Specialized TEPs must include training for teaching both social and environmental issues
TEPs must include pedagogy for action-oriented education
TEPs must prepare teachers on how to access and deliver different curricula
TEPs must include courses on sustainability education
Lack of confidence to teach science through new teaching methods due to TEP
TEPs fail to expose teachers to grade appropriate science topics and content
TEPs include in their programs what districts value and prioritize

OTHER

Allowed for in-depth discussions rather than move to another activity
KA-F18, t6:05-There's just not enough time. And, but there was a lot of rich information. But it was it just we moved a little bit slower to as far as like the discussion and letting them try some of the

activities. It just took a little longer than than I expected. So longer than like the maybe the hour or 45 minutes that we had set aside to complete the activities."
[MF: "I rather give time for exploring what else they want to know or say rather than sticking to completing the whole LP"].

ME-F18-t7:08-"The other barrier that I've noticed and getting all the lessons done in their entirety is someone is that the discussions have become really rich and wonderful. And that so I've been allowing more time for those."
[MF: "Discussions are so important and I want to give them the space to share their thoughts and voices rather than just cover material"].

Issues of accessibility/inequalities of access to resources amongst SB schools
(b) Because of socioeconomic status of student population at each school
MA-F1, p1, line 3- said segregation of schools creates accessibility issue.
[MF: MA conveys anger.]

MA-F1, f1, line 4- said "Because of how segregated neighborhoods are".

MA-F1, f1, line 5- said that student transfers only further the segregation
.
KA-F2, T25:07-explains that part of the issue of not having AC is also because some schools have great connections-relations with NGOs that help them raise 1000s of $.

MA-F2,T25:31- explains that also some schools in higher income areas have parents that are able to simply gift the school ACs.
[MF: "The schools with rich parents do not have to worry about where to find funding]".

Line of Inquiry 2. Forms of collaboration and resources to support the implementation of integrated lessons

(a) Digital teaching resources, databases and textbooks

AU-F23,t14:35-I asked how she feels about pre-made resources even if these have to adapted to her classroom and she said "I'm all for it. Pre-made resources. Okay. It takes a lot more time for me, having to think of, but of course, I adapt to the kids by just having just the general structure of a lesson is really helpful."

Possible Subjective Claims
Quite Foregrounded, Immediate
"I benefit immensely from having access to pre-made resources even if I have to adapt these"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I will take pre-made resources that I need to adapt over having to make them myself from scratch"

"Pre-made resources are beneficial for us as they give the general structure of a lesson"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is helpful to have access to pre-made resources"

Possible High Level Codes
Access to pre-made resources that can be adapted to each classroom

ME-F18,t46:09- added "And then also, what would be awesome is like a resource library that we can access that like, we didn't necessarily have to build ourselves, you know."

AU-F23-t15:19- I asked what elements she would like to see in these pre-made resources and she said "I love seeing, like student work, like finished work to know, you know, what should I expect… that's by the end of this. Something like that. I mean, it is also helpful, because I know the lessons that we used for science also have timing. And I thought that'd be more helpful, but you know it all depends...can say 5 minutes and takes 20."

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would like to have access to pre-made resources that include an example of the work that students need to turn in or complete"

Less Foregrounded, Less Immediate
"I feel I need more experience in designing practice activities and knowing what to expect from the students as a reflection of their mastery"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Pre-made resources should include examples of student work to give teachers a reference of what to expect as equality completed work for that lesson"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important to have pre-made resources that include samples of expected student work as this is an area of instruction I want more support with"

Possible High Level Codes

KA-F22, t2:26- I asked what are essentials and she said "I think a reliable database of resources, okay, because having that Google folder, and ready with like, resources to get to that's, I mean, amazingly valuable. Things that are, have already been curated, and are approved, you know, to be appropriate for that age, age level. And they're concise, right? They're not going on for 45 minutes, or, you know, it's just, which is really a little piece, because it's fourth grade, you don't need a 45 minute lecture, you need three or four minute chunks of things that will spark their curiosity. Yeah. And get them talking or, you know, so I think that if that existed, right, free resources, and an emphasis on free, yes, for sure that you can access that. Child friendly, teacher friendly, and curated"

Possible Subjective Claims
Quite Foregrounded, Immediate
"I want a free access database that has teaching resources that have been curated for their content quality, that have been checked for their grade pertinence, and that spark curiosity"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"An extremely valuable tool to have is a database of free child friendly, teacher friendly curated resources"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is essential to have access to a shared and free database or folder that contains teaching resources curated by age/grade and content quality"

Possible High Level Codes
Free access database with teaching resources curated by grade and content quality

ME- KA, MA-F1, b3, line 13- expressed desire 4 times to "have access to a list of resources for organizations   and   programs   that   are   doing   things   locally".

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish we also had access to a list of the people and organizations that are working in specific sustainability issues"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"A helpful resources for doing ILs is a list that details the organizations and programs working locally in sustainability issues"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate

"It is important for the work implied in building ILPs to have easy access to information that details who is doing what locally"

ME-F11, t11:37- about FOSS "for each one of these modules. There is teaching slides, which is nice. There's word wall core cards, just focus questions. There's a teacher prep video. And then if there are any, like, you know, physical handouts or whatever they have, they have those too." Also said that "it's nice to have everything." Referring to having slides and handouts available.

Possible Subjective Claims
Quite Foregrounded, Immediate
"I benefit from having access to a whole packet of resources that includes slides or tools for explaining theory and student handouts, practice work and other resources to master content"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"A complete package includes teaching slides and other teaching resources to help students practice theory/content"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"If we receive a unit or textbook we need to receive all the resources to teach that unit"

ME-F18, t13:07- said that "I would include, tried and translated, any text that we're using translations, you know, in Spanish, or in other languages, and that in a, in a folder that's accessible, and then also any, you know, videos in Spanish, also, like any any resource basically that's been translated into Spanish."

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would want in a free database of resources to also have all the resources translated into Spanish and ideally other languages"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"A complete database means that all teaching resources from videos to readings are available also in Spanish"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate

254

"It is essential for our teaching practice to have access to all the resources that we use in the classroom available in Spanish"

Possible High Level Codes
Database with all teaching resources available in English and Spanish

ME-F18-t15:39- I asked if a bolt with resources that quickly explain the basics of issue-mechanics about climate change would help them to then teach about these issues and use more complex texts with the students and she said that FOSS has background knowledge on that but "FOSS does not do a good job with well…it's it's very lengthy. Like it has all the information there. But it's so lengthy. I'm never going to look at that… it has a whole chapter on background knowledge…..it's 10 page long" and MA said "I don't have time for that"

ME-F18,t15:59-added that "I think that a bulleted list like if it's shorter…also the way you wrote the lessons…" and added that "You did a good job of saying like, the important understanding is this. I felt like I didn't have that hard of a time. I mean, yeah, I think that's always helpful but they can't be too lengthy like the teacher background knowledge as long as they're not too lengthy because the other FOSS ones I can't I don't even sometimes I don't even attempt to read them. Or I'll just scan him really fast. Because it's just too much."

Possible Subjective Claims
Quite Foregrounded, Immediate
"I need a short but quality resource that I can read to help me understand the mechanics and causes of the issue rather than a lengthy resource on teacher's background knowledge"

"I feel many time we don't attempt to teach certain Science units in depth because the background knowledge demanded from us is too much and the resource to get that knowledge is way too lengthy and time consuming"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"It was very helpful to get the background knowledge through the structure in the LPs you designed for us, as it was concise and accessible for us in terms of time required"

"A valuable resource for teacher background knowledge on mechanics and causes of sustainability issues include a short bulleted list with key information versus lengthy documents"

"We do not use the teacher's background knowledge resources that come with our Science books because they are extremely lengthy and time consuming"

"An ILP with a structure like yours indicates teachers what is the important understanding and content to master"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate

"An impactful and useful resource for teachers background knowledge is a short bullied list with key information on the sustainability issue and also the format you included in the LPs"

Possible High Level Codes
Resources for teacher's background knowledge on sustainability issues should include short bulleted lists with key information
Teachers can acquire key background knowledge through selected readings and videos included in a well-designed ILP

KA-F18, t16:56- added that "I rely on the on the tutorials like the videos" and added that "sometimes I'll throw other videos in there. And they seem to be helpful. Like, if I watch them, and then I go to the that I can then I can just scan for like, the information that I need in the teacher, like the manual, and go, but it's just a lot. And they the challenge there is time, like when do we do this? Are we devoting hours after our day is done to look this information up? So we're prepared for it when we're gonna share it? It might I mean, I can't do it when the kids are in the room because the kids are in the you know, where am I doing it during lunch or during? You know? So I think it's that's the challenge is, there's a lot of information. And I can imagine even after you've done it a couple of years, there's always new research, there's always new vocabulary new, you know, so you always want to keep up with what's happening currently. And so it seems like it's an ongoing, like learning curve, right? Are you always trying to keep up with the technology or processes? So I think it's just the time of when we're supposed to do it."
[MF: "I know that in order to teach about and for sustainability issues even when you have done in previous years one needs to stay updated with new knowledge and this can result in having to constantly learn a lot of new information" (AND) "To help teachers with the learning curve we would benefit from short tutorials that include new knowledge on sustainability issues"]

Possible Subjective Claims
Quite Foregrounded, Immediate
"I worry about our time constraints and our need to stay up to date on key new emergent information about and for sustainability issues"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Short tutorials that are periodically updated or new ones that are made available for teachers would help us with staying up to date on new information on sustainability issues without consuming too much of our time"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"We need to stay updated on new knowledge about sustainability issues through mechanism that do not consume too much of our limited time"

Possible High Level Codes
Available teacher short tutorials about and for sustainability issues
Available short tutorials focused on new emerging information on sustainability issues

256

MA-F18, t17:02- agreed that she also likes the videos for background knowledge.

AU-F18, t18:34: said that "I agree with what's been said. So I mean, if we didn't need it this year, but Spanish translations would be great. The resources that you provided for us for the environmental issues, the videos are awesome. The readings, I love the range, and you specified it whether it was for this issue and what's being done to help so…" Explained that bulleted list with resources categorized by either cause or solution was really helpful.

Possible Subjective Claims
Quite Foregrounded, Immediate
"I was greatly benefited from the structure in the ILPs that detailed which resources where for teaching causes and which ones for teaching current solutions/actions"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"A valuable structure for an ILP is the one you used where we could easily find the resources about the issue and the resources for the issue"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is essential to have clear distinctions between teaching resources for an issue and teaching resources about an issue"

Possible High Level Codes
Within a LP have categorization of resources to teach about an issue and to teach for an issue

ME-F18, t19:05- explained that "the way that you did set it up with, like, the way that you organized it by week. And then like having the videos and having anchor charts, and having slides, that was all really nice to have those like mixed media and different, different resources".

Possible Subjective Claims
Quite Foregrounded, Immediate
"I want LPs with a structure that details what is to be covered each week"

"I want LPs that include mixed teaching resources and media"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"A valuable LP includes different types of media and teaching resources and details what is to be covered each week"

Possible High Level Codes
ILP with mixed media and teaching resources
ILP with structure that details what is to be covered each week

257

ME-F18, t19:05-explained that "I really like using Newsela. Because it's really easy to change the level for every article, they have three to four reading levels. So and they also have a ton, like they have, like 1000 articles on climate change. And so I think that like I'm not sure if you're familiar with it, but I think that, that that's a really great resource because it'd be pretty easy to then have in that database. Oh, here's like a second grade reading level third grade reading level, fourth grade reading level of the same exact article". Added that also "resources available that are tagged with who is the author, comprehension level would be useful". AU agreed with using Newsela also because "it reads outloud"

Possible Subjective Claims
Quite Foregrounded, Immediate
"I find useful databases that give you a large number of options on reading articles that also have been adapted for each reading level"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Our ideal database of teaching resources would include articles adapted for each grade level tagged with the author"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"We need variety and grade adapted reading articles"

Possible High Level Codes
Database with reading resources adapted to different comprehension levels and identified with author
Database with reading resources that have read out loud option

Karla-F18-t21:17: replied to my question to what kind of resources she would like to have access to "I think I would include definitely more active more things that are like hands on, to sort to go along with the vocabulary and the information. Thinking back to what we were talking about how it's, if it's too like text heavy, vocabulary heavy, throwing in something that is like more of a hands on experience, I think helps, the kids get excited about it. And so then you're using, you know, this text or this process, and they're applying it to something that's moving or they're building or they're tearing apart. And then I think it really adds to the kind of understanding and like just remembering the information".

Possible Subjective Claims
Quite Foregrounded, Immediate
"I want my students to have hands on activities along with reading and listening because this approach helps them to retain information better"

Possible Objective Claims
Quite Foregrounded, Quite Immediate

"Students greatly enjoy hands on activities and so pairing those with traditional resources like reading and listening is useful for a quality ILP"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important to include front loading information and reading activities along with hands on work that helps students to become engaged in the learning"

Possible High Level Codes
Hands on activities as part of the set of teaching activities included in an ILP
Hands on activities as a key engaging teaching resource

ME-KA-F18, t22:23- agreed when I clarified that it would be "almost like a category that has, another category that has the texts, articles, another that could be used as read alouds, something that's more specific to the hands on activities that will go with all of it."

MI-F18-t1:03:29- said "having the resources is amazing. Like, well, today, just in fifth grade, like we were putting in their IB planner, we were putting in like updating it to match what they did this time. So like I think that's really helpful having your resource folder in there and like the activities that were used like it's helpful to have that time to like this is the flow of the unit".

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would love to have time with the teachers to maintain a shared folder where we upload activities that have been done for different integrated lessons that are part of one unit"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The shared folder you created was very helpful as we can see what activities are to be developed for an entire unit and how these connect"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"We need to have time to maintain a shared folder with all the activities set for a unit so we can visualize how the entire unit will be developed"

Possible High Level Codes
Shared folder with all the needed resources and all the activities set for an entire unit

KA-F22, t9:05- I explained that a textbook that covers all the content for all the topics but everything is fully integrated she said "Yeah. That's the way it should be…Yeah. I mean, I think about even with our history, you know, if we can, what's like, why isn't our history content more integrated with again, the reading, reading or the writing? Right? Yeah… Why hasn't that been invented? I mean, I think it comes down to money, right? Because the publisher that would have to do that would have to look at 50 different states."

259

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would love to have a history textbook that is perfectly integrated with our reading and writing"

"I wonder why we work with so disconnected subject matter content"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"An integrated textbook would be ideal and very beneficial for our teaching practice"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is a matter of money, creating a fully integrated textbook"

Possible High Level Codes
Official transdisciplinary textbooks that integrate several subjects
Official curricula should integrate content from several subjects

(b) Having an expert or TOSA style support for IL

AU-F23,t12:43- I asked how would you want to have access to more resources? Or what type of resources would benefit you with your own teaching style and the way you learn and she responded "Like a person...we talked about this in the focus group, like a Tosa, someone who I can go to that's on site when I need support in something, or can even observe… I know, Mik She helped me with writing a lesson. I mean, like a whole chunk, weeks, she would teach some lessons, I went to teach others…so something like that, where I can see what it should look like, and then try it out. And then you know, someone who's like an expert…"

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would love to have an expert that work on-site that is available to answer questions and that can teach IL that I can observe and the try out"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"A TOSA focused only on integrated lessons would allow us to have on-site support both for questions and for lesson modeling"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"To get ILs rolling we need on-site support available in different ways"

Possible High Level Codes
Sustainability focused TOSA/coach available on-site to support teachers when they have questions and that can model integrated lessons

AU-F23,t13:31-I asked her if having that expert would help her to build a database of her own integrated lesson plans and she said "Yeah. Because Mik would do things that I like, Oh, I've never thought to do that. Yeah, different strategies that yeah I haven't seen or haven't used in a while".

Possible Subjective Claims
Quite Foregrounded, Immediate
"I benefit from having an expert delivering a lesson for my students because that is teaching me other strategies I could use"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"A sustainability education TOSA that models lessons is a great option to teach us news strategies"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is important that our districts invest in specialized TOSAs so we can properly bring into our classroom sustainability education"

Possible High Level Codes
Sustainability education TOSA/expert to model lessons and new strategies

KA-F22, t 3:44- I asked what else besides the resources she would need to actually design and deliver integrated lessons and she answered that "Ideally, you would have, I mean, aside from additional time, it would be nice to have an additional person, right? Because you could then have stations that are doing different things or somebody else to add to the conversation and guide The teams as they're working. manipulatives are always helpful just because I think they really there it's not this you can say oh, you're talking about something how something feels or or looks or how it degrades or something. Just the fact that they can hold it. I think it makes a difference anytime you're teaching anything that they can hold physically have it be present in the room is a…"

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would love to have an additional teaching staff with me in the classroom so we could develop hands on lessons with manipulatives through stations"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Another teacher or an assistant would allow me to develop stations with hands on activities"

Foregrounded, Immediate
"Lesson with manipulatives are very beneficial for our students especially for integrated learning"

Possible Normative-Evaluative Claims
Backgrounded

261

"Our district needs to invest in more teachers or assistants if they want us to develop meaningful activities such as stations with hands on activities"

Possible High Level Codes
Additional teacher or assistant to support integrated learning through stations with hands on activities

KA-F22,t4:50- I asked about a specialized integrated education TOSA and she said "I think that would be beautiful. We work really closely with our lit coach and IB coordinator Mica and I, I find that extremely helpful, right, because she's, I might think of an idea, but she's looking at a different lens, or she's like helping to guide me back in the direction that I am, that I need to be going in, or it will pose a question that I hadn't thought about. And then it's like, oh, then I can manipulate my lesson or, you know, adjust this way or that. So I, I think having a Tosa or some other specialist in the room to help with the lesson building or choosing the resources. And I say that because even though you might have found like a lesson, that's fabulous, next year's group will be different. And you're gonna have to adjust according to who's in the classroom. Right? And what they know and what they're curious about. And so it's not like a one and done. It's a the way we're supposed to reflect and adjust, I think, I mean, it's an ongoing thing. You can't never be done with training."

Possible Subjective Claims
Quite Foregrounded, Immediate
"I am very benefited from the collaborative work we do with our lit coach, so an integrated ed coach would be as beneficial"

"I am committed to quality lessons but this imply that we have support from someone besides Mik that can help us to continuously improve lessons"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"An integrated ed coach would assist us in the process of building the IL and/or selecting the resources"

"An integrated ed coach is part of ensuring there is quality education as we are meant to improve and edit lessons every year based on our new group of students"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is crucial to have support like our lit coach, but for building IL and selecting the necessary teaching resources"

Possible High Level Codes
Specialized TOSA or coach to support with selecting resources for ILs
Specialized TOSA or coach to support with overall construction of ILs
Specialized TOSA or coach to support with yearly improvement of ILs

ME-F18,t49:09-agreed that the consultation person could be like a TOSA, even more someone to help them set the bones of the LP, said "Oh my god that would be amazing".

ME-F18,T50:11- MI said that should be her job and that for next year she wants to have "time for looking at units for, in theory an hour, 15 minutes just dedicated to that and planning that. But then the reality of it is…" and ME said "that's our time… So a TOSA would be someone actually giving me the plan… We here are the articles for this unit. Here are the slides besides the lesson plans…"

AU-F23,t36:56- I asked if a TOSA would be helpful to remind her of the ESD pedagogies and she said "reminding of the practices, and also just being, like, finding resources too like what you did was extremely that saved us hours."

Possible Subjective Claims
Quite Foregrounded, Immediate
"I was so relieved and found it so helpful that you found the resources for us"

Possible Objective Claims
Less Foregrounded, Less Immediate
"A sustainability education TOSA or coach can help us with selecting ESD strategies and remind us of these so we can use them in other lessons"

"Without a sustainability eduction TOSA or support like yours we would have never gathered all the resources for the ILP that we designed together"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"If we are to deliver ILPs and use ESD pedagogies and quality resources we need to receive support from a specialized coach"

Possible High Level Codes
Specialized coach or TOSA would help remind teachers of available ESD pedagogies
Specialized coach or TOSA would save teachers time and ensure that quality resources are gathered and used

ME-F15, t55:04- said that it would be amazing to have a TOSA just helping them do what I did with them.

ME-F15, t36:41- I said that some schools out of the US have a "me" that meets with teachers, gathers ideas, and then this person writes the detailed LPs, ME said that's what a TOSA does

Karla-F15, t36:48: To the above comment "Yeah, but the TOSA and the and like the LIT coach, that's what they're supposed to be doing is"

ME-F15, t 36:52- added that "instead of doing that they're doing more like remediation and intervention"

263

KA,ME-F15, t 37:24- both agreed when I said that districts should have TOSAS to help teachers with integrated LP designing and writing and ME added "because it is a LOT."

KA-F18, t59:53- explained that it would be useful to have time to consult with an expert on students' random questions re:sustainability, she said " free time to inquire about anything that might lead your children might lead you down like, like a recycling plant or oh, you know, we, I'm trying to think right now what came up recently? And I was like, Oh, let me get back to you on that. Because it really wasn't part of what we had been talking about. But, you know, so sometimes they're random" and added "Yeah. And, and, I don't know, but I, whenever that happens, I usually like to follow that a little bit, until we're kind of satisfied with what wherever we find or give them an opportunity to also go down any curiosities that might have come up for them. So I think having that opportunity to kind of inquire about the things that come up for you, that you're like, Oh, I let me find out about this. Because I had an oh, it was fracking. It was one of the videos we were watching, and then they mentioned fracking. And then we were like, oh, let's so then we watched another little mini tutorial about fracking. It was like, Okay, now we can move on, because that curiosity has been satisfied for now".

Possible Subjective Claims
Quite Foregrounded, Immediate
"I want to let my students ask interesting and curious questions that might not be fully related to what we are learning, but that implies I have the chance to learn "

Possible Objective Claims
Less Foregrounded, Less Immediate
"A sustainability education TOSA or coach would support us when our students have random curious questions and we need to follow up with them as we need to inform ourselves first"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"If we want to deliver learning that fosters curiosity and honors a student-led process then we need support from a specialist/coach that we can consult with on topics that are new for us"

Possible High Level Codes
Specialized TOSA/coach to help teachers with questions and curiosities posed by students related to sustainability content

(c) Other needs

-Less students
AU-F23-t21:30-I asked what else would be helpful to do her job and she explained that "Anything, even things for the students…Smaller class sizes. I mean, I've 25 this year, which I feel like it's not a lot. But you know, I really do feel it when kids are absent, and there's only 20 in the room just feels like it's more manageable. But it might just be you know, I'm I'm beginning. So I'm still working on

the management aspect. But I just feel like I can have more. More time with groups if there's less in the classroom…"

Line of Inquiry 3. Elements from a professional development on ESD did teachers identify as most important for their preparation

1. Views on PDs provided by district and HA leadership

(a) Negative, referred to structure and content

ME, KA, MA-F1, b3, line 7- said cannot remember most of the content taught as they receive so many so frequently that these lose their applicability.

MA-F1, b4, line 8- said in regards to training on how teachers now need to refer to non-native English speakers "we arrived at San Marcos and they said here you go this is how we call these students now" *[MF: "We never get meaningful training even for crucial things like supporting BELs which are a big % of our student population"].*

MA-F10, t9:52- said "Oh, yeah, the district has not done very much. It looks like we've like I've been part of the district's curriculum trainings that have happened over the years and nothing sticks." *[MF: MA conveys disappointment as she shares this information as matter of fact, something that happens over and over.]*

Possible Subjective Claims
Quite Foregrounded, Immediate
"I wish the district would provide us with meaningful professional development that we can actually use for our classroom instruction"

Less Foregrounded, Less Immediate
"It upsets me that through so many years I have never received a training from the district that I can claim that made an impact on my teaching"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The district's trainings are not impactful for our classroom instruction as the taught content is not something we as teachers either remember or want to use"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"The district needs to recognize that its trainings are not helping teachers and thus the students"

"The district needs to hire better professional development providers"

Possible High Level Codes
Trainings from the district are not impactful or useful for teachers
District needs to reassess its PDs providers

265

MA-F10, t10:10-I asked if they get training from the district every time they get a new curriculum and she said "Yeah, but it's not always great."
[MF: "It is usually not useful so we have to learn how to teach the curriculum on our own"].

Possible Subjective Claims
Quite Foregrounded, Immediate
" I wish the PDs would teach us properly how to implement new curriculum"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The majority of PDs provided by the district for new curriculum are not useful"

Possible Normative-Evaluative Claims
Backgrounded
"It is important that the district hires PD providers that can give us effective training on new curriculum"

Possible High Level Codes
PDs by district are not effective and useful for teachers
PDs by district fail to train teachers on how to deliver curricular content from official textbooks

MA-F18,t30:23- added that "there's a lot of repetitive professional development that happens, like all of the professional development we have received for our math curriculum has felt like a waste of time."

Possible Subjective Claims
Quite Foregrounded, Immediate
" I wish our time was not wasted with PDs that are just repetitions of others"

"I wish the district would respect our time and provide mandatory PDs that are useful and effective"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The district keeps imposing PDs that are a waste of our time"

"The district keeps imposing mandatory PDs that do not help us with our classroom instruction"

Possible Normative-Evaluative Claims
Quite Foregrounded, Immediate
"The district needs to stop wasting money and our time in useless PDs"

Foregrounded, Immediate
"It is crucial that the district hires PD providers that give teachers quality trainings"

Possible High Level Codes

266

MA-KA-F1839:06-said to have differentiated levels in the PD-piece for technology, piece for curricular content, etc

AU-F23-t18:10- I asked what she needs to be better at her job in general and she said "I would like more I mean, helpful professional development. Especially as a first year teacher, I, I felt like I didn't get enough or anything [from previous PDs] that was you know, I felt like I could actually apply this in my classroom…"

(b) Negative, referred to how PDs are developed

MA-F10, t10:16-I asked if the trainings by the district are more focused on how to use the mandated textbooks and she said "I mean the units of study training was more hands on, but it was also, like such a hassle because we were being pulled from our classes. And I think that kind of took away from it. Because it was just like, such a chore to have to go to another school. Do your sub plan. Yeah. And then it's like, boom, boom, boom, gone. You're supposed to apply this to your classroom, but you really only learned like 15 minutes of what you're supposed to be doing. You're still supposed to dig through these units of study, and they're super dense".
[MF: "In theory the training is to help us to teach effectively the units of study but to attend the training there is all this extra work" (AND) "they are so short and we are sent right away to the classroom afterwards that they are really not meaningful and we really do not learn enough for all that time and work commitment" (AND) "In the end you had to create lessons for the sub, go to different schools, learn 15 minutes of actual meaningful stuff and still have to invest a lot of time through the units of study to have an idea how to teach them" (AND) "The PDs are inefficient and poorly designed and delivered and we get nothing truly valuable"].

AU-F18, t30:07- explained that "here was one whole PD day where we got the day off, where the first like hour, they talked about MTSS. But I feel like every year, we get just like an overview of MTSS. And it's like, we know, these known this…"

KA-F18, t30:36- added that "But I hated when they'd be like, you're teaching this part. And I'm like, I don't even know what we're doing. You're expecting me to go face 27 kids right now. And I don't even know, like, I just walked into the room, that would drive me crazy"

Possible Subjective Claims
Quite Foregrounded, Immediate
"I hate when the PDs hired by the district force you to implement something you just learned"

Less Foregrounded, Less Immediate
"I need to have time to practice or observe what I just learned as a teaching practice"

267

ME-F18, t32:50- referring to FOSS now without training "because there's so many pieces to try and it's yeah, trying to figure it out on your own without ever having seen it. There's a lot."

MA-F18-t34:04- referring to Lucy Hawkings training "you would walk in and they're like, we're doing this lesson today. And this is the mini lesson and this is this and then they would just throw you into the classroom, But it was just so dense. It was like I need time to go through this. And they're

268

like you have to go through every single page and make all your teaching points and this and that. It was just a lot for us to do that without giving us guidance necessarily. Like here's the structure. Go."

MI-F18, t35:00-referring to what would need to change in terms of PDs given by district "I feel like there's so much wrong with everything. Everyone is new that I work with the district. So everyone is, you know, trying to make their stand in their point and all these different areas in silos, and they're just like, rolling and pushing and like, no one's communicating, and nothing's cohesive. And it's very disjointed. And I'm a part of rolling out the district PDS, which is very uncomfortable because it is very disorganized."
[MF: "District leadership and key roles have changed and the new appointees are more concerned with making their own individual points rather than working cohesively" (AND) "New district staff is more concerned with each one making their own decisions and no one is looking to work in a cooperative way to support our teachers and students"]

Possible Subjective Claims
Quite Foregrounded, Immediate
"I feel powerless at the disjointed work currently done by the new district's staff and leadership"

Foregrounded, Immediate
"I feel embarrassed that I have to be part of rolling out the district PDs as these will not be impactful as they come from disjointed decisions"

Possible Objective Claims
Foregrounded, Immediate

"District's leadership does not communicate or work together to benefit our teachers and students"

"I do not want our teachers to receive the new PDs because they have been selected by individuals that d not care about the collective good"

Background
"New staff at the district has selected PDs to benefit themselves somehow rather than the teachers"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is wrong that those with the power to make crucial decisions like the type of PDs that teachers receive do not work or communicate closely as they should"

Possible High Level Codes
District new leadership works in silo and disjointedly
District new leadership does not work cooperatively to get the best PDs for teachers

KA-F18,t37:27- added that "I am not really fan of the Zoom ones… even the district when we've done the self directed PDS where we get like the one session where you take you pick which one you want to go to, those have not been very useful."

KA-F18,t37:27-explained that she has gone to many PDs where too much of the time is spent explaining where they can find resources etc that the textbook includes, but if they have already explored that then it is a waste of time. She explained "I think we have to have, like, Okay, what is it that you're coming for? Is it the technical, like the technology version piece of the curriculum? Or is it something else? And and that would really be beneficial, because if it's just like, the technical portions of it, then you know, those folks need to be in like a separate session, because the rest of us then are just sitting there twiddling our thumbs."

Possible Subjective Claims
Quite Foregrounded, Immediate
"I dislike when PDs by the district have you waste your time in sessions for content that you already master"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The PDs by the district often waste our time as they force us to sit through sessions that we do not need"

"The PDs by the district often are designed poorly and not thoughtfully to only provide content that the participants do need"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important for PDs the be designed in ways that participants are not force to attend sessions they do not need"

Possible High Level Codes
Poorly designed PDs that force participants to sit through sessions they don't need
PDs need to be designed into sessions that target specific areas or content

(c) Negative, referred to the end goal and objectives of PDs

KA-F18, t30:40-added that I agree. She said "Because it sounds more like they're trying to sell you the product than actually how to use the product."
[MF: "The PD providers are more focused on marketing their product to us and the district than to provide teachers with effective teaching practices and how to teach the curriculum"]

Possible Subjective Claims
Quite Foregrounded, Immediate
" I wish the PDs were focused on teaching strategies and felt less than marketing schemes"

2. Ideal forms of collaboration and PDs

(a) PDs format

ME-F19, t11:49-said in terms to all the goals and me teaching them all in only 2 hours along with lesson samples that "I can't like I could not hold all of this stuff. Yeah."

ME-F19, t3:58- I asked about the 1st piece of sust and sust issues and the length of it and if it should be more like 2 pieces she said " Oh, definitely, definitely two. I still don't like all one all day, PDs. I feel like it's too much information, I feel like it'd be nice to split it up. And then in maybe two or three parts, I feel like two hours is a good amount, and then split it up into two hour chunks that are not too far apart. So you're still kind of like feeling like there's momentum…"

271

"PDs work better for me when they are structured in short but connected sessions delivered close in proximity"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is impactful when a PD is structured in several connected sessions rather than in one whole day training"

Possible High Level Codes
PDs are most effective when delivered in short sessions that are delivered closely
Short connected and continuous sessions rather than one day PDs

Ka, ME-f15, t52:05- agreed when I say "I need to prove that you guys cannot be trained in two days and be like, now you know how to do sustainability integrated lessons." KA added "which is what other PDs always do" and ME added "But then it's like they can check off this stuff". We were talking how I gave them resources and we did not even have time to code those properly so I was going to ID for them which content/topic the resources were useful for/which were the entry points/ID within a resource pieces of content that can be used to teach a specific topic

KA-F15, t 54:05- agreed when I say that "we can't accomplish these amazing transformative teaching with six hours like we only did three sessions of two hours"

AU-F23, t19:57-I asked what type of format in terms of time would she prefer in a PD and she said that either one long weekend or several sessions and explained that "I mean, it's always hard to have to be subbed out If I have to miss school days I would prefer not to….Because it's it's hard not being in the classroom. Having to prepare subplans. Okay. So I mean like a day or two…"

Possible Subjective Claims
Foregrounded, Immediate
"I do not want trainings that make me miss classroom instruction"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I prefer trainings done outside of my classroom instruction as it is hard and time consuming to prepare plans for a sub"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important that trainings do not make us miss classroom instruction"

Possible High Level Codes
Preferred trainings conducted outside of classroom instruction schedule

272

MA-F18, t28:29- added that "the other professional development I was gonna mention is like going to conferences, like going to the AVID trainings, and getting to collaborate with people that you never collaborate with, because they're not from your district, and they're not even from your state necessarily. And having that opportunity to talk to other professionals is just so valuable. And they make it so fun. And you're like not dragging your feet about it…every time it was I just felt like I came away with stuff I could actually use and it kind of just boosted morale."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I felt empowered and motivated after attending conferences that are set up like trainings where there is cross collaboration and learning with teachers from other districts and states"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I benefited from trainings that were in the form of events where I could talk, share, collaborate, and learn from other teachers and professionals"

"Learning techniques and methods that one can actually use in the classroom is always uplifting and encouraging"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important that we have opportunities to attend events were we are learning from others, collaborating, and learning about methods that we can actually use in our classrooms"

Possible High Level Codes
Trainings in the form of professional events and conferences focused on practical education methods and strategies

(b) Support from a specialist

ME-F19, t3:58- "… and then we talk like what we talked about is having that, you know, check in continually throughout the year, where I think it'd be really nice to either have a really small group with a like, you or consultant or someone so that we can ask like specific questions and just like, you know, check it like have some accountability for like goals and like, maybe share outcomes and stuff like that."
[MF: "In an ideal world we would be continuously supported in our lesson planning journey by a person that is making sure we have set goals and can clear questions as we set lessons"].

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would love to have support by a specialist that can help me do my lesson planning, keep me in track, and guide me in case I have questions as I build lessons"

273

"I would love to have lesson planning sessions that are done with a specialist and in a small group setting"

Possible Objective Claims
Foregrounded, Immediate
"Lesson planning would be improved if we had a specialist supporting us as we design activities and questions arise"

Background
"We need to have specialized support throughout the year for lesson planning but we all know that is never going to happen"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is crucial that schools provide teachers with ongoing face to face support as they navigate lesson planning"

Possible High Level Codes
Ongoing support throughout the year from a specialist done in small groups for guiding the planning of integrated lessons

ME-F18,t45:00- added that " I do think like, having someone that we can check in with on a regular basis, and you know, short, that wouldn't take a lot of time, but just to check in about, like, you know, for example, like the unit that we built for sharing the planet." Also added that "I mean, it was really easy to see the connection between, like what we were already supposed to be doing in science and sustainability, but like for other units that were not focused on science, like how, like, what how do we how do we what's the best way to integrate them? So like, I think having like consultations with actually consultations throughout throughout the year, throughout the year, like we have one per unit, just to check in and be like, Hey, this is what I'm doing. What do you think?"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish we could have someone that works with us as a consultant to do check-ins as we build our lessons and to provide guidance on how to do integration of sustainability topics within academic topics that are less obvious for that integration"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"We will have a hard time integrating sustainability topics within academic topics that are less obvious if we do not have a regular guidance and support from a specialist"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate

274

"Ideally after a training on IE we also have a consultant that we meet with through short sessions to provide feedback as we build lessons and to guide integration of sustainability topics"

Possible High Level Codes
IE PDs that include short check-ins with specialist to guide integration and lesson building

ME-F18,t46:54- I said that rather than going through the process of using the technique that I taught them, here's a bunch of resources now code them all that would already be coded for you, ME confirmed "I mean, ideally, I mean, because that does take a lot of time." +" But that's the reality. But it's Yeah. And it's like, yeah, I mean, we could totally do it if we had the time, but…

(c) PDs with practice and/or implementation time

Karla-F18, t23:20: said that "I would definitely like eliminate would be to get a PD and then to be sent, okay, you're back in the classroom tomorrow, implement this, which seems to happen quite a bit. And so I think that having shorter PDS that actually gives you time to think about how you can implement or dig a little deeper, you know, into the areas that you're interested in, I think is just an easier way, right to make sure that, that we're actually implementing the information because it all sounds great until then, you're back in the class the next day, and then it's like, oh, when am I going to find the time to you know, to do this…"

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would love to get PDs that are delivered through short sessions that expose you to content while giving you time to understand how you will use that content in your own teaching practice "

"I find effective PDs that teach you all the content in one day and then the next day you are expected to go implement what you learned the day before"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"PDs that include time for teachers to analyze how introduced methods can be used in their own classroom instruction are highly efficient".

"If we are given the time to analyze how we are going to use methods we have been trained on there are more chances that we actually use that training in our classroom instruction"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is highly efficient and important that PDs provide sufficient time and have a structure so teachers can analyze how they can use what they have been trained or"

"It is crucial that PDs avoid sending teachers to implement trainings content without time to study first how they will use that content"

Possible High Level Codes
PDs delivered in a structure that balances introducing/training teachers to content/strategies with time for teachers to analyze how they will implement that content in a classroom
Teachers often want to use strategies learned but they are not given the time to analyze how they will implement them in their classroom reality
PDs that avoid putting teachers too soon to implement taught strategies in the classroom
PDs with sessions for teachers to analyze and discuss key areas of interest

KA-F18, t24:10- said that "something that we recently started doing, which was with our new elevation training, it's something that I liked about that was the fact that it was like this, like mini lesson. Right? And then it's like, go try it out"

KA-F18, t24:44-added that "that framework of here's a mini lesson, try this strategy out, you know, reflect on it or report, you know, come back then it kind of gives you that that time I'd like that idea, rather than, here's all of this information, eight hours or six hours worth of information, and then, you know, off you go. And it's like, oh, I don't even remember what we said, you know, at eight o'clock, and now you're asking me to…"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I would benefit from trainings where I am taught how to develop a short lesson, then I can try it out, then I reflect and report how it went with a specialist, rather than just sitting for 8 hours listening to a training"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"An effective way to train the teachers o ILPs would be to provide them with the framework: training on short lesson-try lesson out- reflect&report"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It would be effective to give teachers the opportunity to try out teaching strategies/lesson they have learned through a training, then reflect and report how it went with a specialist"

Possible High Level Codes
Sustainability education PDs that combine introducing and explaining a short ILP, opportunity to implement ILP, reflect and report about implementation with a specialist

MA-F18, t25:19-explained that "the GLAAD training was probably the best professional development I've gone to through the district. And like, while it was like a week being out of the classroom, which was really hard, it was an opportunity to learn a ton of strategies and really dig into those strategies and a lot of planning time with those strategies. And then also seeing those strategies

in a classroom because we were on a school site we were observing, we were observing, implement that by somebody else, do them with the class. And then that provided a lot of collaboration time."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
" I wish we had more hands on trainings that would allow us to observe in action introduced teaching strategies"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"We would benefit from trainings that focus on introducing/explaining teaching strategies, having time to analyze those strategies and how we could use them, create LPs with those strategies, observe those strategies being used in a real classroom, and the use them in our classroom"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is paramount that we receive higher end trainings with effective designs that combine theory on teaching strategies, time to plan with those strategies, observation of those strategies, and implementation in our classroom"

Possible High Level Codes
PDs that include theory on teaching strategies, time to time to plan with those strategies, live observation of those strategies, and implementation in the teacher's classroom

(d) PDs with in-person or video demonstrations

ME-F19, t10:38- I asked what would work best in a PD to explain and show teachers how a lesson fosters 1 or more of the ESD goals if through mini lessons that I explain as I did in the PD or to explain the goal and then co-design a mini lesson and go implement and test it, so she responded "I think personally, it sounds like a lot of teachers like to see in person demonstrations, I have never gone to an in person demonstration, like gone into a classroom during a PD, probably because of COVID. But I would love, my ideal would be to have see a video, that's of an example of a teacher in a classroom, we don't have to sit there for 45 minutes for the whole lesson. But it's basically just showing the important clips of how they're doing it. And then along with the video, there may be could just be a really simple lesson plan with that to show you how they did it. And, you know, like, how they matched it with the standards or whatever, but keeping it like start definitely starting out like the first if this is like an ongoing PD and something that's going to be active in the district like starting simple. So like having an overview and having little bits and pieces rather than going like deep into every single because it seems like because it because this there's a lot here…"
[MF: "There are so many effective ways to get teachers to use new approaches as the ESD goals, like having demonstrations of teaching moments when goals are met and then include a lesson plan that

details the ESD goals and the CCSS, all under a simple format that avoids going too deep into information as that is when teachers find PDs overwhelming"]

Possible Subjective Claims
Quite Foregrounded, Immediate
"I would love to get a PD on ESD that shows through a video how teaching practices are implemented to foster goals and have in my hand the written lesson plan of what I am observing"

Possible Objective Claims
Quite Foregrounded, Quite Immediate

"Teachers will prefer seeing short key pieces of a lesson being taught that meets the ESD goals while having the written version of the whole lesson"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"Training on how to use the ESD goals for lesson planning will be done best if teachers can watch how a lesson that meets goals is delivered and have that lesson also in writing".
"If part of district trainings, training on ESD goals should avoid going too in depth into each goal and focus on showcasing key examples from integrated lessons that meet a goal"

Possible High Level Codes
Training on ESD goals could include combining the written integrated lesson plan with key teaching moments shown/exemplified (in-person or through a video)
Training on ESD goals should avoid going too in depth into each goal and showcase key examples

AU-F23,t32:39-I asked what should I have done to help her use the ESD goals more as a guide during her LP process or even during her teaching and she said " Maybe if we just had more, I mean, I think I just forgot, so you just had more reminders, or sessions or okay, it's I just, I forgot, and if…And I was like, Oh, I think, Okay, this this is right, this is what I should be doing. You know… I think it [EDS Goals] complements because I think all these should be things we should be doing or teaching."
[MF: "I needed practice sessions after you explained the goals, I needed to practice how I would use them in my lesson planning" (AND) "I think we should all be using the goals as they help us shape lessons into meaningful activities for our students"

Possible Subjective Claims
Quite Foregrounded, Immediate
"I was feeling hesitant if I was using the goals right and wished I had more reminders and sessions on how to use them"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I needed more practice sessions to consolidate what you taught us on how to use the ESD goals"

278

AU-F23,t33:50-agreed when I said that for her to really grasp new techniques like using the ESD goals as guides/standards she needs to be able to implement/apply so a practical piece to the training.

AU-F18, t29:24- added that "the one that I really enjoyed. It was over the summer and it was Orton Gillingham. But it was it wasn't that applicable for fifth grade. But it was mostly for like phonics and phonemic awareness. It was on Zoom, but I really enjoyed it because it was just there were sessions where they just show how to teach and then they put us in groups and actually practice teaching it to each other….that was that was really helpful like actually getting that practice…"

ME-F18, t30:41-agreed with KA that watching rather than thinking how to implement what was taught in a PD is best for her

MA-F18, t 31:36-explained that FOSS did great trainings-ME also said that- because "they used to actually come and like, walk us through the units and have us do every single investigation. We got pulled out multiple times a year to do it. And they were really good and useful. Like I could teach that

fourth grade electricity unit like that, because I have done it. And then we would get pulled out again to do the other ones."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish we would receive the old FOSS trainings where we would work with a coach and develop each investigation so we knew exactly what to do with our students"
Possible Objective Claims
Quite Foregrounded, Quite Immediate
"We benefited from trainings that walked us through hands-on lesson plans/experiments"

Backgrounded
"We would be able to do more investigations if we actually received training that walked us through the hands-on LPs as they consume a lot of backend work from our side"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"To ensure we deliver hands-on LPs from official textbooks we need to receive trainings that teach us/walk us through the whole LP rathe than expect us to read the giant teacher manual"

Possible High Level Codes
Teachers want PDs that also walk them through every step for setting up and delivering hands-on activities

MA-F18,t32:21-refering to FOSS "And it was nice because like with Foss, you have to like, they would teach us like even like, here's how you pull the materials that you need…. just knowing where all the materials were and how to set up all the investigations… but that's not what we get anymore"

MA-F18,t42:38-added that "maybe more opportunity for modeling will be a great resource. And then like, I mean, we never have enough time to really be able to dig in and build and like you did a bulk of that. And then like, so like for us to then have that opportunity of like, what is it really like to go and find all these resources and, like actually having time to do that, because I think that's where we tend to get a little overwhelmed. It's like, we have these ideas that we really want to do and like think would be really meaningful to the kids. But at the end of the day, I gotta go home, I got to take care of myself, too. And I can't be spending my whole entire evening watching videos of you know, that are school appropriate for…"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I think that more modeling of strategies, design methods, and how to code resources is beneficial and desired by teachers"

"I wish we would get a training that also provides the time for us to find the relevant teaching resources as that step is overwhelming when you are facing it alone"

"We feel overwhelmed as we have to choose between spending a lot of time searching for meaningful and impactful teaching resources or respecting our personal time for self care"
Possible Objective Claims
Quite Foregrounded, Quite Immediate
"If we do not have the paid time or time during a training to search for the teaching resources that go with integrated education then we most likely won't deliver such lessons"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"We cannot be asked to deliver quality meaningful instruction if we are supposed to use our personal time to search for resources for integrated education"

"We must be given the time to find teaching resources for delivering amazing and exciting activities we want to give to our students"

Possible High Level Codes
Time within IE PDs to find teaching resources for creating relevant and meaningful lessons as teachers lack time in general and searching for quality resources is time consuming

MA-F18,t44:09- I asked if she meant modeling the pedagogies or modeling how to find resources and she said both.

MA-F18,t44:33- I asked if she could clarify if she meant training so teachers know how to look for those resources and then having the opportunity to create the LPS using those resources with someone and then see the LPs in action later on. She agreed by explaining "if it were a different group of teachers, you're not working with the HE teachers that are already through that transdisciplinary lens. I think like providing examples of that and how that really can work and how valuable that is, is really…"

(e) Evidence of impact and applicability of integrated learning

MA-F20, t29:41- I asked if I was to give this PD and method to the district what would stay or leave and she said "less is often more…. Especially like at a district level where you have so many veteran teachers that are resistant to change. People just people need to know the why first, right? Like, why are you trying to change… But I've been doing for so long like that piece has to come. Because there are so many teachers that are just like I've been doing it for this many years, and it's fine."

Possible Subjective Claims
Foregrounded, Immediate
"I fear that too many veteran teachers are resistant to change"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Teachers need to be able to see why they should adopt new teaching practices and design methods, especially if they simply making radical changes to how they have been doing things-like lesson planning"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"For full adoption by the district and implementation by teachers, it is crucial to evidence why it would be meaningful, effective, and important to adopt ESD teaching practices and design methods"

Possible High Level Codes
Evidence to teachers within districts of the relevance and impact from adopting ESD teaching practices and design methods

(f) PDs with in-person or video demonstrations

AU-F23,t34:32- she said about the ESD teaching strategies " I feel like this is all I mean, nothing was super new, but I did feel like we could have done more field trips or field work. But all of these, I feel like are things that we strive for." She added that to really get those strategies more engrained she is "all about seeing things in action…Yeah, a video, or, I mean, I can also just read examples of things under each, strategy...but videos are always very helpful…"

KA-F18, t32:77-added that "in person hands on or being able to watch it in action."
MI-F18,t36:12-explained that "I learned best from watching people do things and being in other classrooms with others. So I think that's super helpful. Being able to see it and do it. I'm also like, huge into I like planning things out with others. So being with them when we like, create something. And then a lot of it is the time, like they said, so if there is something we're supposed to be doing, having the time to be like, Okay, this is all that we learned. Like, let's actually map it out and see what it looks like in our real life."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I think it is beneficial for us to collaborate in lesson planning"

"I think it is beneficial for us to map out the strategies and methods learned in a PD against what we have to teach so we can determine best how to use/implement what we learned"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"As a team we have to be given the time to collaborate for lesson planning"

"I want us to map out the strategies and methods given in a PD against what we have to do and our classroom realities so we can actually implement these effectively"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is veery beneficial for us as team to work together in lesson planning and map out how what we have learned in a PD can be used in our classrooms"

Possible High Level Codes
Collaborative planning
Mapping of strategies and methods provided by PDs against instruction needs

KA-F18, t30:40: said that "it was a hands on like, there was somebody teaching it, there's a group of students, and teachers got to actually be like, watch the process. And I was I felt really excited about the process of watching somebody actually, you know, go through the steps, right. And I think there's, I particularly enjoy that type of learning where I'm like, seeing how it's done. I'm like, Okay, this is how I'm going to do it."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I enjoy and learn best when I can observe the strategies and/or methods that I just learned about"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Training that give us the chance to see how strategies/methods are implemented in a real classroom are my favorite"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"In a PD it is effective to provide a component where teachers can observe how strategies/methods are used with a group of students"

Possible High Level Codes
PDs that include a component to observe implementation of strategies/methods in a real classroom

ME-F18, t48:00-I asked if she would prefer to see teaching strategies implemented in a classroom in person or through video, or if reading the LP with the teaching strategies was enough and she said that "I mean, ideally, you'd see it in person and the second choice probably seen it on a video and then third

283

choice is like, reading it, but I know that like with, you know, the reality of like, the resources we have, it's, you know, might not be possible".

AU-F18,t52:22- added that "But I would love to have seen more. The same thing like videos have it in action. I do like reading lesson plans, too. So that was also very helpful to have you written them out. But you know, I'm a visual learner. So I would love to seen a few implemented"

MA-F18,t53:01-clarified that videos would not work for her because she is impatient.

MA-F18, t53:44-agreed but clarified that it is a time thing when I said "So maybe like even a combination where you have like teachers are watching the video. But you also have sort of the lesson plan scripted. So you can have those two options, and then you work with your Tosa or with your trainer to create a mini lesson. You go you implement it, you come back, you get feedback, and then you work on the next one, and so forth".

AU-F23,t1:33- explained about her TEP "I mean, any class that I had, that I enjoyed the most is when the professors taught it as if, you know, they were modeling what it would look like in a classroom. It just made sense to see it in that way. Versus just reading".

(g) Learning about sustainability issues

ME-F19, t5:28- I asked if the PD should have a section just on CC, the basics, policies, what's being done and she said "I don't know if everyone is like that. So I think that is important to include that. But I think also you don't want to make that too long. And the segment because I feel like in general, I would say teachers in Santa Barbara, our population that probably would know a good amount about sustainability. I think it's so I mean, I still learned stuff. They're still like little things. Yeah. You know, you learn or you're reminded of."

AU-F23-t28:38-I asked if the wondering of sustainability issues piece of the PD was helpful and she said "it was it was helpful, because I mean, when we talked more about the local issues, I'm not really familiar. So it was really, enlightening to understand and hear what's going on locally."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"Learning together about local sustainability issues made me feel more empowered to teach about these as I do not know enough about local issues"

Possible Objective Claims

"It was helpful that we discussed and shared about local issues as part of the PD"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"If we are to teach about issues we need to be more knowledgable about these issues"

Possible High Level Codes
Learning about local sustainability issues during PD was empowering and very useful
PDs on IE should include learning about sustainability issues if teachers are to deliver ILPs

MA-F18,t 42:38- explained that from my PD "loved those two days that you gave us all that background knowledge of like, policy, and what is like sustainability and all of that, like, as a one and done that is, that felt awesome. I was like, I learned something today. So I, I really enjoyed that."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
" I felt excited and empowered after the session focused on the background of sustainability and sustainability issues"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The sustainability focused session was extremely beneficial for me"

"The one time session was enough content and length and gave me the knowledge to fell like I left with new valuable information"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It was effective and empowering to deliver a one time focused sustainability issues and background session"

Possible High Level Codes
Sustainability background and issues focused session was empowering and highly impactful on their literacy

ME-F18,t45:00- explained that "I do think that sustainability is a worthwhile, you know, subject and, and focus in elementary school. And so that is definitely something that I would be happy to see in district wide PDS."

AU-F18, t54:12-said that "so yeah, like, quick blurbs of like, what is ocean acidification... You know, something like, what should I know in order to teach the kids... I want them to know".

Quite Foregrounded, Quite Immediate

"I would benefit from a PD that includes access to quick videos or blurbs that explain content of mechanics and processes of sustainability issues"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Short but detailed videos that explain mechanics of sustainability issues are key to help us deliver more and better ILPs"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is crucial to give teachers as part of IE PDs access to short videos that explain mechanics of sustainability issues"

Possible High Level Codes
IE PDs with access to concise videos on mechanics of sustainability issues

(g) PDs with strong components of new and different teaching strategies

AU-F23,t11:56-I asked if she could ask for anything in particular in a training or resources for delivering integrated learning she said "I would say more of the strategies of what I can do in the classroom. Okay. Because, I mean, I feel like I know, like, a basic amount, but if it's, it's something I can do on my own time, but I would love to see more. Yeah, strategies or projects or things that the kids can do."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I would like to receive trainings that would prepare on myriad of non-standardized teaching strategies for IE"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My knowledge of teaching strategies is basic, so I need trainings that increase my expertise in new teaching practices"

Backgrounded
"I learned just the basic teaching strategies and so to implement IL I need trainings that expose me on new strategies that I could use"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important that we receive trainings that increase our knowledge of progressive teaching strategies, like the ones for IE"

Possible High Level Codes

286

AU-F23,18:35-I asked what would make a PD meaningful and she said "showing us more just teaching practices, or even we had a few for the math on the curriculum, but it was just, it was more just talking over what this part is versus what this part is, you know, not actually like, how to teach it teach it [meaning the curriculum and the content]…we have the teacher guide, but you know, it's always nice to be yeah in person versus to read through a manual"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want to learn how to teach official curricular content, I do not need trainings focused only on the textbook"

"It is hard for me to imagine how to teach curriculum when I have to read it through a manual and no one has shown me teaching practices for the content in that curriculum"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I need more trainings and support on teaching practices rather than trainings to go over a textbook or curriculum"

Backgrounded
"The district hires trainings that are focused on a publisher's materials rather on how we can deliver curriculum with progressive and engaging teaching strategies"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important that our trainings have a strong focus on how we can teach different topics and content as we cannot learn engaging teaching strategies from just reading a manual"

Possible High Level Codes
PDs need to train on engaging teaching strategies for different topics within an official textbook
Teachers cannot figure out which engaging teaching strategies to use from only reading a textbook manual

(h) Optional PDs rather than imposed

MA-F20,t45:07- we were talking about my PD and how to get it to districts and she said "Yeah. And I like to me like that. Like, like, like I said, like I was so jazzed, I was like, Yes, this is what we want to be doing. This is like, why we're here. But I think, I think like this would be so like, in our ideal world

of professional development, it's a choice, like, you get to choose which sessions you go to. And so like, if this is on the menu of choices, you're gonna get the right teachers in to go to it, and enough of them are going to be jazzed about it that then they're going to want to talk to everybody else about it. And then the next round, more people are going to want to do it. Like, to me, that's the way in which it can be done with the least amount of resistance and the most enthusiasm… And that's what we always beg for. We're like, give us the choice, and give us actual meaningful, professional developments."

[MF: "Your training excited me so much because I care and want to deliver learning integrated with sustainability education as this is why I am a teacher to educate students on things that matter and are relevant " (AND) "Most teachers want trainings that are not imposed by the direct but rather we have a menu of options so in that way we chose based on our needs, strengths, weaknesses, and interests" (AND) "If this type of PD was an option within a menu by the district then passionate teachers like myself would choose it and they would the go and do amazing ILPs and other teachers would learn about their impactful teaching and this would create interest and enthusiasm amongst the non-passionate teachers"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish the district will listen to the teachers as they are the ones receiving and thus using the trainings and what we want is to have options and a choice select from those options rather than mandatory useless PDs"

"I wish we had sustainability education PDs as an option from a menu of available PDs as that would get the most passionate and committed teachers in and they would in turn create amazing lessons which would help to inform non-committed teachers about the impact of IE"

"I loved the IE PD as teaching relevant lessons is what I want to give my students and why I am a teacher"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"With IE PDs as an option you will easily get the non-committed teachers in after one cohort of committed teachers attend the PDs and implements amazing consequential LPs"

"Teachers want to have options for PDs, not imposed meaningless PDS"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is crucial that the district provides us with options of PDs because this is how you get sustainability passionate teachers trained on IE and they will then act as ambassadors to IE to spread the word of its impact amongst non-committed teachers"

Possible High Level Codes
Optional PDs on sustainability education as a strategy to reach all teachers
Optional PDs on sustainability education to support current passionate teachers
Optional PDs as a way to respect teachers' requests to select trainings that suit their needs

288

MA-F20, t 46:06- explained that by giving the choice then the passionate teachers will be silently showing the others how great the integrated ed is, the amazing projects students are doing and then those teachers become interested instead of "This is mandated, and everybody has to do it. And this needs to be done by this date. It's you're getting the teachers that are interested. First. And it's the by in, because we I feel like there's a tendency for teachers to have a look like there's I think, oh, there's a lot of resistance to change for a lot of teachers. Yeah, I'm not gonna say every teacher, like don't feel like I feel like that way. But I feel like there's a lot of resistance to change. And I think that everybody thinks everything is just more work, and more is being put in our on our plates without any give back. But I think that there are a lot of teachers that want to learn and are jazzed. And like, I think that when you have that ownership of like, Oh, I'm choosing to do this, it's a lot more likely that it's going to be used in a way that it creates effect. Yeah, instead of just getting thrown on a shelf. And yeah, not looked at it.

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"Teachers want ownership of their own training and professional growth and that ownership generates fosters that what was learned in trainings is actually used"

"Many teachers are fearful about trying new strategies, especially if they are not knowledgeable about these and they come as impositions by the district, as teachers are concerned that these new strategies or methods might add more to their plate rather than help"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"When teachers have an option to choose their PDs, the chances of them using what they were trained on are higher"

"Teachers are resistant to change so start with providing optional PDs on IE so you get the buy in with the passionate teachers first"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"The most effective way to get new teaching methods like those in sustainability education to be used by all teachers if to first provide optional PDs and get the passionate teachers trained first. They will use those strategies and also inform the non-passionate teachers that these strategies are not add ons but extremely useful"

Possible High Level Codes
Optional PDs on sustainability education ensure that learned teaching strategies and methods are actually used by participant teachers
Optional PDs on sustainability education will eventually help to get non-passionate teachers on board

289

(i) Forms of collaboration during and after PDs

MI-H18,t51:29-we were discussing how many people would be needed to get everything for a perfect integrated unit if there was no TOSA and MI said " Yeah, yeah...BUT we can do this as a team" and agreed strongly with me when I said that what we have created can be a strong guide for future units and lesson planning.

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I believe we can continue to deliver ILPs if we work as a team and by using the co-created ILPs"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The lessons that were co-created are the foundation we need to continue solo and successfully deliver ILPs"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"Collaboration was key as we created ILPs that can serve as a guide to build new ILPs"

Possible High Level Codes
Collaborative work between specialist and teachers for integrated lesson planning

MI-F18, t1:02:52- explained that having the time to think about local issues and have the time to plan a unit or lessons right after or soon after that thinking session was very meaningful.

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I loved that we were able to lesson plan together with an expert and as a team right after we analyzed local issues"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"We want to construct integrated LPs soon after analyzing as a team local issues"

Less Foregrounded, Less Immediate
"We rarely have time to lesson plan together a whole unit or even discuss local issues"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"An effective way to create ILPs is to do so collaboratively and soon after having discussed local issues"

PD Impacts shared by teachers

1. Utilizing ESD goals to help improve classroom instruction

(a) Useful but lack time to use ESD goals

ME-F18, t1:05:47- said "I was really stoked on after the introduction. And like, all of that I was really excited. And I printed out and even laminated like, the, you know, all of the principles and like, the different frameworks and stuff. But unfortunately, yeah, I just felt like, I didn't have the time to integrate it. But I want I would like to." And "I feel like we just don't have the time."

[MF: "The session on sustainability and on local issues was very motivational, as the sections on the ESD goals, and as usual with quality and meaningful training I was excited to apply what I had learned, but reality strikes and that means I do not have time to look at lessons I am going be doing and editing them so they meet some ESD goals" (AND) "It is not ok that I do not have time to use quality tools like the ESD goals to improve and elevate my classroom instruction"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wanted to use the ESD goals to improve my existing lesson plans but I have no time as there is so much other stuff to deal with"

"I believe that by using the ESD goals and the ESD strategies I can elevate my lessons"

"I wanted to use the the ESD goals and the ESD strategies to edit old lessons but I did not have time to do so"

Less Foregrounded, Less Immediate

"It upsets me that I cannot have time to improve my lessons by using meaningful tools like the ESD goals"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I have no time for improving my lessons with meaningful tools like the ESD goals"

AU-F18, t1:06:10- said that "I loved the ideas. I love. I did have the paper for a while next to me. But yeah, there's just, we didn't get to apply as much"

ME-F18, t1:06:39-explained that even though she would like to use them as a reference to edit previous lessons or shape new ones, she has no time.

Au-f23,T30:40-I asked if the ESD goals helped somehow, if she thought/used them and she said "to be honest. I didn't think of them…But maybe that's just something that I also know, I need to work on more, because in the IB, you know, we have certain things that we need to just mention, or, you know, connect. So I mean, in, it isn't maybe in the planning, like, we do plan this to connect with these certain aspects, but bringing it to the kids and saying, Oh, we're being we're systemic thinking right now…"

ME-F19, t9:23-I asked her one on one if the ESD goals helped or stuck w her and she explained "oh, yeah! I mean, I feel Yes, I would, if I had if I was trained and have the time to like, you know, and process them and integrate them.

(b) Goals and pedagogies provide a lens for shaping relevant lessons and instruction

KA-F18,t1:06:56: explained "I did have them as a reference. Yeah. And I, I always kind of go back to our key concepts and their lines of inquiry. And those are the things that I refer to, most often, even when I'm talking with the kids to try to connect back to something that's on our IB board. I don't know that I refer to it like, Oh, let me look at that paper again. But I think it's something that's in the back of my mind as how my lens is. Like, is this gonna be interesting? Is it gonna be fun? Like, because if I get excited about it, then they'll get to get excited about it... And if it feels like it's like, not too, then then you know, it's like, okay, none of us is going to be happy to. But I think, I don't know that I looked at them and, and said, Okay, I'm going to do this and this, but I think it's something that, you know, still

was in the back of my mind, but like, ME, I always kind of go to that [referring to IB] and, and try to figure out, you know, okay, where what are we? What are we focusing on…"
[MF: "Even though I did not purposely looked at the goals or the strategies while I was prepping lessons I found them relevant and so I definitely had them in the back of my mind influencing the lens I was using to shape my lessons"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I definitely felt inspired by the ESD goals when I was shaping and getting lessons ready even though I did not look at them directly"

"I thought that the ESD goals served me as the IB line son inquiry, as tools that I have in the back of my mind shaping my decisions so my lessons are engaging"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I had the ESD goals as a reference and so they did influenced my thought process as I got my lessons ready"

"The ESD goals like the IB lines of inquiry serve me more as tools to ensure that I am questioning the structure of my lessons so they are fun and engaging"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is important to use tools like the IB lines of inquiry and the ESD goals as they help me to ensure that my lessons are relevant and engaging"

Possible High Level Codes
ESD goals served as tacit guidance to shape engaging lessons
ESD goals served as IB lines of inquiry to guide teachers as they shape fun and relevant lessons

ME-F19, t9:23-I asked her one on one if the ESD goals helped or stuck w her and she explained "oh, yeah! I mean, I feel Yes, I would, if I had if I was trained and have the time to like, you know, and process them and integrate them. They're great, because personally, I mean, I don't I can't speak for other teachers. But for me, I didn't become a teacher just to like help my students learn academics. I was really just more focused on like whole child learning, so to see like empathy in there and to see global citizenship and community futures thinking like I'm loving all of them." She also added that "And I actually think this is this is our actually more covers more bases than IB does. I mean, IB does cover these, but I haven't seen that it's not as explicit and cohesive in this way".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I believe the ESD goals provide more guidance for shaping relevant lessons than the IB does"

293

"I believe that the ESD goals are meaningful and useful for my teaching practice as they would help me shape lessons that are focused on the whole-child rather than just academics"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"With adequate time and more training I would use the ESD goals to shape my lessons"

"Using the ESD goals would ensure that my lessons are shaped in accordance to my goal as a teacher, that is, to give a holistic education"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important to get more straining on the ESD goals and have proper time to use them for lesson planning as they cover more crucial components of holistic education than the IB framework"

Possible High Level Codes
ESD goals serve teachers better to provide a whole-child focused education than the IB framework
ESD goals as meaningful tools to support teachers seeking to develop relevant lessons

KA-F22,t10:54- I asked how helpful having the ESD goals was and she said "They were they were definitely helpful." I asked if they continue to be helpful and she said yes "Well, again, it just gives you a another lens to kind of think about what you're doing and how you can include either, how could adjust it so that you're looking at the lesson, right, In one of these was one of these kinds of targets and minor one of these ways of formulating the lesson. So I think it always it also puts like the child in the forefront right there. The reason why, and the WHO it needs to appeal to and who it needs to be easy for and who it needs to be engaging for. So just giving it that focus is why they are helpful."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I believe the ESD goals help the teachers to create lessons that place the student in the center of the learning process"

"I find the ESD goals very useful as they help the teacher to think about how the lesson can be centered around the students and how it can consider the students"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The ESD goals give the teacher a new lens to use when editing and shaping lessons to ensure that these are child-centered "

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important to use the ESD goals as it is a lens that helps teachers to edit and create lessons designed that consider our students needs and interests"

ESD goals as a lens that helps teachers edit and create lessons that consider the students' needs and interests

KA-F22, t12:58- She added on the ESD goals that "the thing, I think that's why they're also helpful is because it kind of stops you from relying on the same strategy every time. Because as much as routines are, like, they're good, right? That mean, they help us all, but sometimes just throwing, like something different into the mix. It also it creates, like excitement, and more engagement for the lesson....So that's, that's the, you know, whenever we do like the co-learning, or, you know, some other version of it, I think the kids are more excited. You know, and then we rely on certain, you know, like, strategies that we are consistent with but having that extra".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I feel excited about using the ESD goals as I think they will help me to use new and different teaching strategies to make my lessons more engaging"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"I want to use the ESD goals to avoid using the same foundational strategies and instead select strategies that help me deliver engaging lessons"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important to have foundational strategies but to avoid using these all the time for lessons"

"Using the ESD goals will ensure that I do not rely on the same strategies and actually shape lessons that are engaging and exciting for my students"

Possible High Level Codes
ESD goals serve as a tool to guide teachers in selecting engaging strategies for delivering relevant learning

KA-F22, t14:07- she agreed with me when I said that the ESD goals are "standards, goals that you're striving to, you know, meet or things you're trying to cultivate in the learning session. They allow you to choose the strategy, how you're going to teach it a little bit more flexible than with the academic standards".

KA-F22, t23:30- she added to how they weave sust content even before the training "you were talking about how some things just happen organically. And I think for us, those are issues that came up that we did discuss, but we weren't thinking oh, well, what were the issues? Okay, science standards, can we attach to this? Right? It was more. We had the conversation because it's something we were cared about, and that we wanted to highlight, you know, that. Yeah, the way that Native Americans were responsible in caring for the land, and it was they were borrowing, they weren't taking more than they

needed. Yeah, it was. So definitely something that we can when we, when we hit our second unit, we had our land, rocks, and soils, landforms I mean, talk Natural Resources again, you know, they that's another opportunity. Right there. There isn't any reason for us not to cover it there. Where we are in place in time. Definitely. Again, the mining and again, I mean, another opportunity we can weave in sustainability issues and natural resources. I don't think there's any unit that that we're like, Oh no, this does not fit in here. They all have some component"

KA-F22,t11:46- I asked if she will be referring to the in the future and she said "I think they align really well with our IB code. Okay, so yeah, there's definitely keepers"

ME-F19-t24:50-confirmed that many of teaching strategies from the PD she uses them, she explained " I liked the strategies and I like I like, like the simulations. I don't know why I hadn't heard it, described that way before, and that one was like, oh yeah. And I remember after this thing I was like, I'd like did a simulation… so I appreciated this the EDS teaching strategies piece)"

ME-F19-t25:40- about the EDS teaching strategies visual I made "And these are just nice when you're lesson planning to be like, oh yeah that one [acting out choosing one]"
Possible High Level Codes
ESD teaching strategies give teachers a menu of engaging options

2. Using the I.A.S method as a guide to create integrated lessons

(a) Useful to ensure standards are met while crafting relevant lessons

MA-F18, t5:43- said that she "love that. Because I think it like Mica was saying it really it helps us reinvigorate. And like remember, like, oh, there's meaningful learning to be have. Yeah, beyond and like, we can fit that into the standards, the standards like direct us, but we can kind of fit what is important and meaningful to the students and relevant to their lives. And what, like I consider to be really important. That can fit into the standards".
[MF: "The whole I.A.S approach and goal of integrated education is empowering because it reminds us that we do not need to give up on our goal of providing our students with an education that is relevant to their lives even when we have the testing as a major focus that drives the content we teach"].

MA-F18-t6:20-I asked if she thought it was valuable to have the S step and she explained "I do see the value of that. I think, you know, it's hard when there is so much pressure put on these tests, but like, and because that's so standards based. But then it's really a crapshoot when it comes down to it. Like, we're looking over the tests, like over the kid's shoulders, and it's just like, Oh, I didn't expect that to be here. Or oh, this is the same exact test as it was last year. Or, oh, maybe we should do this standard earlier in the year because we're not there yet."

ME-F19, t26- about the S step "if we had to write up formal lesson plans, and that's something that we had to do. And I think some sites do have to do that. So that's important to have. And obviously, we want to hit the standards, too. But yeah".

KA-F22,t20:28-agreed with me when I said that matching the sustainability content with subject matter content is the most time consuming for me and that when you finally start to do the weaving you are organically meeting the standards, she said "Yeah. Yeah! [*OC: As if absolutely, I know, it makes 100% sense*]". I then said that if you missed a couple of standards then you just add a couple of activities or step to meet those and she said "yeah yeah! [*OC: As if I understand, I see it, I agree!*]"

KA-F22, t18:51- I asked if she thought the IAS made sense or if she would change anything and she said that "I think that it's, it seems like the the easier way to think about it. Because there I realize this

right, <u>when we worry about the standards first it's, it's, it's almost very, like very limiting. It really limits to your creativity. But if you look at the issue with a problem, and then plug in like the activities or the things that you're going to do, it's very easy to pull the standards and connect it to what you're doing.</u> I think that seems to be like the, the more flexible and the one that's <u>more focused on the student. Right? It's not standard base, it's student base. So yeah, I think that this is an easier way than when you look at the standards first as that is very scary.</u> Like what I know, because when I saw them, for the first time during the teacher preparation program was like, Oh my gosh, like how am I even going to teach all of that? But then you start looking at your lessons and the things that you do and you're like, oh, yeah, we do this, we do this and then it's not".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I dislike using the standards as the starting point to lesson design because it can be overwhelming and restrictive "

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"It is very easy to meet the standards by using the I.A.S method"

"Using the I.A.S method gives the teacher more creative freedom than using the standards for lesson design"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is important that we get teachers to use the I.A.S method because their design process would be less restrictive than when using the standards "

Possible High Level Codes
I.A.S method gives teachers creative freedom when designing a lesson while easily meeting the standards
I.A.S method ensures that teachers create student-based lessons versus standard-based lessons

AU-F23,t39:44-I asked if the order of the method and the steps within it made sense or if she would change anything and she said "Yeah, the flow makes sense. Because you do want to start, I mean, for me, that's like the most that's what I want to teach. That's what I want the kids to learn. And then you start thinking about how can I, what would this fit into? And then what standards does it hit. Yeah, but yeah, it does make sense to me".

AU-F23,t40:30-I asked how concerned she really is about hitting the standards when she prepares her lessons and she said "I mean, in our that's all we did in our teaching program, we had to explicitly in all our lesson plans, we had to write such long lesson plans, and state which standard that activity activity applies to…I mean, I will go back and reference just to think like, what? What

298

can I teach now? Okay, like, yeah, what skill should I hit or what skills? Yeah, should the kids know, yeah."

MA-F20,t9:36- I asked if she thought that even though pre testing take time in Feb-March if teachers could be integrating sust content earlier and she agreed "Oh totally!" And added "if we had done this professional development in the fall, you wouldn't have heard about testing… you hit like January, February, that's when it's like"

KA-F22, t22:58-I told her that as I shared with ME maybe start 1 2 45min activity that is integrated within 1 unit and even if it's a low bar it's a way to start building their shared folder of integrated lessons and she said "But it's I mean, I was looking, I mean, and I'm looking at our units right now. And in the beginning of the year, when we're starting first talking about the early, you know, California history. We are talking about how sustainable living was back then, you know, what materials were being used? It's definitely like, something that, that we can weave in sustainability."

(b) Valuable tool to guide lesson planning

MA-F20t28:49: I asked "did the method stuck or helped for the unit we worked together, was it easy to think of integrating an issue?" she replied- "Yeah, I think that especially as like Audrey and I go into planning for next year, like, we're gonna look back and be like, Okay, how can we better these lessons and put them through a lens of sustainability? And like, where can we incorporate this a bit more? Because we do find it so valuable…"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I am motivated to use the tools learned through the PD like IAS for next year's planning as I found them very valuable"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The method and tools will help us improve our lessons for next year and infuse them with sustainability learning"

"I will use the method and tools learned to infuse next year's lessons with sustainability content"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It will be valuable to use the methods and tools learned to edit and improve our lessons so they are integrated with sustainability learning"

Possible High Level Codes
IAS and tools learned are valuable for improving future lessons
IAS and tools learned are valuable for editing lessons into integrated ones

299

ME-F19,t26:42-I asked if she liked IAS and if it stuck/trickled down into other lessons they planned and she said "Yeah I mean, we obviously we actually, I mean, we do this, but it's like the way that you set up because it makes it like, kind of a clear, clear process. But yeah, it's like, obviously, we have to, we have to pair everything that we do."

ME-F19, t27:25-I asked if the method helps with the very first piece of the ideation of a LP and she said "for the ideation process, yeah I think so… because it's actually really simple. Yeah, you think that it's like, it almost doesn't need to be said, but it is a good way to like, because once you start, I feel like when you're talking about a lot of this is all about implementing sustainability. And I think it starts to sound like oh, it's gonna be like this difficult thing to do. Yeah, really, it's pretty simple".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"Now that I have gone though the training I believe the I.A.S method is simple and easy to implement"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Many teachers think infusing sustainability content is difficult, but the I.A.S method makes it an easy and achievable process"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is not difficult to use the I.A.S method to kick start the design of an integrated lesson"

Possible High Level Codes
I.A.S method is a simple tool to help teachers design integrated lessons

KA-F22, t18:51- I asked if she thought the IAS made sense or if she would change anything and she said that "I think that it's, it seems like the the easier way to think about it. Because there I realize this right, when we worry about the standards first it's, it's, it's almost very, like very limiting. It really limits to your creativity. But if you look at the issue with a problem, and then plug in like the activities or the things that you're going to do, it's very easy to pull the standards and connect it to what you're doing. I think that seems to be like the, the more flexible and the one that's more focused on the student. Right? It's not standard base, it's student base. So yeah, I think that this is an easier way than when you look at the standards first as that is very scary. Like what I know, because when I saw them, for the first time during the teacher preparation program was like, Oh my gosh, like how am I even going to teach all of that? But then you start looking at your lessons and the things that you do and you're like, oh, yeah, we do this, we do this and then it's not".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I like the I.A.S method because it guide the teacher to center the design of the lesson around an issue not the standards and that give you more creative freedom"

"I do not like using the standards as the starting point for my design process of a lesson"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Designing lessons with the standards as the starting point limits how engaging and creative your lesson will be"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is valuable to use the I.A.S method as it supports a design process that honors the teacher's creativity"

Possible High Level Codes
I.A.S method ensures a creative design process
I.A.S method is much more simple than designing from the standards

AU-F23,t39:44-I asked if the order of the method and the steps within it made sense or if she would change anything and she said "Yeah, the flow makes sense. Because you do want to start, I mean, for me, that's like the most that's what I want to teach. That's what I want the kids to learn. And then you start thinking about how can I, what would this fit into? And then what standards does it hit. Yeah, but yeah, it does make sense to me".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I like the I.A.S method because it allows me to start design from content that I want my students to learn as it is relevant to them"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The I.A.S method ensures that lessons are centered around content that matters to myself and to my students while meeting the standards"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is important that we use methods like I.A.S so we can craft lessons that meet the standards but most importantly that are centered in content that is meaningful and relevant"

Possible High Level Codes
I.A.S method as a tool to design lessons centered in relevant and meaningful content

3. Direct benefits from the PD

301

(a) Tools to create integrated lessons as a mechanism to deliver relevant learning

MA-F18, t5:43- said that she "love that. Because I think it like Mica was saying, it really helps us reinvigorate. And like remember, like, oh, there's meaningful learning to be have."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I felt hopeful when I learned about integrated education because it was a reminder that we can deliver meaningful lessons"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Doing integrated lessons brings a new reinvigorating energy to our teaching"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is crucial that we teach integrated lessons because it is empowering for both us and the students"

Possible High Level Codes
Integrated lessons empower and motivate teachers
Integrated lessons allow teachers to provide meaningful learning

MA-F20, t30:14- I asked about the value of integrated teaching and how to pitch it to veteran teachers and she said "for me this sustainability, like, where we are in the timeline of the world right now, it really like in the students that we are teaching right now. This brings the relevance to it and makes their learning so much more meaningful, and kind of gives them a context of like, understanding of the world, but also where they can apply their learning and why it's important even like the history stuff, like understanding what came before, and thus why things are the way they are".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want to teach through a sustainability lens as our students deserve it due to the historical moment we are in"

"I need my students to learn through integrated lessons as they provide them with context to ground and apply what they learn"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Integrated learning allows students to see how their learning can be applied and thus it becomes meaningful and applicable"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate

"Due to the historical moment we are in we owe it to our students to provide them with learning that is applicable and meaningful for them"

Possible High Level Codes
Integrated education provides applicable and relevant contexts to learning
Integrated education is a responsibility towards students due to our historical timeline

MA-F20, t31:21- I asked if she saw that the integrated LPs made some behavior changes or got the students more engaged and she answered "I think when they were invested through the relevance. It makes everything go smoother. There's always exceptions to the rule. But in general, in general, when the kids care, they're way more in, in everything, everything. We're reading a book right now that just feels so relevant to them that they cannot get enough." And added about the book that "I think they see themselves and their peers in the character that they are so into it because it feels relevant and because they have peers that are struggling".
[MF: "When students learn though content that they somehow can relate to, they can connect with, they are going to want to learn about it and learning is fun and enjoyable for them this is why is key that we can have the chance to design lessons that achieve that"].

Possible Subjective Claims
Foregrounded, Immediate
"I wished we could always deliver lessons with content that our students can connect and relate to as this is when students become truly invested in learning"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Content that is relevant and that students can connect and relate with creates an engaging and enjoyable learning process"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"Integrated lessons with relevant content will make students invested and engaged in the learning process"

Possible High Level Codes
Integrated lessons foster engaged and invested students
Integrated lessons provide students with relatable content they can connect with

MA-F20, t48:01- I said that the PD and the methods is to help them take stuff off their plate and that the strategies were things they already use in the classroom and she added "Yeah, it wasn't like we were doing anything groundbreaking… it's providing relevance and provide a lens for which the kids could really connect." I said " I knew you use many of the ESD teaching strategies" and she said "exactly! Yeah, we do"

303

MI-F18, t1:01:31- added that "thinking about what sustainability looks like in our community in this area around HE. Or, like, we add our home versus like, here in this community, like taking that time to think about what it looks like".

(b) Applicable and empowering knowledge for teaching practice

MA-F20, t55:34- I asked anything else you want to share and she said "has been like super helpful. And like, positive Yeah, yeah, yeah. Feels good. Like trying new things. Yeah." I asked if she thought she was leaving with applicable knowledge and she agreed and said "but it was a good six hours."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I saw great value in the training content"

"It felt great to learn what we did from the PD"

"I found the content from the PD to be valuable and helpful for my teaching practice"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The pD gave me methods and strategies that are new and helpful for my teaching practice"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Trying new strategies and methods like the ones provided by the PD is important for improving our teaching practice"

Possible High Level Codes
PD provided valuable and helpful new strategies for improving teaching practice

AU-F18,t52:22-**said "**I also really enjoyed just hearing just the introduction of everything is new to me. And I like how is a framework of teaching that can be transdisciplinary, can be applied throughout different subjects".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I see great value in ESD as it is implemented through a transdisciplinary approach"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The transdisciplinary approach of ESD is greatly valuable for my classroom instruction"

304

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"Transdisciplinary approaches are key for quality education and thus I prefer frameworks that allow that"

Possible High Level Codes
Transdisciplinary teaching as a valuable feature of ESD that elevates learning processes

MI-F18, t1:01:31- said that "Anytime we go to like a training and you feel excited about something and passionate about a subject coming out of that with that feeling, even if like, testing tries to squash your heart the next day, like it's still like having that like remembering why you're a teacher and why you care and why you're passionate".

Possible Subjective Claims

Quite Foregrounded, Quite Immediate
"I know the teachers felt motivated through the PD as it reminded them that they became teachers to make a difference"

"The teachers were excited and passionate about what they learned through the PD"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"This type of training gave teachers tools to deliver lessons that align with their passion for meaningful education"

"The PD gave the teachers a needed reminder that their practice is not all about standardized testing"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"This type of training is essential for our teachers as they need to be motivated and guided on how their lessons can be relevant and meaningful and thus truthful to their passion as teachers"

Possible High Level Codes
PD reminded teachers that their practice can be more than just prepping for tests
PD gave teachers strategies to implement their passion for quality education
Teachers were excited about PD and what they learned through it
PD was inspiring and motivational during testing weeks

ME-F19, t02:35- I asked for her thoughts on the 1st section the sustainability pillars history, etc and she said "I like that it covered, Ii seemed to cover all of the areas that are important. Yeah. I mean, it's funny, because it's been a few months now, since we've gone over this. And I just remember being really impressed. And I ran out. I left. You know, it's a good PD when you leave feeling like really motivated and inspired. That's how I left, and it sounds like that's how others felt too." She also added

that "it just seemed very comprehensive. And it seemed like there was nothing, nothing really missing."

AU-F23,t10:18- I asked what were her thoughts on the training part on the causes and consequences- overall on the PD- she explained "I mean, I loved Yeah, the little part that you were able to introduce to us because it's, it feels new to me. I mean, I'm passionate about climate change. And I would want to inspire the kids to care also. But yeah, I haven't really had many, or any opportunities to teach it….Or learn how to teach it yeah [strong agreement]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I really enjoyed learning about local sustainability issues because this was very new to me but I am passionate about issues like climate change"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The PD gave me tools and information to craft lessons that can get the students to care about sustainability issues"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"We should be getting this PD as a mandatory thing as we all want our lesson to inspire our students to care"

Possible High Level Codes
PD was meaningful as it taught how to craft lessons that will inspire students to care

Line of Inquiry 4. Elements from PD on ESD that teachers applied

1. ESD Learning Goals used in co-designed LP and during instruction of co-designed LP
(a) Using local contexts (local citizenship)

ME-F2, T31:59-said she thinks that by integrating affordable housing crisis in SB they will be "making activists rotting for their teachers ability to get a house"

MA-F10, t21:39-said to my offer to using the kelp forest and resources that I have, that she would love to use the kelp forest as the foundation rather than Yellowstone as "it is too easy and obvious"

Possible Subjective Claims
Foregrounded, Immediate
"I want the students to be challenged in a meaningful way through content that also happens to be part of their community"

MA and AU-F10, t24:20-both agree with excitement to use the kelp forest instead of Yellowstone

MA-F10, t24:26-said using the kelp forest will work because "the students are so passionate about the ocean and that it is easy to draw their little empathetic hearts into the ocean"

MA-F10, t25:32-said that the LP they have used in the past that includes Yellowstone can be easily adapted to the kelp forest

ME, KA-F11, t17:48- I proposed a visual provocation but they proposed "I mean, we could I mean, we could talk, we could still do, like, walk the neighborhood and" "pick up pick up trash, right?". She added "Because we did that a couple of times to with during this unit last year, we just got a big bag, we went out to the field, and they got to pick up all the trash, they saw the field. And we were shocked, like astonished at how much trash was there that isn't like really visible. But there it was, it was all like plastic".

Including local contexts and spaces within learning activities

MA-F10, t1:03:24-said that "Yeah. And like, letting them kind of explore and they've been exposed. Like they watch CNN 10 on a pretty regular basis. And so they see a lot of the environmental stuff going on, and even just other sustainable sustainability issues going on. Just it's like, it's not very much so we don't go very in depth with it. But they are exposed to a lot. And they're very, yeah, can we watch?" AND "we just watched an episode and they're talking about the floods in New Zealand and then they're able to be like, Well, that happened here too. Exactly." AND "It was very much like, oh, I can connect to this".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want my students to have some exposure to information on sustainability issues because they care and want to learn about these"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My students greatly connect to content about sustainability issues when they can relate that issue to an event that happened in their community"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is important to make connections between issues happening abroad with issues happening locally"

Possible High Level Codes
Value of making connections between issues happening abroad with issues happening locally

MA-F20,t20:00-explained that "food waste group really got it because it is a tangible topic".

Possible High Level Codes
Using topics that students can connect with fosters engagement by students

ME-F15, t6:41- we were discussing the final summative, the format for it and what it would be focused on and I asked if they wanted it to be like big thinking/the students proposing something grand and "crazy" even if the technology does not exist and ME was direct and polite but said "I kind of liked the idea of making it as relevant as possible and having them look around their immediate community for examples, and just for to look around our immediate community for solutions to… But if it was, if it was just up to me, I would just start start with, you know, start small, because I think that that's like, a good way for them to feel more powerful, because they're not able to develop the solution. If here at school, they see something that could be done, they actually could possibly make up a solution that gets you know, implemented".
[MF: "Our students engage the most when the activities somehow are connected to spaces that they know and are familiar with" (AND) "Local and community-based content is the most engaging for our students as it is relevant"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want to provide content and activities that are relevant to the students' lives"

"I want the students to focus on acting on local issues even if the action proposed is small because it is feasible and that ability to develop the action is very powerful"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Allowing the students to propose a feasible action to a local issue is powerful and meaningful"

"Using our community as the starting point to envision solutions is an effective teaching strategy"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is more effective and powerful to have the students think of solutions/actions that they can actually carry out rather than focusing on grand ideas they might not be able to develop right away"

Possible High Level Codes
Using local community as the starting point to envision solutions
Proposing feasible actions and solutions to local issues
Relevant content as part of empowering education

(b) Critical thinking

MA-F10-t43:41- proposed to my question where can we weave a sustainability topic within the eco LP (using the structure of the old one) that "once they have those interactions, kind of looking at the effect of removing or some other issue, I don't know, we had all those dead birds like a year ago, like figuring out what factor was causing that…. kind of giving them that opportunity to first wonder hmm, and then explore"

Possible High Level Codes
Giving students opportunity to wonder about the causes of an issue
Giving students opportunity to explore and learn about the causes of an issue

KA-F11, t19:40- strongly agreed with my suggestion of after provocation on picking trash make the connection between plastic and FF and CC by asking what do you know? What is plastic made off? Where does it come from? How do we produce it? And then give them time for like a personal reflection

Possible High Level Codes
Asking questions that provoke wonderings rather than directly giving information

309

AU-F12, t4:20-told students in bio loss team think about the consequences of biodiversity loss as they are reading the content because this is info they have to answer in their research guide

AU-F12, t39:23- in response to read text on 15 min cities she replied "wouldn't you want to live in a neighborhood like that?"

MA-F13-t17:40-she read portion of Students developed strategies to cut back on waste and as she asked her students "That's something you've observed here in the cafeteria; are you forced to take an entire tray? You have a premade tray. Right. And do you eat everything on it?"

MA-F13-t 18:57-asked students Do you see this as an issue at our school site? And then followed up with "How so", "and so what becomes a problem", then "what's the problem with food waste", then "what's the problem there (at landfills), and asked for "what else" after students said too much money wasted and takes ups more land; and then asked "how is bad" when student said it is bad for the the environment"; then "how does it pollute the air" when student answered polluted the air; asked "who uses a factory" when students said they use a big factory in relation to how GHG are emitted and then closed this extremely engaging discussion with "Right! The farm so we're producing too much food because we're not eating all of it".

AU-F12, t2:38-student answered for cause of bio loss that trees are being cut down and AU asked "why is that harmful?", student answered "because that kills shelter", AU replied "we call that deforestation".

MA-F13, t21:38- asked "if the kids eat food that they enjoy, are they going to waste as much of it?"

MA-F13-t23:28- asked the Food Waste team "[reading] at a grocery store look for ugly produce. Fruits and vegetables with irregular shapes are still tasty. But they're often overlooked. Okay, that sounds like something that is easy that any one of you could do. Is there something in here about taking action, about what you can do to help, steps you could take in your research guide?"

MA-F13, t24:31-helped Junior understand piece of ugly produce by saying " Listen, I'm not saying specific foods. Julio. Oh, don't take specific foods that you don't like. But for example, like if it was a carrot that like you know how sometimes they're a little crooked?" And adding "so it doesn't matter what the shape is."

MA-F13-t33:54- as she read "A new study has assessed the potential different drivers of this decline, and found that land use change is the number one cause, followed by the direct exploitation of wildlife

and pollution. What is perhaps most surprising is that climate change has been only the four largest driver of recent biodiversity loss on land." She asked the bio group "So what they're telling us here is it's not climate change that's causing the loss of the right is a factor, but it's not the biggest, it's the fourth largest factor. That means that there's three factors, even more detrimental to the animals than climate change. With the... we usually think of climate change as being like the root of all the problems right? Not the case here. So let's find out. It says here that pollution is the third largest driver that means that there's two more bigger issues on top of that, isn't that crazy?"

ME-F14,t42:06-Marissa said that "plastic is made out of fossil fuels and these are non nonliving. But a table was one living But now is not." So ME followed up and asked the class "If something was once living, and is then been reduced or made by humans, is it still considered a natural resource?" Raphael is the only one that adds a comment (pencils like chairs have been made by men) and because no one else is answering ME asked to raise hand if they think tables, chairs pencils are NR and then to raise their hand if they don't.

KA-F15, t10:15- I said I could get images for local places and she replied "Even worldwide. I mean it. I think that that is because I mean, if you showed, like, this island that's now underwater or something, you know, yeah. Is this the same place? You have them: You know??

Possible High Level Codes
Giving students content that can have they wonder and analyze rather than memorize

(c) Personal values: student-led, opinion pieces, and sharing personal thoughts

MA-F10, t 27:15- recommended that LP on ecosystem began with having students brainstorm to give examples of a system

MA-F10, t1:01:52-requested me to include activities in the eco LP that could give the students more opportunities to explore their interests specific to the environmental issue they are passionate about because "having the time and space to facilitate that is often challenging"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want to find the time for activities that allow students to explore their interests on specific sustainability issues"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"It is challenging to find time and space to include activities where students can investigate curiosities related to sustainability issues"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It very important that if we can we include activities in which students explore and investigate interests and curiosities related to a sustainability issue"

MA-F10, t51:42-explained that they usually focus on a sustainability issue separate from the eco unit by assigning a one pager with an outline of what they expect to be on there along with some resources so each student has to research an issue they choose

MA-F10, t1:02:4-said that students are always begging to watch CNN10 and learn about issues

ME-F11, t25:33- agreed with me when I suggested an opinion piece connected to the provocation

ME-F11, t26:33- strongly agreed when I said that students love activities where they get to share their ideas

ME-F12, t1:08:25-asked concerned if we could decide what the summative would be on. She said that "we would like to have right like a completed opinion piece at the end of the unit. And that can be like our summative that kind of interweaves everything. But what I mean, it sounds like is this, they're going to choose, we don't know if they're going to choose an issue on their own, or we're going to focus on the same issue or something like that. But it basically it's going to be another letter." I said the summative did not need to be another letter and she said that "it would be better if it is something action integrated because that is interesting to them" to which KA agreed.
[MF: "I want the students to produce as a final product something where they can reflect their opinions, ideas, and thoughts related to the issue they investigate"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I need the students to produce a final instrument that weaves what they learned about the issue with their ideas, thought, and opinions related to how they can act or what can be done with respect to the issue they researched"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Action-oriented weaved with opinion writing is a powerful and engaging strategy that our students greatly enjoy"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It very engaging is our students can focus on producing an opinion piece that explains their ideas for actions to be taken with respect to a sustainability issue"

312

ME-F12, T 1:09:30- Added to summative discussion that alternative it could be the students presenting to someone or a group of people that could use that information in someway.

ME-F12, 1:09:59- to my suggestion for summative to be a presentation to a group of people that would be their opinion but on a proposal she suggested that "I wonder if we should just make it specifically to the kid? It'd be easy… And it'd be like any, maybe a proposal for something that we can do at HE and like a school site, yeah. Proposal, maybe to their families that they could do at home." Added that "Yeah, family, maybe, or school proposal. And then we don't know if they're going to choose the specific or maybe it's just any action, any climate, any action that they think…"
[MF: "I know the students and what gets them really excited is to be able to research an issue and then propose their own idea for how to take action on that issue at the school or home level"].

Possible Subjective Claims
Foregrounded, Immediate
"I want to provide as many opportunities for the students as possible so they can propose their ideas for school-based or home-based actions"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Lessons where students can propose their ideas for actions to an issue they have researched and become connected with are always powerful and relevant"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is important that we capitalize on opportunities for delivering activities where students can ideate and propose feasible solutions or actions"

Possible High Level Codes
Desire for activities that allow students to proposed ideas for school-based or home-based actions

ME-KA-F12, t1:15:06- when talking about doing a letter for the summative they discussed the option of sentence framing for them to allow them to give their opinion.

KA-F12, t1:15:47-proposed than rather than a letter for the summative they make a video that is like an elevator pitch that summarizes their opinion piece, because the video could be shared with lower grades.

ME-F12, t:15:58-agreed elevator pitch idea is great as it can be shared with the whole school.

KA-F12, t1:16:25-agreed with me when I said it could be a like a movie screening day of their pitches.

ME-F12, t1:18:00- said about movie screen of pitches that "I wonder, if we should tie we should contact Mica and Veronica. About like, ideas for like, if we should we should screen it to if they if we want to involve the whole school if we want to involve you know, who we want to involve in the screening?"

ME-F14,t31:11-to help students with the concept of interactions-which they had struggled in the earliest portion of the lesson- she use the throw the ball technique and asked several questions around examples of interactions "what's an interaction between teachers and students and plants? What's one interaction? Table 4? Ok another interaction between teachers, students and plants and ants?

MA-F20, t26:10- explained about the students' one pagers "they are producing it. And they're like trying. And I was like, This is awesome….and there's I mean, there's obviously a range to like, yeah, of course. You can look at Jacobs who did the electric vehicles. And you can look at Dominic's like, how detailed and how deep he went…"

ME-F19, t38:44-explained that for the texts she actually circled which ones the student shouldn't worry about and for the remaining ones she let them choose "I told them to read this. Uh huh. But because you're doing stations, they only had 15 minutes. So I said if you need to scan, scan, but try to read all three of them. Choose the one that you're the most excited".

ME- F1, d3, line 12- said that student-led learning is one of the key teaching strategies used at HA.

MA- F1, f3, line 1- said that the 6th graders work on an action-oriented capstone project as graduation requirement from IB program.

(d) Systemic thinking

MA-F13-t16:25- as she read "Farming, packaging and transporting food produces greenhouse gases. They pollute the air, as food packaging often ends up in a landfill" she told the students "To me as the researcher knowing that I'm talking about a sustainability issue, knowing that part of that is what is causing the problem, there may be something in this paragraph that you want to underline to remember to add to your notes"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want you all to think beyond the content, focus on the bigger picture and the task"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Think about the cause of the problem you are trying to identify and think of this as a researcher, not focusing on memorizing but understanding the content"

Possible High Level Codes
Analysis of content from a systemic focus versus memorizing content

MA-F13, t4:38-asked students "Well, would we need gas stations? If we're walking and biking? Do we need access to gas stations of money?" And added "The idea is, let's lessen the amount of gas we need than the amount we need to drive and increase the availability of things around us when we can walk or bike"

MA-F13, t5:29- Ximena asked what would happen if a person is late and they have to bike or walk, so MA replied "What do you think? That's a really good question Ximena. And the idea is here, what they're saying is rather than making it so that you have to go far away to get something that would make it so that the space is used better, so that people can access those things close to home, rather than having to go far away."

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I appreciate and celebrate your question and thinking"

Possible Objective Claims
Foregrounded, Immediate
"Think of it as an effort to put things people need closer to them"

Possible Normative-Evaluative Claims
Foregrounded, Immediate

Possible High Level Codes
Engaging students with content through systemic analysis versus just teacher-focused explanations

KA-F15, t9:48- I was explaining how the students will be learning about climate change and connecting fossil fuel industry with plastics and with climate change and KA proposed the following "I wonder if we can start images to show like before and after of like 50 years ago+and why do you think that?"-she referred to places affected by climate change

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want the students to analyze information through an activity that makes them think of all the connected factors that cause an issue"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Using visuals that have students see the effects of an issue can help them analyze the causes of the issue "

Possible High Level Codes
Visual activity to allow systemic analysis of the effects of climate change

(e) Co-learning

MA-F10, t 29:01- explained that they "like what they have done in the past for allowing students to get to the definition of ecosystem which is to show them slides with examples that are ecosystems and that are not and together they say yes or no it is an ecosystem, and then after all the slides have been shown they can create their own definition of an ecosystem".

Possible High Level Codes
Analyzing content together to co-create explanations and understandings

KA-F22, t15:11- I asked about her thoughts on the ESD teaching strategies and she said "I think, um, once. I don't know that there, I don't feel like it's new any of them. I think some of the ones that we do the most of and really have positive results with are the group discussions and debates. And the readings and writings, we I'm going to add like, also like short videos on that, like, for example, sometimes I'll like read something in the morning that relates to something we're doing talking about in class, for example, today I was, I read an article about the La Niña weather pattern that we are getting and when we were reading the something about the kelp forest, yes. Okay. Yeah, it talked about storms. So we, I was like, Oh, guess what I learned. I read this today, we look at this thing that we read. And then we actually started looking at what La Niña was, and what's the difference

between El Nino and La Nina found a little like, two minute video for it. And, and then we just kind of talked a little bit about that".

ESD Learning Goals highlighted after instruction of integrated lessons

(a) Sharing personal values, ideas, and opinions

MA-F20,t21:46- explained that as a consequence of the research guide "students were really proud. And it was awesome, because they could like we, we really had to push them to get them done before open house. It was just the reality. Like you got to have something for open house." And "they had to share their project with their parents. And they were like, all of them were pretty proud. It was really awesome, even Darby's was really quite exceptional".
[MF: "The research guide allowed the students to show their ideas and opinions and that got them very engaged to the point that even students that usually lack enthusiasm did a great job with their final product" (AND) "Because they were so engaged, they all did a greta job and they were so proud and excited to share it"]

317

"It is crucial to give students activities that guide them to find information and answers combined with opportunities to provide their opinions"

Possible High Level Codes
Guided independent research work combined with providing opinions is highly engaging
Students produce high quality work through activities that honor their unique ways for finding information and providing their ideas
Activities that guide versus impose learning engage all profiles of students

MA-F20, t22:20- explained that even Darby's was great and she told him "I think I need to keep yours as an example for next year." And "Yeah. So even those tough, tough kids".

MA-F20, t26:10- explained that the students' one pagers were really great, each one to the depth that is aligned to the student's abilities, but overall they were all a great reflection of how interested and engaged they were with the LP.

KA-F22,t42:27-I asked if the students were engaged during the SS lesson on the mayor activity because it's just this group in particular or because of the action piece and she explained "I think it was the action piece because one they had already met the mayor. And then and so that really made it like, oh, we know who we're writing to. But they also were very writing about the stop sign which was a big deal. Like that, the the conversation was, you know, somebody could get run over, I almost got run over, those kinds of things. So it was they really, it was something that really was meaningful in their life experience. And something that they know where that yeah, that was. And then I had another child who had written they had talked about the stop sign over here on Mountain. And then another child wrote had their letter, and they had different street signs. And I said, Oh, is this right? Is this the Street View? Because I remember we're talking about this street, and he's like, Oh, no, there's also this other street over here. And I was like, Oh, okay. So, you know, so he was really being thoughtful of, wait a moment, how do I walk to school? And where would I like to see another stop sign? Um, so that was, you know, so I think it's because it was relevant to them that they were so yeah. And right now, when they're working, the times that they've gotten together with their group there for the majority, you know, the most part they're engaged and participating. And they're contributing, which is important, you know, important and valuable"
[MF: "The activity that had the students analyze what type of action or solution they would propose to the major was extremely impactful because they got to think about what was something affecting their immediate lives and they got to express that need as their idea, their contribution, why they thought that matter"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate

318

"It made me feel so happy as an educator to watch how engaged and excited the students where in the activity of proposing a solution to an issue they identified"

"I want the students to have as many opportunities as possible to contribute as it is so valuable for their learning and growth"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The students were extremely engaged and motivated in the activity because it related to an issue that affected their lives immediately and they got to propose their idea for how to solve it"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is very valuable and important that we provide learning activities that have relevant components to students lives and that allow them to voice their ideas"

Possible High Level Codes
Activities that allow the students to identify issues that have direct impacts in their lives
Students contribute and are engaged when they can voice their ideas and opinions
Positive impact of activities that allow students to learn through relevant content

(b) Local and global citizenship

ME-F19, t 57:14: we were talking about if students can see how applicable it is what they are learning through an integrated LP and she said "Totally. And it's, it's so… I wish we did more lessons that were just like really relevant, yeah, yeah…. impactful, poignant" She gave the example of fractions and how the textbooks and LPs they get are always the same example if the pizza and in general for math, so irrelevant.

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wish we received better material and resources from the district that allowed us to deliver lessons that have content that our students find relevant"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Our teaching resources contain content that is not relevant to the students so the activities are just doing the academic teaching but are not truly impactful"

"The integrated lessons were impactful because they contained content that was relevant to the students' lives"

Possible Normative-Evaluative Claims
Foregrounded, Immediate

319

"It is very important for the district to provide us with textbooks and resources so we can deliver activities where the students can see the relevance of what they are learning"

Possible High Level Codes
Integrated lessons provide content that students connect with as it is relevant to their lives
Lessons with relevant content allows students to see learning as applicable

KA-F22,t44:09- she also confirmed that the students liked and found relevant what they were learning through the LP.

AU-F23,t46:12- I asked for any meaningful comments or anything she wanted to share from the film festival LP and she said "Yeah, they loved it. You know, I mean, I think it was like an hour and a half. We did watch it in one session. And I was anticipating, oh, no, like an hour of just sitting down watching videos. But they, they, they loved it. And I think it was really important that you included videos with kids and seeing them explain the issue and what they're doing too, so they feel like they you know, they can do the same things." She also agreed that there were many comments on how they could be agents. [MF: "Even though it was a long session, the videos were engaging because they included young people explaining issues and taking action on issues" (AND) "If we teach with content that allows the students to imagine how they can take action and be agents, the lessons are organically engaging and relevant"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I was worried that the length of the film festival was going to be an issue, but the fact that the content include young people being agents of change was extremely engaging for the students"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The students will engage and want to learn when the content includes information that allows the to envision how they can make a difference in an issue"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is very important that the students have opportunities to learn through content that inspires them to be change agents"

Possible High Level Codes
Learning content that showcases young people as change agents
Lessons that explain issues while also showcasing how students can make a difference

KA-F22,t38:28-she explained how relevant the integrated learning was "and they have control over it. Absolutely. When we talk about how we use our classroom resources, like the how much paper we're using, and why we can't just get another piece of paper and we should, you know, make best use of the one we're using. I think that connects it to, okay, well, what can I change? How can I change my

behavior to impact the environment? So I think those are the things that are most meaningful is when they can connect it to their their life and what they have control over it… this particular class this year hasn't been big on plastic, which is really neat. I don't see kids bringing the reusable water bottles either. Like there's those that those that there are several that do they have the reusable bottles, and then the rest are just using the water fountain. I don't see like last year, the amount of plastic that we were seeing was just crazy. So these guys, some I don't know, if it was something they learned last year, or if it's just because maybe we talked enough about it, where they're like, Okay, I'm not gonna use a plastic water bottle. I'm not sure. But they're already different from last year's class somehow".

[MF: "Even if it is something simple like being mindful on how much paper we use as a classroom, actions that the students can take, things they have control over, are always extremely interesting and engaging for them, this is why lessons that include content on feasible agency are powerful"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want the students to learn with content that is relevant to them like actions and habits they have control over"

"I wonder if this group simply learned about not using plastic bottles because as teachers we organically talk about it so much"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Lessons that focus on small feasible actions are meaningful and a powerful way to get the students wondering how they can make changes in their actions while they learn about an issue"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important that the students can learn with content that explicitly shows how they can take action at a feasible level"

Possible High Level Codes
Lessons with content that shows students how they can take feasible actions
Teaching about an issue through content that students find they can connect to their lives

ME-F20,t40:45- "And a couple of them were like, Oh, cool…. drawing an environment in Santa Barbara. And then labeling natural resources, specifically from Santa Barbara. And then the next station was going through the picture gallery and writing one sentence for each picture. And like pretending that you're reading the caption right for the picture".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I loved how engaged the students where with the activities that included doing work related to local environments"

Possible Objective Claims

321

Quite Foregrounded, Quite Immediate
"Activities that include content that is specific to local contexts are also engaging

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is powerful to teach with content that students know about, that is about their communities and local environments"

Possible High Level Codes
Lessons with content related to local communities and environments

AU-F23,t46:58-agreed when I asked if the students liked that some videos in the Festival were from CA and thus it was relevant for them.

(c) Empathy and care

ME-F19,t44:38: I asked if there have been any memorable moments or comments from the integrated LP and she answered "Honestly, I feel like that happens all the time. Not only with this, like there have definitely been a lot with sustainability where there's just like, they're like, oh, like for this the slide yesterday when it was talking about how much plastic how many marine animals are killed every year from plastic pollution, and they didn't know that they get entangled and then they saw pictures of like the birds entangled and everything and they're just like, "AHHH". I mean, you can see it affected all of them and we do something called Heart observation. It's called like we call it either Book head heart observations or video head heart, depending on what medium we're using. But it's where they're, they're checking in with, like, what thoughts are they having while they're watching and what feelings are coming up. So that was something that we talked about, like, how did that make you feel?"
[MF: "We have to teach the students about these major issues with content that makes them care, while remembering that they will get strong emotions from this content and thus giving space to check how they are feeling and sharing these feelings is very important"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want my students to have the space to check in with themselves and share what they are feeling, specially when we learn content that is about an issue affecting animals or people"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"My students feel a lot of emotions, from caring to being concerned, so integrated lessons need to include a moment to go over those emotions"

Possible Normative-Evaluative Claims
Foregrounded, Immediate

322

Possible High Level Codes
Content about the impacts of issues should be paired with spaces to share how students feel from learning about these issues
Fostering empathy is key, but it needs to be paired with always checking how students are feeling
Content about the consequences of issues will generate emotions, from empathy to anger

MA-F20,t24:41- shared that film festival was awesome but that "We did have a little bit of the like, I'm overwhelmed. One student who was like I I'm feeling really stressed out." So she told the class " want you to also like pay attention to what they're saying in terms of what's being done and what can't be done".

Possible High Level Codes
Importance of teaching about issues always hand in hand with learning for that issue

ME-F19, t45:33-on students' reactions during LP "I think one of them said angry too. Yeah. Yeah. So they're definitely they're all like, this is stuff. I feel like the nice thing about this sustainability is that I think like, it's just really easy to out of all the subjects I feel like it's the easiest to engage the students".

Possible High Level Codes
Content about the consequences of issues will generate emotions, from empathy to anger

ME-F19, t55:14- I asked how would she describe the general feeling consequent or when learning through the integrated lessons and she said "Yeah, I mean, I think that you can tell it's just hitting, striking, striking, striking a chord is striking a chord. Yeah. And you can see that because there are a lot of [expression of awe+concern], and concern, and asking a lot of questions and responding to questions and just a high level of engagement".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I could see how much of an emotional impact the content on the consequences of issues was having on the students"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The students were extremely concerned and amazed at what they were learning from the impacts of the plastic pollution and climate change"

Possible Normative-Evaluative Claims
Less Foregrounded, Less Immediate
"It is easy to see how impacted the students are when they are exposed to content about an issue, that is why we need to pair it with content on how to act on that issue"

323

Possible High Level Codes
Content about sustainability issues generates genuine concern and care in students
Fostering empathy and care needs to include learning how to act on an issue

KA-F22,t50:56-explained how the portion of the comparison pictures of before and after was evidently causing the students to look hopeless she said "It wasn't because the lesson was doom and gloom. I think somebody asked something. And that kind of led us to talk about the impact or something like that… And so I was looking around at their little faces. And I'm like, Oh, like this is like, when are we getting to the happy ending? but when we stopped and we talked about how, like, you know, there, it wasn't like everything is lost, there was still hope… And that's why, you know, that's what we're talking about this because, like we're gonna and then I think we started talking about well, what would you do? Like, what's your solution? She also said "it was really like, it was a lot… It definitely sparked something!" I explained I will fix/edit it for next year and include of before, after and KA jumped in and said "what is being done!" She added that the component that we didn't add was what is what's being done, and that's what we ended up talking a little bit about what would you do differently? You know, like, just we saw this but like people are being active… But I could see it in their faces. It was like, oh, like I'm so sorry. This was a terrible idea!…I said that she cam up with that idea and we were so excited about it and she said laughing "I know I know! I thought it was a brilliant idea… So what we need is okay before and afters but at the end, we do have to have a before and after and look at now with what's being done. Yeah. And how great, who is doing this. Now how things are. Yeah. So that was the missing piece there.. This looks terrible but things are being done and now we're gonna learn more…Well, I broke their hearts and then put them back together. Let me tell you there is hope".
[MF: "I learned so much from this activity because I thought it was going to be so powerful to have a before and after when indeed what they needed was a highlight/emphasis on what is being done, where is action being taken, and for me to teach the lesson through a lens of hope"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I was so worried and heart broken as I could see that the students were feeling too worried, too helpless from watching the before and after images"

"I wanted to remind them that there is hope and people are doing things"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Content exclusively on the consequences will generate more concern and feelings of helplessness and inability to make a change than motivate students to want to learn what they can do"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is absolutely essential that when teaching about an issue we also deliver information on what is being done, and how the students can take action, and emphasis the lesson on the hope and the action component"

324

(d) Co-learning

AU-F23,t44:48-I asked if she wanted to share anything meaningful said or done by the students when learning through the LP and she said "Well, I'm always with this group. I was always surprised how much like how passionate they are about, you know, climate change or how much they knew already. I mean, you saw it when I was doing the small groups, they're just pulling out things that they knew...so that was that was surprising and also really nice to see that they they do know and they do care".
[MF: "I was surprised but also relieved that in the lesson plan on climate change my students had so much pre-earned knowledge that they were sharing, because I am not fully knowledgeable on this topic and I also see the value of them sharing and teaching each other and myself"]

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I loved learning so much new information from my students during the climate change lesson"

"I think that all the knowledge the students have on climate change is a sign of how much they care and want to learn about the issue"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The students are exposed to information on climate change and other issues outside the classroom"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"Because the students have outside earned knowledge on climate change an dotter issues it is important that we deliver lessons that allow them to share and teach that knowledge"

Possible High Level Codes
Lessons that allow students to share and teach classmate and teachers about knowledge earned outside the classroom

KA-F22,t28:38- very excitedly told me that in the part of the LP that they had to watch my underwater video she actually found a live cam that was live-streaming with a diver "We actually popped into a session by accident… It was so cool. It was so cool. The diver it just like lined up where they were doing a talk for someone and we like ended up going on the cam, right as they were doing it. And they had found actually this toy, some plastic toy. And they brought it up and they were like, What is this thing doing down here? It was the coolest thing ever… we were so excited."

"It is important that we have the time to find meaningful resources like videos and live sessions of environments that our students normally do not have access to as this creates curiosity and empathy"

Possible High Level Codes
Resources that expose students to new or unfamiliar environments as a means to foster empathy

(e) Curiosity
AU-F23,t45:22-I asked even if they didn't know the difference between a seal or an otter if they were engaged with the content and she said "Yeah. And they also they really liked seeing the underwater videos…videos is something that I need to remember to incorporate more…They were just like, Oh, what is? Or is that X thing, you know, they were just excited to see the underwater world… As I am sure they're not really familiar."

Possible Subjective Claims
Less Foregrounded, Less Immediate
"I was happy to deliver a lesson that showed the students an environment that they are not familiar with as most will likely can't afford to go in underwater activities"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is important to deliver lessons that expose students to new places and environments, content that sparks their curiosity"

Possible High Level Codes
Learning content that sparks students's curiosities
Learning content on new environments sparks curiosities and engagement

KA-F22, T32:04-explained how students enjoyed the readings even if KA had to read them "They did, they did like them. They... We again, we didn't get through too much of it. But I think having the not just reading it, but stopping and having the conversations like paragraph by paragraph was what they liked sharing about oh, because one of the paragraphs was like, Oh, the fish grazing. And I said, What does that mean? Fish grazing? And, and they were like, and they said, Well, what other animals you know that graze someone said a cow. And they said it's what do they do when they're grazing? Grass? Okay, so fish are grazing and eating that. And yeah, they thought it was hilarious...They are silly sometimes."

Possible High Level Codes
Lessons that provide space for students to share their curiosities and wonderings

3. Key features of sustainability education highlighted by teachers during design sessions

(a) Transdisciplinary activities

MA-F10, t1:08:00-explained very well how the additional requested readings could be used to cover informational reading standards like quoting, accurately determining main ideas, be able to summarize the text relationships or interactions between two or more.

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"My students will benefit if we use readings in the Science lessons that also allow them to practice language arts standards"

"I want to deliver transdisciplinary lessons that serve my students for more just one subject"

Possible Objective Claims
Foregrounded, Immediate
"Lessons are more effective when they allow the students to learn and practice content from more than just one subject"

Possible Normative-Evaluative Claims
Backgrounded
"It is not that difficult for the official curriculum developers to prepare lessons that teach about science and language arts content and skills"

Possible High Level Codes
Official teaching resources should simultaneously teach skills and standards from multiple subjects
Desire for integrated science readings that can also allow students to practice language arts skills
Desire for transdisciplinary and integrated resources
Transdisciplinary resources are effective teaching resources

ME, KA-F11, t27:45- agreed that if LP on CC was transdisciplinary they could "devote more than just 2 lessons per week for Science if the content is weaved into writing workshop and tied into our reading workshop".

Possible High Level Codes
Transdisciplinary resources are a powerful tool to deliver effective teaching
Desire for integrated activities to teach more science due to limited available Science periods

ME-F11, t 29:37-said it would be ideal if Math could also be integrated in the CC LP so they could also use that block but mainly to have it be a fully transdisciplinary lesson.

ME-KA-F11-t33:39-when discussing on how many available periods they shared that if math was integrated they could use that period for the lessons. They both shared that they would need to integrate basic math concepts as there are important academic holes in math.

327

ME, KA-F11, t38:58-both discussed that transdisciplinary approach is best for "giving" enough periods for the whole integrated science unit.

AU-F23,t16:25- I asked if she would prefer to teach about issues like climate change through only science or several subjects and she said "It's always helpful, like, several subjects, because they'll start to see that, oh, I read this and reading and now I'm learning about, like, the scientific portion of climate change and science… we have curriculum that we have to follow. It's not always possible, but yeah, I mean, ideally, I love that idea".
[MF: "Our official curriculum does not include any transdisciplinary activities, everything is taught in silo and that is very ineffective"].

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wished we could have access to more transdisciplinary activities because it makes teaching more effective"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Transdisciplinary lessons are more helpful for us than the content in official textbooks"

"Transdisciplinary lessons allow students to see the connections between the skills and the content they are learning and that is engaging education"

Possible High Level Codes
Transdisciplinary activities allow students to see the applicability of skills and content from different subjects
Desire for transdisciplinary activities that also teach about sustainability issues

ME, KA-F15-t28:46-as we discussed what topics to integrate into the science unit besides reading, writing I asked if math was still a desire and they both agreed a lot.

KA-F14, t29:09- I asked if we could have a 4th lesson per week to bring in math in connection to the science content and she said "That's the thing we kind of were hoping we had originally. Yeah, we're gonna be able to do".

Possible High Level Codes
Desire for science activities integrated with math under a sustainability focus

ME-F15, t29:16- in relation to discussion on integrating math she said "if you could focus help us focus on word problems that relate to sustainability".

Possible High Level Codes
Desire for languages arts activities that relate to learning about and for sustainability

328

ME-F15, t45:20-when discussing the resources that I shared with them and how I was going to use some for math, ME said she had actually found several resources that she thought were very useful as they had graphs, so during the scanning of the resources she was paying attention to what they could be used for. ME said "Like, we could say, okay, like patterns or something to like, if this pattern continues, like, what is? Where will we be in 20? In, you know, 2050" + "just also just analyzing data is good. Like, we really I don't feel Yeah, I've not been able to really".

MA-F10, t1:08:00-said that they would like to have more readings for the reading workshops while they cover standards that are not only on the science part but also to provide the students exposure to other content, like content that helps them wonder about issues, things being done

ME-F14, t46:03- said "our classes don't have enough time to analyze charts." I asked if that is on the standardized test and KA confirmed (analyzing data)

KA-F22, t 15:11- was explaining to me how she was teaching the kids about the El Niño and La Niña as she read something in her house that morning and wanted to discuss that with the students, she explained that "I was talking to Mica about earlier today, because I was like, I was I wish I had known more about that. Because then I could really explain it to them. I said, so the only thing I could think about I was, like I said, you know, it's like this hot air is being released all the carbon that's trapped in, in the water being released. I said, it's almost like a, like an ocean burp. They thought it was hilarious. But, you know, hopefully, they're now when they hear it. And we were talking about I said, you should watch the news, because it's probably on the news. And I you know, so we went down, like a little path that was a little different, but it connected to what we were doing. And they actually can see it live in, you know, in action. The thing that that I didn't think about was I said, do you remember Hurricane Katrina? They're where, you guys are too young. But I related it because we I said, you know, we had people that had to move here after Hurricane Katrina, we actually took in people that had been evacuated. And so we had this, you know, it was it connected to like, the language and the vocabulary using and, and it was like, oh, you know, how the impact is global. So anyhow, it was exciting...but I think, you know, in that critical reading and writing, it's not just the what we, it's what we do and bring in for them, and then how we can connect it to other things in the class."

OC-F10, p39- went to the bathroom and she pulled me into her office. She said that her main concern is that the teachers are not understanding how they can use the IB themes and lines of inquiry as an opportunity to create transdisciplinary lessons.

(b) Action-oriented

MA-F10, t59:46-said she wanted to revamp the project of investigating a sustainability issue from how they have done it in the past so it can actually be more action-oriented even if that is only putting up posters around the school as "that's still action. 100% Yeah, it's education making their or presenting to another class".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I think action-oriented work can be as simple as allowing the students to produce educational materials that include their ideas and opinions on how to take action"

"I want my students to have the opportunity to research an issue with the goal of proposing ideas for agency"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Action-oriented learning includes informing others about your ideas for agency "

Possible High Level Codes
Desire for lessons that position students to research an issue with the goal of presenting their ideas for how to take action
Action-oriented activities can include students sharing their opinions and ideas for agency

MA-F10, t1:05:27-agreed with my suggestion of giving the students a list of options of people/groups they could do some community work with and have students choose who they want to work with as a way to explore their interests/concerns related to environmental sustainability.

Possible High Level Codes
Desire for including activities that give students the choice to select from local agents of change to work with

KA-F11, t25:45- suggested to attach the opinion piece to the solution.

ME-F11, t46:25-agreed when I explained that by focusing on coding CC resources and sticking to CC as the main issue then the portion of sustainability can be done by having students "learning about innovations and then proposing how can you do it at an individual level. Perhaps maybe you give them three choices and said, okay, you can do the next three periods, two periods, we're going to focus on either reading, writing and proposing, well proposing through reading and writing for actions at the individual level, family level, school level, or community level".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I think giving the students some guidance but freedom at the same time will be very engaging and meaningful for them"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"The students will benefit from having choices to propose actions at a specific level, while having a options for the level they select"

"It will be very powerful to integrate learning for CC with reading and writing while giving students freedom to propose actions at the level they are most interested in"

Possible High Level Codes
Learning about innovations through readings
Proposing ideas for actions at a level each student selects
Having the option to select the level of agency to propose ideas for

ME-F12, t42:59-shared that for the prior SS unit they designed an action oriented activity so students had "a choice of four different topics. So some of them did land rights, some did affordable housing, some did extreme weather and then the last one was public access." Groups researched issue and proposed a solution by writing a letter by using a template that the teachers did for them. The letter had them write about "their issue, why it mattered to them and what they think could be done and they had to choose, at least from mine, they had to choose, is this something that the mayor would be more apt to work on? Or the senator?"

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I wanted to give the students a menu of issues they could select from"

"I wanted to give the students the chance to feel connected with the issue so they would be more engaged in the portion of proposing an action"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It was important to include options for the area of the issue"

"It was important to provide students with a template for an action-civic letter addressed to a public servant"

Possible High Level Codes
Giving students options of areas they could research an issue within
Giving students guide/template to produce an action-civic letter

KA-F15, t8:05-backed ME desire to have the students work on something they can do, she said "Yeah, let's do something in that, for them to pick something that is actionable".

Possible High Level Codes
Giving students options to select ideas for feasible actions

ME-F15, t 8:16- added to her desire for summative to be action-oriented that "I think, even something at home. Because, right, because I think that a lot of so many, you know, often, you know, the generation before us is not as committed. Right? So if just even being like, Okay, I am going to make sure or really start a campaign at home so that we don't use plastic water bottles, or we start composting or that we ride our bikes or any of those things. I feel like that could even be you know, I don't think

the home is too small of a starting place. Okay, so I would say like home, school, or like neighborhood, I guess it could even be Santa Barbara".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I think that including activities that allow the students to take action at a home level is powerful and meaningful as they will be educating their parents and older generation that is more set on their ways"

"I do not think that actions at a home level are too small"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Lessons with activities that guide students on how to take actions even if it's a their home's level are powerful and important"

"We can deliver lessons that guide and inspire the students to take action on an issue at a home, school, neighborhood or even community level"

Possible Normative-Evaluative Claims
Quite Foregrounded, Quite Immediate
"It is important that we deliver lessons that allow the students to engage in actions, no matter if it's at home or a larger level"

Possible High Level Codes
Including activities to position the students in agency at a home, school, community level
Including activities that position the students as agents of change within their homes as a way to catalyze change within adults in the household
Students as powerful agents of change at their homes

ME-F15, t10:50-agreed when I said that the best place to start with actions is at home and said that "people won't listen to other adults." When I said "have a kid bug a mom about plastics in their home".

ME-F15, t 13:30- discussing about prepackaged snacks "I think that really the most powerful agents in the home are the kids".

ME-F15, t13:37-from our above conversation I suggested I would include examples of what kids can do/are doing at home and she said "perfect!" I was referring mainly to ideas to reduce plastic consumption.

Possible High Level Codes
Content/examples of young people taking actions at home as part of integrated lessons

ME, KA-F15,t14:51-both explained that examples on how to properly recycle is important because to start with the school does not even recycle. I said the amount of trash on campus is out of control and ME said "It really is. And I don't know how to approach that subject. But we do have I think we just

332

need more trash cans. One of the things is we need more trash cans. And I was just talking to Marco about like just having more strategic trash cans around so that the kids don't have to walk across the play area to throw something away, because, but um" + "and the other thing is too it's not simple, right?" + " They just sent a flyer and they do this, like every quarter they send a flyer of like, what's recyclable, what's not, and it's not intuitive".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I think that our school administration could be doing a much better job at one basic action against single use plastic pollution, which is adequately recycling"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"The school administration can place more trash cans and educate our students better at how to properly recycle to lower the level of pollution by plastics on campus"

Possible Normative-Evaluative Claims
Foregrounded, Immediate
"It is crucial that our administration leads with example and begins with a basic action which is enabling adequate recycling"

Possible High Level Codes
Showing students how to take actions at home by modeling those actions at school

ME-F15, t15:44-added to the above that "you know, so I feel like, like, ever since I started teaching, I'm like, I want to have charts up on our recycling and trash. I haven't taken that step because I know that we don't recycle. Like, like if the custodians and our schools are not even going to".

ME-F15, t17:50-as we discussed the summative, she proposed that instead of just screening the summative is a campaign strategy instead and that the screening is showing/sharing the student's campaigns which she proposed could range from a student simply protesting to sharing flyers around school or at home to anything else-screening off their campaign strategies.

Possible High Level Codes
Lessons that guide students to a proposition of an action that is shared in a free format

ME-F15, t21:53- was excited to hear me share that one of their students told me she was mad that the school is so dirty after recess and that she wants to protest and that I told her I protest all the time, with signs out in the street with other people, and the student asked "do you protest?!" And I showed her a picture and she was so excited to see me protesting

Possible High Level Codes
Sharing with students how educators take action in their personal lives

ME-F15, t 22:19- was excited about the idea of bringing Veronica and others to the screening as a way to promote whole-school actions "yeah because I feel like if they were to just do their campaign strategies, I feel like there needs to be a component of them sharing it with us. Yeah. And maybe, if it's not just like, a classroom presentation screening, like it can we could also I think, I think Veronica would want to be there. Yeah. with all the amazing things. And we can invite other teachers".

Possible Subjective Claims
Quite Foregrounded, Quite Immediate
"I want the students to not only propose an action, but to share their agency ideas with others"

Possible Objective Claims
Quite Foregrounded, Quite Immediate
"Students need to share their ideas and propositions for agency as this is an integral part of celebrating their engagement"

Possible High Level Codes
Allowing students to share their ideas and propositions for actions with others

KA-F15, t23:49-asked if the portion for producing the idea for the campaign can be integrated into their writer's workshop -as I asked about how much time available they have for that component.

ME-F15, t24:14-agreed with KA -above- "Have them write the opinion, which is, this is my solution because A, B, C, D"

Possible High Level Codes
Including that students provide their opinions on why they propose a specific action for agency

OC-F10, p39-VE mentioned that student-led and action oriented is key for her: "action is the glue that binds everything".

FINAL HIGH LEVEL CODES FOR EACH LINE OF INQUIRY

Line of inquiry 1. Challenges for implementing integrated lesson plans

(a) Higher-level codes for lack of class time
• Lack of time to each about sustainability issues

- Lack of time to teach in-depth about issues
- Need to find time to insert learning about issues

(b) Higher-level codes for test prep as a priority

- Test prep as a priority over science and integrated content
- Test prep as a priority over key subject matter content
- Test prep as an overall priority
- Test prep as a barrier for delivering relevant and integrated education
- Test prep as a priority over engaging lessons
- Test scores as the standards of quality education

(c) Higher-level codes for testing consumes substantial schooling time

- Testing as a barrier for integrated teaching
- Testing consumes time from meaningful learning
- Testing consumes time for making integrated lessons

(d) Higher-level codes for lack of prep time for ILPs

- Lack of time to master how to integrate learning about issues
- Lack of time to prep due to testing
- Lack of time to make relevant lessons
- Lack of time to edit lessons to include sustainability
- Lack of time to create ILPs
- Lack of time to use ESD goals
- Insufficient paid time by district for quality lesson planning
- Lack of paid time for lesson planning with new methods
- Lack of support and time to find resources on local contexts
- Lack of time to redesign lessons into integrated lessons

(e) Higher-level codes for district's priority is test scores

- Principals and districts are the key for ESD at schools
- District is not truly committed to ESD and sustainability learning
- District values forms of education that provides it with opportunities for making money

(f) Higher-level codes for negative emotional and academic effects

- Testing affects students negatively
- Standardized testing is a negative force over students and participants
- Testing affects students emotionally
- Standardized testing is not inclusive of all learning profiles
- Standardized testing is not inclusive of diverse student populations

335

(g) Higher-level codes for limited knowledge measured
- Tests fail to measure relevant knowledge
- Standardized tests measure a small set of skills
- District prioritizes test scores over holistic skills and knowledge
- Tests measure non-foundational knowledge
- Test scores as the standards of quality education

(H) Higher-level codes for non-equitable standardized testing
- Standardized testing does not consider diverse student populations
- BELs students are not supported properly for taking standardized tests
- Test scores affect level of state support to schools

(I) Higher-level codes for lack of support for integrated education
- Lack of support and time to access resources on local contexts
- Lack of support to access and edit integrated lessons
- Lack of paid time for lesson planning
- Ineffective resources by district to include sustainability education

(j) Higher-level codes for distrust on district's recommendations
- Recommendations and resources from district not fully welcomed
- Damaged relationship between district and participants
- Participants distrust and are resistant to district's new impositions

(k) Higher-level codes for inadequate official textbooks and curricula
- Lack of training to familiarize with new imposed curricula
- Imposed new curricula that is unfamiliar to teachers
- Official textbooks with racist language
- Biased, filtered, and inaccurate content in official textbooks
- Non-engaging and outdated official textbooks
- Poorly designed official textbooks
- Official textbooks that demand too much back end work
- New imposed curriculum does not align with state's teaching framework
- New imposed curriculum rolled out without consulting teachers and schools
- Official curriculum does not serve the diverse student profiles
- Official curriculum does not include sufficient practice content
- Official curriculum demands time to enrich it
- Official curriculum demands time to adapt it to students
- District fails at providing resourceful and adequate official curriculum

- Official textbooks need effective structures and easy to access resources
- Diluted official curriculum that lacks crucial teaching content
- Official textbooks are condensed and poor in relevant teaching content
- Official textbooks do not serve teachers to deliver all the information and knowledge students should acquire

(l) Higher-level codes for lack of resources for diverse learning profiles
- District imposes non-engaging DELD lessons
- District imposes DELD lessons not plausible due to time constraints
- Lack of time to translate ILPs and engaging activities for BELs
- Need accessible bilingual teaching resources
- Need BEL support staff for the entire school

(m) Higher-level codes for TEPs preparation on Science education
- Lack of preparation in engaging Science pedagogy
- Lack of well-rounded literacy and mastery of Science topics
- No exposure to grade appropriate science topics and content

(n) Higher-level codes for TEPs lack courses on diverse teaching strategies
- Need courses on how to access different curricula
- Need courses on pedagogy for delivering different curricula

(o) Higher-level codes for TEPs lack sustainability education related courses
- Need to include relevant courses on sustainability education
- Need courses and emphasis on environmental sustainability
- Need courses on action-oriented teaching strategies
- Need courses on how to teach for both social and environmental issues
- Districts priorities influence what is included in TEPs

(p) Higher-level codes for for teacher's need and desire for literacy
- Lack of well-rounded literacy of mechanics and causes of sustainability issues
- Lack of preparation in pedagogy for sustainability issues

(q) Higher-level codes for teacher's low literacy in science education
- Lack of preparation in engaging science pedagogy
- Lack of well-rounded literacy and mastery of science content and topics

(r) Higher-level codes for students 'low reading skills
- Low reading abilities and skills
- Poor support from admin for students with diverse reading abilities

- Low reading abilities and limited vocabulary

(s) Higher-level codes for students 'limited mastery of academic content

- Limited background knowledge on foundational science topics
- Low preparation on how to conceptualize new unfamiliar topics

2. Line of inquiry 2: resources needed to deliver lessons under ESD

(a) Higher-level codes for premade teaching resources

- Access to pre-made resources that can be adapted to each classroom
- Pre-made resources with samples of expected student work
- Pre-made resources that can be adapted to each classroom

(b) Higher-level codes for ILPs

- ILP with categorization of resources to teach about an issue and to teach for an issue
- ILP with mixed media and teaching resources
- ILP with structure that details what is to be covered each week
- Hands on activities as part of the set of teaching activities included in an ILP
- Hands on activities as a key engaging teaching resource

(c) Higher-level codes for databases

- Free access database
- With teaching resources curated by grade and content
- With lists of people, organizations and programs working locally in sustainability issues
- With all teaching resources available in English and Spanish
- With reading resources adapted to different comprehension levels and identified with author
- With reading resources that have read out loud option
- With all the needed resources and all the activities needed for an entire unit

(d) Higher-level codes for resources to teach educators on sustainability issues

- Short bulleted lists with key information on the issue
- Selected readings and videos included in a well-designed ILP
- Available teacher short tutorials about and for sustainability issues
- Available short tutorials focused on new emerging information on sustainability issues

(e) Higher-level codes for official textbooks and curricular content

- Units or modules that include all relevant teaching resources, from slides to practice handouts
- Official transdisciplinary textbooks that connect several subjects
- Official curricula should connect content from several subjects

338

(f) Higher-level codes for ongoing form of support

- Sustainability focused TOSA/coach available on-site to support participants' questions and to model ILPs
- Sustainability education TOSA/coach to model lessons and new strategies
- Additional teacher or assistant to support integrated learning
- Sustainability focused TOSA/coach to support with selecting resources for ILPs
- Sustainability focused TOSA/coach to support with overall construction of ILPs
- Sustainability focused TOSA/coach to support with yearly improvement of ILPs
- Sustainability focused TOSA/coach to remind teachers of available ESD pedagogies
- Sustainability focused TOSA/coach to gather quality resources for ILPs
- Sustainability focused TOSA/coach to help participants with sustainability related questions and curiosities brought by students

3. Line of inquiry 3: most relevant elements in a PD on ESD

3.1. PDs provided by the district

(a) Higher-level codes for lack meaningful and relevant content

- Not impactful as content is shallow
- Lack training on how to deliver curricular content from official textbooks
- Participants do not remember or use content from PDs
- Deliver too much content at once
- Lack teaching methods for official curricular content
- Often focused on marketing a textbook or curriculum

(b) Higher-level codes for deficient design

- No time to practice introduced teaching methods
- Lack opportunities to observe in a classroom the taught pedagogies
- Lack how to access and navigate official curricula and textbooks
- Force participants to sit through unnecessary sessions
- Lack sessions focused on specific content

(c) Higher-level codes for poor decisions by district

- District fails at providing non-repetitive PDs
- Participants need to be exposed to curricular content before teaching it
- District's new leadership works in silo and disjointedly
- District needs to reassess its PDs providers
- District new leadership does not work cooperatively to get the best PDs

339

3.2. Most relevant elements in a PD on ESD

(a) Higher-level codes for PDs with an effective format
- Delivered in short sessions that happen closely
- Short connected and continuous sessions vs one day PDs
- Trainings conducted outside of class time
- Trainings in the form of professional events and conferences on practical education methods and strategies
- Avoid asking participants too soon to implement taught strategies
- Constant reminders of previously introduced content

(b) PDs with practice and/or implementation time
- Walk participants through every step for setting and delivering hands-on activities
- Time to find teaching resources for creating relevant and meaningful lessons
- Include time to analyze how to implement introduced pedagogies in a classroom context
- Sessions to analyze and discuss teacher's key areas of interest
- Sessions to practice how to use ESD goals
- Introduce, analyze and implement ILP, reflect, and receive report from a specialist
- Include theory on teaching strategies, time to plan with strategies, live observations of strategies, and implementation in the teacher's classroom
- PDs with a practice session to try out learned strategies
- Time for finding teaching resources for creating relevant and meaningful lessons

(c) Higher-level codes for support during and after PDs
- Ongoing support throughout the year from a specialist
- Include short check-ins with specialist to guide integration and lesson building
- Introduce, analyze and implement ILP, reflect, and receive report from a specialist
- Collaborative planning amongst participants
- Mapping strategies and methods provided by PDs against daily instruction needs
- ESD PDs with short check-ins with specialist to guide integration and lesson building
- Collaborative work between specialist and participants for integrated lesson planning
- PDs were participants co-create ILPs right after sessions of sustainability issues

(d) Higher-level codes for PDs with in-person or video demonstrations
- ESD goals taught through a sample written ILP and examples of key teaching moments (shown
- in-person or through video)
- Avoid going too in depth into each ESD goal and showcase key examples
- Include observation of strategies/methods implemented in a real classroom

340

(e) Higher-level codes for PDs with evidence of value of integrated learning
• Include evidence of the relevance and impact from adopting ESD methods

(f) Higher-level codes for PDs with sessions on new teaching strategies
• Strong focus on PDs on teaching strategies for IE
• PDs need to train engaging teaching strategies for different topics
• Textbook manual's with clear details on which engaging teaching strategies to use

(g) Higher-level codes for PDs with sessions to learn about sustainability issues
• Sessions on learning about local sustainability issues
• PDs on ESD should include learning about sustainability issues
• PDs on ESD with session on sustainability and on issues
• PDs on ESD with access to concise videos on mechanics of sustainability issues
• Participants co-create ILPs right after PD sessions of sustainability issues

(h) Higher-level codes Optional PDs on ESD rather than imposed
• Optional PDs as a strategy to reach all teachers
• Optional as a way to support current passionate teachers
• Optional as a way to respect participants' requests to select trainings that suit their needs
• Optional to ensure that learned teaching strategies and methods are actually used
• Optional as a way to get teachers not passionate on IE on board

4. Line of inquiry 4: applied elements from the PD

4.1. ESD learning goals used during co-design of integrated lesson

(a) Higher-level codes for rationale to use local citizenship
• Local examples to create engaging lessons
• Connections between issues happening abroad with local issues
• Local content is key for empowering education
• Learning activities that allow students to see or experience an issue

(b) Higher-level codes for desired elements from local citizenship
• Include local contexts and spaces within learning activities
• Use local community as starting point to envision solutions
• Use topics that students can connect to fosters engagement
• Propose feasible actions and solutions to local issues as part of activities

(c) Higher-level codes for desired elements from critical thinking
• Give students opportunity to wonder about the causes of an issue

- Give students opportunity to explore and learn about the causes of an issue
- Ask questions that provoke wonderings rather than directly giving information
- Ask questions to guide analysis rather than directly explaining
- Ask questions to guide student-led analysis and critical discussion
- Give students questions to help them analyze content rather vs directly explaining it
- Give students content that promotes wondering and analysis vs memorization

(d) Higher-level codes for rationale to use sharing personal values
- Opinion activities are engaging
- Action-oriented activities are relevant to students
- Student-led activities engage learners of all academic abilities
- Student-led activities are engaging and relevant for all learners
- Value in student-led activities

(e) Higher-level codes for desired elements from sharing personal values
- Include student-led activities to explore curiosities regarding sustainability issues
- Time for student-led activities to investigate a sustainability issue
- Action-oriented learning weaved within opinion focused activities
- Activities that allow students to propose ideas for school-based or home-based actions
- Student-led learning vs teacher focused explanations
- Student-led activities
- Allow students to select readings based on their interests

(f) Higher-level codes for desired elements from systemic thinking
- Include analysis of content from a systemic focus vs memorizing content
- Engage students through systemic analysis vs teacher-focused explanations
- Include visual activities to allow systemic analysis of the effects of climate change

(g) Higher-level codes for rationale to use co-learning
- Co-learning engages students in group discussions
- Co-learning creates learning culture that welcomes curiosities and interests from all

(h) Higher-level codes for desired elements from co-learning
- Analyze content together to co-create explanations and understandings

4.1. ESD learning goals highlighted after implementation of the integrated lesson

(a) Higher-level codes for desired elements from sharing personal values, ideas, and opinions
- Guided independent research work combined with providing opinions is highly engaging

- Activities that allow the students to identify issues that have direct impacts in their lives
- Activities that guide versus impose learning engage all profiles of students

(b) Higher-level codes for rationale to use sharing personal values, ideas, and opinions
- Students produce high quality work through activities that honor their unique ways for finding information and providing their ideas
- Students contribute and are engaged when they can voice their ideas and opinions
- Positive impact of activities that allow students to learn through relevant content

(c) Higher-level codes for desired elements from local and global citizenship
- Learning content that showcases young people as change agents
- Lessons that explain issues while also showcasing how students can make a difference
- Lessons with content that shows students how they can take feasible actions
- Teaching about an issue through content that students find they can connect to their lives
- Lessons with content related to local communities and environments

(d) Higher-level codes for rationale to use local and global citizenship
- Integrated lessons provide content that students connect with due to the relevancy to their lives
- Lessons with relevant content allow students to see learning as applicable

(e) Higher-level codes for emphasis on using empathy
- Content about the impacts from issues should be paired with spaces to share how students feel from learning about these issues
- Fostering empathy is key, but it needs to be paired with always checking how students are feeling
- Content about the consequences of issues will generate emotions, from empathy to anger
- Content about the consequences of issues will generate emotions, from empathy to anger
- Content about sustainability issues generates genuine concern and care in students
- Fostering empathy and care needs to include learning how to act on an issue
- Importance of teaching about issues always hand in hand with learning for that issue
- Only teaching about the consequences of issues is overwhelming and paralyzing for students
- Learning about an issue must be done through content about the actions being taken to address the issue
- Hope and action are more powerful tools for fostering care and empathy than fear

(f) Higher-level codes for desired elements from co-learning
- Lessons that allow students to share and teach classmates and teachers about knowledge earned outside the classroom
- Resources that expose students to new or unfamiliar environments as a means to foster empathy

(g) Higher-level codes for desired elements from curiosity

- Learning content that sparks students' curiosities
- Learning content on new environments that spark curiosities and engagement
- Lessons that provide space for students to share their curiosities and wonderings

Appendix C

A. Integrated Lesson Plans Co-designed by participants

A.1. Integrated Lesson Plan: Participants A & B

Lesson Plan 4th Grade
May 8th-June 8th
Subjects: Science 4,-Earth and Human Activity
   Reading, Opinion Writing
   Mathematics, Multidigit operations

Week 1 (May 8th-12th)

Day 1.
Provocation Activity: Picture Slideshow- Before and After-15min
- Teacher shows slideshow.1 which contains pictures of natural environments from many years ago and from today.
- The main goal is to activate inquiry and curiosity on WHY the shown scenarios are different today. Guiding questions can include:
  - What are the main differences from picture 1(before) and picture 2(now)?
  - Do you know in which continent and country this place is located?
  - Has this place changed because of forces of nature or because of human activities?
  - Can forces of nature become stronger and therefore more destructive because of human activities?
  - What type of resources do you think this environment gave humans when it was pristine (as seen on picture 1)?
  - How do you feel when looking at the images? What else would you like to know?
- As students provide their answers, the teacher can collect these on a poster, the board or a jam board.
- The provided answers are discussed and an exploration of the answers is developed to guide students into the next step.
- The teacher will conclude with an explanation on how climate change is the causing factor for the degradation in each showcased environment.

Climate Change Overview-25min
- The teacher asks if anyone knows what is climate change, what causes it, and what are consequences from it. Answers can be collected on the other half of the board/poster/jamboard.
- To provide a more thorough explanation of climate change, the teacher shows video.1.
- The teacher explains that while watching the video, everyone needs to be checking for the answers to the questions written on the board.

- As the video is played, it is expected that students raise their hands when they have an answer to one of the questions; if no student raises their hand, the teacher needs to pause the video to ensure that piece of information is understood.
- Once the entire video is played, the teacher asks for volunteers to explain in their own words what is the main understanding they have from the video.
- The teacher reviews the answers to the guiding questions. The main goal is that students can connect how climate change affected the scenarios. showcased through the slideshow.
- Important: explain to students that through the next weeks they will be learning about solutions + people doing work to tackle climate change and also how they can help!
- To consolidate understanding on greenhouse gases and climate change, the teacher asks students if they know how a greenhouse (vivero in Spanish) works. Students are invited to draw their answers and a volunteer can shared theirs on the board. The teacher explains that as the mesh that covers a greenhouse, Earth's atmosphere has gases that act as that mesh, almost like a blanket. The teacher at this point can open GHG.pdf to guide the discussion.
- BEFORE moving onto page 3 of GHG.pdf, the teacher needs to ask the question: so what do you think is the problem with greenhouse gases? What did the video say about where they come from? The goal is for students to reach to the consensus that is from human activities that there is an increase in the natural amounts of GHGs, therefore their "blanket" or "greenhouse" power is increasing, hence making Earth warmer.
- Page 4 allows the teacher to summarize some of the main effects of increased GHGs and therefore of global warming, which include climate change. It's important that the teacher highlights that climate change is a consequence of global warming. You can also use/PRINT GlobalWarming.pdf and have volunteers read sections to consolidate knowledge on the consequences of global warming.
- Page 5: if there's time. If not these will be covered on day 3.

If there's time or an extra activity needed: the teacher requests students to brainstorm (individually, pairs or small groups) if they have ever heard their parents/family members talk about a natural environment that has changed because of climate change or human activities ;or if they know of a place that has been altered by climate change.

Day 2.
Introduction to Natural Resources-10min
- Students are requested to draw 3 examples of what they think is a resource that is provided by a natural environment (local or from anywhere else). The teacher should remind the students the concept of natural environment if considered necessary (images from local environmental can be shown: underwater kelp forest, Yosemite's forests, local river).
- Volunteers share their drawings and the teacher writes key words-ideas from these answers to co-create a "definition" of natural resources. This definition should include the key idea that there are renewable and non-renewable resources.

Natural Resources-30min
- The teacher uses PPT.1 to dive deeper into the topic of natural resources, renewable and non-renewable resources.
    - Slide 3: have stations so small groups of students work on each station; each station can have the task printed out (tent folded paper placed in the middle).

- Slide 4: the teacher provides an example of good management of natural resources and guides the formulation of 3 ideas for good management of trees that are commercially grown for wood as a building material.
- Slide 8: in pairs, or small groups, students are tasked with categorizing the printed cards into the 2 categories (renewable and non-renewable): *PRINT: slide 18 of PPT1 + sortcards.pdf.
- Once all the students have finished sorting, the teacher goes over each category by using slide 18 and adding the correct resources to make sure everyone understands how each resource is categorized. A discussion on fish stocks and trees should be encouraged because even though these are renewable, the rate at which we are consuming/extracting these is outpacing the natural rate to repopulate fish populations and forests.

Day 3.
Non-Renewable Resources-45 minutes
- The teacher asks students if they can mention/remember the non-renewable resources that were categorized on the previous lessons. The goal is to have the answer on: coal, natural gas, petroleum, and minerals. The teacher can showcase slide 1 from PPT2. If students answer trees and fish as well, consequent to the discussion from last class, then it's important to recognize this and further highlight that commonly non-renewables are not considered to include trees and fish.

- Slide 2: the teacher will explain that coal, natural gas, and oil (also known as petroleum) belong to the group of non-renewables called Fossil Fuels. Their name is because of the natural process through which these resources are made. Through video 2 (play until minute 3), the teacher will explain the process that made fossil fuels. A video guide can be given to keep students engaged.

- Slide 3: students are assigned with reading (in pairs or small groups, or through a reading guided by the teacher) fossilfuels.pdf which focuses on how each fossil fuel is made, how it is extracted, and the dangers/effects from each type of extraction. In pairs/small groups, students are tasked with writing 3 questions based on the content, pretending they are the teacher. The questions are mixed and random questions are pulled out so the class can answer these together to reaffirm the understanding on fossil fuels. Is important that the class discussion highlights how each fossil fuel is extracted and the dangers and negative consequences from these extraction methods.

- Slide 4:
    - The teacher reinforces that fossil fuels are burned to produce energy (each one through a specific process) + in the US 78% of the energy is produced by burning fossil fuels. The teacher uses video.3 to further explain the process of burning coal to produce electricity. Video.4 can be played from minute 1 on onwards to explain how oil is transformed into gasoline.

- Slide 5: After watching both videos, the teacher assigns students to research one of the following questions in small groups. Each group is handed their section of guiding questions in the researchsummary1.pdf:
    - Other sources for producing energy in the US?
    - Example of a country in the world that uses clean or renewable energy; the name of the renewable energy?
    - Example of a clean source for running vehicles?

- 2 examples in the US of negative effects from burning coal to produce energy?
- 2 examples in the US of negative effects from extracting oil?
- Once each group presents, the answers are gathered by the teacher and the students can complete their researchsummary1.pdf with the teacher's guidance.

Week 2 (May 15th-19th)

Day 1.

Part A. Oil and plastics- 15min

1. In a roundtable, the teacher asks if anyone knows about another use for oil, besides it being refined/transformed into gasoline for transportation. The conversation needs to lead to the answer: oil is used to produce plastics!

2. Slide 1 from PPT3: explain that most plastic can only be recycled two times. After that, plastic is either burned, which releases GHGs, or it breakdowns down into smaller pieces that are carried away by the wind and the rain. In addition, only certain types of plastics can be recycled along with the fact that not all people and cities recycle properly. This causes that only 91% of plastics consumed in the world are NOT recycled.

3. Slide 2 from PPT3: the teacher explains that they will watch V3 to understand how plastics are made (play until 3 min 38sec). As the video is watched, key vocabulary and concepts are written the board-notebooks-discussed by the teacher.

4. Slide 3: The teacher explains that using a non-renewable resource- oil to make plastic items that we mostly only use one time is neither effective or sustainable and shares the facts included in the slide. She asks students if they know/have read/have learned somewhere about innovative ways to either discard plastic or make items with a material that is durable like plastic but that doesn't have the negative consequences. The answers are gathered on the board-poster and the teacher reminds students that the key is for us humans to act (small and big) on issues like plastic pollution. That implies creating new materials to replace plastic made from oil and find ways to degrade plastics quickly and without creating microplastics.

5. Slide 4: the teacher explains that there are many efforts underway to succeed in these two needs; the remaining of V3 (from 4min onward) is watched to introduce students to innovations on plastic management and bioplastics. It is recommended that when each innovation is showcased, the video is paused so the teacher can explain vocabulary or concepts that might be new to students.

Part B. Innovations and Natural Resources in SB-30min

6. Slide 5: The teacher assigns students in small groups to work in a rotation through stations. Each station will have the following tasks that need to be completed a group:

Station A: students draw a natural place in SB that they enjoy/care about. The drawing needs to identify/label 3 natural resources and include a short description/sentence on how each resource is used by humans, plants, animals or by all.

Station B: an iPad shows pictures from Gallery1.pdf. Students have to pretend that they work for a magazine and that their job is to write a short sentence describing each picture by using what they learned from V3.

Station C: students are handed a copy of ChewOnThis.pdf. Each student has to explain which of the innovations they watched in V3 and/or just read about is the one that excites them the most and why.

Station D: students have to research the degradation time of 2 plastic items that they regularly use at school or at home.

7. Volunteers share their answers.

*Mathematics period-if you have the space/time: complete after day 1 of this lesson plan. 30 minutes?

1. Students are tasked with watching V4 and while they do, they have to write down as many numbers that are showcased in the video. V4 should played until 1'13''.

2. The teacher asks for volunteers and together all the values/numbers included in the video are written down (on the board, poster, type and screened). In addition, the teacher asks for volunteers to share their research results from Station D-day 1-week 2. If this station was not done, then students can be tasked with completing a short research (5 min max) on the degradation time of 2 plastic items that they regularly use at school or at home. The goal is to have on the board/screen at least 10 different numbers, labelled so students know what each value represents.

3. The teacher in addition shows Facts.pdf as values within it will be needed in the upcoming steps.

4. The teacher explains that they will be doing a series of calculations, as if they were in charge of a project that has to determine the impact of plastic items on the well-being of green spaces in SB. For that they need to complete some additions, subtractions, multiplications, and divisions.

5. The teacher has to write/screen the following exercises and complete the missing values with numbers that are on the list that was co-cerated in step 2:

a. If 5 students from HE Elementary use 1 plastic bottle during one day, how many years would all those bottles need to degrade?-This exercise uses the value/data from V4 at 34seconds.

b. Turn to the classmate sitting next to you. Add the time for each of the items you researched during Station D. What is the collective time, in days, needed for all those items to degrade?

c. What is the time difference, in months, between the degradation time of paper towel and a plastic bag?-This exercise uses the value/data from V4 at 34seconds.

d. If there are ___number of students attending HE Elementary and each one did not use during one week (select item from student 1), (select item from student 2), (select item from student 3), and (select item from student 4), how many years would nature be spared from dealing with the microplastics produced during the combined degradation time of these items?

e. How much water is needed to produce the 2.5 million bottles of plastic that are consumed every hour by US citizens?-This exercise use data from Facts.pdf

f. Based on the results from exercise e, what is the equivalent of that result in number of showers if the average shower uses 15.8 gallons (59.7 liters) and lasts for 7.7 minutes.

g. If 0.3 ounces of plastic are needed to make an average plastic bottle and 5 ounces of carbon dioxide are emitted as a greenhouse gas for every ounce of plastic used in a bottle, how much carbon dioxide would have been produced if the whole 4th grade class bought 1 bottle during 1 week?

Day 2. Environments

Part A. Introduction to the concept of environment-15min
6. Using PPT 4, the teacher shows slides 1 and asks students if they know what the term environment means. An exploration of their answers and ideas is developed.

7. Slide 2: the teacher celebrates the answers provided and explains the definition for environment shown on the slide: a region (small or big) and all the non-living factors and conditions in that region that living organisms are interacting with and are affected by.

8. Slide 3: to deepen the explanation of environment, the teacher goes through the diagram with the students and allows them to identify more non-living factors.

9. Slides 4-6: the teacher goes over the examples to consolidate understanding of what constitutes as an environment and the key idea that an environment is defined by its different conditions and factors and how living organisms are affected + how they are responding to and interacting with these. For each example, the students need to lead the process of identifying the labels marked as questions.

10. Slide 7: students are proved with the question: are the factors within an environment examples of natural resources? If needed, the teacher can bring up the definition for natural resources that was co-constructed during week 1.

Part B. Environment Dynamics-30min
11. Slide 8-10: the teacher goes through each slide to further explain how factors in a physical space/region affect living organisms and how living organisms respond (or are incapable of responding) to changes in "normal" factors or conditions within their environment.

12. Slide 11: together and guided by the teacher, the students identify and define a natural environment in SB. Once it is identified, in pairs or small groups or as a class, students have to research and:

h. Identify the main physical factors that create living conditions for the animals and plants.-One of these factors should be rainfall.

i. Identify a recent drastic change in a physical factor that affected the animals and plants in that environment.-Ideally, it will be the recent increased rains and thus floods.

j. Explain if they think the plants and animals had time to respond or adapt to that change.

k. Their thoughts on: what caused the physical factor to drastically change.-Ideally they will make the connection with climate change as a driver of changes in local rain patterns and intensity of rainfall.

l. Their thoughts on: if humans can predict some drastic changes in physical factors in environments they live in (for example their city)and therefore we can take precaution actions like canceling school during rainy days or buying extra food, do you think we also have a responsibility with the plants and animals that don't have the ability/technology to predict drastic changes, like the heavy rains we had this past winter? If we do have a responsibility, if you were senator Limon, what would you do to help the communities of plants and animals that are affected by drastic changes like heavy rains in an area where heavy prolonged rains are not common?

Day 3. Ecosystems

Part A. Ecosystems-25min
1. The teacher showcases slides 1-4. From PPT5. The teacher provides a general description of each ecosystem (without using the term ecosystem yet).

2. Students are grouped and provided with a copy of each slide 1-4. They are tasked with brainstorming, to then share with the class:
   - the type of animals that they think live in each place,
   - the types of plants
   - non-living elements for each slide.

3. Using the students' input, the teacher types on each slide the animals, plants, and non-living elements. *see slide comments for the types of animals and plants

4. Slide 5: The teacher asks, what do all these places have in common? The goal is that students are guided to:
   - Identify that there are living organisms and non-living elements,
   - Identify that there are interactions amongst living organisms
   - Identify that there are interactions between living organisms and their physical environment.

5. Slide 6: the shared answers from slide 5 are collected on the board (*print slide 6 on a large poster size paper) or type on the slide under 4 categories (also, it would be engaging if students are given a copy of slide 6 and they have to write the answers as the teacher collects them):
   - types of animals
   - types of plants
   - other living organisms (like kelp-it is an algae)
   - physical elements

351

- interactions: this last category might be the hardest to understand so the teacher can include 2 examples to guide students and/or use slide 7 (e.g. preying on an animal, eating a plant, using the sun to produce sugars, using a tree as a home, absorbing nutrients found in the dirt, using bushes to camouflage)

6. Slide 8: next the teacher invites volunteers to provide their own definition for all these places. "If you showed all these places to the 1st graders at HE, what would be a definition you would use to describe all these places?".

7. Slide 9: teacher explains that all these places are called ecosystems which are: a community of interacting living organisms and their physical environment. The teacher should also ask the questions on the slide to highlight that:
   - Humans are also animals that are part of ecosystems
   - Humans can interact with other animals, plants, and physical elements in ways that hurt/damage the living things and even whole ecosystems.
   - Living organisms always interact in balanced ways

8. Slide 10-16. The teacher explains that there are 2 general categories of ecosystems: terrestrial and aquatic, and presents general examples under each category.

Part B. Ecosystems in SB and California-20min
1. Slide 17: The teacher asks students to individually describe or draw an example of an ecosystem they know about or that they visited. The example has to be from California or SB. The definition of ecosystems should be visual so students can use it as a reference.

2. Either the teacher selects 2-3 examples or 2-3 volunteers share their answers. For each example, the teacher guides an analysis to confirm if the example is indeed an ecosystem; if not, together, the class will identify how can the example be modified so it constitutes an ecosystem. The analysis questions can include:
   A. Are there interactions happening between species of animals, between animals and plants, and between species of plants?
   B. How are animals using and/or benefiting from natural resources and physical elements?
   C. How are plants using and/or benefiting from natural resources and physical elements?

3. The teacher uses slides 18-19 from PPT5 to describe examples of ecosystems that are native to SB and CA. The slides include guiding questions, which can be answered as a group or assigned individually or in small groups.

Week 3 (May 22nd-26th)

Day 1.

Part A. Services provided by Ecosystems-The Kelp Forest of California: 45min

352

1. Slide 1,2 PPT8: the teacher explains that as they have been studying, ecosystems provide home, food, shelter for many living organisms.

- In addition, ecosystems also benefit humans in many ways. These benefits are called ecosystem services.

- For example, a park provides a free space where humans can enjoy the outdoors, children can play, families can spend time together: all these things make us feel happy, so this would be a recreational or emotional service provided by the park.

- Another example: many insects, like bees, butterflies and wasps, move pollen around plants. When pollen from one plants is taken by an insect to another plant, seeds will be formed. This is a job that insects do from which humans benefit: seeds produce plants and different types of plants produce foods we eat.

2. Slide 3: the teacher shows a short video of the kelp forest, explaining that the kelp forest is a very special ecosystem we have in the coastal waters of California. The teacher tells the students that first they will 'immerse' in the kelp forest and then they will read together about the kelp forests. She asks them to keep in mind that kelp forests perform many services that are extremely important for humans. We need kelp forests to survive!

3. Slide 4: the teacher invites students to write one sentence or one word to describe their feelings or emotions about what they just saw about the kelp forests, which are part of California and our natural community in Santa Barbara. Answers can be shared.

4. The teacher reads KelpForests.pdf (students can have a copy to follow along; there is also a Spanish version). She explains to students that as she reads, she wants students to underline or circle any detail that is specific to a job or service-something the kelp forest does- that is very important for humans.

5. Once the reading is done, students are assigned to work in pairs and they have 5 minutes to identify one service/job performed by kelp forests. Each pair has to explain to the class their answer. As answers are provided the teacher completes the empty spaces in the poster ServicesbyKelpForests.pdf (print in large/poster paper). A discussion of all the identified services should be developed to ensure everyone understands the key services provided by kelp forests:
a.   Capture and store carbon from carbon dioxide ("remember one of the 2 worst greenhouse gases?")

b.   Protect our coasts and shorelines, as kelp forests act as gentle barriers that slow down big ocean swells.

c.   Provide a home to baby fish, which then grow to become big fish, which are consumed by humans.

d.   Provide a home to many marine mammals, invertebrates, and other organisms: all these organisms play a role in the ocean, keeping the ocean healthy. Without a home, these organisms would die and so the ocean would lose very important helpers that keep the ocean healthy.

e.   When the Chumash inhabited the Channel Islands and the coasts of California, the kelp forest was a key provider of natural resources for them. The kelp forests became part of the culture of the Chumash. As the original land owners of Santa Barbara and the Channel Islands, the Chumash

culture is part of our culture, which includes loving and protecting the kelp forest. This is a spiritual service, as the kelp forests reminds us that we need the ocean and we cannot strive without it.

Day 2.
Dangers and Threats to Ecosystems-The Kelp Forest of California: 45min

1. The teacher invites students to share their thoughts on the importance of ecosystems to all living organisms, including humans. The aid students, slide 1-2 PPT8 can be shown. The goal is to have students remember-collect the knowledge acquired through the previous days/lessons on ecosystems and natural resources. This is a short 'warm up' activity.

2. Slide 5: the teacher explains that ecosystems on Earth are threatened at different degrees by the activities conducted by humans. For example, even the places that are protected are suffering from air pollution; but there are many ways in which individuals and groups of people can do and are doing things to restore and protect ecosystems.

3. The teacher reads ThreatsKelpForest.pdf (students can receive a copy to follow along).

4. Slide 6: the teacher shows the pictures to tell the story of the new protected area created in Patagonia, Argentina thanks to the amazing work that a small community did:
a. Picture 1: click on to take you to Google Maps and see the location.
b. Picture 2: explain that this is a community (the one they just saw on Google Maps) where there are massive kelp forest such as there are in California.
c. Picture 3: explain these are people that are part of the community that worked together to convince the government of Argentina to protect the kelp forest that grows in their community's coasts and that is key for all humans and the loving organisms that also depend on them. This community worked with scientists and lawyers to prove to the government how important and needed it was to create a protected area that included the kelp forest outside their coasts: they succeeded and the Parque Nacional Patagonia Austral has been recently created!
d. Picture 4: Kelp forests at the Area Protegida Península Mitre.

5. Slide 7: the teacher explains that as with the community they just learned about, in California we also have some areas in our coasts that are protecting kelp forests (use map with red arrows to explain this). But that there are many other areas that are not protected and should be protected: this means that no fishing can take place in these waters, boats that drag nets to catch fish cannot be in these areas, and so the kelp forests are keep pristine.

6. In small groups, students have to prepare 3 reasons to give to the teacher, pretending that the teacher is California's Governor and that they are a group of scientists, lawyers, and citizens concerned about unprotected areas of kelp forests. What would you say to California's Governor to make your case about protecting more areas of kelp forests along the coast of California?

• Each student in each group needs to present a reason. Each group needs to choose the order of their speakers and practice.

• If there is time, groups can present this day or conduct the oral mini presentations on day 3 (5min per group).

*An alternative to slide 7: during writing workshop, students individually write their opinion about the importance of protecting kelp forests, using the services provided by the kelp forests as evidence (have the ServicesbyKelpForests.pdf visible). They have to imagine they:

a. are writing the speech for a person that will be meeting with California's Governor, so their job is to make a great case for protecting more areas of kelp forest or,

b. are writing a speech they will make to educate HE students about the magnificent and important kelp forests of California.

Day 3.
Global Warming and Ocean Acidification

Part A. Global Warming Review: 5min

1. The teacher can use GHG.pdf to conduct a review of the greenhouse effect and how it's connection to global warming.

2. The second to last page on the GHG.pdf should be reviewed to remind students that the greenhouse effect causes global warming along with other issues like ocean acidification and climate change (extreme changes in the normal weather patterns across the world).

Part B. Demonstration of CO2 production and Ocean Acidification: 20min

1. The teacher explains that:

• She will demonstrate how CO2 is produced through a reaction that combines baking soda and vinegar. The reaction can be written on the board simply to help them visualize how a reaction is written in chemistry.

$$NaHCO_{3(s)} + CH_3COOH_{(aq)} \longrightarrow CO_{2(g)} + H_2O_{(l)} + Na^+_{(aq)} + CH_3COO^-_{(aq)}$$
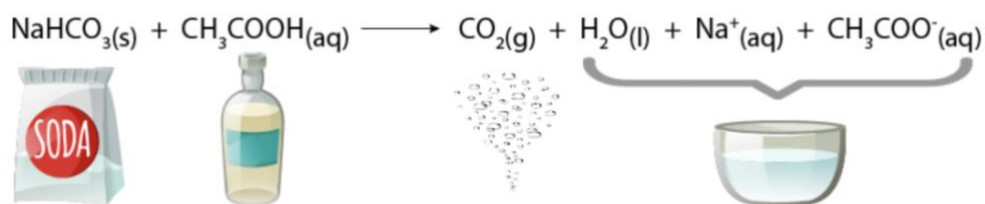
• The teacher explains that the experiment is to help them visualize a gas, as gases cannot be touched or felt, but can be smelled and sometimes be seen through experiments like the one she will conduct.

• The teacher reminds students that they will see how CO2 is made and that CO2 is one of the greenhouse gases produced by burning fossil fuels ("remember, non-renewable resources").

2. The teacher conducts the experiment for producing C02:

A. Pour 1.5 cups of vinegar into a bottle with a small neck.
B. Measure out 1 teaspoon of baking soda and drop it into a balloon. Be sure that the baking soda drops into the large area of the balloon as much as possible.
C. Stretch the balloon around the neck of the bottle (already filled with vinegar) BUT BE SURE to hold the top of the balloon over the side of the bottle so the baking soda remains in the balloon.
D. Stand the balloon upright being sure to hold it around the neck of the bottom and allow the baking soda to drop into the bottle — the reaction will take place quickly and the balloon will begin to inflate.
E. See how the mixture will bubble as it creates CO2.

3. Asks students if they know any other process or reaction that makes CO2, besides burning fossil fuels: the answer should be breathing! Show students this animation, to remind them that plants and algae (like kelp forest) take CO2 (produced from burning fossil fuels and from our breathing) and convert it into oxygen! Do highlight that breathing does not add dangerous amounts of CO2, it human activities that are producing HUGE amounts of C02 which is adding to the atmosphere and thus increasing the natural greenhouse effect.

Materials and Tools for C02 demonstration:
• Baking soda
• White vinegar
• Plastic bottle
• Ballon
• Measuring spoon

4. The teacher demonstrates how CO2 mixes with ocean water and creates ocean acidification (see this video to help you understand how to conduct the demonstration):
A. Put on your safety goggles.
B. Pour 1 1/2 fluid ounces (40–50 mL) of acid-base indicator solution into each of the two clear plastic cups.
C. Add 1/2 teaspoon (2 grams) of baking soda to the paper cup.
D. Tape the paper cup inside one of the clear plastic cups containing the indicator solution so that the top of the paper cup is about 1/2 inch (roughly 1 centimeter) below the top of the plastic cup. Make sure the bottom of the paper cup is not touching the surface of the liquid in the plastic cup—you don't want the paper cut to get wet. The second plastic cup containing indicator solution will be your control.
E. Place both clear plastic cups onto a sheet of white paper and arrange another piece of white paper behind the cups as a backdrop (this makes it easier to see the change).
F. Carefully add 1 teaspoon (about 5-6 mL) of white vinegar to the paper cup containing the baking soda (image below). Be very careful not to spill any vinegar into the indicator solution. Immediately place a Petri dish over the top of each plastic cup.
G. Position yourself so you are at eye level with the surface of the indicator solution and look closely. What do you see? Where is the color change taking place?
H. After a few minutes have passed, you should notice a distinct color change at the surface of the liquid. As you continue to observe the reaction taking place, the liquid in other parts of the cup will also begin to change color.

I. This activity illustrates how the diffusion of a gas into a liquid can cause ocean acidification. After a short time, the surface of the indicator solution changes color: from blue to yellow. This color change indicates a pH change caused by the diffusion of CO2 gas into the liquid.

J. Is important to explain the concept of pH: you can show the phScale.pdf to explain that this is the range that exists in nature, some things are acidic and some things are alkaline——use the pdf and the items to illustrate that the ocean is becoming more acidic-from its current pH value (8.2) is going to a lower value (as it becomes more acidic).

Materials and Tools for Ocean Acidification:

• Safety goggles
• An acid-base indicator such as bromothymol blue, diluted with water: 8 milliliters bromothymol blue (0.04% aqueous) to 1 liter of water
• Two clear 10-oz plastic cups (the tall ones)
• Paper cups, 3-oz size (you'll only use one in the experiment, but keep a few extras at hand just in case)
• Masking tape
• Plain white paper
• Permanent marker
• Baking soda
• White vinegar
• Two Petri dishes to use as lids for the plastic cups
• Graduated cylinder or measuring spoons
• Gram scale or measuring spoons

Part C. Student Investigation: Effects of Ocean Acidification-20min

1. Effects of OceanAcidification.pdf: the teacher explains that ocean acidification, the process that she just demonstrated in a cup, has severe consequences on marine life. One of those effects is that it weakens corals and the shells of organisms like clams and oysters.
2. The teacher explains that they will be conducting an investigation to see the effects of ocean acidification on marine organisms that have shells:
A. Students will work in pairs or groups of 3. Each group will have 3 glass jars/containers and 3 shells of the same type.
B. Groups will label with a marker 3 shells: shell #1, shell#2, shell#3.
C. Groups will measure the weight of each shell and record on page 1 of StudentInvestigation.pdf
D. After weighing the shells, the students will fill each jar with ocean water. Teacher:
-from the large gallon container with ocean water, distribute into 1L bottles and give each group a bottle.   -make a mark at the same height on each jar or give students a cylinder and ask them to fill each jar with the same amount of water (you decide based on the glass container you will provide-it should be enough water to cover the shell).
E. Label each jar: jar#1, jar #2, jar #3

F. Put 50ml of vinegar into jar#2 and 100ml of vinegar into jar#3. Record the amount of vinegar on page 2 of the StudentInvestigation.pdf.
G. Place shell#1 into jar#1, shell#2 into jar#2 and shell#3 into jar#3.
H. Ask students to discuss with their group their hypothesis and write it on page 3 of StudentInvestigation.pdf: what do they think is going to happen with each shell after 4 days immersed in the water, based on the fact that each jar has different amounts of vinegar?
I. Class Hypothesis: the more vinegar, the more acidic the water and the more damaged the shell. The teacher should discuss the class' hypothesis after all groups have talked about theirs.

Materials:
Shells
Scale
Jars
Graduated cylinder
Markers

Week 4 (May 29th-June2nd)

Day 1.

Part A. Student Investigation-Ocean Acidification-20min

1. After at least 3 days since the shells where immersed in water: students-in their investigation groups- observe each jar and make comments on page 4 of the StudentInvestigation.pdf.

2. The shells are removed and weighed. Groups have to record the new weight of each shell: they have to remove each shell and weigh, one at a time, so they know from which jar the shell came from. The weighs and any additional observations on the condition of each shell are recorded on page 4 of the StudentInvestigation.pdf.

3. Students compare their hypothesis with the observed results and prepare for a group discussion, through which the teacher reiterates the effects of ocean acidification: the more vinegar, the more acidic the water, the more damage on the shell—> the damage is observed as less weight, cracks, holes.

4. The investigation is closed through the discussion around the idea: factors can negatively affect ecosystems; often, when this happens organisms do not have enough time to respond to the changes in their environment and therefore they can suffer severely. The investigation on ocean acidification illustrates how a change in the pH of the ocean is caused by a factor (CO_2 produced from burning fossil fuels) that in turn is causing a change that is so severe and so quick that organisms with shells and coral reefs do not have enough time to respond—> adapt—->make generations of their kind that somehow can survive in more acidic waters (for example, shells that are thicker—>but this requires a lot of time for the organisms to be able to produce offspring/new generation that has this beneficial trait/thicker shells).

Part B. Global Warming: Evidence from Science-10min

1. The teacher explains to students that Science is a key tool for helping us understand the effects of human activities. More specifically, scientists have been able to prove how greenhouse gases produced by human activities are causing global warming and how global warming is causing severe effects like climate change, ocean acidification, and melting of the polar ice caps (ocean level rising).
2. The teacher shows this video to further explain how scientists collect evidence/data to demonstrate the link between greenhouse gases produced by human activities and global warming.
3. Watch this video to show how scientists collect samples of the ice in the South Pole as part of research to prove that humans are driving global warming. Highlight: there are scientists, but also other people that are crucial for this type of research! Those that drive the snowmobiles, transport food, and the samples, also those that take pictures and videos and even the people that write about the work that is being done to help educate everyone on this work.

Part C. Opinion Writing (can also be done during the writers workshop)

1. Individually: write your thoughts on why everyone should know how science and scientists help us to understand why humans activities (like burning fossil fuels for transportation and energy) are the driving cause of global warming.

Day 2. Solutions to Global Warming and Climate Change-45min

1. Quick reminder of the connection between global warming and climate change + effects of climate change: for example extended droughts, hurricanes and storms stronger than normal.
2. Reminder: for every problem we always have the possibility to find a solution! There are many people, from scientist to activities, writers, engineers, teachers, students, photographers, and many many more that are doing great things to help reduce how much greenhouse gases we put into the atmosphere—>to tackle global warming and thus climate change.
3. Read aloud: InnovationsGlobalWarming.pdf. Highlight that these are examples of complex advanced technologies. Once completed, show the videos to some of the innovations just read about: here

4. Explain that they are now going to explore options to ways that they can help their families contribute less to global warming; they just learned about complex technologies, now they are gout yo learn about plausible actions to be taken at home! Many of these solutions are taken by kids everyday everywhere in the world1!Explore as a class this website and this website and allow students to give their opinions on which action(s) they would want to adopt at home/teach their families about/get their families onboard, what would be barriers/challenges to adopt one or more of these actions.
5. If there is time and they want an example of an organization that is working on plastic pollution across the world, and that was started by two young sisters when they where 12 and 14, play this video and explore their website.

Day 3. Expert Talk!-45min

1. Expert talk with Tadeo Ramirez (UCSB Ecology Ph.D student who studies climate change in flora).30min
2. Explain summative project to students: each will prepare an action strategy (drawing, a sign for a campaign/protest, flyer to place at school or give to parents, a video of them explaining their opinion-elevator pitch style, etc) to share their opinion on:

• What could be done at school or at home to help reduce our contributions to global warming?—MAIN PIECE-should be thought as something that can actually be developed, with the right support and resources, but still something plausible that they could see implemented.

• Why they want others to know about the actions they want to take to help tackle global warming and why others should follow their lead!

Each student should record their action strategy in a 1-2minute video simply to show what they produced and share in that way their opinion on What could be done at school or at home to help reduce our contributions to global warming.

Week 5. June 5th and 6th

1. Students prepare their ideas in writing about what could be done at school or at home to help reduce our contributions to global warming, including describing their action-strategy. If there is time they begin recording their strategy so this can be shared on June 7th.

June 7th:
1. Students share their action campaign/strategy.

A.2. Integrated Lesson Plan Participants C & D

LESSON 1. What is an ecosystem and interactions amongst elements of an ecosystem

ESD learning goals:
-Systemic thinking
-Critical thinking
-Local citizenship

-I would recommend editing intro activity 'Focus' from lesson 1 and use the below suggested version:

1. Write the word ecosystem on the board. Ask each student to individually write in a piece of paper what comes to mind when they hear the word ecosystem. Have the students keep their paper as they'll use them for an upcoming activity.

2. Show the students PPT 1. Provide a printed copy to each student.
   A. For each slide/page, have the students describe the different components they see. For those slides showcasing no ecosystems, allow students to identify what elements/components they see.
   B. As students identify what they see on a slide, categorize their answers under two titles you have on the board: living elements & non-living elements.

C. Give students time to write on each page the elements that are identified (they can either draw an arrow and ID as living or non-living, or create their own chart with 2 columns).

3. In teams, have the students create a meaning for the word ecosystem. Ask the students to look at their printed material for guidance and also to provide the prompts:
a. An ecosystem has…
b. An ecosystem can be found…
c. An ecosystem is…

4. Place the team definitions on a poster with the title "team definitions of an ecosystem".
5. Implement 'Explore' from lesson 1. I would recommend that:
    -Each student has their own graphic organizer and that you check that each student completes it.
    -Once the teams have worked on gathering their evidence, each student should rewrite-edit their initial definition of ecosystem, showing the growth of their individual understanding by applying evidence. Each student should name their paper and hand it over (students don't have to show/share this individual work).
6. Create a round table and guide a group discussion so the class can create a common definition of ecosystem through the construction of a visual map on a poster. Do this by:
A. Asking each student for a key piece of evidence/information they found (is important that each student contributes rather than by focusing on the teams').
B. As the answers are provided, write key words. Once everyone has contributed, have the students guide you so the visual map can be created by building sentences that use the key words (sentences for 'bubbles' or 'main ideas' of an ecosystem).
C. The discussion can also include that each team explains what their initial definition was lacking.

7. Ask students to pull out the printed material and:
A. Individually write if each example is an ecosystem or not.
B. Have volunteers share their answers and explain these by using the visual chart as a supporting tool ('this is not an ecosystem because there are only non-living factors and we said that ecosystems have living and non-living factors that interact and affect each other').

8. Transdisciplinary connection:
-What are the topics for grammar, reading, writing for that week?
    A. Students select one ecosystem from the examples provided in the print-out.
    B. Each student has to write X# sentences (grammar connection?) to explain:
  • How they think the living and non-living elements on their selected ecosystem interact with each other.
  • What could cause that one or more of the living and-or non-living elements disappear?
  • What would happen to the interactions if one of the living or non-living elements was removed/disappeared?

LESSON 2. Abiotic and biotic factors and their interactions

ESD learning goals:
-Systemic thinking

-Critical thinking
-Local citizenship
-Co-learning

1. Have a poster ready that has one column for the name of the ecosystem and following two columns (one for abiotic & one for biotic factors) (have enough lines for each of the ecosystems shown on the printed material plus two additional lines).

2. Ask students to take out the printed material from lesson 1. Guide the students so together the class can categorize the identified elements from each page into either the abiotic or biotic column in the poster. Provide a closing explanation on what are abiotic and biotic factors.

3. Ask the students to go outside the classroom and take a 10-15min supervised walk through the school's campus:
A. Students take a clipboard and a sheet that they have divided in two sections, one for biotic factors and another for abiotic factors.
B. Students take notes on each column as they see biotic and abiotic factors.

4. Once students have returned to the class, guide a roundtable to:
A. Share the factors that were identified for the school's campus and to categorize these in the poster.
B. Guide a student-led discussion to understand how the biotic and abiotic factors interact with each other.
C. Provide a closing explanation that ecosystems can be a combination of natural ecosystems that have been included into spaces built by humans. Many times, humans build their homes within existing ecosystems and so our homes become part of the abiotic factors and we become part of the biotic factors. In either case, abiotic and biotic factors are interacting.

6. Open PPT2 and ask students if they can think of a marine ecosystem that can be found in our local coast/Channel Island (slide 1). The goal is to guide students to the answer of the kelp forest (slide 2), but also include/type on the slide any other local marine ecosystem they mention.

7. Show Kelp Forest Video (slide 3): explain to the students that they will be observing an underwater video of the kelp forest in Limwu (Santa Cruz) island:
A. As they observe the videos, ask students what they think it's been showcased and guide them to identify the organism or abiotic factor that they are seeing. As this identification is done, have students complete T-chart Abiotic and Biotic Factors Kelp Forest as you write the information on the poster Abiotic & Biotic Factors.

8. Explain to the students that they will be working in pairs and that each pair has to come up with an explanation of the type of interaction that is being showcased in slides 4-8. Print these slides beforehand and give each pair a copy. Once every pair has completed their work, allow each pair to share at least 1-2 of their answers and make sure everyone has the correct answers on their printouts.

9. The roles of kelp forest:
A. Show slide 9 to explain to the students that kelp forests have many ecological roles as they are complex ecosystems. This will further help students to understand the concept of an ecosystem and

the way factors interact (today they will learn about 4 key ecological roles; during lesson 4, students will learn about the role of kelp forests as carbon sinks).

B. Have students work in pairs to research one of the following species including its scientific name, how the kelp forest supports it, and 1 organism they eat:
- 1 species of fish that lives in the kelp forest during their juvenile stage.
- 1 species of invertebrates that is supported by the kelp forest.
- 1 species of organisms that lives in the kelp forest and that is eaten by sea birds.
- The scientific name of the seals and dolphins that inhabit the kelp forests off the Channel Islands.

C. Each pair has to prepare the following to present to the class: one student writes the name of the species on the board and explains "Species name here likes to eat _____" to introduce the second student who assumes the character of the researched species to explain how the kelp forest is important to him/her (as the assumed species).

D. Use slide 10 to conclude the explanation that many species use the kelp forests as their home/part home.

10. Transdisciplinary connection:
-What are the topics for reading, writing, vocabulary for the week?
A. Have students read the article on Climate change and oceans.pdf, including watching the short video detailed in the reading. Provide the students with key guiding questions to guide their reading and to highlight content that is specific to:
- Human actions that generate greenhouse gases.
- How climate change is connected to global warming.
- How climate change is affecting the oceans.

B. Students write sentences to provide their own explanation on the two bullet points, by CONNECTION TO LA.

C. Student volunteers share their sentences during a group discussion to consolidate the class' understanding how global warming drives climate change and climate change has severe negative effects on global oceans.

LESSON 3. Producers, consumers and decomposers

1. Begin the lesson by asking students "What is kelp? Is it a plant, an animal, anything else?" Show a picture of a kelp stalk and ask guiding questions like:
- Does the green color hint what kelp is?
- Do you see a part (or a lack of parts) in the kelp stalk that can help you identify the type of organism kelp is?
- How do you think kelp gets its energy/food?

-The goal is for students to see how kelp does not have roots like plants, but it does have a similar green color as plants. While it is not a plant but an algae, kelp does the same process as plants. Remind students what that process is (photosynthesis) and provide/write on the board the key elements for that process, highlighting that both plants and kelp produce their food by using the energy from the sun.

2. Use Algae of the Kelp Forest.pdf to explain to the students the 4 types of species that live in the kelp forest that make their own food by using the energy of the sun:

-Giant kelp
-Red Coralline algae
-Bull kelp
-Acid seaweed

3. Explain to students that as they learned in the previous lesson, many other organisms live in the kelp forest. Students are given a color copy of Creatures of the Kelp Forest.pdf:
A. Students are asked to cut each of the squares.
B. In small groups (3 students) they have to categorize all the organisms in any way they like. You will have to provide some extra information on bacteria as they are not as 'evident' as decomposers as fungi are. Also, fungi, sea cucumbers, starfish, sea urchins, and other kinds of marine worms are decomposers in the kelp forest.

4. In a roundtable, each group shares the ideas for the categories they created. The goal is for the teacher to guide an analysis so the right interactions amongst all the creatures are explained so the 3 categories of producers, consumers, and decomposers can be identified. With the 3 categories written on the board, the teacher asks for volunteers to come to the board and place one organism under the right category (categorize all the organisms from the pdf).

5. Implement Lesson 5, section Explore. For question 10, use instead "look at the board and the organisms we have under each category, think of how it eats and thus its role". The end goal is that each team of 3 students has a chart with written descriptions for each category.

6. Provide the students with a print out of Categories.pdf . Have a large print out of this slide for yourself as well.

7. Discuss the student research (from their 3 column chart) on producers to:
A. Filter all the answers written by the student teams and as a class create 3-4 sentences that provide the key features of producers. Write those sentences on your poster (Categories.pdf) in the space under 'producers' and ask the students to do the same in their print-out.
B. Have the students circle in green all the producers in their print-out
C. Follow step A and B for the consumers (circle in red) and for the decomposers (circle in red).

8. Watch video Researchers Warn a Warming Ocean Threatens Giant Kelp Forests:
A. Give the students a video guide with key vocabulary used in the video; go over the video guide and ask students to pay attention for when each word is used/described so they can raise their hand when they hear it and together an explanation/definition can be created.
B. Play the video and complete the video guide.
C. Task students with writing a short personal reflection on their feelings on the key message provided through the video (broad habitat shrinking, it's forcing many species to find new homes).
D. Remind the students of the article on Climate change and oceans.pdf and the human driven causes of global warming. As a class, discuss how the students can adopt a new habit/way of acting that can help them as young citizens to reduce human driven causes of global warming.

LESSON 4. Kelp Forests as natural solutions to global warming

1. Remind the students of the different roles of the kelp forest that they learned through lesson 2. Explain that in addition, kelp forests also have a really important role, helping to absorb huge quantities of greenhouse gases, especially carbon dioxide. Due to this amazing ability, kelp forests are known as a nature-based solution to climate change (something nature has made to help control the overall temperature of Earth).

2. To better understand this role, introduce this short video. Discuss with the students their understandings on kelp forests as carbon sinks or a nature-based solution to climate change.

3. Explain to the students that kelp forests can be found in another regions of the world where the ocean has cooler temperatures, such as in the Patagonia, Argentina and Tasmania, Australia (show in world map). Emphasize to students that as citizens of one planetary community, is fundamental that they also learn about how kelp forests are being affected in other parts of the world. Followed, show this video. As the video is shown, paused when the following key concepts are explained, to allow a proper understanding   of   the   same:

• A
• B
• C
• D
• E

4. Read for the students the article Charismatic carbon. As this article contains some complex vocabulary, either provide an adapted version or create a guiding reading tool so the content can be properly understood. The main goals from reading the article are:
• Students are exposed to innovative thinking to propose creative solutions to address global warming.
• Students are exposed to the work of a local scientist and thus learn about paths to conduct impactful science to address global warming.

5. Ask students to write 1 question for Halley; support the students to ensure that each one asks something that is related to the article but also aligned to each student's curiosities and interests.

6. Conversation with Halley Froehlich.

7. Optional: explore this website as a cool, innovate idea that is currently being tested to help with sequestering (capturing) carbon just as kelp forests do.

8. Upcoming lessons-

Transdiciplinary lesson:Before introducing student-led research on a local sustainability issue, introduce the issue of sea otters disappearing-sea stars dying-sea urchin populations rising- kelp forests disappearing…

Discuss the role of kelp forests as carbon sinks as a way to introduce studying a local issue and the moving to the research part where students conduct their own investigation (they elect the issue by

using as a reference the study that was done guided by the teachers of the disappearing kelp forest and the connection with climate change).

LA-Science:
-Informational reading: quoting accurately, determining main ideas, be able to summarize the text relationships or interactions between two or more
Ideas:
-Have students read the article from Island Visions on Invasive Sea Urchins (scan the pages).
-Each student has to construct 3 questions pretending they are the teacher and provide the expected accurate answer: questions need to ask the reader to quote accurately, determine main ideas, summarize the text relationships or interactions between two or more
-The questions are given to a classmate and the answers have to be built by including what they read…

B.2. Lesson Plan # 2 Participants C & D

April 21st-May 3rd
Unit: Sharing the Planet
Subjects: Reading, Writing, Science
ESD Learning goals:
CCSS:

Friday 3-21st, 1:15-2:30pm

Acting for our Planet Film Festival

1. Students watch a series of short videos that focus on 5 sustainability issues, affecting SB, CA, and the world. The videos provide engaging information on the causes, consequences, and solutions to address each issue.
2. Using the video guide, students answer questions related to the videos and focused on fostering systemic and critical thinking.

Monday 3-24 to Friday 3-28

Reading block: 20 minutes

1. Practice reading strategies for STAR test: students are tasked with reading 3 articles that are related to a common theme under the umbrella of actions and solutions to address one of the sustainability issues showcased during the Film Festival.

Writing block: 45 minutes

1. Practice writing strategies for producing an opinion essay: students are guided in the production of an opinion essay related to the 3 articles they read during the morning block. The writing process

is focused at providing students with additional practice to master the skills they will need to produce an opinion essay during the STAR test.

Science block: 1 hour

1. Students are reminded of the importance of knowing about social and environmental issues that are affecting their community, country and the world, along with the importance of learning about those individuals and organizations that work to improve, solve, mitigate an issue.
2. The teacher refers to the issues showcased during the Film Festival to provide the students with a short explanation on the difference between a social sustainability issue and an environmental sustainability issue, with a reminder that many times a social issue overlaps with an environmental issue.

3. Students are requested to write in a piece of paper an example of a social or environmental issue happening locally (SB), regionally (CA), nationally (US) or globally. Papers are collected and the answers are read and discussed. The teacher can have a poster with 2 columns (social issue, environmental issue) and categorize under each column the issues showcased during the Film Festival and the answers provided by the students.

4. In a roundtable, students share how they feel with their newly acquired knowledge on the different people and organizations that are working in social and environmental issues (through the Film Festival and the readings). Emphasis should be placed on providing a safe space for students to share their personal values and beliefs; and to express their ideas about the different ways one can work within social and/or environmental sustainability. Students can also share if they know an example of a person or group working in one of the issues they learned about through the Film Festival. Individuals reflections can be collected on a second poster.

5. Students are tasked with investigating a social or environmental issue by using the research guide.
   A. The issue that each student will focus on will be selected individually, based on the student's interests, knowledge, and curiosities.
   B. The students can be inspired and guided by a list of social and environmental issues that will be shared by the teacher.
   C. The investigation will be completed throughout 5 Science blocks (from 24th-28th).

- Details on the investigation:
  - Set to culminate in an individual presentation on May 4th.
  - Format
  - Time for each student
  - Audienc**EC. PD on ESD**

C.1. Complete PD slide deck: https://tinyurl.com/5n946ncw

C.2. Description of PD

PD Session 1

Session 1 began with introducing the participants to the PD's main goal, specifically, to prepare them with the tools for successfully integrating learning about and for sustainability issues during formal classroom instruction. Session 1 was structured in two shorter portions, separated by a 15 minute break.

During the first portion of session 1, the concept of sustainability was introduced by using the anonymous answers provided by the participants through the in-take survey. The answers were briefly discussed and analyzed to highlight that the concept of sustainability is complex and multilayered. Following, in order to provide a more detailed historical account of how the concept of sustainability came to be, the participants learned about 1987's Brundtland Report. Emphasis was done on the fact that sustainability, as a concept and a term, has greatly evolved since its conception and as such it has varied definitions and even interpretations. A widely commonly accepted understanding of sustainability was presented, that is, that sustainability is a societal goal to exist as a species in ways that simultaneously restore and protect the natural state of environments, ensure social well-being, and promote fair economic models. Participants learned that rather than explaining sustainability with a strict definition, the central idea behind sustainability is a more encompassing approach to explain the concept. This central idea is that the decisions that we make and the actions that we take today will inevitably have an effect on the future well-being of all human groups, natural environments, & economies. Sustainability was further described as an overarching concept that includes three essential pillars. The first is the societal pillar, which includes elements such as individual rights, community rights, race, culture, and gender. The second is the environmental pillar, concerning marine and land environments, living organisms, natural resources, ecosystem services. The third is the economic pillar, specific to economic models, extraction models, and production models. A more recent fourth pillar recognized by many leading institutions, experts, and practitioners is the political pillar, which includes the processes to enact laws and regulations, governance, and elements within political systems.

Following the introduction to the pillars that shape the concept of sustainability, examples of social, environmental, and economic sustainability issues were presented. Social issues included gender inequalities; gender violence; racism; lack of access to potable water; violation of human rights; lack of access to quality education; child malnutrition; and poverty. Examples of environmental issues that were presented include climate change; biodiversity loss; deforestation; pollution of rivers; pollution of oceans; pollution of land environments; loss of marine keystone species; and species extinction. Economic sustainability issues that were explained include polluting production methods; unfair production models; destructive extraction models; unjust extraction models; unregulated consumerism; lack of support to production models done locally and sustainably; lack of support to circular economic initiatives; lack of support to alternative purchasing models; and irresponsible access to credit. Following, participants engaged in a discussion that was developed by first requesting them to think of examples of sustainability issues occurring within their communities. This enabled participants to share social, economic, and environmental issues that they are passionate about at a personal level and professional level. The issues were explained by each participant while I provided space for the others to enrich the discussion through comments and questions to allow a participant-lead conversation.

The first portion of session 1 was completed through an analysis of the link between sustainability and sustainable development. This was achieved by explaining to participants that sustainable development is a social process that follows principles that guide how we as a species act, live & grow while considering ourselves, our families, our communities, our nations, the world, natural environments, and all living organisms. Furthermore, I highlighted that in order to achieve true sustainable development all social groups must be considered and that any action or solution to

368

mitigate or solve issues must be contextualize. In addition, the participants learned that true sustainable development is when all decisions we make today consider the next 7 generations to come; include the economic value of the different services provided by natural ecosystems; and consider the interdependency between and interconnection amongst society, environments, and economy. Participants left the first portion of session 1 with the explanation that sustainable development entails fostering individual and community values, actions, ways of thinking, aptitudes, skills, and knowledge that can support the before mentioned conditions for such development. To conclude, I highlighted that both the concepts and goals of sustainability and sustainable development are philosophical & analytical frameworks to guide humankind to collectively build through cooperative ways the necessary routes so we can design & implement a vision of a future that is agreed & shared by all societal groups.

The second portion of session 1 focused on introducing the participants to education for sustainable development. I explained that the essence of ESD is that across all grades and subjects knowledge is developed, attitudes are fostered, actions are enabled, and values are promoted to empower students to be agents of change and mindful citizens. A short overview of the history of the birth of ESD as an overarching education framework was followed. This included how in the early 2000's nations began implementing ESD as a response to commitments made to promoting sustainable development in their countries; and how by 2005 the education community had fully evolved its understanding of the urgency to merely teach about the environment (environmental education) to teach for sustainability issues during formal schooling (ESD). The overview also explained that by 2010 the international education community reached a consensus on the general teaching approaches, goals, and content promoted by ESD. Such consensus led to the generation of Agenda 2030 for Sustainable Development as an international commitment to achieve the 17 sustainable development goals described within it. More specifically, I detailed that UNESCO (2020) describes Agenda 2030 as a guiding document to achieve sustainable development and thus as "the plan of action for people, planet and prosperity…". Moreover, I explained that for achieving each goal, targets have been set and amply described within each goal. For goal 4, which is quality education for all, target 7 describes the need to "ensure that all learners acquire knowledge and skills needed to promote sustainable development, including among others through education for sustainable development (ESD)".

The second portion of session 1 also included a discussion on some of the evidence-based benefits from teaching in alignment with ESD. The participants were explained that this alignment is specific to delivering lessons for subject matter instruction that integrate content and activities on sustainability issues that are relevant to the students; along with content and activities on current solutions and ways for student agency. The benefits from this alignment that were shared with the participants included an increase in student's academic performance on core subject matter; increase in students' interest & engagement during lessons; increase in students' involvement with local impactful groups; increase in students' awareness & understanding of sustainability issues; students report seeing their learning as more relevant; increased opportunities to learn through different approaches; increase in teachers' literacy about sustainability issues; increase in teachers' disposition to teach about & for sustainability issues; increase in teachers' satisfaction; teachers report an improved perception of their impact as educators; improvement of school's operations; increase of school's engagement with external immediate community; and increase of school's engagement with relevant networks & organizations.

To conclude the second portion of session 1, participants were introduced to the applications of ESD as an educational framework. I explained that ESD as a framework includes three key buckets of tools for educators: sustainability learning goals, teaching strategies, and design methods. When

utilized, these tools support educators to enrich existing or create new learning activities. In addition, these tools can be used for lessons delivered for classroom instruction of core subjects (formal courses), classroom instruction of non-core subjects (non-formal courses), and for extracurricular or after school classes. I highlighted that the remaining of the PD would focus on the applications of ESD in the instruction of formal courses. The main goal from such integration is the design and implementation of integrated lesson plans, described by I as lessons for topics of one or more core subjects that meet official standards; teach grade relevant academic topics; foster sustainability thinking and attitudes; and teach about and for one ore more sustainability issues.

PD Session 2.Part 1
Session 2 of the professional development focused on introducing the participants to the first bucket of tools provided by ESD, that is, the sustainability learning goals. Participants learned that these goals or principles are homologous to the academic standards set for core subjects. In essence, the ESD learning goals ensure that educators create activities and deliver these in ways and with content that is truly conducive to learning about issues while learning for these issues. As with academic standards, educators can use the ESD learning goals as a set of requirements that activities must foster. Participants were explained that the goals serve in three main ways. First, to guide educators during the design process of an integrated lesson. Second, to foster sustainability thinking, values, attitudes, behaviors through the integrated lessons. Third, as a reminder that the goals need to be meet along with the academic standards for the topic(s) being covered through the integrated lesson. I also explained that the goals are more flexible than academic standards, in the sense that an integrated lessons does not need to meet each goal, but one or more. How many and which goals are met or fostered is directly related to the type of content and activities included in a lesson. The key is to always refer to the goals as one is designing an integrated lesson and question 'is this activity fostering one or more of the ESD goals? 'If the answer is no, then the educator can edit the activities and/or content so students can be learning about and for sustainability. I added that the ESD goals are not exclusive and that many goals actually foster other goals and so it is normal to have certain goals always met simultaneously. This explanation led me to introduce the ESD goals. I encouraged teachers to have this map printed out and laminated to create a habit of referring to it while designing integrated lessons.

Session 2 continued with an analysis of each ESD goal. This analysis was done through the same approach for each goal. First, a detailed explanation of what each goal seeks to foster in the learning process was provided by giving the participants three key ways in which each goal can be met, accomplished or fostered in a learning activity. I highlighted that beside the ways she would be presented and discussing, there are other ways to foster an ESD goal. The ways introduced by the researcher, it was explained, are easy to remember and to conceptualize into an activity, and most likely, participants have already done them before and thus are familiar with them. Second, an introduction of one or more examples of integrated lessons that met the specific goal being analyzed were presented. These examples were taken from previous teaching experiences by I and contextualized to fit the cultural, social, economic, and environmental profile of the communities that HE serves. As such, the participants were told that each example was an opportunity for them to use in future activities with their students. Following I provide a description of how each ESD goal was explained to the participants and the tools used during these explanations, by using the same order in which the goals were introduced during the PD.

Systemic Thinking

The first ESD goal that was analyzed was systemic thinking. I began the analysis by asking the participants for their opinions on what a system is. Following, I explained that in essence a system is made up of different components. Some components interact negatively with others, some do so in a positive way, while other components are neutral. Consequently, when students engage in systemic thinking they are able to understand an issue not as a series of random and disconnected problems, but as a group of factors that are related and that interact with each other. By doing so, students can look at problems from a fair perspective ensuring that all affected groups are not ignored or forgotten when analyzing the consequences and potential ways to enact change. I also explained that systemic thinking can be fostered during learning processes when activities allow students to:
Identify and learn about the different connected components that make-up a sustainability issue.
Identify where actions are needed.
Understand how these actions need to be developed in synchrony rather than in isolation.

To illustrate how to foster systemic thinking, I provided an example of a fourth grade Mathematics and Language Arts integrated lesson. I explained that when a step in the shown lesson was highlighted, that meant that the step fostered systemic thinking through one of the ways previously described.

Critical Thinking
The next ESD learning goal introduced was critical thinking. I highlighted that many ESD goals will be fostered while one or more are also being met. This is the case for systemic and critical thinking. Many critical questions need to be posed in order to produce a thorough and accurate systemic analysis of an issue. Hence, when fostering systemic thinking, critical thinking will also be done. I explained that three ways in which critical thinking can be fostered through a learning activity include to:
1. Question the causes & analyze the consequences of an issue.
2. Analyze on-going actions & solutions and the lack of these.
3. Wonder & discuss ways to address an issue. Each way was color coded so it could be identified when discussing the lesson plan presented for critical thinking. To illustrate these three ways, and also how systemic and critical thinking are fostered together, I used the same lesson plan discussed for systemic thinking. I presented to the participants the type of critical questions that students and teachers would be asking when conducting the systemic analysis developed during the introduced fourth grade mathematics and language arts class. These questions were color coded and are below presented with these codes:
a. What is causing longer droughts in CA? Is it the same reason why there is less total rain every year?
b. With less water in reservoirs, how are humans affected? What about industries?
c. If we live in an area with droughts that are becoming longer, why are lawns allowed? Are there programs to remove lawns?
d. Who regulates how much water industries use? What about homes?
e. What kind of habits can people learn & adopt?
f. How can households save water?
g. How can students help to educate adults?

Co-learning
For co-learning, I explained that this ESD goal can be fostered when:
1. Students guide an activity or provide information or knowledge that is used as part of content in a lesson.

2. School staff or non-staff provide information or knowledge that is used in a lesson or they guide/direct a learning activity or project.
3. Teachers and students research, explore, analyze, and learn information together. These three ways were color coded as shown before.

Global and Local Citizenship
For learning about Global and Local Citizenship as an ESD leaning goal, I explained to the participants that three ways in which they can met this goal during learning activities include:
1. Teaching about the causes and consequences of issues happening to distant communities and/or nations.
2. Researching with the students about solutions, actions, projects, and/or programs to address or mitigate issues .
3. Learning about and collaborating with groups, organizations, individuals doing impactful work within one or more sustainability issues.

Empathy
        Empathy towards the consequences and effects experienced by others was the next ESD learning goal introduced and discussed during the PD. I explained that three ways in which the participants can foster empathy during learning activities include:
1. Delivering activities that help the students understand the feelings, struggles, and challenges of people, communities and/or nations.
2. Delivering activities that allow the students to share with family and/or friends what they have learned about the feelings, struggles, and/or challenges experienced by others.
3. Delivering activities that allow students to be curious about other places, types of communities, and foreign natural environments.

Innovation and Ideation
For innovation and ideation I explained that this goal can be met or accomplished by using one or more of the three ways described below:
1. Learning activities include studying and/researching current innovations in social, environmental, political/regulatory, and/or technological fields.
2. Learning activities allow students to identify where an innovation could be applied to help address or mitigate an issue.
3. Students can ideate and propose ways of acting, technologies, policies, programs, and or infrastructures to tackle the causes(s) of an issue(s) or to help mitigate the consequences of an issue(s).

Futures Thinking
I introduced and discussed futures thinking by explaining that this goal refers to imagining and/or envisioning future scenarios where specific current sustainability issues have been resolved. I shared that three ways in which futures thinking can be fostered in a learning activity include:
1. Students can identify current issues that need to be resolved in order to collectively build a sustainable and fair future for all.
2. Students can imagine a future where current sustainability issues have been resolved, in essence, envisioning and proposing how a current way of doing something the has a negative impact is then done in a sustainable way. To exemplify this, I explained that this could imply that students identity

the way we grow food, by using vast amounts of land that has to be deforested, in the future we grow food vertically by capitalizing on existing buildings where people live.

3. Students can analyze the systems and components that need to be changed, improved, created and/or eliminated to achieve a sustainable future. This would imply that students can identify the elements within systems that need to be fixed, which can include systems such as economic models, the ways we produce food and goods, regulations regarding preserving ecosystems, our built environments, current forms of transportation, sources for energy, and many more.

Contextualized Learning

The next ESD goal introduced was contextualized learning. I explained to the participants that educators can meet this goal when a learning activity does one or more of the following:

1. Includes relevant content to the school's social, environmental, cultural, and economic contexts.

2. Allows students to apply knowledge in a school assignment and/or to collaborate with local and regional stakeholders, projects, and/or programs.

3. Allows students to carry earned knowledge to their homes, sharing it with family and friends.

Individual and Community Values

The last ESD goal that was introduced and discussed was individual and community values. I explained to the participants that three ways in which a learning activity can meet this goal include to:

1. Ensure that students share values that are part of their personal beliefs, family beliefs, communal beliefs, and/or national beliefs.

2. Ensure that students understand that each person, family, community and even nation can have different values (that can also be the opposite of our own).

3. Ensure that students respect the values that each person and community has, while also understanding that we cannot impose our values onto others.

PD Session 2.Part 2

During the second part of session 2, I introduced the participants to the teaching strategies that are reported to effectively support teaching about and for sustainability. These were presented to the participants as ESD teaching strategies, as they are amply reported by international research as part of the group of pedagogical approaches utilized when delivering integrated lessons designed under ESD. Participants were reminded that these teaching strategies represent the second group or 'bucket 'of tools they can use during the process of creating integrated lessons for core subjects delivered during formal classroom instruction. In addition, I explained that by applying these ESD strategies, educators can implement student-led, experiential, action-oriented, and critical learning. Such a learning process is reported as foundational for achieving education about and for sustainability. I also highlighted to the participants that some or many of these strategies could be familiar to them and/or commonly used by them. I explained that these strategies are meant to be used as guidance to design integrated lessons and that how they should be used during the design process would be covered in session 3. At that point in the PD, the goal was to introduce the participants to the teaching strategies, clarify what each entailed, and discuss examples of lessons in which one or more had been used.

To introduce the participants to examples on how ESD teaching strategies are used as part of an integrated activity or lesson plan, I discussed each one by emphasizing its key features. Following I explain how each ESD teaching strategy was discussed during the PD.

Personal reflections

Includes any type of activity where students can express their views, ideas, fears through short essays, paragraphs, short sentences, a poem, visual maps, drawings, songs, or even a short story.

Group discussions and debates
Discussions allow students to provide their ideas and comments through a teacher guided format. Debates teach students how to produce and defend an evidence-based argument.

Emulate good practices
Behaviors and practices like refusing-reusing-recycling; turning off lights; using water wisely; growing food on campus; separating trash are conducted by students and teachers everyday or as much as possible as part of a larger learning project or as part of an established routine.

Simulations
Allow teachers to recreate real-life situations, such as a municipal meeting, a UN conference or a debate between community residents and a local polluting company.
Simulations position students in roles in which they have to enact people that have different and even opposing values or views to their own or that work in fields/jobs that harm their community or the planet.

Fieldwork, fieldtrips, and community work:
Include projects that can be developed on the school's campus (indoor or outdoor).
Include fieldwork or working outside and/or learning through nature.
Include working (one or more days) in and/or with a community project (i.e.public department, NGO, business).
Include excursions to locations of natural and/or social relevance and/or that are connected with a sustainability issue. This exposes students to trades, professions, and individuals doing work that is impactful to a community and/or region and that is relevant to the students.

Critical reading and writing:
Students read and/or research an ongoing sustainability issue to create written material, produced through systemic thinking, to include their perspectives on the causes and consequences of the issue and to propose solutions to address and/or mitigate it.
Critical reading and writing can also include learning and/or researching about a recent critical incident (local-regional-global) with the goal of:
analyzing what went wrong.
discussing and proposing what should have been done at different levels by different sectors and/or actors in order to have prevented the incident.
discussing and proposing what students think can be done at an individual, family, and community level to:
avoid something similar happening in the future to educate about the causes of the incident
to educate about the causes of the incident.

Problem & Solution-based learning
Students are assigned (individually or in small groups) to investigate a sustainability issue that resonates with them, that has recently occurred or that has been affecting their community or nation for some time.

The research includes identifying through a systemic analysis the different factors that allow for the issue to happen (including political/regulatory, cultural, social norms).
The research also includes detailing the consequences to the human and natural communities.
The research culminates in an action plan or innovation that is designed and proposed by the students.
The design is done under the assumption that if possible, the action plan should be carried out and tested.
The research and proposal for an action plan do not take longer than two to four weeks.

Case studies
Students learn about a local or regional organization or individual working to solve and/or mitigate a sustainability issue.
Ideally, students can connect with the organization or individual in order to conduct meaningful work, remotely or in-person.

Stimulus activities
Include creating, reading or watching a piece that can help students to learn about or for a sustainability issue.
Pieces can include poems, short stories, videos, documentaries, art pieces, photo journals, news articles, summaries or presentations.
Stimulus activities can also include a hands-on, experiential activity, such as an experiment or an activity where students have to apply earned knowledge by producing a piece/product.

Project-based learning
Usually implies a mid to long term project that can be developed through one or more subjects and grades.
Requires background work or research conducted as part of the initial stage of the project and focused on the causes and consequences of a sustainability issue.
The project can have as an end goal:
educating the school and immediate community about an issue.
educating the school and immediate community about actions to mitigate an issue.
proposing an actionable idea/project to mitigate a local issue.
launching a project/idea/program/campaign to mitigate a local sustainability issue.
making infrastructural improvements or additions to a classroom and/or school in order to achieve more sustainable operations.
        As an exercise to help the participants to conceptualize the application of the ESD teaching strategies, I presented a lesson with activities developed with one of the ESD strategies. I also guided the participants to identify the strategy that was used.

PD Session 3.Part 1
Session 3 of the professional development focused on the third 'bucket 'which the participants can draw tools from to guide them during the development of an integrated lesson. This bucket is specific to the design method known as SI.A.S, in addition to other recommendations to be followed to succeed at the creation of an integrated lesson.
        Part one of the third session begun with the introduction to the SI.A.S method and the explanation of the acronym by using the visual on page # of appendix 11. This initial introduction focused on covering the three general steps and what is done during each. The details of each step were provided in a later portion of the PD. I added that the SI.A.S method is to be used when

participants want to create an integrated lessons, that is, a lesson that has a combination of integrated activities, non-integrated activities, and sustainability focused activities. The integrated activities are those that merge sustainability content (about and for) with subject matter content. Non-integrated activities exclusively teach subject matter content and do not include sustainability content. The sustainability focused activities solely center on teaching about and for a sustainability issue. To add, I explained that integrated lessons are created with the main goal of teaching students subject matter content while always including activities that focus on learning for an issue, that is, learning about solutions and/actions to address an issue. As a continuation, I explained each of the steps within SI.A.S.

SI Stage

In order to complete the first step, the participants should meet the following four requirements:

1. Select a sustainability issue that is going to be:

Engaging for the learners; this can be ensured if the teacher chooses an issue that is:

of great interest to the teacher

of great interest to the students

that was brought up by the students, or

an issue of great importance but is not yet in the students 'and general community's radar.

Relevant and relatable for the students. This can be ensured if the teacher initially selects an issue happening at the local community level as there are higher chances that the students are able to see the consequences from the issue; it will be easier for the students to identify or understand the causes; and there will be more immediate opportunities to engage students in impactful work. I pointed out that if the participants wanted to select a key global issue, then they could use the 17 Sustainable Development Goals as reference and guidance.

2. Next, the participants should gather content that is:

About the issue, including:

The mechanics of the issue and processes involved.

Causes of the issue, such as the factors, elements, and actions that are creating the issue.

Consequences of the issue, including the natural and human communities affected and how they are affected.

For the issue, including:

Solutions and/or efforts to address and/or to mitigate the issue, which can range from individual and collective actions to technologies, programs, policies, and projects that are being implemented, currently under design, currently being developed, proposed or perhaps only at a state where they are being discussed by relevant stakeholders.

Ideas to solve and/or mitigate the issue proposed by students, governments, organizations or stakeholders.

3. When searching and selecting the final content about and for the issue, participants should ensure that the quality and the quantify of the content is adequate, which includes:

Having many sources of information and ample content about and for the issue.

Using evidence-based content.

Using resources and information provided by reliable sources such as public and private local, regional or national organizations like the UC system and its many departments and schools, NOOA, Center for Biological Diversity, Brookings Institution; and international organizations like UNESCO, UN, IBE, FAO, global alliances and networks, and research institutions and universities.

4. The following recommendations were provided to conclude this section:

Strive to find individuals and/or organizations working in the issue to connect and collaborate with. Create a resource database by yourself or with other teachers by saving every resource you find, first categorizing the content by issue, followed by categorizing the content if it is about the issue, for the issue or content on possible partners and/or collaborations.

Email experts, organizations, researchers that you come across during your content search as most individuals are willing to help and share their knowledge and network.

Keep in mind that the content needs to have relevance to the grade that it will be taught to. If the content is not grade appropriate, the participants can select the content if it can be easily adapted to the grade level.

A Step

I explained that there are four stages to be completed as part of the A step. The same are described below.

Identifying the time of the year when the sustainability issue is going to be weaved into curricular content. This implies that the teacher analyzes the official curriculum by looking at features such as:

The curriculum's structure, which could have themes that have a clear connection or alignment with one or more sustainability issues. HE follows such a structure with the IB themes and thus many of these are clearly aligned with several sustainability issues.

The school's calendar includes special events or dates that connect with one or more sustainability issues.

The school's curriculum follows specific academic standards such as the CCSS. Some of these standards align with several sustainability issues and thus the academic topics taught under those standards would be ideal entry points for weaving learning about and for an issue.

As a practice exercise, I assigned the participants with identifying the sustainability issue(s) that they consider could be taught in alignment with the lines of inquiry contained within each IB theme. The participants were told that they could include any issue that was relevant to them or they merely taught had a clear alignment with the line of inquiry. To complete the exercise, I provided a table that summarized the lines of inquiry established by the IB curriculum for each grade to allow the teachers to identify the type of sustainability issues they considered could be weaved into each line of inquiry.

2. Once it has been determined the time of the year when learning about and for the issue will be integrated, the teachers should proceed to identify the academic topics that are meant to be covered during that time of the academic year.

3. I explained that after having identified the academic topics, they should use the resources gathered on the issue (causes, consequences, mechanics) and for the issue (solutions, innovations, actions) to complete the following 2 sub-steps:

3.1. From each gathered resource on the sustainability issue, highlight those that have content that can serve as entry points. This means content that can be shaped to teach about one or more of the academic topics detailed in the table created during the previous step. In essence, the participant is scanning through all the sustainability resources to identify which ones have content that could be utilized to teach one or more academic topics from the table. As this is completed, I recommended that for each resource the participant should write its url, a brief description, and details the academic topics that could be taught with the content in that resource. The resources can even be analyzed by grouping them in two categories, those that are about the issue, and those that are for the issue. This organization and coding of the resources would generate a useful summarized and organized list. An

377

example of how this list would be produced and how it would look like is found on page # of Appendix 11.

3.2. As a next step, the participant should then check off all the topics from the table of academic topics that can be taught with all or part of the content in a resource. This step in essence is a way to revise and confirm the academic topics identified in step 3.1 to allow the participant to have a simple and organized visual tool that details which topics can be taught with the gathered resources on the sustainability issue. I recommended that step 3.2. should be done by having the table of academic topics to be covered during the time selected (step 2) next to the list created in step 3.2. This was further explained with the following illustration found on page # of Appendix 11.

3.3. I also explained that an additional step can be done if it serves the participant. This implies listing the resources that can be used for each topic that was checked off. This step was further explained with the example found on page # of Appendix 11.

4. As a next step, I explained that the participant has to select from the list of checked off academic topics which ones will be in the integrated lesson. I detailed that because the participant will have a table with topics from several subjects, they have to determine whether they want the integrated lesson to be:

Focused only on topics from the same subject: one discipline lesson.

Focused on topics from two or more different subjects: transdisciplinary lessons. If this is the option, then the participant needs to be sure that they can teach the topics from the different subjects at the same time, meaning that when the integrated lesson is delivered, students will have already received the foundations for each different topic.

In addition, at this step, the participant will identify all the academic topics that were not checked off, meaning, that cannot be taught through the gathered sustainability content. For those topics, the participant needs to decide whether or not these will be included in the integrated lesson. If those topics are included, then the participant simply needs to create activities to introduce and/or practice these by using content from an official textbook or other academic resource. The resulting activities will therefore be non-integrated, as they will be made by using content that has no information on the sustainability issue. If the participant decides that those academic topics are better taught through a different, independent lesson, then they simply have to make that note and later create the lesson or set of activities for those topics. To illustrate how step four would look like, I continued to use the same example for the academic topics to be covered during the third trimester for fourth grade at HA.

To further support the understanding of step 4 and specifically of what an integrated lesson developed for one subject would look like versus an integrated and interdisciplinary lesson would look like, I revised the lessons that were introduced as examples for different ESD goals.

S Step

The last step in the SI.A.S method is specific to the creation of learning activities that will be part of the integrated lessons while meeting the official academic standards for the topics to be covered through the lesson. I explained that at this step the participants should have at hand the ESD learning goals, the ESD pedagogies, and the official academic standards.

When completing the S step, the participant will design learning activities that:

Will use sustainability content to teach the academic topics selected in the A step (integrated activity).

Will only teach about the causes and consequences of the issue (sustainability focused activity).

Will only teach about solutions, actions and/or efforts to address the issue (sustainability focused activity).

Will teach about the academic topics by using academic content, not by using sustainability content (non-integrated or academic focused activity).

I also explained that there is no set order that the different types of activities need to be included in an integrated lesson. Nevertheless, it was recommended to begin with activities that introduce or explain new academic topics. In addition, I mentioned that once new academic topics have been properly explained, then the lesson can include integrated activities that teach the students about the issue, followed by activities that teach the students for the issue. I emphasized that it is crucial to never forget to include activities that either teach students about current solutions/actions or that position the students in opportunities to propose ideas to solve an issue or even to act on an issue. These activities ensure that students remain hopeful and passionate about being agents of change and diminish the amply reported cynicism and eco-anxiety that is evidenced when only learning about the consequences of sustainability issues.

As the design of the integrated activities was the most novel element for the participants, I provided an in-depth explanation of this process. First, I explained that in essence what the participant will be doing is shaping the sustainability content gathered in the S step into a learning activity. To do this, the participant can 'look 'into the group of ESD teaching strategies to confirm if any can be used as the mechanism to restructure or reshape the 'entry point' content, found within one of the gathered resources on the sustainability issue, into a formal academic activity. This implies that the participant has a digital or physical copy of the ESD pedagogies at hand. I also noted that if none of the ESD pedagogies seem like a proper fit to reshape or use the entry point content, other teaching practices can be used. The ESD pedagogies are meant to be used as guidance, and as the participant designs more integrated activities, they will be more comfortable with using other teaching mechanisms for shaping entry point content. I also highlighted that using one ESD pedagogy can be sufficient for creating an integrated activity. Once the participant has an idea of the ESD teaching practice or pedagogy that will be used as the instrument to shape the entry point content, then the participant can design the integrated activity. To do this, I emphasized that two key standards need to be meet and thus kept at hand:

The official academic standards, so the participant can design the activity with the adequate academic rigor and thus ensure that the students will be learning and accomplishing what is needed for the academic topic(s).

The ESD learning goals, which are homologous to the academic standards in terms of learning for sustainability. As the participant designs the activity, at least one ESD goal needs to be fostered. If the participant realizes that none are fostered, then they can take a step back, analyze what has been designed so far, refer to the essence of what each ESD goal strives for, and edit the activity in ways that one or more goals can be met or fostered. By doing this, while keeping the academic standards in mind, a highly relevant, engaging, and academically rigorous activity will be created. Two key questions that can help the participant during this step are 'Is the learning activity fostering an ESD learning goal? What learning activity/pedagogy can foster _____ESD learning goal?'

To complete the entire integrated lesson plan, the participant will also design activities only focused on the academic topic and activities only focused on teaching about and for the issue. For the

activities focused only on the academic topic, the academic standards are key and thus need to be used as guidance. For the sustainability focused activities, the participant can use ESD pedagogies as well as other strategies, but always, one or more ESD goals must be fostered.

I also added that once the participant has designed all the activities for the integrated lesson plan, they should do a last revision to check that:

there are activities that teach ABOUT and FOR the issue

the academic standards are properly fostered

at least one ESD learning goal is fostered for each integrated and sustainability focused activity

PD Session 3.Part 2

To support the comprehension of how to apply the SI.A.S method, during the last part of session 3 the participants reviewed a sample fifth grade science lesson. Together and guided by the researcher, they identified the sustainability issue covered, the academic topics covered, and the ESD pedagogies, academic standards, and ESD goals that were met.

In addition to the previous exercise, the participants were guided in the application of the SI.A.S method for building a fourth grade integrated Science lesson. Due to time constraints, I created the sample lesson plan and thus provided the sustainability issue (effects of plastic pollution on marine life and developing countries) and the resources on the sustainability issue. The exercise thus focused on guiding the participants through the application of SI.A.S as I did when creating the sample lesson plan.

In terms of the resources used in the sample lesson, these were categorized in four groups, articles, which included resources coded as A1 through A18; galleries and photos, which included resources coded as G1 and G2; interactive, which included the resource coded as I1; and videos, including resources coded as V1 through V6. The list of these resources and the links to each resource is included on page # of Appendix 11. The participants were tasked with briefly reviewing the resources.

The exercise continued with step A. Even though the sample lesson was previously made, the participants did discuss when the issue of the effects of plastic pollution on marine life and developing countries could be integrated into the fourth grade IB program of studies. The theme 'How We Organize Ourselves 'and the topic of 'Natural Resources 'was decided as the one with the most evident alignment with the issue. This decision coincided with mine when I created the sample lesson. I reviewed with the participants the topics for each core subject that are meant to be covered during the trimester when the selected theme is meant to be covered. Social studies was left out as the participants explained it is only taught during the first semester.

To complete step A, the participants identified the entry points or content that they could use to teach about one of more of the academics topics from table #5. The participants compared the topics they selected with those that I deleted when I did the sample lesson. They agreed on several topics and found interesting differences which presented as important points of discussion. As the lesson had been previously done, I presented my final list of topics that I identified could be taught with content included in each resource on plastic pollution.

To practice the last task in step A, I explained that I decided to follow the transdisciplinary route and thus I created the sample lesson for topics 4.NBT, W.4.1, W.4.2, RI.4.1, RI.4.2, RI.4.3, L.4.4, SL.4.1, ESS3. as detailed in the previous table.

To adequately practice the S step, I introduced a sample lesson, included as Appendix 12. The discussion and analysis of this lesson was done by using a series of questions which are included below and underlined. Through these questions, I further explained the tasks implied in Step S and

clarified questions that the participants had in relation to the design of integrated and sustainability focused activities.

To conclude session two of part two of the professional development, I provided a list of general final recommendations for designing integrated lessons that included:

The goal is to design a lesson plan that is composed of many learning activities (integrated, sustainability- focused, and non-integrated).

Start with 1 integrated activity per month or 1 lesson plan with integrated activities per semester. As you build your internal library of integrated lessons and make more comfortable with designing them, you can strive for more integrated lessons per academic period.

Each activity can be part of a long-term project or even an evaluation. Each activity will vary in length and difficulty.

The entire lesson plan can be as short or long as you need it to be.

Due to the relevance of designing lessons that integrate action for climate change, I included a final section to provide participants with relevant resources and advice. Even though it was a short section, it contained relevant and useful information, including:

Strive to develop at least twice per year an integrated lesson on climate change and/or global warming.

Remember: social, environmental, and economic problems stem from both climate change and global warming. Consequently there are many opportunities to teach about these issues in every core subject and every grade.

Begin your integrated lessons with content on solutions and actions, then explain the consequences, and finish by connecting these with the causes of both climate change.

Allow students to identify how it affects them, their families, and their community.

If you don't know enough some helpful resources include: NASA, The Climate Reality Project, Climate Change Beginner's guide, Dummies, Climate Change For Beginners Podcast

I concluded the professional development with a list of websites, sustainability learning resources, names of networks and alliances that their school could join, and relevant publications, including:

https://worldslargestlesson.globalgoals.org

California Academy of Sciences

kids.earth.org

https://ca.pbslearningmedia.org

https://sanctuaries.noaa.gov/education/teachers/

https://education.nationalgeographic.org

https://resources4rethinking.ca

https://www.globalschoolsprogram.org/resources-for-educators

https://www.usgbc.org/education/learning-lab

Sustainable Development Solutions Network Greenschool Yards America

Green Schools Alliance

Green Schools Initiative

Green Schools National Network Center for Eco-literacy

Green Schools in the Tropics

Whole-School Sustainability Framework

D. Sample Lesson plans delivered during PD on ESD

Interdisciplinary Lesson Plan

IB POI: How We Organize Ourselves

Issue: Effects of plastic pollution on marine life & human communities

Subjects: Science, Reading, Writing, Speaking+Listening & Mathematics

CCCS: ESS3.A, L.4.4, W.4.2, RI.4.1, 4.NBT , SL.4.1, W.4.1, W.4.2, W.4.3

ESD Learning Goals: Co-learning, global & local citizenship, systemic thinking, critical thinking, individual and communal values, empathy, futures thinking

Length: 8-10 periods/lessons of 40min

Science period

*Note: students have already been introduced to:

- the concept of natural resources
- renewable vs non-renewable resources
- global and local examples of how natural resources are used/the services they provide for us
- fossil fuels (FF): 3 types and how each are used to produce energy
     effects from extraction of FF and their use for energy and fuel

A. How plastics are made

A.1. Students sit in a circle and are asked for descriptions/explanations on what they remember learning about how FF are used for energy and fuel.

A.2. Teacher inquires if anyone knows about other uses for petroleum; if answers are provided, these are written on the board.

A.3. Teacher explains that petroleum is also used to produce plastics and reminds students that petroleum is a non-renewable resource (teacher can say 'Does it makes sense that we use a non-renewable material for making plastic items that mostly we only use one time? Doesn't seem like the best material for producing plastics and the best way to use a non-renewable resource').

A.4. Teacher provides a video guide that will be used to watch __, which explains how plastics are made. The video guide is reviewed prior to watching the video in order to explain the 3 sections that the students will be answering. The first section contains questions that the students will answer as they observe the video (the video is paused as students raise their hands with answers to the video guide, which are then written on the board). The second section of the video guide contains questions that are focused on the students' perspectives on the fact that a non-renewable resource is used as raw material for making plastics (which we which know cause great pollution). These questions are answered after the video is watched.* __ needs to be played until 3'38''. (ESS3.A)

A.5. The last section of the video guide includes a list of science-related vocabulary that is revised and defined by the class under the teacher's guidance, after the video is watched and all prior sections have been answered. The vocabulary can be written in a separate notebook designed for concepts and words learned when studying about and for a sustainability issue (the notebook can be named 'learning for

the planet'); when an activity is done for/about a sustainability issue the teacher can make the habit of identifying, defining, and transcribing new vocabulary into this notebook. (L.4.4)

Which ESD learning goal is fostered in A.4-5? Which ESD pedagogy is used?

A.6. Teacher shows pictures from ___ and explains that the students will pretend that they work for a magazine and that their job is to write a short description/explanation for each picture by using what they learned from V1-video guide. Volunteers can share their descriptions. (ESS3.A; W.4.2)

What is missing in A.6?

Mathematics period

*Note: students have already been introduced to:
- place value recognition for multi-digit whole numbers
- reading and writing multi-digit whole numbers using base-ten numerals, number names, and expanded form.

B. How long does it take for plastic to degrade

B.1. As a continuation to a previously introduced practice to place value recognition for multi-digit whole numbers, students watch ___. As the video is played and data/numbers are shown, the teacher pauses it to write these numerical values on the board to create a list that includes a short description of what each value is for (e.g. '400 years for plastic holder to degrade'). *V3 should be played until 1'13''.

B.2. In small groups or pairs, students are tasked to complete a short research on the degradation time for 3-5 items made out of plastic that they regularly see students (including themselves) use at school. Groups have to share their findings and the values for each item are added to the list from B.1. The teacher needs to have at hand the degradation time for plastic cutlery and straws in case no one shares this information as this will be used in a later step.

B.3. Using all the values in the list written on the board, the teacher tasks students to complete place value recognition exercises and read the numbers using base-ten numerals. The teacher can add more multi-digit whole numbers to expand this exercise. (4.NBT)

B.4. The teacher guides a group reading (out loud) of the sections 'the last straw' and 'chew on this" from ___. The teacher relates the content read from A2 to what was learned earlier in terms of years it takes for plastic items (like cutlery and straws) to degrade. *How could we finish/edit this activity by using either a simulation or a short in-class debate?*

B.5. The teacher provides students with the link to __, so students can culminate the lesson with an interactive game.

Reading period

C. Effects of plastic pollution in oceans and marine communities

C.1. In a roundtable, the teacher asks students to anonymously write in a piece of paper something they know about the effects from plastic pollution in the ocean and its communities and to include their opinions and/or feelings on this issue. While students are writing, the teacher places on the board a poster that has a table that contains two sections: one section has the headline "effects", the second section has the headline "what can we do". The teacher gathers the students' writings and randomly selects pieces of paper and reads their content. As these are read, the answers are written on the "effects" section of the table.

C.2. Students are tasked to read article ___ and to underline all the words for which they don't know the meaning.

C.3. Once all the students have completed the reading, the teacher asks out loud a series of questions related to the sections of the reading 'what is the problem with plastics' and 'how does plastic waste end up in the ocean'. The questions are structured so students have to refer to details and examples contained in the reading in order to answer correctly. Afterwards, in pairs, students have to brainstorm one way they think that one of the sources of plastic pollution could/should be addressed (this can be at an individual, family, school, community or national level). Each pair can draw and/or orally explain their idea. The ideas are written in the table under the section "what can we do". (RI.4.1)

C.4. Through a group discussion, the teacher guides students to analyze the consequences of plastic that are described in A1. The analysis should result in students proposing the information that should be included in the table under the section "effects". (RI.4.1)

Which ESD learning goal is fostered in C.2-4 and which ESD pedagogy is used?

C.5. Students sit in pairs; each one has to write down the words that were highlighted/identified during the reading (step B.2). Together, each pair uses context and reference materials to define the words. Pairs share to the whole class their answers. (L.4.4)

C.6. The teacher introduces ___ and assigns specific portions to be read out loud by a student; the goal is for each student to have a chance to read out loud. The class discusses if any of the information they read specific to consequences of plastic pollution should be added to their table under the section "effects". Students are tasked (as in-class work or homework) to write a short text that explains 2 of the consequences of plastic pollution (on animals and/or humans). The text needs to include one proposal of an action that can be done by the whole 4th grade class during school hours in order to help reduce how much plastic waste is produced by the class. The teacher will share the ideas proposed by each student (anonymously or not) and the class will vote for 1 action that they want to adopt from now on during school hours. (W.4.2)

Is solution-based the pedagogy for C.6? Why is co-learning fostered? What other ESD goal?

Science period

D. Effects of plastic pollution in developing countries

D.1. The teacher explains through a slide show how plastics are recycled, which numbers/codes can be recycled in traditional facilities (use ___, ___, ___, ___, __ to build presentation) and which numbers/codes can be picked up for recycling in SB (using resource ____ to explain). The explanation needs to include the clarification that plastics can only be recycled once or twice and that only 9% of all plastics produced since 1950 have been recycled. The explanation should end with the message that because plastics are produced from a non-renewable resource it is crucial that we seek for new ways to produce plastics with alternative materials that are abundant and through processes that do not harm the planet and human communities.

D.2. The teacher gives the students a handout with pictures of different natural environments from distant nations (select at least 5: Ghana, Uganda, Tanzania, Ethiopia, Senegal, Kenya, Mexico, Vietnam, Turkey, Malaysia, India + for each country select a land or marine natural environment). Students are tasked to individually analyze which natural resources each environment provides to the local communities. The teacher projects each picture from the handout and by using Google Earth explains in which country the environment is located; the teacher then requests for volunteers to share their answers on the resources that are provided by the showcased environment. The answers are categorized as renewable or non-renewable. (ESS3.A)**

D.3. The teacher also explains how specific resources provide a service/benefit globally (for all human communities). This can include how mangroves sequester carbon dioxide (greenhouse gas) or how jungles produce oxygen + sequester carbon dioxide + hold millions of species. By using the pictures from D.2 the teacher guides an analysis to identify which services are provided by each environment. (ESS3.A)**

D.4. The teacher explains through a series of slides (pictures with short descriptions) that many countries, including the US, export the trash that they have collected as recycled trash to countries that have greater numbers of communities living in poverty (so the collected items are recycled in these countries). The presentation is focused on the same countries showcased in step D.2. The content in the presentation is extracted from resources __ y __ and edited to 4th grade level. The teacher's discussion is guided to the central message that recycling is not the solution to the plastic pollution issue, as recycling is not perfect: plastics can only be recycled 1 or 2 times (depending on the type of plastic) and most countries that produce the most amount of plastics do not recycle their plastic at facilities located in their countries but send it away to countries that do not have proper facilities. The explanation ends with the teacher explaining that there are many ways that people, families, and countries can lower their plastic production and that these actions will be discussed in upcoming lessons.

D.5. As a first step towards learning how to consume less plastic and help the planet, the teacher explains that students are tasked with a homework in which they have to audit how many plastic items they have in one of the rooms in their home (bedroom, kitchen or bathroom); for each item the students have to write the code (#) and note if the item is used less or more than one day. The teacher explains that part of the homework will be to present the findings to the class.

Which pedagogy is adapted in D1 and D4?

Speaking and listening period

E. Individual and family level actions to address plastic pollution

E.1. The teacher brings to class the infographic from __, reads the information in it, and places it next to the table that the class has been working on. The teacher reminds students that even though the problems that plastic pollution causes are many and very serious, there are many solutions being developed and there are many ways each person and family can contribute to eliminate this problem.

E.2. The teacher asks each student to share their findings from the homework on auditing plastics at their homes. As they do, the answers are categorized as single-use plastics (plastics we throw away immediately after we have used it for a short period of time) and plastics that we use for over a week. The answers are also categorized based on the code (#) of each item to collectively calculate the totals for each code/type of plastic. The teacher uses the interactive guide from ____ so students can discuss which items from the audit can be placed in the blue bin and which ones can't be recycled; the discussion can be extended to what was learned in earlier lessons about recycling and its impact on communities from distant countries.

As a sustainability focused activity, which ESD learning goal is fostered in E.2?

E.3. Resource ____ can be read by the teacher prior to the class to have ideas to help guide the following activity: the teacher reminds students that the fact that they have at home single use plastics and plastics that can't be recycled does not mean that they don't care for the planet. The teacher reminds the students that an important job they can do is to use the knowledge they earn at school to teach their families and friends on the plastic pollution issue, why it is important that we know what can be recycled, and why it is important to adopt ways to avoid or reduce buying plastic items. As a continuation to this reminder, the teacher tasks students to think and propose ways that different items from the audit can be avoided or consumed less by their families. Each student has to share and explain their idea(s). All the ideas are written by the teacher on the "what can we do" section of the table that the class has been working on. The teacher finishes by explaining the 4 Rs (refuse-reduce-reuse-recycle); and with the students' lead, the ideas written on the table are categorized on the board under each R. (SL.4.1)

Which ESD learning goal is fostered in E.3 and which ESD pedagogy is used?

E.4. Each student is tasked with a short homework in which they have to share with their family 3 ways to avoid or reduce buying single or multiple use plastics (even if these items can be recycled). Students have to write down the 3 ideas they shared with their family and write one opinion paragraph/piece that explains how they feel when they share their knowledge on plastic pollution and on ways to consume less plastic. (W.4.1)

Which ESD learning goal is fostered in E.4 and which ESD pedagogy is used?

Writing period

F. Solutions and actions to address plastic pollution

386

F.1. The teacher asks students if they know of an interesting technology or idea to help with the plastic pollution in oceans and rivers and/or to help us reduce the amount of plastics in our lives. If any student provides an answer, the teacher can search for the solution/idea and invite the student to co-teach/explain the content found. The teacher explains that innovations that can help humans to tackle huge issues (like the millions of tonnes of plastic in the oceans) happen when we are not afraid of being creative and that anyone can design/create/invent solutions.

F.2. The teacher presents a slide show with 10 current innovations, proposals/ideas, and actions to help to clean oceans and rivers, and to eliminate plastics from our lives. The content can be extracted and adopted from resources ___, ___, ___ and from the last minutes of ___ and ___.

F.3. Students are tasked to write an informative/explanatory text pretending that this will be published in a local SB newspaper; the article needs to explain SB residents about one current solution to the plastic pollution issue. For this activity, the teacher provides a handout with the solutions and information given in step F2. (W.4.2)

Which ESD learning goal is fostered in F.2-3 and which ESD pedagogy is used?

F.4. As homework (or a mini evaluation) the teacher tasks students with writing a short narrative piece in which each student describes an imagined world in the future where humans do not consume/use/produce plastics made from petroleum. Students can describe what alternative materials to plastic humans are using in this future world, how do oceans and rivers look, which technologies helped humans to get rid of all the plastics in the oceans, rivers and forests, or focus on any other idea that appeals to them. Students are reminded that they can create this future world without constraints on what are current technologies, laws, etc, that is, they can imagine a world where machines, materials, ways of acting, regulations that today seem impossible or don't exist are real. Students can also prepare a short artistic piece to be presented to the class, which describes their imagined world; this piece can be a drawing, a song, a poem, a collage, or simply an explanation of what they imagined and wrote about. (W.4.3)

Which ESD learning goal is fostered in F.4 and which ESD pedagogy is used?

_____

We are missing two topics in this lesson plan:
RI.4.2 (main idea)
RI.4.3 (explain events-ideas)

How can we edit this LP to include activities (integrated or non-integrated) focused on each of these 2 topics?

Appendix D

A.   Consent form

UNIVERSITY OF CALIFORNIA, SANTA BARBARA

BERKELEY • DAVIS • IRVINE • LOS ANGELES • MERCED • RIVERSIDE • SAN DIEGO • SAN FRANCISCO • SANTA BARBARA • SANTA CRUZ

DIANA J. ARYA
ASSOCIATE PROFESSOR, LITERACY
GIVERTZ SCHOOL OF EDUCATION
3151 EDUCATION
SANTA BARBARA, CA 93106-9490   TELEPHONE: (805) 893-2185

November 4, 2022

Dear teaching colleague,

You are invited to participate in a research study, which focuses on a series of professional development sessions and discussions related to UNESCO's framework, Education for Sustainable Development (https://www.unesco.org/en/education/sustainable-development). This research study is part of a project called Community Based Literacies, which is one of several program partnerships between UCSB and SBUSD. Participation in this research is voluntary, and will not have any bearing

388

on the resources that you and your students will receive from this project. Consenting to this study does not require any additional activities or requirements beyond the regular professional development resource activities you will engage in as part of our collaboration program. These activities include:
-A six-hour professional development on teaching strategies and pedagogies to teach about and for sustainability issues during instruction and in alignment with IB units.
-An online questionnaire (5 minutes approximately to complete)
-One-on-one sessions (up to 3 hours) to work on lesson plans for one or more units (optional)
-One-on-one interview (in person, up to 45 minutes)
-One group-level discussion (in person, up to 45 minutes)
-Four classroom observations

Your consent will allow us to research all records (written, audio and video) that we would be collecting to support your instructional goals.

There are no known risks to your participation in this research. There are no direct benefits to you or your students. We hope that this research will help us develop high-quality instructional support for teachers and will contribute to the field's understanding of how best to support teachers in helping students develop 21st century skills needed to address present and future social, environmental, and economic sustainability issues.

All data collected by the project will be kept in a secure location in our research offices at the University of California, Santa Barbara. We will not share individual information with anyone outside of the research team. Hard copy data and audio records will be kept in a locked file. Computerized data will be secured in pass-coded computer files. All identifying informational will be stored in separate files from the data itself. All published materials will use aggregated data only—no individual students or classrooms will be identified.

If you have any questions about the research, please contact Diana J. Arya, at 893-2185 or by e-mail at darya@ucsb.edu or Estefanía Pihen at 970-4122934 or by email at estefania764@ucsb.edu

If you have any questions regarding your treatment or rights as a participant in this research project, please contact UCSB's Committee for Protection of Human Subjects at 805-893-3807 or by email orahshelp@research.ucsb.edu

I have read this consent form and agree to take part in this study.

Teacher's Signature	Date

B. Interview protocol

1. Can you share with me which TEP did you attend to and when?

2. Did your TEP include courses on sustainability issues?

3. Did your TEP include courses on how to teach for sustainability issues?

4. What kind of course, knowledge and/or experiences you consider would have been beneficial for you to have received as part of your TEP in order to feel prepared to bring integrated learning into your classes?

5. What were some of the most impactful courses and/or learnings from your TEP?

6. What type of resources would you ask to your district, if you could, so you could design and implement integrated lessons as they one you co-designed?
   A. Please explain the elements and features
   B. Please explain what would be needed to have access to these resources
   C. Please explain why you would want these resources

7. Can you describe which components from the PD on ESD where most useful for
        A. The design process of the integrated lesson plan
        B. For the implementation of the integrated lesson plan
        C. Having to bring integrated lessons in the future, when you have no support from a coach like myself and you continue to navigate daily challenges

8. Can you explain which ESD learning goals were most useful to guide your design process?

9. Can you explain which ESD teaching pedagogies were most useful to guide your design process?

10. Are there any key moments from teaching the integrated lesson that you want to share with me, in terms of comments and/or reactions by the students?

11. Would you recommend changing or adding anything specific to the PD on ESD?

12. Can you share with me which challenges you consider affect the most your availability to bring integrated lessons into your formal classroom instruction?

C. Participants Answers to Questionnaire

1. Tell me about your experience as a teacher thus far. What have been the highlights?
Participant A:
My key highlights are the kids and their excitement for learning. I also enjoy going where the kids want to with their questions. I have found that when they express their genuine questions and we follow them it enriches the learning in ways that I couldn't have anticipated.
Participant B:
My key highlights have been building rapport with my students, collaborating with my teaching partner, and talking with other first year teachers and sharing similar struggles/ experiences as first year teachers during TIP meetings.
Participant C:

Developing positive relationships with students; working with a dynamic and committed team; constantly learning & growing.
Participant D:
As trite as it may sound, the key highlights have been the relationships that I have established with my students and been able to maintain throughout the years. My first class are now seniors in High School and I still get to hear from them and learn about how they are doing and share in their excitement for what's next. I have also really enjoyed working with Student Teachers from UCSB. I love getting to collaborate with new educators and hear their ideas- coming from such a fresh perspective on education.

Question 2. Tell me about your experience as a teacher thus far. What have been challenges?
Participant A:
Time and content management. I'm concerned that I often feel like I'm not covering enough of the content.
Participant B:
Behavior management, feeling comfortable teaching math when math was a weaker subject of mine when I was a student, and the general worry of whether or not I'm doing enough.
Participant C:
Work/life balance; not enough hours in the day; unreasonable expectations by administration.
Participant D:
Obviously the challenges that have arisen from the pandemic and how that has impacted the classroom have been the most major challenge throughout my career. I also have the same challenges you'll hear from most educators- too many extra responsibilities, spread too thin, class sizes, lack of meaningful professional development…

Question 3. Based on your knowledge and experience, what does the concept of sustainability mean to you?
Participant A:
In education I would apply it as the energy/time and resources that teacher puts into her class and how long this can be sustained. How much of these resources can be put in before you "run out/ burn out." A sustainable teaching career would then be one that although will require constant replenishing or investment it is in balance with what is taken. Input of energy, resources, creativity etc with an output of growth, satisfaction, joy etc.

Participant B:
Sustainability is using resources available to us at the present without taking away from the needs of the future.
Participant C:
Sustainability is the practice of being thoughtful about our choices and how they impact our environment. It is an acknowledgment of the state of affairs and an intention to live in harmony with our natural world - to cause the least amount of harm.
Participant D:
Sustainability can take on many different forms- in terms of the environment it's finding a way to make sure that we are finding renewable resources that are not hurting the earth. In terms of teaching it's making sure that the work load is maintainable and that teachers are supported such that they are not burned out.

Question 4. In what ways does sustainability relate to your professional life?
Participant A:
Personally sustainability is the balance that I strive to have, my investment in trying to be an effective teacher while not losing myself or missing out on my life outside of school.
Participant B:
As a teacher, it's important to teach students how they can make more sustainable choices in their lives. Some every-day examples are picking up trash, reusing water bottles, sorting out their trash during lunch (trash, recycling, food waste), and teaching them to not waste food at lunch.

Participant C:
I feel I have an obligation to integrate this concept/reality as much as possible so this next generation is informed.
Participant D:
I think the concept of sustainability comes up in teaching often as we cover topics such as Environmental issues that face the globe. Students do a project in our ecosystems unit in which they research and learn about various environmental issues that often align with the concept of sustainability. As mentioned before, the other form of sustainability is making sure that I am doing what I can to balance my workload such that the career is sustainable for myself.

Question 5. In what ways does sustainability relate to your personal life?
Participant A:
In addition to my personal efforts to conserve natural resources and avoiding overuse of not recyclable material, I apply sustainability from time to time use. Time allocation is an area that I like to focus on when it comes to sustainability. I try to make sure that the activities I chose to do outside of work sustain my spirit and address me as a whole person. In doing this I can assure I will be in a good headspace for myself, my family and my students.
Participant B:
In my personal life, here are some ways I try to live sustainably: using reusable products (coffee cups, grocery bags, etc), limiting shopping for clothes and if I do, I try to avoid "fast fashion" stores, reducing meat consumption, and supporting local businesses.

Participant C:
It is a consideration in many, many parts of my personal life ~ water usage, consumption, waste practices, transportation, etc.
Participant D:
While I have realistic ideas around how much impact individual efforts have upon earth's sustainability I still find it important to do what we can even if they are small things with small impacts- as it is the responsible thing to do.

Question 6. Explain how your students are exposed during your classes to information on the causes and consequences of different sustainability issues.
Participant A:
We use digital formats, EPIC and other online resources. We also have a unit in our science curriculum on sustainability. Through dialogue. Through observation, when we observe an action that requires attention.
Participant B:

Most days, we will watch CNN10 as a class, and occasionally the news segments will touch on the causes and consequences of different sustainability issues. During and after watching the CNN10, students have an open space to respond to any of the segments and ask any questions.

Participant C:
Reading of curated non-fiction articles (Newsela); CNN10 news shorts; organic dialogue; we have a Science unit dedicated to resources, environment, and sustainability.
Participant D:
As mentioned prior they get exposure to the causes and consequences of some sustainability issues through their environmental issues projects.

Question 7. Explain how your students are exposed during your classes to Information on current projects, efforts or solutions to address specific sustainability issues.
Participant A:
Last year during our unit on sustainability and natural resources we collected plastic bottles. We wanted to show the students how much space all the plastics use up in the landfills.
Participant B:
Most days, we will watch CNN10 as a class, and occasionally the news segments will touch on the current projects, efforts or solutions to address specific sustainability issues. During and after watching the CNN10 of the days, students have an open space to respond to any of the segments and ask any questions.
Participant C:
No answer.
Participant D:
I believe Mik has already sent you the unit planners that reflect where we address sustainability.

Question 8. Related to all the training and preparation you received about causes, consequences, and/or solutions to sustainability problems. How much training did you receive in your pre-service teaching program?
Participant A:
I don't recall having any training that was specific to sustainability. My current awareness has been acquired from courses I took as an undergrad and my own personal curiosity.
Participant B:
I got my teaching credential at Antioch University and while I don't remember specific training about sustainability, one of their values as a school is ecological literacy. I went through the program 4 years ago, so my memory might not be exact. Throughout the program, we had to write reflections of our experiences as student teachers and students in the program, and had to provide a number of "artifacts" of how we used ecological literacy or did anything related to ecological literacy any time throughout the program.
Participant C:
I took undergraduate classes in environmental science and communication - did not have a dedicated environmental education class for my credential/masters program.
Participant D:
None?

Question 9. Related to all the training and preparation you received about causes, consequences, and/or solutions to sustainability problems. How much training have you received as an in-service teacher?
Participant A:
I have not received any training.

Participant B:
This is my first year teaching and I don't think I've had any training specifically related to sustainability yet.
Participant C:
None.
Participant D:
None.

Question 10. What support do you hope to receive as a result of our work in methods to integrate sustainability learning into your lessons?
Participant A:
Awareness of scientifically accurate student friendly information. Resources and activities that are hands on for students.
Participant B:
Any support to integrate sustainability in my lessons would be relevant, beneficial, and impactful.
Participant C:
Student & teacher resources (activities, curriculum, books, videos, etc.) that are easily accessible & collaboration for where and how to integrate/align to our curriculum.
Participant D:
I am just excited to be part of this project and finding ways to enrich our unit to make it more relevant and impactful on our students.

Appendix E

Transcripts for Class Observations: https://tinyurl.com/bjua6ezn