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Critical Literacies and Cosmopolitan Sensibilities: Traversing Digital Media Spaces, Building
Socially Just Global Places

By

Devanshi S Unadkat

A dissertation submitted in partial satisfaction of the

requirements for the degree of

Doctor of Philosophy

in

Education

in the

Graduate Division

of the

University of California, Berkeley

Committee in charge:

Dr. Glynda Hull, Co-chair
Dr. Erin Murphy-Graham, Co-chair
Dr. P. David Pearson

Spring 2022

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Abstract

Critical Literacies and Cosmopolitan Sensibilities: Traversing Digital Media Spaces, Building Socially Just Global Places

by

Devanshi S Unadkat

Doctor of Philosophy in Education

University of California, Berkeley

Professors Glynda Hull & Erin Murphy-Graham, Co-chairs

My dissertation seeks to explore opportunities for disruptions—moments of learning in (digitally) networked spaces that seek to challenge, subvert, and reimagine our worlds. Drawing primarily on sociocultural theories of literacy and learning, I explore the ways that learning, mediated by digital technologies, takes place in formal and informal educational spaces. The world that students inhabit is increasingly characterized by rapidly spreading information (and mis-information) and the ease of connectivity made possible by the proliferation of technology can significantly affect the lives of others near and far, for better or worse. As such, my dissertation consists of five chapters that seek to: (1) add to conversations conceptualizing the kinds of skills and dispositions entailed in our current world and (2) to interrogate how learning occurs through the quotidian interactions in the everyday lives of children, adolescents, and young adults. The central chapters of my dissertation are three empirical pieces that draw on data collected across different educational contexts wherein digital media are regularly used by students as tools in creating and sharing knowledge.

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Critical Literacies and Cosmopolitan Sensibilities: Traversing Digital Media Spaces, Building Socially Just Global Places

On a warm and muggy early September morning, my colleagues and I drove to a small town on the outskirts of New Delhi, India. After several erroneous turns and directions from multiple passersby, we followed winding, narrow dirt roads that led to the rusted iron-gates and large, peeled, red and white signage, of a rural public school, *Asha*. In a region where student absenteeism was the norm, *Asha* not only successfully retained students but also significantly promoted their learning. While making strides to promote a quality education for young boys and girls in the neighborhood, the school simultaneously supported the engagement of parents and other community members in their children's education. The school was hailed by UNICEF as a model in achieving targets towards the UN's *Sustainable Development Goal 4 (SDG 4)*¹: achieving a quality education for all children around the world and we were visiting *Asha* to learn about their approach to teaching and learning.

Over the course of the day, I was struck by the candid curiosity the students expressed in their earnest quest to learn anything and everything that was not already known to them. They had a desire to gain knowledge with an unceasing eagerness that resonated with something inside me. Perhaps, it was a realization of my own inability to reflexively question and learn--- a recognition that I perhaps was only viscerally open to learning and should work towards the kind of willingness to listen, question, and think that the students at *Asha* demonstrated. As I mused, gazing at the school playground, an enthusiastic 8th grader, Saagar, whom I had befriended earlier that day, jolted me back to reality. Without realizing it, I had been standing there rubbing my hands together with some sanitizer. Saagar asked me what I was rubbing on my hands and said he wanted to try some since he liked the way it smelled. I placed a few drops in his hand and he squealed with delight as he reveled in the cool sensation on his palms and the smell of *black cherry merlot*. He invited his friends to try some sanitizer too exclaiming they would feel a 'cool' and 'clean' sensation when they rubbed their hands together. The group collectively *ooh-ed* and *aaah-ed* chorusing a series of questions about the composition and chemistry of sanitizer and its uses. Just as enthusiastically and without missing a beat, they continued to ask me additional questions about the filming equipment our team brought with us. The unceasing questions they posed in conversations as they moved from one topic to another, all the while allowing everyone's voices to be heard were indicative of their desire to keep learning.

Their eager questions and curiosity were just one facet of their thoughtful dispositions though. The students were equally keen to share the tools and technologies they regularly used in their own lives, recognizing their existing knowledge and skills, and desiring to engage in a mutual exchange of ideas. They shared with me that some of the older boys had their own cell phones and were permitted to use social media platforms such as *WhatsApp* and *Facebook*. However, it was considered inappropriate for a girl in any "good" household and of any age to

¹ Additional information on the United Nation's Sustainable Development Goals (SDGs) can be found on [their website](#).

have her own cell phone or social media profile²—a taboo that the students called out, incredulously wondering why their elders get angry when girls use technology or social media. Crowded around a clunky mobile phone that weighed more than my sleek MacBook Air, the students gave me a tour of one of their WhatsApp and Facebook profiles. *Geeta*, one of the females in the group whispered that her brother had helped her to create a Facebook profile unbeknownst to their parents. As I listened to each of them opine on the merits of having access to social media, the owner of the mobile phone, *Sushant*, remarked that my iPhone 5 was much smaller than his handheld device and perhaps I wouldn't have access to the internet through such a tiny phone. In the same breath, Sushant mused that since his phone was more powerful than mine, I should perhaps get myself a phone like his on my way home from the school. He gave me directions to the store and said the owner was his "uncle" and would give me a good price on the phone if I mentioned his name.

Unanimously agreeing with Sushant, the students invited me to tour the other gadgets they had available to them at school. Proudly they pointed to the school's sole desktop—a dusty Compaq with a large CPU—that they sometimes take turns using. These students who wanted to learn, craved knowledge, shared resources, collaborated with one another, and travelled long distances to get to school, took nothing for granted. Rather, they seemed to appreciate everything available to them at their school—whether a small or a large "thing"—with equal reverence. When I got back to my hotel room that evening, I looked around at the digital gadgets strewn around me that far outnumbered what the school had available to all students. From my perspective, the students had limited resources, but didn't hesitate for a minute, *to share*—knowledge and resources—and also *to learn*—reflexively and thoughtfully. I don't entirely know that I can articulate what I think I learned from these students, but needless to say, my interactions with them left a lasting impression on me to delve deeper into addressing the questions in my dissertation. I summarize two key "lessons" I was left with and the subsequent questions that arose in the following sections.

Lesson 1: On rethinking the Cs of 21st Century Learning

First, I realized that the students perceived themselves quite differently than one might perhaps expect. They viewed themselves as being in somewhat a privileged position compared to others in their community. Their goal was to seek knowledge, learn, grow, and give back to the community. They wanted to be engineers who could improve the infrastructure of their community, doctors who could provide healthcare that wasn't easily available to their community; the students' long-term aspirations focused on giving back. This was ironic since my colleagues and I were at Asha because the school was identified as being a site that served marginalized and disenfranchised students in order to improve their economic outcomes in the future, consistent with the targets of SDG 4. The school, in fact, exemplified the stark inequity that exists across the country wherein public schooling has been relegated to a quality not deemed worthy of attaining and private schools are becoming the norm to aspire to among people of all classes. The students, however, didn't share the view that their school was

² For example, [this recent NPR report](#) documents the adverse impact of the social stigma associated with girls' owning smart devices.

perhaps ill-equipped compared to affluent schools in cities. Rather, the Asha students saw themselves as agentive and empowered to shape their futures. Inspired by the lead teacher, whose commute to and from the school takes about 3 hours each way, the students wanted to be agents of change, not simply skilled workers in a market economy.

The students viewed education as a means to liberate and nourish their minds, engage in reflections and transformations of their worlds to improve the lives of their community. They had a seemingly unquenchable thirst to learn from those in their community as well as others from outside. In other words, the students' dispositions are consistent with what I have come to know as tenets of an education informed by the capabilities approach and a worldview that is cosmopolitan (Alkire, 2005; Appiah, 2006; Freire, 1968/2014; Hansen, 2010; Nussbaum, 2012; Walker & Unterhalter, 2007). It seemed that the very goals that drive global agendas of development and education fall far from the lived realities of the people they intend to benefit. While the views of many well-meaning educators, such as myself, and organizations, such as UNICEF, is to ameliorate the lack of opportunities for a quality education for children around the world, the goals of a "quality" education are often informed by approaches that conceptualize education in narrow terms based on capital returns and the protection of human rights (Alkire, 2005; Robeyns, 2017; Walker & Unterhalter, 2007). These views of education aspire to foster the development of many 21st century skills (or the "C's" as they are called), but do not include the kinds of critical consciousness or cosmopolitan sensibilities students demonstrated. Arguably in the present moment where our world is fraught with the rise of authoritarian leadership that threatens to undermine democracy, the need to ensure that students are developing skills that enable them to traverse tensions that undercut our moral obligations to one another. In other words, the skills emphasized as requisite for 21st century learning should account for the kinds of dispositions needed to work with and through seemingly stringent differences in order to enable "compassionate connections" (Appiah, 2006) and "reflections upon inequities in our world in order to transform it" (Freire, 1968/2014).

Lesson 2: On Networks, Capital, and Culture

As I pondered further, the next logical place of inquiry seemed to delve into the paradox of how we currently are in a world that is "vastly interconnected, yet deeply divided" (Hull, & Stornaiuolo, 2010, p.86). In contrast to the life worlds of the students, families, and larger communities at Asha, my life world promises that access to almost anything and everything is just *one click* away, yet the material goods one can procure, never seem to be enough for many people who inhabit my world. My world has access to ample sanitation, but at the start of a pandemic, basic supplies were hoarded out of a fear of depletion. My world is saturated with screens, commodities, and more consumer items than one might even know of, but yet just one day after celebrating a holiday to be thankful, we hear of people stampeding to buy more goods. My world is one in which many are "educated" and should know the privilege that comes with it, but yet, use this privilege to perpetuate existing systems of inequality.

The *networks* that exist in my world seem to be primarily of two kinds: *social* connections that one might leverage to improve their own status in society, and *digital* networks that tout interconnections between people around the globe. However, digital networks are created, controlled, and algorithmized by the people or entities who *own* them—usually corporations or wealthy individuals who also have access to a vast number of social

networks. Van Dijck (2013) notes that the profit driven motives of most technology platforms further enable a neoliberal agenda that caters to the whims of those who already wield power. Ordinary citizens become the users to be bought and sold while also becoming susceptible to the bias of algorithmized information and single stories (Apple, 2000; van Dijck, 2013; Willson, 2019). Moreover, digital networks are generally accessed only through devices that have Wi-Fi or other cellular capabilities—a gatekeeping mechanism wherein universal access is untenable even in the richest nation in the world. The harsh realities of inequities have become even more apparent—in fact, undeniable—in the face of the current shifts to distance education and online learning where students around the globe must rely on digital technologies and access to the internet to be able to keep up with schoolwork.

Based on estimates by UNICEF³, 1.6 billion of young children and adolescents around the world not only will suffer malnutrition and face tremendous insecurities but will also fall behind in their education due to the tangential effects of the COVID-19 pandemic. Most impacted will be young girls in rural parts of the developing world— some perhaps from the young group I met at *Asha*-- and students in low-income neighborhoods of the ‘developed’ world—including in the East Bay Area that has now become my backyard. On the other hand, in places such as the outskirts of wealthy Silicon Valley, many students seamlessly transitioned to adapting to digital instruction as their families hired private tutors to support “learning pods” in order to ensure their children’s education was not put on hold. Technologies have the power to spread knowledge, information, and ideas around the world in seconds, but just as powerfully can amplify existing inequities to further engender hierarchical structures of power and privilege. This trope is not new; but the question of how technologies can be utilized within practices that leverage their potential as tools in bringing about social change is ever more important to interrogate as educators³ are charged with the task to ensure resilience in delivering instruction in the face of multiple calamities that prevent *normal* schooling. As we confront century old inequities that now compel us to acknowledge the ramifications of our *kosmos* continuing to allow them to exist unchecked, we must look at the role that tools and technologies—digital, physical, and other non-material kinds— play in shaping our life worlds. Additionally, it is imperative to interrogate how these tools and technologies are leveraged: how the practices surrounding their adoption have the potential to disrupt the status quo or engender or reproduce hierarchies of power and privilege.

Next Steps: The Big Ideas and Questions

I would have described *Asha* as perhaps “lacking” adequate schooling resources, but the students expressed a disposition that focused on recognizing their position in relation to the world that they knew; a position that they articulated as being privileged since they had access to resources that many other children in neighboring schools did not. Rather than aspiring to obtain more material resources associated with monetary gains and wealth, these middle schoolers were already thinking about how they would use their positions of privilege and the education they felt were bestowed upon them to improve lives of others in their community.

³ For additional information, see UNICEF’s [data hub on COVID-19 and children](#)

As conceptualizations of what it means to be cosmopolitan continue to evolve and calls for the use of digital technologies to decrease inequities reverberate across disciplines, I seek to explore how the beliefs and practices that inform the goals and agendas of education make use of a range of tools, technologies, and practices in order to foster critical and cosmopolitan sensibilities in students and promote an education informed by social justice perspectives. In my dissertation, I will analyze data collected from three projects framed by theoretical considerations of sociocultural views of literacy and learning, the capabilities approach, and sociotechnical media theories. In what follows, I provide an overview of the framework I use, the components of each chapter of my dissertation, and contributions I hope to make to the field.

Background and Theoretical Framework

The world as we know it today is promulgated by digitization, cloud-computing, and algorithmizing, and continues to be more so every day. Most things one might need exist in a single *platform* in an attempt to streamline services. For several years, widespread e-commerce, automated delivery services, and educational technologies, among other digitized practices, have changed the face of the industries they operate within-- in some cases carving out a niche within the field and in others wiping out earlier versions, for better or worse. Take for example, the case of bookstores being almost entirely effaced amidst the widespread use of e-readers or previously manually created paper and pencil work that is now easily digitized—arguably in both these cases, we see some opportunities and some drawbacks, presenting us with constantly changing systems of information, knowledge production, and practices in an ever-evolving world. Questions about the implications of these changes for learners and educators around the world have been explored for decades (Cope & Kalantzis, 2009; Hull, 1993; New London Group, 1996), and are even more relevant today wherein the utopian vision of technology as a neutral equalizer of connectivity, an opportunity for social mobility, and the antidote to many of the world’s problems is far from a reality.

Across the globe, vast inequalities create conditions which prevent regular access to and equal participation in digital spaces. In fact, as I write these words, around the world people are facing uncertainty as we confront the reality of millions of lost lives in a global disease outbreak amidst failing health care systems, displacement and insecurities caused due to climate change, the increasing brutalization of groups of people based on their race and/or ethnicities, and no predictable sense of when things will ‘return to normal’-- or what normal will even look like. The multiple pandemics we currently face are undoubtedly a complex outcome that represents how processes of globalization, spurred in part by the rapid proliferation of technologies create an interconnectedness among citizens of the world where as philosopher, Kwame Anthony Appiah (2006) notes, “each of us can realistically imagine contacting any other of our seven billion fellow humans and send that person something worth having” or conversely, “also send, through negligence as easily as malice, things that will cause harm” (p. 87).

The convergence of the large-scale issues we face is no coincidence as rising extremist ideologies take hold government in countries across the globe. We see the world fall into disarray in response to a pandemic entering its third year along with sociopolitical events of magnanimous proportions, such as the current invasion of Ukraine by Russia and the continued wars being fought in countries around the globe. Simultaneously global efforts to combat the

inadvertent harm that has us reeling and brought to light many strifes that were ignored and rebuild our world towards a better future, are indicative of our ethical and moral entailments to local and global others as we navigate our lives as *citizens of the world* (Appiah, 2006; Hansen, 2010; Hull & Stornaiuolo 2010; Hull, Stornaiuolo, & Sahni, 2012). Equally important, climate change spurred by the apathy of large corporations, multinational trade agreements- or disagreements- and the denial of science among authoritarian regimes seizing control around the world, leads to natural disasters that threaten basic needs and livelihoods of many around the world. Such governments have also spawned increases in violent hate crimes, discrimination, and threats to our ability to live with one another in respectful and compassionate ways across the world⁴.

Many recent events have arguably exposed the extent of the inequities woven into the fabric of our existence for centuries. While some continue their lives almost unimpacted, others scramble even more than before, facing insecurities that threaten their existence in far more urgent ways than the threat of succumbing to the COVID-19 virus itself or any other single threat from the many pandemics we face. The converging of the many calamities we face as a human race underscores the increasing urgency with which we need to address exacerbated inequalities in order to upend the current modus operandi through innovative, ethical, and socially just practices.

Possibilities Amidst Uncertainty

Ironically, the forced shift to digital spaces has in some instances presented glimmers of hope as administrators and public-school officials encourage teachers to adopt creative, project based, and meaningful pedagogies that allow many students to learn in more engaged ways than before. We now hear of students learning fractions by baking cookies with classmates over Zoom, researching and creating independent presentations on their favorite animal, and even practicing social skills such as turn-taking during circle time in these digitally mediated spaces. These creative pedagogies⁵ that educators are tirelessly working to instantiate, represent acts of care, responsibility, and a commitment towards improving the lives of others, near and far, as teachers offer their curriculum ideas to one another or open access to a range of courses to learners around the world. Amidst this upheaval, where we face the potential threat of continuing to reproduce and further widen existing inequalities, we are then inadvertently presented with opportunities to build better futures-- futures that we want that perhaps might not be as untenable as we think.

My dissertation seeks to explore such opportunities for disruptions—moments of learning in (digitally) networked spaces that seek to challenge, subvert, and reimagine our worlds. Students and teachers in various contexts often demonstrate everyday habits of mind that foster skills and dispositions consistent with a concern for the well-being of others. My goal in this dissertation is to explore how such worldviews and ethical entailments can be fostered

⁴ For example, among the many issues that stem from such hostile movies, In the US we are seeing legislation in various states seeks to undermine protections for women’s health and transgender rights while promoting bills to limit the teaching of history to a White-washed perspective.

⁵ A nice summary of this optimism is presented in this poem: [*It was Never the Teachers*](#).

and instantiated in digital spaces across educational contexts. My hope is to interrogate pedagogies or participant structures of new “classroom” or learning spaces and explore expansive goals of student learning and assessment in an effort to reimagine how knowledge is created and shared.

Shifting Scapes, Digitizing Spaces.

Globally almost 50% of the world’s population now has access to the internet⁶ through a smart phone, instant messaging, or other devices, thereby creating a world of netizens (Hauben & Hauben, 1998; Ritchie & Roser, 2019; van Dijck, 2013) who inhabit a multitude of digital spaces for different purposes. For example, young children frequently use tablets to engage with various applications or “apps”, adolescents often communicate with one another via social media while curating online identities for themselves, and adults rely on all kinds of technology in their personal and professional lives every day. Yet, none of these age groups are restricted to the use of solely one technology, medium, or tool. Rather, most users of technology in their daily lives access multiple web applications through multiple devices each day. The use of technology is seen as a quintessential 21st century skills, one that all individuals must acquire in order to keep up with the demands of our current world—and is even more forced upon us amidst the necessary adoption of online and distance education to maintain social distancing and safety measures.

Our life-worlds shape and are constantly shaped by the tools, technologies, or artifacts around us creating *disjunctures* across the various spaces or *scapes* that we inhabit (Appadurai, 1990). Media theorists and sociocultural thinkers alike remind us that we, humans, are but one among a number of other *actants* existing in vast networks constituted by the collective influence of one another (Appadurai, 1990; Latour, 1994; 2005). Arguably, in the current Web 2.0 age, a number of digital technologies are powerful and influential actants mediating our daily lives. Through the collision of multiple actants in our worlds, we become agentive citizens of a *phygital* world regularly confronted with the juxtaposition of material and non-material, human and non-human, intentional and non-intentional, old and new influences. These disjunctive shifting *scapes*, the rise of media, increasing access to communication channels, and the subsequent sharing of goods, services, and information, among other things around the globe, have created a new world order characterized by the movement across and the thickening of global and local connections (Brandt & Clinton, 2002; Steger, 2020).

However, as technologies continually evolve and new forms emerge, access to and participation in knowledge construction through the most cutting-edge technologies remains unequal. We live in a world that is “vastly interconnected yet deeply divided” (Hull & Stornaiuolo, 2010, p. 86). The notion of cosmopolitanism is rooted in the ancient idea of a worldview known as *cosmopolitanism* and historically mainly conjured an image of an elite global traveler. In recent times, this term has been reinvigorated to capture more worldviews that recognize our allegiance towards each other from a bottom up perspective, describing the

⁶ Ritchie and Roser (2019), indicated that “All individuals who have used the Internet in the last 3 months are counted as Internet users. The Internet can be used via a computer, mobile phone, personal digital assistant, games machine, digital TV etc.” The data they report on were collected in 2016.

habits of mind cultivated through people's increasing migratory patterns and the rapid shifting and spread of information and ideas (Hansen, (Appadurai, 1990; Robbins & Horta; 2017; Steger, 2020). More recent theorizations of cosmopolitanism force us to reflect on century old conceptions towards more top-down reimagination of what it means to be cosmopolitan. These newer theorizations allow us to acknowledge the dispositions of those that have had contact with others forced upon them and how everyday acts of imagination and dialogue, which are often seen as mundane, represent a more complex, heteroglossic reinvention of the ancient and elite notion of cosmopolitanism (Bakhtin, 1986; Hansen, 2010; Hull, Unadkat & Adams, 2021; Robbins & Horta, 2017). These accounts are important because they allow us to view anew the ways in which we can foster these dispositions in schools or learning contexts that are now, quite literally, entirely *networked*.

Participatory Practices in Digital Spaces

Users of digital technologies and media are regularly confronted with information curated by algorithms not just in terms of whom or what they choose to "follow" but also through additional algorithmic suggestions and paid advertisements on media platforms that are inherently ideological, often lack credibility, and impact the everyday experiences of all media users (Darvin, 2017; Dixon-Román, Nichols, & Nyame-Mensah, 2019; Willson, 2019). Thus, as users navigate these increasingly dynamic, fluid, paradoxical spaces, a key task becomes traversing these with a disposition and skills that seek to disrupt and transform marginalizing ideologies and structures.

Many forms of marginalization that are commonplace in our offline worlds, can easily be reproduced and often amplified in digital networks that span vast time and space (Darvin, 2017; Kennedy & von Vocano, 2019). At the same time, digital spaces provide a medium for mobilizing, disrupting, and subverting hegemonic practices (Bonilla & Rosa, 2015). Thus like institutions, ideologies, and forces of the past, our digitally mediated worlds have the potential to both reproduce and disrupt structures of oppression, perhaps at greater magnitudes than before. Given the vastly mediated digital networks in which adolescents regularly participate and the rapidity with which media and information travel across time and space, uncritical participation practices in such networks can have serious adverse outcomes such as the production of *hegemonic rationality* that engender biases or violence against certain individuals or groups and thereby reproduce existing structures of oppression or reify messages of exclusion (Darvin, 2017; Dixon-Román et al., 2019; Kirkpatrick, 2008; Nichols & Stornaiuolo, 2019).

Amidst our increasingly digitally mediated life-worlds, debates on individuals' constitutional rights to free speech and the censoring of hate speech have led to sometimes violent clashes among groups. Phrases such as *cancel culture* and *snowflakes*, have become a commonplace in our parlance where those who dogmatically believe in upholding the status quo are quick to dismiss calls for justice as a liberal bias. In response to concerns about increasingly spreading misinformation⁷ and hate speech, debates to implement counter

⁷ See for example the [report](#) from the Knight Foundation.

measures center in the discourse of politicians, activists, and leaders of technology companies⁸. On the flipside, we see equally forceful efforts to provide spaces for such views in the name of “unbiased” and “uncensored” free, and often hateful, speech⁹.

In an effort to interrogate these tensions, my dissertation, draws on data collected across three empirical studies to explore the possibilities that emerge to disrupt the reproduction of hierarchies in digital spaces and corresponding kinds of practices, dispositions, tools, and skills that enable such subversion. I conceptualize literacies and meaning-making practices through the lens of sociocultural theories of learning, globalization, and technology studies. Drawing on literacy scholars who have shaped our current understandings of the ways in which citizens of the world today create, share, and disrupt/reproduce knowledge, I seek to interrogate the possibilities for change that emerge when these citizens become *netizens* (Hauben & Hauben, 1998)—individuals who are not defined simply as people with an intentionality and potential to affect some other entity, but rather *actants* who represent an amalgamation of their individual potential and the potential of the (digital) tools they wield on a day to day basis (Latour, 199).

Through these big ideas, I present three papers across which I seek to explore how individuals and societies continually shape one another leading to development or large changes at micro (individual, community, and local) and macro (structural, global, and systemic) levels. Importantly, I seek to explore how this development might be a mechanism for disrupting hierarchies towards a more socially just society through the cultivation of a cosmopolitan world view. Thus, I conceptualize what education can and should look like through the lens of the capabilities approach and how a cosmopolitan worldview might be fostered through the formal and informal educational spaces that netizens around the world inhabit (Alkire, 2005; Appiah, 2006; Hansen, 2010; Nussbaum, 2012; Robeyns, 2017; Robins & Horta, 2017; Walker & Unterhalter, 2007). These ideas will be collectively illustrated over the three empirical chapters of my dissertation and further interrogated/summarized in the concluding chapter.

Components

My dissertation consists of five main chapters including this introduction, three empirical papers, and a concluding chapter. Across the three empirical chapters of my dissertation, I hope to provide an initial exploration to the following “big” questions:

1. What skills, dispositions, and practices are entailed in participating in digitally mediated worlds? What role does education play in fostering these skills, dispositions, and practices?
2. What structures enable media spaces to privilege subversive practices and value multiple kinds of ethically oriented knowledges? How should participation and knowledge in these spaces be produced, circulated, and learned?

⁸ For example in a newsletter, Twitter issued [updated guidance on tackling “misleading information”](#). Similarly, Instagram FAQs indicate their [commitment to identifying “false information”](#).

⁹ See for example the social media platform, [Parler](#) created as an “alternative to platforms that censor hate speech”

In other words, through the 3 studies presented in this dissertation, I seek to interrogate how the various networked sites that enable us to connect around the globe can be intentionally leveraged as spaces that promote interactions through cosmopolitan and critically conscious sensibilities and practices. I explore these tensions across different age groups ranging from elementary school through spaces of higher education in order to discuss in particular the implications of globalization, mediatization, netizenship, and digitization on education. Below, I provide a brief overview of each chapter.

(Paper 1) Food Eating Contests Meet Societal Transformation: Shifting Scales and Stories in Adolescents' Digital Composition

This empirical chapter focuses on adolescents' digital storytelling practices and social media use. Through an analysis of data collected during an after-school program centered on digital storytelling amongst geographically dispersed youth, the chapter demonstrates the complex considerations adolescents make in their authorship and viewership of artifacts and practices that circulate in digital spaces. Through a recognition of the agency that adolescents seem to inhabit digital spaces with, I explore the potential of playful proclivities and purposefully driven digital activism that characterize the practices of youth in these spaces. Building on arguments in the field, I offer a framework to conceptualize critical digital literacy skills that seeks to underscore the salient role that various skills, knowledge, and tools play in influencing how youth can appropriate digital media spaces as sites of contestation and change.

Theoretical Framework

Drawing on a transliteracies framework (Stornaiuolo, Smith, & Phillips, 2017), this paper conceives youth media practices as having the potential to be socially transformative by disrupting dominant ideologies that seek to marginalize or harm others (Darvin, 2017). More specifically, in drawing upon a decade of design-based work in digital storytelling (Hull et al., 2006; Hull & Stornaiuolo, 2010; Hull, Stornaiuolo, & Sahni, 2010; Hull, Stornaiuolo, & Sterponi, 2013), this paper seeks to demonstrate how, in specific contexts, social media practices can be leveraged to promote participation in a network of shared meaning-making. In other words, I explore how students reflexively appropriated social media practices, transforming these spaces into sites of contestation and creating new kinds of subversive literacy practices.

I seek to extend the notion of *youthtopias* (Akom, Ginwright, & Cammarota, 2008) to digital contexts in order to enable an understanding of how we might support adolescents towards such agentive and subversive participation in social media spaces. In other words, this paper explores the role of fostering adolescents' critical digital literacy skills in shaping the development of agentive and counter-hegemonic identities through authoring digital stories as well as how adolescents can develop hospitable and critical imaginings of self and others located in distant spaces locally and globally (Darvin, 2017; Hull & Stornaiuolo, 2010; Hull et al., 2012; Stornaiuolo et al., 2017). I seek to extend existing theorizations in the field to propose a framework to conceptualize adolescents' critical digital literacy skills.

Research Questions

In in paper, I ask: *How can educators support the development of students' everyday digital literacies to be more critically turned? What (im)mobilities influence the development of adolescents' critical digital literacy skills?*

(Paper 2) 360-Degree Storytelling: Constructing Digital Narratives, Deconstructing Gender Narratives

This paper draws on data collected during a virtual reality digital storytelling exchange between students in India and the US. Building on Professor Hull's lineage of research, this work continues to explore the possibilities for reflexive dialogue and learning that emerge when adolescents and young adults speak to each other across differences. This project leverages immersive virtual reality (VR) technology for students to advocate for gender equality in their community through digital storytelling. Digital storytelling has been used as a mechanism to promote voice among populations marginalized by society; however, its use with adolescents is limited (e.g., Hull, & Stornaiuolo, 2010). While studies of adolescents' technology use have begun to shift towards a focus on their creative and transformative potential (e.g. Zimmerman, 2016), digital storytelling to promote activism voice among adolescents remains largely unexplored.

This project centers on the ways in which students use cutting-edge digital technologies to (1) create narratives that focus on improving individual and community lives and well-being through advocating for gender equality and (2) showcase their strides towards transforming their community to local and global audiences.

Theoretical Framework

Drawing on critical feminist pedagogy (Freire, 1968/2014; Hull, Jury, & Sahni, 2015; Sahni, 2017), cosmopolitanism (Appiah, 2006; Hull & Stornaiuolo, 2010, 2010; Hansen, 2010), and new literacy studies (e.g., Kress, 2005; Scribner & Cole, 1981; Street, 1984), this chapter explores how the young girls told crafted their stories in empowering ways. Additionally, I interrogate these theories by drawing on notions of development, education, and justice using the Capabilities Approach (Nussbaum, 2012; Sen, 1999) to explore how the girls repositioned themselves in relation to an imagined global audience.

Generally speaking, information and communication technologies are used in projects of development to promote instrumental skills that are viewed as essential to have in order for students to be productive members of our global economy. The lack of conceptualization of the role of technologies and their use has led to uncritical adoption of a range of technologies leading to much cynicism on the potential of technology to bring about improvements in the lives of individuals (Sein & Harindranath, 2014; Walsham, 2017). However, I argue that through a rigorous conceptualization of the role of technology and the larger discourses and practices that surround its use, technology can be leveraged as a tool to promote social justice and change. In other words, drawing on the digital stories created by students at Prerna School, I explore how the use of virtual reality technology in the context of the school's critical feminist pedagogy illustrates how non-instrumental goals of education, consistent with an education informed by the capabilities approach, can be realized.

Research Questions

In this paper, I ask: *Towards what ends are information and communication technologies for technologies leveraged under the notion of development? How can the use of technologies be leveraged to align with conceptualizations of development that are centered on promoting non-instrumental aims/goals of education?*

(Paper 3) Learning with Impact: Digitally Mediated Practices Online

This paper seeks to interrogate questions on re-imagining online education through the use of innovative digital technologies that enable students and teachers to collaboratively engage in creating, curating, and sharing knowledge in the context of undergraduate courses. Specifically, I seek to explore the use of student-facing learning analytics or social learning analytics (S/LA; Long & Siemens, 2011; Shum, & Ferguson, 2012) in furthering the students' learning and development in an undergraduate course.

Online education has been trending for decades but continues to remain fraught with mixed views about its implementation among students and instructors (Cheung et al., 2021; Long & Siemens, 2011; Renz & Hilbig, 2020; Hensley, 2005; Godwin-Jones, 2014; Kessler & Wall, 2016). Researchers have documented a range in the quality, content, and delivery format of instruction in these courses, as well as, raised a number of ethical considerations about the datafication through course platforms (Bricknell & Muldoon, 2013; Frey & Sutton; Fujita, 2020; Hensley, 2005; Hew, Jia, Gonda, & Nai, 2020; Khan et al., 2020; Marachi & Quill, 2020). Amidst the efforts to address some of the shortcomings of online educational spaces and to leverage the potential of digital tools in furthering student learning and engagement many argue that learner produced data trails have the potential to support pedagogical practices for instructors and students to gain insights into student learning and participation in a course (Holcomb, Brady, & Smith, 2010; Khan, Atta, & Jawaid, 2021; Long & Siemens, 2011; Shum & Ferguson, 2012). This paper is an effort to contribute to understanding the role of student-facing learning analytics in the context of an online and hybrid undergraduate course.

Theoretical Framework

Drawing on sociocultural understandings of literacy and learning to explore how student-facing learning analytics and other available tools mediate student learning and engagement in online learning spaces (Scribner & Cole, 1984; Vygotsky, 1978). These frameworks provide conceptual apparatus in understanding of how “cultural and individual planes interact recursively; social development provides affordances for individual development, which in turn contributes to further societal development and so on” (Freedman, et al., 2017). The collective insights from these theories thus enable an exploration of how student-facing learning analytics create opportunities for individual learning and development as well as their role in facilitating learning and development among members of the course.

In this work, part of a designed based research project (Barab & Squire, 2004) led by Dr. Glynda Hull, I seek to contributing to re-imagining traditionally passive online educational spaces to be dialogic spaces that promote student agency and engagement through leveraging participant structures made possible by available tools. Drawing on Scriber & Cole's (1984) notion of a practice, I conceptualize learning as a practice that takes place at the nexus of

available tools, knowledge, and skills and illustrate how students' learning practices are mediated by the available tools, particularly student-facing learning analytics.

Research Questions

In this paper, I ask: *In what ways do digital tools, specifically student-facing learning analytics, and activities surrounding the use of these tools mediate learning practices in online and hybrid courses? More specifically, how do students leverage information from data trails ensuring from student facing learning analytics to subsequently modify the activities they participate in while engaging in learning practices in these spaces?*

Summary

Collectively, the three studies in this dissertation allow me to consider tensions inherent to traversing spaces where boundaries of all sorts are blurred creating an illusion of harmonious interconnection that in actuality creates participatory networked spaces that are as susceptible to promoting discord as they are harmony. The final chapter of my dissertation provides concluding considerations—theoretically and practically— in supporting students' as they navigate various digital spaces.

Food Eating Contests Meet Societal Transformation: Shifting Scales and Stories in Adolescents' Digital Composition

Data collected by the Pew Research Center (2015; 2018) on social media usage and access to smartphones amongst US teens aged 13-17 shows that there has been approximately a 20% increase in the number of teens that have access to a smartphone over the course of three years. Moreover, 92% of teens report going online daily and 24% say they are online “almost constantly” (PEW Research Center, 2018). Arguably, there have been rapid increases in the usage of social media and dynamic shifts in the platforms through which teens access digital spaces¹⁰; however, the impact of teens' social media use on their lives remains unclear to researchers, educators, parents, social media companies, and adolescents themselves. Indeed, teens in the US have reported mixed views on the impact of social media on the lives of people their age. One in three teens (31%) view social media as having mostly positive effects on their lives, such as providing increased connectivity across distance or opportunities for self-expression. On the other hand, one in four teens (24%) report that social media has mostly negative effects on their lives as a result of experiences such as increased bullying or less meaningful interactions with others in digital spaces. The largest consensus (45%) among the teen population seems to be that the effects of social media on their lives was neither positive nor negative (PEW Research Center, 2018).

It is concerning that adolescents report spending significant amounts of time online but do not seem entirely attuned to the magnitude of ways in which they are impacted by the social media they consume. Adolescents are regularly confronted with information through media platforms not just in terms of whom or what they intentionally choose to follow but also through algorithmic suggestions on media platforms that lead to the production of *hegemonic rationality* (Kirkpatrick, 2008). That is, digital tools and media platforms are inherently ideological, often lack credibility, and impact the everyday experiences of all media users in covert ways that potentially engender biases against certain individuals or groups while privileging others (Darvin, 2017; Dixon-Román, Nichols, & Nyame-Mensah, 2019; Willson, 2019). Given the vastly mediated digital networks in which adolescents regularly participate and the rapidity with which media and information travel across time and space (Appadurai, 1999; Stornaiuolo et al., 2017), uncritical participation in such networks can have serious adverse outcomes by reproducing existing structures of oppression or reifying messages of exclusion (Darvin, 2017; Dixon-Román et al., 2019; Nichols & Stornaiuolo, 2019). For example, recent reports indicate that: 1) online hate speech is most often directed toward people from marginalized groups (Kennedy & von Vocano, 2019), and 2) 65% of adolescents report encountering hate speech in their social media use, most often in the form of racist, sexist, homophobic, or anti-religious forms of speech (Statista, 2018).

¹⁰ Comparing data collected by the Pew Research Center in 2015 and 2018 shows that there have been significant shifts in the kinds of social media apps teens say they most often use and for the most part these trends hold up in the use of most platforms regardless of demographic characteristics, with a few exceptions. YouTube now has the lion's share of teen users (85%; not included on the list of apps teens used in 2015), followed by Instagram (72% in 2018; 52% in 2015), Snapchat (69% in 2018; 41% in 2015), and Facebook (51% in 2018; 71% in 2015; [Lenhart, 2015; Anderson & Jiang, 2018]).

Yet, social media is not a monolith; social media users can appropriate these digital spaces to engage in activism, contestation, and advocacy for change as we see in social justice movements around the world that have their roots in social media practices and/or hashtag activism. For example, #ferguson and #icantbreathe have become synonymous with efforts of the *Black Lives Matter* movement in the US (Bonilla & Rosa, 2015). Internationally, #endmaleguardianship trended in Saudi Arabia as part of a feminist movement that ultimately led to significant gains towards more equitable treatment of women (Thorsen & Sreedharan, 2019). Many such movements are led by youth activists mobilizing towards demanding justice and enacting systemic change within their communities. Take for example the youth-led *March for Our Lives* movement where #neveragain was the hashtag that launched a much larger campaign advocating for stricter gun control measures in the wake of the high school shootings in Parkland, Florida.

With the current complex social mediascape, this paper seeks to consider how certain social media practices have the potential to be socially *transformative* by disrupting dominant ideologies that seek to marginalize or harm others. More specifically, this paper seeks to demonstrate how, in specific contexts, social media practices can be leveraged to promote participation in a network of shared meaning-making through reflexively appropriating digital media spaces as sites of contestation and the subversion of hegemonic ideologies. Building on a decade of design-based work on youth's digital media practices (Hull & Stornaiuolo 2010; Hull, Stornaiuolo, & Sahni, 2012), I seek to extend the notion of *youthtopias* (Akom, Ginwright, & Cammarota, 2008) to digital contexts in order to enable an understanding of how educators might support adolescents towards agentic and critically turned participation in social media spaces. In other words, this paper explores how adolescents' critical digital literacy skills shape their participation in popular and trending social media practices while fostering the development of agentic and counter-hegemonic identities.

This paper discusses part of a year-long afterschool Expanded Learning Program (ELP) implemented with middle schoolers enrolled across three Bay Area programs during the 2018-19 academic year. I apply a *transliteracies* framework (Stornaiuolo et al., 2017) to explore tensions that emerged around generating more critical and cosmopolitan uses of digital media over the course of the program. I examine how competing frames of audience, between YouTube and a multi-sited (closed) digital network, created certain possibilities and simultaneously exerted limitations for educators in fostering critical modes of participation in these spaces. I use these insights to inform how educators might better understand adolescent interaction "with the world while on the move" (Stornaiuolo et al., 2017, p. 85) to better support reflexive participation in social media practices so as to enable students to navigate and transform ideological (digital) spaces that marginalize, rather than empower, and recognize credible sources from hoaxes (Darvin, 2017). Such a move would be consistent with an understanding of transliteracies as "critical and creative social semiotic practices arising within complex ideological networks and characterized by the movement of people *and* things" (Stornaiuolo et al., 2017, p. 72).

Theoretical Framework

I draw on sociocultural theories of literacy in order to conceptualize the literacy practices and forms of meaning making entailed in the new world order of rapidly moving

people, audiences, texts, and technologies. In particular, I use tenets of critical pedagogy and ideas from New Literacy studies to conceptualize the role of critical digital literacy skills in the context of digital spaces as *youthtopias* that can be leveraged as sites of praxis (Akorn et al., 2008; Darvin, 2017; Freire, 1968/2014; Gee, 1999; Nichols & Stornaiuolo, 2019; Mills, 2010; New London Group, 1996). Further, the transliteracies framework (Hull & Nelson, 2009; Stornaiuolo et al., 2017) as a methodological and ontological tool, enables me to explore the shifts in adolescents' social media practices towards participation in digital spaces that entails critical and reflexive understandings of self and others.

Technologies of Literacy

Decades ago, anthropologist Arjun Appadurai argued that globalization through the rapid proliferation of electronic media “offers new resources and new disciplines for the construction of imagined selves and imagined worlds” (1996; p. 3) and thereby transforms the field of mass communication. Amidst increasing global access to digital technologies, the ways in which information is shared across space and time is rapidly and continually shifting, presenting both opportunities and challenges for meaning-making and literacy education. Moreover, other facets of globalization further shift our cultural worlds, calling for a new world order through processes such as mass migration that allow us to confront increasing linguistic and cultural diversity, plurality, and hybridity (Appadurai, 1996; Cope & Kalantzis, 2009; Stornaiuolo et al., 2017). These shifts through globalizing processes, or what Appadurai (1996) refers to as disjunctive *scapes*, require understanding and addressing the ways in which communication across distances through the circulation of media can be empowering and reflexive rather than marginalizing and thereby reproducing existing hierarchies.

Through ethnographic studies of literacy practices, sociocultural theories of literacy have centered the role of technologies that shape literacies, where literacy, or its plural form *literacies*, are conceived of as social practices that combine a technology of literacy with specific skills and knowledge appropriated towards cultural and ideological purposes (Scribner & Cole, 1981; Street, 1984). These studies allow us to recognize how technologies shape literacies through the histories, ideologies, and goals embedded in the uses of each technology and how technologies reciprocally are also shaped by literacy practices. As such, new forms of meaning-making arise through the continually evolving technological landscape of the *digital turn* (Mills, 2010), allowing for knowledge to be created and shared across time and vast spaces by leveraging the use of cutting-edge technologies for different purposes (New London Group, 1999, Nichols & Stornaiuolo, 2019; Perry, 2012).

Participation in literacy practices on social media platforms today involves digital production of artifacts through multimodal composition, consideration of diverse audiences, and a potential to widely and rapidly spread messages through digital technologies. Such practices can be seen in *meme culture* and/or *remix*¹¹ practices where social media users appropriate semiotic resources in ways that represent their own meaning influenced by their individual histories and identities (Lankshear & Knobel, 2007). *Meme-ing* is used to engage in a

¹¹ For an example of how students in higher education use remix practices in their academic work see: Scott, J., Hull, G., & DiZio, J. (2019).

variety of shared meaning making practices, such as certain kinds of humor, political engagement, or participation in specific messaging. Other media platforms, Twitter or Reddit, for example, offer spaces where users choose to rally around trending topics or create and participate in groups or communities based on shared interests.

While various forms of technology lead to a multitude of rich literacy practices, the particularity of the histories, ideologies, and goals embedded in the uses of each technology, when uncritically adopted for participation in literacy practices, can engender or reproduce existing power structures (Darvin, 2017; Nichols & Stornaiuolo, 2019). Many studies document the ways in which forms of bullying offline that target specific marginalized groups are reproduced in instant messaging and other social media spaces, thereby further directing hate messages and forms of exclusion towards already vulnerable groups (Kennedy & von Vocano, 2019; Statista, 2018). Further, certain practices that could be harmful are euphemistically—and dangerously-- masked as a form of creative self-expression. For example, *trolling*¹² is a popular literacy practice seen on many social media platforms often covertly intended to harm others, as was the case with how students in the project described in this paper initially used social media, as I will discuss in more detail later.

Indeed, this duality of the of social media, like other technologies of literacy, stems from the mobility and materiality of the platforms; characteristics that provide legibility and durability or a *somethingness* to these technologies, enabling them to persist and influence literacy practices even in the absence of immediate human action (Brandt & Clinton, 2002). Given the materiality and embedded ideologies of the technologies of social media and their associated literacy practices, viral trends when taken up in ways that don't involve a reflexive understanding of their meaning or perhaps their intent to cause harm, can lead to hurtful messages targeted at specific groups or individuals. In other words, unless the practices around participation in and with these literacies and their corresponding technologies are transformed, digital spaces might further exacerbate already existing structures of oppression.

Towards this end, there have been calls to encourage conceptualizations of digital literacy and participation in the increasingly fluid, mobile, and changing physical networks of our current global order in ways that entail critical, hospitable, and moral imaginings of self and others (Darvin, 2017; Hull & Stornaiuolo, 2010; Hull, Stornaiuolo, & Sahni, 2012; Nichols & Stornaiuolo, 2019; Nichols & Johnston, in review; Silverstone, 2006). In the context of his theorization of mass media, Silverstone (2006) emphasizes:

Insofar as they [the media] provide the symbolic connection and disconnection that we have to the other, the other who is the distant other, distant geographically, historically, sociologically, then the media are becoming the crucial environments in which a morality appropriate to the increasingly interrelated but still horrendously divided and conflictual world might be found, and indeed expected (p. 8)

¹² Trolling is a salient use of social media that generally involves mocking specific individuals or groups. While the practice itself is not inherently harmful and can be appropriated subversively (as political comedy or satirical genres do), generally trolling is appropriated to perpetuate hurtful messages and in many cases cyber-bullying.

Thus, to imagine and create spaces where digital literacies or social media spaces can be appropriated in ways that empower youth and transform inequities, I build on notions of digital literacies and cosmopolitanisms—new and old (the most recent of which have taken a critical turn)—in order to discuss implications of this worldview for literacy practices in digital contexts.

Shifting Participation in (Mobile) Literacy Practices

More recently, theorists have turned an eye towards promoting the development of *critical digital literacy* as a means to being aware of the ways that power operates in digital spaces to shape thinking and reproduce dominant social and cultural ways of being (Darvin, 2017; Hull, Kenney, Marple, Forsman-Schneider, 2006; Hull & Stornaiuolo, 2010; Nichols & Stornaiuolo, 2019). Darvin and Norton (2015) propose a tripartite model of investment to understand (what Bourdieu refers to as) the *sens pratique* that learners need in order to navigate online and offline spaces in local, translocal, and global contexts. In this model, learners are able to negotiate the complexities of the digital world or develop critical digital literacy skills to inform participation in these digital networks by mastering the rules and other knowledge specific to different contexts, seamlessly traversing contexts to participate in multiple spaces, and using resources available to them to access, challenge, and transform the spaces they inhabit (Akom et al., 2008; Darvin & Norton, 2015; Darvin, 2017).

The infusion of an element of criticality into the use of social media has led to the spread of powerful individual and collective acts of subversion as well as large scale social justice movements that have gained momentum across the globe. Examples of such larger social justice movements and their associated *hashtags* include #neveragain, #wearethe99percent, #endmaleguardianship, #rhodesmustfall, #sayhername, #womensmarch, and #ferguson (cf. Bonilla & Rosa. 2015). The scope and outcome of each of these practices is varied-- many gain momenta through active global participation while others may focus on more nationally specific issues and grassroots participation. Thus, digital networks can have the potential to be leveraged as *youthtopias*-- traditional and non-traditional educational spaces that support youth agency and collective efforts of youth towards the transformation of public and private spheres of life (Akom et al., 2008). In other words, social media activism has created new kinds of life worlds that foster collective imaginations or sodalities that have the power to be emancipatory when leveraged in specific ways (Appadurai, 1996; Hull, Stornaiuolo, & Sahni, 2012). It is these kinds of practices that entail a recognition of self and others in hospitable ways and towards transformative ends, that youth must embody in their everyday participation in social media practices (Appiah, 2008; Hansen, 2010).

The goal of literacy scholars and educators becomes, then, to understand the myriad ways youth engage in everyday media practices and how such participation can be shifted towards creating spaces of *praxis* that enable youth to critically and reflexively engage upon and transform their worlds (Akom et al., 2008; Appiah, 2008; Freire, 1968/2014; Darwin, 2017; Hull & Stornaiuolo, 2010; Hull, Unadkat & Adams, 2021; Robbins & Horta, 2017). This view sees youth, not only engaged alongside adults, but also mobilizing themselves to demand social justice. The work I present in this paper is motivated by questions about the ways in which educators might support adolescents, who show a keen interest in transforming their worlds already, by fostering their agency to leverage the potential of technologies towards appropriating digital spaces as sites of praxis. In so doing, I don't intend to devalue the more

prevalent everyday practices youth engage in around digital media and acknowledge how playful uses of social media can lead to powerful and agentic acts of meaning making. Rather, I seek to interrogate the tensions that emerge when the possibilities to disrupt harmful discourses through critical dispositions of self and others arise within the context of these playful proclivities.

Moves, Mobilities, and Transliteracies

Given the prominent role that digital technologies and social media play in the life of adolescents, there is a need to ensure that their participation in such networks does not engender the reproduction of marginalizing structures such as those described above. We see examples of social media movements arise in different corners of the world; some movements are led by prominent community activists, some are led by individuals or groups often from the margins, while others are mobilized by youth—young people who are all too aware of the harsh realities of what their adult futures hold and recognize the need to make big systemic changes for the future.

To understand the multiplicity of youth's everyday social media practices and the ways in which they can leverage these practices towards more critical ends, I draw on analytic moves articulated in the transliteracies framework as a window into students' media practices (Hull & Nelson, 2009; Stornaiuolo et al., 2017). I explore how shifting *scales* of composition through considerations of different imagined audiences, digital tools, student and teacher investments, and other pedagogical goals influence students' narratives and instantiation of critical digital literacy practices. That is, I ask, *how can educators support the development of students' everyday digital literacies to be more critically turned? What (im)mobilities influence the development of adolescents' critical digital literacy skills?*

Methodology

Over two years, our research team¹³ iteratively worked with middle and high schoolers at various educational programs in the Bay Area and India to craft stories for their local communities and for a global audience of peers participating in this digital storytelling exchange. The project began with students at a Bay Area school creating narratives about their everyday lives to share with peers in India based on digital stories that had been crafted by students from India involved in an earlier project (Hull, Stornaiuolo, & Sahni, 2012). The students in India viewed these stories created by Bay Area youth and crafted narratives to highlight salient aspects of their own lives while considering how their own stories might respond to those of their peers'. These stories were brought back to the students at the Bay Area school. At this point in the project, the stories from India were also shared with three additional sites in the Bay Area. In this multi-sited case study (Creswell, 2013; Miles &

¹³ The Hull Research Group (HRG), led by Dr Glynda Hull, has long standing partnerships with the sites mentioned in this project. This work was carried out as part of regular collaboration with the schools that focused on an international digital storytelling exchange. I was involved in the project as a graduate student researcher to support the implementation of the project curriculum across sites and simultaneously carried out research on the work being done through the aforementioned collaboration.

Huberman, 1994; Yin, 2009), I focus on the implementation of the project at these three Bay Area Schools that I describe in more detail below.

Participants

My paper focuses middle schoolers' production and exchange of digital stories in after-school learning spaces. I draw on data collected across three Bay Area after-school programs during the 2018-2019 school year: St. Augustine, St. Erica, and St. Patrick¹⁴; at the time of the study¹⁵, all three sites were full-operational faith based private schools serving low-income students and families. The sites were part of the federal 21st Century Community Learning Centers Program (CLC)¹⁶, supporting the creation of community learning centers and academic enrichment program for under-served youth during non-school hours. At each site there were 20-30 students from grades 5 through 8 divided into 4-6 groups working together to create digital stories. The groups varied in terms of composition by gender with some all-male, some all-female, and some mixed gender groups. Students picked their own groups based on their interests and existing relationships with peers.

Context

Many students in the technologically rich Bay Area were well-versed in the practices of popular social media culture and were already members of and seamlessly navigated various social media discourses on a daily basis. They expressed that they frequently spent time on YouTube¹⁷ and followed specific channels and/or *vloggers*. They also participated in viral literacy practices that were popular across the internet and had various kinds of digital footprints across social media platforms. At the start of the program, the after-school program staff developed a *translocal* network among the three schools. The eventual goal of this project was to create and share videos across sites intended to be modeled after *vlogging*¹⁸; students were instructed by after-school staff to create these videos so as to "get the most likes" from their peers.

Working in small groups, students were encouraged to respond to and provide feedback on the videos made by other groups and incorporate feedback into improving their own videos as part of their efforts to create likeable vlogs. I noticed that the themes in most students' projects mirrored many viral internet and/or YouTube trends. For example, some students wanted to partake in the popular *Mukbang*¹⁹ trend to see if they could push the limits of their

¹⁴ All site and participant names are pseudonyms

¹⁵ NOTE: one of these sites was closed in the past year due to funding constraints

¹⁶ More information on the 21st Century CLC program can be found [here](#).

¹⁷ Students' self-reported use of YouTube as their most frequently used social media platform in this student is consistent with trends from the PEW Research Center's (2018) report of most popular social media platforms among adolescents.

¹⁸ Vlogging is a popular social media practice, adapted from the popular writing practice of "blogging". Through self-made videos, individuals document and share their experiences, opinions, and ideas interacting with their audience through a range of narrative styles.

¹⁹ Mukbang is a combination of South Korean words that mean "eating" and "broadcast". A Mukbang can be a pre-recorded or livestreamed video broadcast in which a host eats a large amount of food while viewers watch. This global phenomenon is characterized as a one-person food contest that consists of binge eating.

appetite, while another group aspired to mimic dance moves, called *flossing*, associated with the popular game, Fortnite. More concerning was that at this point in the project, an instance of trolling, which I describe in more detail later, became a part of the students' creation and sharing practices where groups mocked other groups through their vlogs.

One of the student groups, which I will call the "Fortnite group," became upset by some of the feedback they received on their video. The Fortnite group created a response video that mocked the students who gave them feedback by overlaying a laugh soundtrack ([see here](#)) while zooming in to images of specific students. As the image fully zoomed in on each student's face, the screen briefly flipped to an object or animal meant to draw a resemblance between the student and image in an attempt to playfully mock the appearance of each student.

Although none of the students expressed being offended by the trolling videos and insisted they were all "just having fun," our team was concerned that such practices would continue to create hierarchies of what already seemed like social cliques in the school and engender bullying. More importantly, given the prominent role these students indicated social media usage plays in their lives, we wanted to work with them towards becoming more intentional about their participation in social media trends so as to be aware of the ways in which their own practices could contribute to creating spaces of contestation and subversion. In an effort to ensure students were engaging in digital exchanges in ways that supported their reflection on the purpose, meaning, and outcome of their practices, we shifted the focus of the project using the structure described below.

Reframing Project Goals

We introduced students to ideas about storytelling through reflections on their own memories of stories that had made an impact on them or felt compelling. We interrogated the terms "impact" and "compelling" as a means to have larger conversations about what constitutes a meaningful or memorable story, the content and nature of such stories, the modalities stories are delivered through, and considerations of imagined audiences in telling stories that will be meaningful to them. Students watched a range of short stories across a variety of genres, including commercially made films and digital stories created by students at our other project sites around the world. Reframing the goals of the project and introducing a variety of digital stories created opportunities for students to consider the meaning behind the message of their video productions and the practices they drew on to create and share their stories.

Introduction to Peer Network

Through the conversation about impactful and meaningful stories we introduced students to films made by students in India and other parts of the Bay Area using virtual reality (VR)²⁰

²⁰ VR is an immersive computer-generated environment in which a user interacts with a virtual world through a mobile or smart device, such as a tablet, a computer, or a headset. The use of a headset creates the most immersive experience wherein a user feels like they are in the virtual space they view. VR has been used across disciplines as a mechanism for simulating real spaces (e.g., real estate), training (e.g., medical and surgical

technology. These stories centered on themes of identity, community, diversity, and equity. Researchers and program staff scaffolded students' viewing of these films through guided questions and reflections and charged students with creating stories that would be impactful or compelling to a network of imagined peers located distally. Students thus composed narratives that would be shared with peers through our private digital network and were also told that eventually they would have the choice to upload their narratives to YouTube if they desired to do so.

Data Collection

Data in this project were collected through written ethnographic field notes by researchers at each site. Each week researchers made jottings (cite) that were then written out into longer field notes. Each session was also video recorded, and these recordings were also used in writing field notes. Additionally, student generated artifacts over the course of the project (such as students' planning notes, storyboards, etc.) that were also used along with their final digital stories to explore their composing process. I also used responses from a survey students completed at the end of the semester about their experience using social media and their work in this project.

Data Analysis

My analysis focused on the literacy practices that students in three Bay Area afterschool programs engaged in over the course of two semesters.

Data were triangulated by drawing on the aforementioned sources. I thematically coded observations, interviews, surveys, and student artifacts (Dyson & Genishi, 2005) based on deductive codes from the transliteracies framework (Stornaiuolo et al., 2017) as well as inductive codes that emerged from the data (e.g., codes related to the content and form of students' narratives; Maxwell, 2013). I read through field notes noting changes in students' project goals, ideas for their digital stories, and composing practices, as well as in the interviews with participants and the surveys about their projects.

I adapted multimodal techniques to analyze the various iterations of students' digital stories over the course of the project (Hull & Nelson, 2013). The codes generated through this analysis included the list of deductive codes used in analyzing field notes and allowed me to explore the various scales of composition students used in their digital stories (Miles, Huberman, & Saldaña, 2013). Comparing various iterations of the digital stories and the artifacts students created over the course of the program allowed me to explore how students shifted scales and stories in their composition. Through possibilities and challenges that emerged in these students' composition of stories and their reception of their peers' stories, I applied a transliteracies framework to understand the (im)mobilities of youth literacy practices.

procedures), gaming (e.g., Minecraft) etc. However, the use of VR as a composing and communicative tool used by adolescents is a relatively unexplored area.

Findings

In this section, I explore how the reframing of project goals and the introduction of new technologies created possibilities as well as constraints in students' moves towards more critical forms of participation in media practices.

Media & messaging: An Argument for Critical Digital Pedagogy

The students in this project were engaged in exchanging their video productions in the form of short YouTube clips with their peers within their translocal network of schools. As I describe below, the *uptake* (Stornaiuolo et al., 2017) of the harmful practice of trolling led to researchers and program staff collaborating to shift the goals of the project. Viewing the VR films made by their peers and working to craft a response to new imagined audiences introduced several elements of liminality into the project by offering opportunities for participation in a new network to an unfamiliar but more specific imagined *audience* (Stornaiuolo et al., 2017) through various modalities as I trace below. The expectation was that when framed as an exchange with a specified *audience*, the resulting down-scaling from an unspecified population of all "YouTube" users would enable students to move away from uncritical adoption of viral literacy practices to engaging critically in creating and sharing knowledge with others through their narratives by intentionally considering what might *resonate* (Stornaiuolo et al., 2017) with their imagined peer audiences.

Media Practices go Awry: Trolling in Afterschool. What most seemed to resonate initially with this group of students were internet trends that had become viral across the globe and involved an uptake of a particular practice appropriated by each participant in their own ways to "recontextualize and repurpose" (Stornaiuolo et al., 2017, p. 80) content based on their own identities (histories/local specificities/experiences/knowledge). To young people, these viral trends, emanating from online meme culture, seemed to be a means to participate in global literacy practices that involved collaborating in shared meaning making with people around the world.

Although such re-appropriating may inherently be an agentic way for youth to participate in digital networks, we were struck that none of the groups seemed to have picked up on any subversive uses of digital media and seemed content with participating in already existing trends without questioning their origins or goals. This latter form of inadvertent harm through participating in a trending practice was apparent in the group's trolling video I described earlier. Their use of a mocking "laughter soundtrack" to troll their peers was also re-appropriated for use in videos created by other groups, leading to a back and forth of such "trolling" between groups rather than communication focused on learning about one another or considering what kinds of stories might be interesting to create and share to translocal audiences.

Critical Digital Literacy: Shifting Scales. To introduce critical digital literacy practices through immersive storytelling, students at three local Bay Area sites were asked to view VR films made by students in India and another school in the Bay area that focused on their everyday lives, disrupting stereotypes, and highlighting ways to bring about social change (Darvin, 2017; Freire, 1968/2014). We noted a wide range of responses emerging to these films

that both disrupted and reaffirmed stereotypes held by some students. What emerged, resonated, and was considered for uptake with individual students was in part determined by students' own individual interests, previously held ideas, and ultimately the path that they each charted through the viewing of the films (Stornaiuolo et al., 2017). While some students described re-affirmations of themes of poverty, underdevelopment, and a lack of resources, others noted similarities in students having to wear school uniforms, participate in specific activities, and being impacted by a number of social factors. In collaboration with peers and teachers in the classroom, some students revisited their initial viewings, surprised to find out they had missed something and keen to learn more.

Through multiple viewings and dialogues with one another about the content of the narratives they saw, depicting images of school and home lives and movements towards equality, students at the Bay Area sites became open to engaging in new kinds of narrative creation and learning, and began to reconsider the content of their videos. We saw emerging new insights as students began to reflect upon their local contexts in ways that paralleled ideas about tackling inequalities in the films that students saw; students turned their eye towards social issues in their own community such as poverty, gun violence, immigration, and police brutality. The resonance of ideas around social injustices and their subsequent uptake as the focal point of their narratives moved many students to share personal experiences of themselves or a family member experiencing first-hand the trauma of one of these issues. Several groups decided to use recent events in the US and local community to foreground the impact of these issues. Thus, these students demonstrated an emerging critical reflection upon their worlds in order to analyze structures that maintained or reproduced inequality and began scripting narratives towards these themes.

However, collectively, students' questions for and interest in their global peers located in a country they didn't know much about and their local peers who lived a few cities over but had vastly different experiences, eventually bumped up against their initial desires to go viral; their goals to participate in a social network that they already were members of and knew intimately came to the forefront of their considerations of narratives. In the sections that follow I highlight this tension and students' resolution of this tension. I draw on examples of videos made by two student groups that represent themes seen across all groups.

Emerging Tensions: Playful Proclivities and Praxis

Darvin (2017) notes that in social media spaces, popularity is quantified by the number of likes one receives on their posts and the construction of social networks and membership/participation within these networks shapes the social and political discourses that individuals participate in. Unsurprisingly then, student groups straddled their desires to create videos that they felt would resonate with a 'bigger' scale of audience versus one that would have a 'bigger' impact but perhaps be seen by a 'small' scale of audience by combining their initial and subsequent narratives to form a larger one (Stornaiuolo, 2017). In other words, they expressed that their initial ideas that resonated with viral trends would likely have more uptake across a bigger scale of audience but recognized that a smaller scale of audience might resonate more with ideas that were more meaningful to their lives rather than viral challenges. The narratives involving praxis, on the other hand, were seen as perhaps being polarizing. Consequently, while students acknowledged the possibilities for change these narratives could

create, they expressed uncertainty at the likelihood of these videos being viral enough to reach the same scale as their initial narratives. Below I discuss the work of two student groups as an illustration of the ways students straddled and reconciled tensions between their simultaneous desires to “go viral” and to engage in raising awareness on current societal issues.

We are what we Eat.. and Discuss. One student group at the St. Augustine site initially planned on creating a video to participate in the popular *Mukbang* challenge. They insisted that this theme would give them the most views/likes compared to other student groups on YouTube. However, inspired by some of the VR films they were introduced to, they decided to work on making a film about their school and also articulate ways they could each be agents of change in tackling a social issue. Their final video was a combination of these three seemingly disparate goals where they combined a tour of their school, which concluded with them eating at a table to participate in the *Mukbang* challenge while engaging in a conversation about one thing in the world they each wanted to change. Their responses reflected the current sociopolitical climate in the United States with one student expressing her wishes for another president while another advocated for systemic change to end racism. The group agreed that it is important to “change the way things work” because the current system only serves the interests of certain privileged groups and continues to marginalize others. This convergence of ideas to create their final video seemed to allow students to participate in a popular viral literacy practice they desired to be a part of while simultaneously sharing stories about their lives, aspirations, and hopes to bring about better futures for themselves and their communities.

Fluidity “Makes-Up” Gender. A student group at the St. Erica site had planned on creating a make-up tutorial as their initial film idea. Their goal with this was to teach young girls like themselves how to use make-up (eyeliner, lipstick, etc.) since and they felt this was something a large number of people would be interested in. When viewing the VR films, they noticed symbolism for LGBTQ pride captured in the footage of one of the videos and were drawn by themes of gender equality which were more explicitly emphasized in two other videos. As a result, they expressed a desire to reimagine their video as an awareness campaign to bring to light to several important social issues. Namely, the group wanted to critique the role that media and the make-up industry play in the objectification of women, the setting of unrealistic beauty standards, and the binary conceptualizations of gender. Given the tall order of their goals for this video and unsure of how to make sure their campaign popular, this group decided ultimately to make a make-up tutorial that focused on make-up used by girls and boys since they felt the latter group is stigmatized for using make-up. This compromise thus allowed them to construct a story that would circulate widely while tackling a social issue around gender discrimination— namely, that “makeup does not have a gender, it’s a choice” and could be used in whatever way by anyone of any gender. The group concluded by making a direct message in unison to viewers: “remember, you are beautiful just the way you are.” Though their video did not allow them to interrogate gender as a fluid and social construct, they shifted their focus on simply teaching girls how to wear make-up to using the *click-bait* tag of a make-up tutorial to raise important issues about gender discrimination.

Shifting Scales in Composition

In the examples above, I saw a shift in the goals of the stories students wanted to compose from their initial ideas towards what could broadly be conceived as global social issues involving the use of media to mobilize, raise awareness, and tackle social issues. These shifts in goals *emerged* in response to students' viewing of immersive digital stories that in some ways represented a different genre of meaning making than the students had been used to. What also struck me was the final videos represented the "indeterminate nature of meaning making" (Stornaiuolo, 2017, p. 33) wherein students brought together their multiple story ideas into a single narrative, since each of these stories held a particular affective and cognitive meaning to the students and they seemed to want to hold onto these meaning in each story closely.

The students also considered what themes might resonate with potential audiences, and unsure of whether a subversive literacy practice might become as popular as an already trending literacy practice, most student groups found resolution to this dilemma by integrating these competing interests into a single theme that could to a degree be both-- subversive and popular. I see this compromise as examples of a "racebending practices" (Stornaiuolo, 2017, p. 80), since students not only took up popular cultural expressions or "trends" but in the process of attempting to simultaneously create subversive narratives, restory-ed these trends to write "marginalized identities into existence" (Stornaiuolo, 2017, p. 80). In other words, the students' final artifacts allowed them to participate in popular social media practices by re-appropriating them in ways that simultaneously brought awareness to issues of social justice that impacted non-dominant groups, a move that shifted them towards participating in literacy practices through a more critical lens.

As part of their original introduction to videomaking, students were tasked with creating a video that would become popular among their peers, a goal that seemed to be intrinsically motivating to them. While their re-appropriation of these viral videos incorporated an element of critical consciousness in shedding light on social issues and moved away from the tradition of viral video-making, they were nonetheless reluctant to engage in video production using newer VR technology. Rather, all but two student groups chose to create their narratives using elements of traditional digital storytelling similar to vlogging practices. Given that digital literacy practices on YouTube are a part of the everyday experiences of these adolescents and the ease of accessing content through YouTube or other more staple social media platforms, students were motivated by the scale at which their videos would likely be circulated and received by others when using more traditional modalities as opposed to VR technology, a technology which is arguably less quotidian in adolescents' lives. The ability to more rapidly film, edit, and upload a regular frame video that one could easily view as opposed to a 360-frame video that would require special equipment or additional navigation seemed to be an important factor in students' modal choices. Not only was the unfamiliarity of the VR technology a hurdle for students in terms of composition, but they seemed attuned to the fact that potential viewers might not be able to access 360-videos or their interpretation of the videos would emerge through individual experiences; therefore, students constructed their narratives using familiar technology.

Moreover, the ability to participate in a known global literacy practice (i.e., "trend") that had local significance and permitted instant participation seemed to be the prime candidate for

students to take up given the spatial and temporal barriers of participating in a global exchange through the private/closed social network implicated in the VR project. Finally, an important consideration that students made represents their perceptions of what could be construed as indexical trails different narratives might leave (Stornaiuolo et al., 2017). For students, subversive narratives were seen as perhaps producing scalar traces that might position their narrative in ways that would not be taken up by everyone, but the *scalar trails* left by integrating these narratives into existing trending practices, were viewed as more likely to transcend the indexical nature of the subversive narratives and therefore interpreted more widely across contexts.

Implications for Practice

Amidst a pedagogy aimed at fostering criticality, students' engagement with narratives constructed by others, and their awareness of issues of inequity rooted in their own lives, a space emerged in this project for instructors to scaffold students' movement towards "transformation" and engagement in literacy practices aimed at bringing about social change. I recognize that shifts in thinking are not linear and, more importantly, competing interests and goals might affect what meanings resonate with students. Towards this end, I build on Darwin's (2017) conceptualization of critical digital literacy explained earlier, as an examination of how power operates to shape knowledge, identities, and social relationships within digital spaces (Darvin & Norton, 2015). I interpret the tripartite structure of this framework from the lens of Freirian critical pedagogy, New Literacy Studies, and the notion of *youthtopias* (Akom et al., 2008; Darvin, 2017; Freire, 1968/2014; Gee, 1999; Nichols & Stornaiuolo, 2019; Mills, 2010; New London Group, 1996) to offer a conceptualization of critical digital literacy as *phases* of specific dispositions and practices that can be instantiated in different spaces. Implicit in three distinct phases that I describe below is a continuum of criticality wherein the third phase, transformation, involves a set of worldviews and practices that correspond to a level of criticality entailing the ability to subvert hegemonic or marginalizing practices through praxis (Freire, 1968/2014).

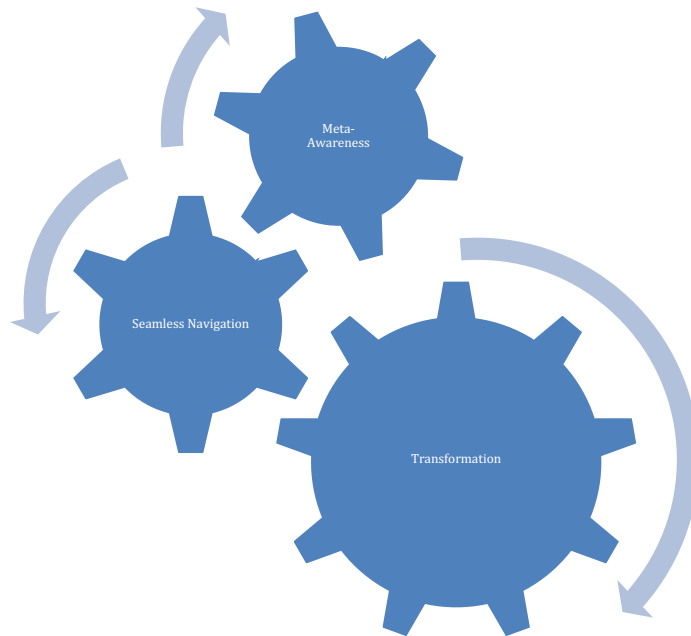


Figure 1. Components of Critical Digital Literacy

Each of the three interacting components corresponds to particular dispositions, skills, knowledge, and tools that enable participating in digital media spaces and instantiating specific kinds of criticality. The illustration of this framework as a set of gears that work in tandem, represents how the recursive nature of how adolescents might employ various skills and knowledge in different social media spaces towards specific goals. There is an implicit linearity in the way that each component engages criticality, starting from a critical awareness, moving to fluidity in participation, to transformation through critical consciousness. The last component is the visualized as the largest since it requires having developed skills in both the other components and is the repertoire of practices that enables tangible action upon one’s lifeworld. Depending on one’s goals and intentions, critical digital literacy practices may entail instantiating one or more phases simultaneously as I discuss below.

Meta-Awareness. This phase entails an intimate knowledge of the inner-workings of different kinds of literacy practices or having a “meta-awareness” of what James Gee (1998) would call a Discourse. In other words, having learned the ways of being or doing, values/beliefs, genres, semiotic resources, and other rules that are specific to various communicative contexts so as to understand the “rules of the game”. This knowledge enables someone to participate in specific literacy practices and one may be able to appropriate the Discourse of multiple practices and contribute their own knowledge to larger spaces of meaning-making. For example, students I worked with--- and arguably their peers elsewhere--- are intimately familiar with the various Discourses entailed in different social media practices, such as Vlogging, Tweeting, or Snapchating, and can participate in each of these spaces as members while also articulating the rules of engagement for such participation.

Seamless Navigation. This phase involves developing the ability to fluidly move across different spaces or practices in order to navigate different codes and strategies specific to each context through an acquisition of membership into different Discourses (Gee, 1999). This process is not unlike the moves of mobile literacy practices in that after developing a meta-awareness of these skills, one is able to then begin to seamlessly traverse the boundaries of different literacy practices in order to actively participate in them (Stornaiuolo et al., 2017). Individuals who engage with multiple (social) media platforms use each of these to convey specific kinds of messages drawing upon various modalities in order to be agentive participants across Discourses. Here individuals not only contribute their own knowledge to larger spaces of meaning-making but also leverage their membership in different Discourses to seamlessly traverse boundaries of different practices as needed. For example, using their knowledge of how to participate in different social media spaces, students were able to quickly navigate the kinds of practices they instantiated and the meanings they tried to convey based on the platform they were using. The students I worked with demonstrated this ability to navigate participation across different platforms not unlike adolescents elsewhere who express they use multiple platforms on a regular basis (PEW Research Center, 2018).

Transformation. This phase requires drawing upon available semiotic resources to gain access to, challenge, and eventually transform spaces. In other words, having gained access to a number of Discourses combined with a meta-awareness of each of their inner-workings, one is able to engage in praxis (i.e., critical reflection upon one's world in order to transform it; Freire, 1968/2014). Thus, in this phase possibilities of the creation of *youthtopias* (Akom et al., 2008) emerge. Subversive social media practices or social justice movements that have their roots in hashtag activism are examples of literacy practices in this phase where individuals actively appropriate, create, and share meaning to bring about social change.

Critical Digital Literacies and Futures

The framework described above represents the how critically conscious dispositions and practices that can be instantiated in various media spaces. Movements or shifts across each phase is seen as being recursive since individuals may participate in everyday literacy practices towards a variety of different goals that may be accomplished with the skills, knowledge, and tools entailed in one or more of these sets. Thus, while some individuals may shift across this scale in a linear manner as they develop familiarity with social media practices, others may begin participation starting at other phases based on their past histories, knowledge, and experiences. Literacy practices that lead to transformation, as in the last phase of this model, require youth to work through different ideological landscapes while sharpening their critical lens with greater autonomy (Darvin, 2017; Nichols & Stornaiuolo, 2019) while drawing on available resources in creative and productive ways. I argue that these skills are vital to foster and perhaps the most important to informing adolescents' participation in digital spaces since they entail the development and use of critically conscious worldviews.

This work speaks to the ways in which literacy educators can create spaces that promote adolescents' participation in digital literacy practices through critical and reflexive understandings. The digital storytelling exchange I describe here took place within a private digital network designed to foster criticality that I hoped students would similarly use in their

everyday literacy practices as well. Recognizing the salient role that everyday social media experiences play in the lives of youth today, the use of a private social network (or digital storytelling exchange) in this work is an effort to inform students' public participation in media practices while scaffolding the development of critical digital literacy skills. Rather than seeing in-school literacy practices as being distinct and decontextualized from out of school literacy practices, I seek to foster skills in school that will enable more informed participation in their out of school lives, consistent with the goals of problem-posing pedagogies. As social media sites and ways of making-meaning continue to evolve, the creative capacities of young minds will no doubt continue to evolve and shape the ways in which adolescents engage with their worlds and exercise their agency.

360-Degree Storytelling: Constructing Digital Narratives, Deconstructing Gender Narratives

On a crisp winter afternoon, my colleague, John, and I were working with a group of high school students at the *Prerna School* in *Lucknow*, a small town in Northern India. While on a lunch break, one of the young women suggested listening to some music and cued songs on *YouTube* inviting John and I to join them in a “dance” party while we waited to start working again. To my surprise *Cheap Thrills*, the global chartbuster by pop artist Sia, blared out of the speakers. Having grown up in India myself, I was fully expecting the music the students selected to be from *Bollywood* and gaped in amazement as a number of students crooned along with the lyrics of one of their “favorite” songs, imitating the dance moves from the music video in perfect synchrony. My naïve surprise stemmed from my expectations that a vast part of the Indian population tends to be more exposed to local *Bollywood* music and “English” music is often tabooed in conservative households, particularly in small towns, where western influence is often seen as corrupting *Indian values*.

The group of students consisted of all females from working class families, many of whom might not have had access to schooling due to their gender. In other words, many of them lived in conservative communities where girls were often tasked with home chores while their brothers attended school. Further, practices like child marriage and *dowry* are not uncommon in their communities. *Prerna School* serves this demographic and seeks to empower girls and women by working with and for the community to affect systemic change and subvert oppressive patriarchal structures. It should not have come as a surprise then that the young women gravitated naturally to listening to music from around the world, much like their affluent counterparts who attended a private school, *The Study Hall School (SHS)*, in the same building. Although students attending *SHS* regularly traveled abroad on family trips and study abroad programs, the dispersion of low-cost smart phones, access to affordable internet at cyber cafes, and the penetration of media platforms like *YouTube* enabled even the students who had rarely traveled outside the confines of their local community to access content from around the world.

The “*Prerna girls*”, as they were often referred to, shared with us that they enjoyed channels on *YouTube* that taught them about other parts of the world. *Pari*, a particularly animated artist in the group, said she frequented the channel *Bad Salsa* to learn new and complex dance moves. *Pari* expressed that she perhaps would not have known this genre of dance existed were it not for having access to *YouTube*. In fact, most of the students in this group indicated that they regularly accessed *YouTube* for several reasons in their home and school or work lives, many even had their own smart phones, and most importantly, all of them considered themselves to be avid and proficient users of the internet, able to navigate this infinite abyss “very well”. The *Prerna girls* painted a complex picture of the role that various digital technologies played in their lives to support their quest for learning, communicating with others, and sharing information. It struck me that the girls’ use and perception of technology was a stark contrast to the dominant and narrow view of the role of technology and its users in the rapidly evolving field of Information and Communication Technologies for Development (ICT4D).

Technologies in ICT4D projects are widely adopted and used due to their low cost and scalable nature, often with naïve optimism that these tools will in and of themselves be a panacea for any societal issue. As such, the field of ICT4D is replete with examples of the use of

technology to improve outcomes in public health, economics, education, infrastructure, and many other sectors (cf., Arora & Rangaswamy, 2017; Bore et al., 2017; Fisher, 2006; Kumar & Anderson, 2015; Kumar, Brunette, & Dell, 2015; Tachhi, Kitner, & Mulenhalli, 2014; Zheng, 2015). However, these varied endeavors position intended beneficiaries as passive recipients of whatever purported goal these projects seek to accomplish and generally focus on promoting economic development as an end goal for intended beneficiaries (Chipidza & Leidner, 2017; Loh, 2015; Sein & Harindranath, 2004; Walsham, 2017; Zheng, 2015). For the Prerna girls however, technology wasn't simply a way to passively receive information, but rather, a tool to help further the active creating and sharing of knowledge or *meaning-making* with proximal and distant others.

Many have called for a change in approaches the focus of ICT4D projects, critiquing the lack of focus on the non-economic aspects of development (Flores-Crespo, 2007; Robeyns, 2017; Sen, 1999; Walker, 2012) or issues of “identity, expression, and agency” (Arora & Rangaswamy, 2013 p. 902) as the Prerna girls themselves were demonstrating. Towards this end, this case study explores the use of immersive forms of rapidly proliferating technologies and cutting-edge digital tools that are becoming increasingly prevalent in commercial and consumer worlds. This paper draws on data collected during a Virtual Reality (VR)²¹ digital storytelling exchange between students in India and the US. Building on a decade of design-based research (Hull, Jury, & Sahni, 2015; Hull & Stornaiuolo, 2010; Hull, Stornaiuolo, & Sahni, 2010), this work continues to explore the possibilities for reflexive dialogue and learning that emerge when adolescents and young adults speak to each other across differences.

A Field is Born: Information and Communication Technologies for Development

Information and communication technologies for development or “ICT4D” is a relatively new field concerned with the use of information and communication technologies (ICTs) to promote international development (Walsham, 2017). The origins and complexities of this multidisciplinary field can be traced back to the post World War II era when the world saw the genesis of the notion of international development and resulting large scale global agendas to promote development. Subsequently international development morphed into the digitally mediated field of ICT4D and has had widespread implications in numerous fields, including education.

Historically the term ‘development’ was simply seen as a transitive phenomenon that takes its natural course and is resistant to intervention (Rist, 2014). However, located in US president Harry Truman’s second inaugural address in 1949, the notion of development as a project of the “first world” that aimed to provide technical assistance to the world’s poor in order to ameliorate their seemingly deplorable conditions, first emerged (Rist, 2014). President

²¹ According to the Virtual Reality Society, virtual reality (or VR) literally translates to ‘near reality’ and refers to the creation of an interactive, three-dimensional computer-generated environment that spans 360-degrees. A person can access this environment through devices, such as headsets, in order to experience a close simulation of reality. Whether for gaming at home or to engage with news reports, 360-degree videos using VR technology are becoming increasingly common due to their capacity to provide immersive experiences. Additional information on VR, the creation of VR technology, and its many applications can be found on the website of the Virtual Reality Society.

Truman's address shifted discourse around the term and introduced the idea that it is possible for a society to develop and avoid the new transitive phenomenon and natural course of becoming 'underdeveloped' (Larrain, 1989; Rist, 2014). All nations were expected to "develop," that is, to achieve their goals by means of increased economic productivity, the use of advanced technologies, and participation in global commodity exchanges. However, what specifically this project entailed and the role that 'developed' nations would play in supporting relatively 'underdeveloped' ones remained unclear, thereby allowing the term to be co-opted to suit the whims of the user of the term in response to rapidly changing international relations and agendas (Larrain, 1989; Rist, 2014).

As nations, international organizations, academics, and economists alike took to the term, *development* came to be the intended goal of programs aimed at economic prosperity and trade, human rights advocacy, and broadly speaking initiatives aimed at *improving* the conditions of the world's poor. The term itself, however, continued to remain underspecified, its meaning taken for granted, and its application open to interpretation from different perspectives. The unspecified and open-ended interpretation has led to a wide range of applications of principles of development in education and other projects, as well as large variations in the means or tools used to achieve certain goals. In fact, critics note that development is often a euphemism describing practices aimed at increasing production of goods and services to drive demand, while eroding the natural environment and social relationships (Rist, 2014). The implications of the continued lack of specificity and operationalization of what development is and what its real cost and benefits are to various stakeholders vary greatly, particularly in educational contexts. To illustrate the range of conceptualizations of development and the resulting implications for education, I discuss how notions of development from three key perspectives in the field inform education and literacy practices.

Investment in Human Capital: Building a Workforce

Perhaps the most common interpretation of President Truman's address, is the human capital view of development, a view synonymous with modernization or industrialization. Proponents of this approach believe that development can be achieved by introducing advanced technologies and replacing older systems, structures, and means of production with modern and efficient ones. Development is used as a verb to refer to an active process that can be achieved, and as an adjective juxtaposed with *underdevelopment*. Largely synonymous with economic prosperity, in particular the growth of Gross Domestic Product (GDP), development is the intended outcome of efforts aimed at improving conditions for labor and workforce growth through investment in human capital and infrastructures that would lead to increased efficiency and productivity (Cummings, 1997; Schultz, 1971). Thomas Schultz (1971) proposed the then radical idea of investing in human capital as a means to economic prosperity. Though noble in his intention, Schultz's Nobel-winning arguments centered on the economic benefits to countries when investing in educating the workforce, inadvertently leading to the view of people as a source of labor and productivity, rather than as sentient beings in their own right.

Given that modernization and human capital theories of development emphasize economic gains as the ultimate ends, education from this perspective is seen as a needed investment in order to produce a skilled labor force who in turn will drive the economy through

the demand for services and labor. Human capital approaches to education assume that human skills are akin to commodities that can be bought and sold, and investing in skills early on yields higher rates of return later. In other words, individuals would be motivated to obtain skills that would make them competitive for an increasingly globalized workforce; thus, education should seek to provide students with certain marketable skills for the future (Schultz, 1971; Walker, 2012). Approaches that emphasize investment in human capital as a means to development thus conceptualize education systems as being more like factory production lines that are centered on delivering outputs through efficiency and/or cost reduction. Such agendas of development lead to educational systems where learning and new knowledge are rarely produced but rather transmitted from apparent benefactors to supposed beneficiaries with the aim of improving the skills of workers in the market economy and ensuring that the means of production and resources remain in the control of those with power and maintain the status quo (Robeyns, 2016; Walker, 2012; Walker & Unterhalter, 2007).

Projects or programs informed by this line of reasoning emphasize that education and the use of technology within education are useful in so far as the introduction of the technology yields to increased financial returns on investment or increased economic growth through the production of a skilled workforce. In other words, advanced technologies replace older ones to modernize and make more efficient means of production and exchange in the market economy, a simple primary effect²² that takes a deterministic view of technology but does little to enact meaningful change (Sein & Harindranath, 2004). The *One Laptop Per Child* initiative is an example of a canonically disastrous project that has been characterized as being driven by a postcolonial and technologically deterministic view (Ames, 2019; Heeks, 2018; Mora, Escardíbul, & Di Pietro, 2018; Philip, Irani, & Dourish, 2010). The goal of the project was to address low levels of literacy by installing solar equipped tablets in rural Ethiopia to enable children to self-learn how to speak, read, and write English. However, the introduction of a language that was so far removed from the everyday realities of the intended beneficiaries did little to nothing to further children's learning, skills, or knowledge in any meaningfully tangible way. The project is considered as ultimately having failed to meet its purported vision and in some cases even had negative outcomes on the intended beneficiaries (Ames, 2019; Heeks, 2018; Mora, Escardíbul, & Di Pietro, 2018; Philip, Irani, & Dourish, 2010). Like this project, in endeavors driven by human capital motives individual well-being and agency through the use of technology and through education take a back seat to attempts to improve economic prosperity. Consequently, ICT4D interventions in education informed by this perspective focus on creating workforce members rather than critically thinking agents of change; in the process neither full human potential nor the potential of any available tools, including digital technologies, is fully leveraged or realized.

²² Sein and Harindranath (2004) conceptualize the impact of information and communication technologies into 3 levels: (1) First order or primary effect, which entails a substitution of old technology with new technology, (2) second order or secondary effect, which involves an increase in a phenomenon enabled by the introduction of a technology, and (3) third order or tertiary effects that result in the generation of new commerce, knowledge, and societal change.

The Right to Development: Increasing Access and Opportunities

As the term 'development' became appropriated across disciplines, actors, and agendas, the idea that nations and people have a *right* to development emerged in the 1970s and was eventually adopted as a UN General Assembly resolution in 1986 (Uvin, 2007). This resolution declared that all humans have an "inalienable" right to development and should be able to "participate in, contribute to, and enjoy economic, social, cultural and political development, in which all human rights and freedoms can be fully realized" (www.unhch.ch/html/menu3/b/74.htm). The human rights discourse views individuals as the ultimate ends of moral and political concerns and focuses on considerations of individual rights in contrast to human capital views that center on considerations of efficiency and view individuals as vectors for economic production and growth (Robeyns, 2017).

The legalistic discourse of the human rights approach addresses reductive views of humans as purchasable and expendable capital by emphasizing their existence and right to certain basic needs, including education. For example, charters and mandates set forth by the UN demand the right of every child in the world to access an education. From this perspective, education is seen as a fundamental human right for all. Similarly, digital inclusion is seen as an imperative for all individuals to be able to keep up with the demands of the current times. Programs informed by human rights approaches seek to expand access to education or digital tools to provide services that are available to all members of a society (Robeyns, 2006; 2017).

However, these views fall short since they fail to move beyond rudimentary benchmarks or vague promises without additional specifications about who is responsible for ensuring the provision of certain guarantees and how. Since the inception of this discourse there has been no specification or binding treaty on whose obligation it is to ensure the procurement of the right to development for all. Therefore, discourses from this perspective, including the resolution of the UN, serve more as rhetorical victories that carry no real obligations to ensure the distribution of resources and are not able in the end to address complex social, political, and economic influences beyond legalistic benchmarks (Uvin, 2007; Robeyns, 2017). For example, simply providing access to schools without the oversight of quality education or regular teaching staff, resources, and other infrastructural considerations does not lead to improved learning outcomes. Likewise, the installation of cell phone towers or high-speed internet access is meaningless if these services require fees or subscriptions that are not affordable to all. For rights-based discourses to move the needle in making meaningful change, accountability and specificity in ensuring the provision of guarantees is imperative.

Development as Freedom: Redefining Ultimate Ends

In 1999, economist Amartya Sen challenged commonly held notions of development that privileged economic growth and modernization of outcomes to articulate development as the process of acquiring freedoms that enable all citizens to lead lives they have reason to value. In other words, the focus of the *ends* of development centers on human well-being rather than on humans simply being the *means* to development. The *capabilities approach* (CA) to development focuses on individuals' *capabilities* or real opportunities to achieve freedoms or *functionings* they value (Nussbaum, 2011; Sen, 1999). Rather than metrics such as GDP that reflect economic gains made by countries but do not reflect the lived experiences of individuals of a country, the central question in thinking about development through the CA is to consider

what each individual in a society is able to do and to be (Nussbaum, 2011). Development from this perspective represents a normative situation in which states guarantee a minimum threshold for living a life of dignity for all its citizens.

This framework is intentionally open-ended and requires further specification and adaptation to local and/or regional contexts. The CA accounts for individual characteristics or *internal capabilities* as well as the social, political, and economic conditions which determine the kinds of substantive freedoms that individuals in a society have. In other words, through a focus on quality of life, the CA promotes areas of freedom to measure the real value of a set of options or freedoms that have intrinsic value. Unlike traditional unitary economic measures of development, capabilities are the ultimate political goal of development and provide a more robust measure of development than traditional economic measures (Nussbaum, 2011; Sen 1991).

The emphasis on guarantees of capabilities rather than functionings ensures that the CA framework is not susceptible to the same shortcomings as human rights approaches to development and education. According to the CA, capabilities are “a person’s real freedoms and opportunities to achieve functionings” (Robeyns, 2017, p. 39). The CA therefore focuses on ensuring meaningful guarantees of certain freedoms to individuals. From this perspective, education is seen as a process of thoughtful reflection upon one’s world with the ultimate goal of bringing about transformation towards justice (Freire, 1968/2014; Walker, 2012). Classrooms that encourage students to engage in conversations about current events while being civically and politically engaged in taking action towards societal change represent education from the perspective of the CA. In educational contexts, such spaces are characterized by debate and dissent against oppressive structures resulting from information sharing and dialogue (cf., Hull et al., 2015; Hull & Stornaiuolo, 2010; Tacchi, Kitner, & Mullenhali, 2014). From this perspective, students are seen as active constructors of knowledge, and education is seen as a central capability of nurturing mind, body, and spirit within communities (Nussbaum, 2011; Walker, 2012). It is this kind of education that projects of development, including ICT4D, must seek to instantiate to make any meaningful, sustainable, relevant, and impactful changes to the lives of intended beneficiaries.

Theoretical Framework

A liberal education is defined as one that helps “clear our minds, awaken our consciousness, inform our actions, and enrich our lives” (Flores-Crespo, 2007, p. 46). Such an education is made possible through an approach that emphasizes critical pedagogy and has historically been the focus of education through voices from Socratic times, stoics, and other Greek philosophers. Advocates of humanizing education from the capabilities perspective build on these ideas to promote education that is intimately tied to achieving human capabilities (Flores-Crespo, 2007; Freire, 1968/2014). As noted before, the CA provides an expansive framework to conceptualizing and promoting development. Through this framework, agendas that seek to promote education view the goals of education as providing individuals with intrinsic skills as well as instrumental skills that are both economic and non-economic (Flores-Crespo, 2007; Robeyns, 2006). Education from the capabilities perspective promotes an analysis of the connections between education and freedom. Such an education would promote the

instrumental goals of education while also ensuring that the intrinsic goals of education are met.

To elucidate, Robeyns (2006) expands on the ideas of Drieze and Sen to describe several roles that education can play in the lives of individuals. The *intrinsic* role of education implies a quest for learning and knowledge due to the inherent benefits of engaging in this endeavor. The *instrumental* role of education refers to the economic and non-economic benefits individuals and societies accrue through education in order to improve standards of living, open minds, and engage in collective action. While the role of education from traditional modernization or rights-based approaches centers on attaining one or some of these outcomes, the capabilities approach takes a broad view of the role of education that acknowledges the importance of human capital but goes beyond this to emphasize humans as the ultimate ends of moral and political concerns (Robeyns, 2006; 2017; Sen, 1999; Walker & Unterhalter, 2007). In other words, education conceptualized through the CA is a holistic endeavor that seeks to promote *combined capabilities* through encouraging the development of individual faculties and minds as well as addressing systemic issues that create “unfreedoms”, thereby serving intrinsic and instrumental roles that provide economic and non-economic benefits to individuals and societies (Nussbaum, 2011; Sen 1999; Walker, 2012).

Tools and Technology

The field of ICT4D is replete with examples of projects influenced by multiple paradigms of development, though there appears to be a tendency to privilege models that align closely with human capital or modernization perspectives (Tacchi et al., 2014). The underlying assumptions of projects informed by this view is that developing nations lack the knowledge and resources to break out of their modes of production unless they emulate developed nations in terms of technology use, capital, etc. (Sein & Harindranath, 2004). The belief that technology is a panacea that will lead to economic growth and development in poorer countries informs many ICT4D projects that promote acceptance of technology to the greatest extent possible while maximizing the number of users of the technology (Sein & Harindranath, 2004; Zheng, 2015). As such, many international projects adopted scalable and affordable technology to be deployed to marginalized populations on the fringes of the developing world. The goal with the use of technologies is to improve productivity of various kinds in order to see increased economic growth. From this perspective, technologies are treated as a monolith and are simply adopted since their low cost and scalable nature appears to be efficient in reaping benefits. Chipidza and Leidner (2017) conclude in their review of multiple projects that utilized information and communication technologies for development that most of these projects are unable to reach long-term sustainability without reliance on external supports and/or have unintended negative consequences due to infrastructural, implementational, and other failures. Ultimately, most of projects appear to fail to achieve their goals because of the deterministic views of technology that influence the installation of technologies. Rather than intentionally leveraging the potential of specific kinds of technologies, take a one size fits all approach and utilize technologies that have limited potential or utility in certain contexts.

In contrast, when viewed through the lens of the CA, tools and practices used to promote the goals of education are leveraged in more expansive ways towards ends that promote capabilities and freedoms. Vygotsky (1978) noted that material or physical tools in the

world and tools of the mind or psychological tools mutually shape one another in a process that leads to the development of individuals and society. The implication of Vygotsky's ideas for educators and researchers alike is to remain attuned to "how new tools and writing are functioning and changing and how the development of individuals is affected by new forms of writing that interact with and lead to changes in tools, thinking, and composing" (Freedman et al., 2016, p. 16). However, in reality most projects of development that seek to utilize cutting edge tools— most often digital ones—lack an explicit conceptualization of the role that these tools will play in influencing subsequent thinking or development a la Vygotsky. Tools in any situation are situated artifacts or placed resources that have the potential to shape the practices and knowledge surrounding their use. It is imperative, then, that tools are used with explicit intention to achieve certain goals or outcomes. Latour (1994) makes amply clear that all *actants*, human and non-human alike, have certain affordances that can be leveraged towards specific goals. Within the ICT4D field, the full potential of technology can be realized when emphasizing the tertiary impacts of technology use (Sein & Harindranath, 2004) that lead to societal change. Projects of ICT4D that tend to focus on narrower short term economic goals when conceptualized through traditional notions of development have the potential to take a more robust approach when viewed through the lens of the CA and should thus be conceptualized as such.

One approach informed by many of the tenets of the CA and utilized in projects involving technologies with marginalized populations, is the practice of digital storytelling. Digital storytelling has been used as a mechanism to promote voice among populations marginalized by society (cf. Dooley et al, 2018; Gubrium, Krause, & Jernigan, 2014). Moreover, the power of digital storytelling and narratives in providing adolescents with platforms to speak with one another powerfully and persuasively across distance has been well substantiated (Hull, Jury, & Sahni, 2015; Hull & Stornaiuolo, 2010; Hull, Stornaiuolo, & Sahni, 2010; Hull, Stornaiuolo, & Sterponi, 2013), though the potential of immersive forms of storytelling in enabling additional opportunities for creating, sharing, and circulating meaning remains relatively new. While studies have documented the use of social media and other large-scale platforms as a mechanism to promote voice among populations marginalized by society, studies of adolescents' technology use have been rare and only recently begun to shift towards a focus on their creative and transformative potential, with studies on VR being relatively unexplored (Hull et al., 2013, 2015; Tacchi et al., 2014; Vishwanath et al., 2017). Thus, in this project, I describe work that leverages immersive VR technology as a tool for students to advocate for gender equality in their community through digital storytelling in the context of a high school curriculum.

Research Questions

In particular, I highlight the ways in which students use cutting-edge digital technologies to create narratives that focus on improving individual and community lives and well-being through advocating for gender equality. In so doing I illustrate how ICT4D projects in educational contexts can leverage the creative, transformative, and agentic capacities of digital technologies. Drawing on the digital stories created by a group of female students at

Prerna School²³ in Lucknow, India, I ask: *In what ways can digital technologies be used to promote goals of education and development that are consistent with the capabilities approach? What pedagogical practices undergird the use of digital technologies in an effort to realize these goals?*

Specifically, I seek to conceptualize how expansive notions of development, as in the CA, enable education to be informed through a lens of critical feminist pedagogy (Freire, 1968/2014; Hull, Jury, & Sahni, 2015; Sahni, 2017) as seen in the ways that young women in India crafted stories about themselves and their community in empowering and transformative ways towards ‘development’.

Research Methodology

This project took place as part of a digital storytelling exchange between students in Lucknow, India and San Francisco, California. The research team²⁴ worked with the teachers and students at the schools at each site to facilitate a series of workshops focusing on the creation of 360-degree stories. Each workshop followed a similar structure in guiding students through considerations of audience, the process of storyboarding, capturing footage, and stitching their final stories together. Previous reports of this project focused on how the exchange allowed students to develop hospitable imaginings of self and other, noting their responses to their peers’ stories, their effort to communicate through dialogue across distance, and their reflexive willingness to learn with and from the other. We also noted how students engages in translingual literacy practices to communicate their stories powerfully and persuasively drawing on a wide variety of literacy practices (Hull, Unadkat & Adams, 2021).

Context

The storytelling exchange began with students in San Francisco, at the *Tinker School*²⁵, viewing digital stories created by students in Lucknow at Prerna School using standard square frame videos (cf., Hull, Jury, Sahni, 2015; Hull & Stornaiuolo, 2010). Before viewing the digital stories, the Tinker School students engaged in a discussion to reflect on their assumptions and experiences about India and also specifically the city of Lucknow. The students were also given a set of questions to consider while watching the digital stories and engaged in a debrief about what they saw, what they learned, and questions they had. They then were tasked with considering what students in India, specifically at Prerna School, might want to know about their lives in the Bay Area. Additionally, students were posed questions about mediums of storytelling in order to consider the affordances of traditional square films and the 360-degree VR technology they would use to construct their stories in this project. Subsequently students engaged in storyboarding their films with attention to the mode of delivery of the story,

²³ More information about the Prerna School can be found on the Study Hall Education Foundation [website](#).

²⁴ Members of the Hull Research Group, led by Dr. Glynda Hull included (in alphabetical order of last name): Jessica Adams, John Scott, and Jeeva Roche. In Lucknow (the focal site of this paper) collaborators included: Dr. Urvashi Sahni (founder and director), as well as the technical staff members and teachers from the Study Hall Education Foundation, including (in alphabetical order by first name): Anand Chitravanshi, Anshu Jain, Ash Mehra, Felipe Pozo, Samarth Shukla, and Sidharth Shukla.

²⁵ All names of students and partner schools (other than the Prerna School) are pseudonyms.

engaged in capturing footage using 360-degree cameras experimenting with various camera positions, angles, and other considerations, and subsequently, two of the four groups stitched their final stories together to create digital artifacts for our team to bring with us to India.

In India, we worked with students from two schools that were housed in the same building—The Study Hall School (SHS) and Prerna School²⁶. Both schools are run by Dr. Urvashi Sahni, our collaborator with whom Dr. Glynda Hull has carried out a decade of work on digital storytelling that this project builds on. While SHS and Prerna are both informed by similar objectives of learning through a rigorous curriculum centering critical pedagogy, SHS is a co-educational private school that serves students from affluent families, much like the students at Tinker School. Prerna is a private all girls' school that serves students in the community who come from homes where they may not have been able to access schooling due to cultural and economic factors that promote the education of boys over girls. Many of the students at Prerna are the daughters of working-class daily wage laborers, and many of them have experienced or witnessed domestic violence, abuse, and discrimination solely on the basis of their gender. Prerna works not just with the students but also their families and the larger community to address systemic issues that create unfavorable and unequal outcomes for girls. This school is recognized worldwide for its progressive critical feminist curriculum, its success in empowering young women and girls, and the laudable community efforts that have led to significant strides towards promoting gender equality and a quality education for all through marked systemic change.

Students at SHS and Prerna were a part of the same digital storytelling workshop but chose to work with students from their own schools, resulting in 1 group of Prerna students and 3 groups of SHS students. The workshop format was similar to that of the workshop carried out with Tinker School students wherein students in Lucknow reflected on their assumptions and experiences about life in the United States, specifically the Bay Area, prior to watching the films created by the Tinker School students, engaged in conversations about their observations and learnings, considered what kind of stories they would like to tell, and began to storyboard and capture footage with considerations of the affordances of the 360-degree technology.

Participants

In this dissertation chapter, I focus on the experience of the all-female group of students at the Prerna School, in Lucknow, which consisted of eight high schoolers aged 17 and 18 and two recent alumni of the school in their early twenties. The students in this group came from households with limited income, and many expressed being the first female in their house to have reached their current level of education. I worked directly with this group of students every day of the workshop and was able to get to know the students in this group, and their work in the project, on an intimate basis.

²⁶ For additional information on the Study Hall Educational Foundation (SHEF) through which SHS and Prerna are both operated, see the website (also linked earlier).

Data Sources

Data for this project was collected in Lucknow as part of the storytelling exchange and includes ethnographic observations and field notes, transcribed video and audio recordings from daily workshops with students, student work generated over the course of the workshop, students' responses to surveys and interviews, and students' final video productions.

The ethnographic fieldnotes written by the research team focused on the day-to-day activities carried out, including students' conversation and artifacts (such as storyboards) that were created during the planning, recording, and editing phases of their video production. Fieldnotes on the work of this group of students were primarily written by me using the jottings I made each day during our time with the students to write in-depth notes at the end of the day. I also analyzed their final film to discuss the overall narrative the students sought to depict to viewers. I carried out semi-structured group interviews (Maxwell, 2013) with students and used transcriptions of the audio from this interview along with the notes I made during the interview to better understand students' goals, objectives, and experiences through the video composing process as well as participation in a digital storytelling exchange. Interviews were carried out in Hindi and transcribed to English. In conjunction with interviews, all students responded to surveys, which consisted of several open-ended questions on their prior experience with digital technologies, digital storytelling, daily social media use, and other questions related to their personal and professional interests and goals.

Data Analysis

Triangulating data across the aforementioned sources enabled me to delve into several key considerations in understanding the role that digital technology—in particular immersive storytelling in conjunction with other systemic factors—played in allowing students to create powerful narratives of self. I used inductive coding (Maxwell, 2013; Miles, Huberman & Saldaña, 2014) to generate themes related to students' digital storytelling compositional practices, the role of various digital technologies, and how these enabled *development* in the context of students' lives. I also used a set of deductive codes (Maxwell, 2013; Miles, Huberman & Saldaña, 2014) that I created using key concepts from the capabilities approach (Nussbaum, 2011; Sen, 1999) to interrogate how these concepts aligned with the experiences of students in relation to the intended goals and activities of the storytelling exchange. Collectively, the deductive and inductive codes generated during the analysis process enabled me to explore the role that ICTs leveraged towards explicit and expansive ends played in this project of development and education.

Findings²⁷

From the outset of the project, it was evident that the Prerna girls believed they had a powerful story to tell²⁸ and that their peers around the world would be willing to listen to their

²⁷ All data presented in this section in quotes are English translations (from Hindi) of students' comments (in interviews and conversations) over the course of the project.

²⁸ The full digital story created by the Prerna girls can be found here and a summary (in English) of the video can be found here. The video footage is that of a stretched out 360-degree video to make the video accessible without a VR device; as such there may be some imagery that might appear distorted from the original footage.

story to learn from them and affect change in their own communities. Poised with confidence and pride, their immediate and unanimous decision while storyboarding was to depict how they felt empowered by their school, their teachers, their friends, and families to be able “to make a noise” and “rustle things up” in order to “bring about change” in the face of oppressive patriarchal structures. For the students, digital storytelling itself was not a new process since it was a frequent part of the critical feminist curriculum at Prerna. However, the specific affordances of the 360-camera that students used to create and share stories offered a platform to amplify their voices in a way they felt had not been possible before. In this section, I highlight the ways in which the goals of this project, framed through a lens of an education informed by the capabilities approach, enabled technology to be used as a tool, embedded among other practices, to augment the students’ voices and further their feeling of empowerment.

Raising Voices for Equality

A key characteristic of the project was the constructive nature of creating and circulating digital stories that enabled students to share their own meanings and ideas with peers around the globe. The Prerna girls knew that their stories would be heard by distal peers who came from vastly different backgrounds from themselves culturally, socially, geographically, and economically. In this exchange all participants were positioned as equals who had stories that were worthy of telling. The Prerna girls loudly and proudly took on this task, confident that their peers would learn from their stories with the same reflexivity the girls themselves demonstrated in learning about the lived experiences of their peers. In other words, the Prerna girls, typically seen by dominant groups as marginalized, subalternized, and even disempowered, viewed themselves as being on equal footing to their arguably far more privileged peers in the Bay Area. The girls were keen to learn more about the students’ lives in San Francisco and unequivocally felt that the students at the Tinker School would be equally eager to hear from them about their lives in Lucknow. Additionally, the project provided students with a platform to use their voice in order to express their views and engage in political conversations about their communities (Appadurai, 2004).

Students’ depiction of civic discourse and their use of voice to convey their message was evident in different ways based on what stories they chose to tell and how. For example, one of the videos created by students from Tinker School depicted San Francisco’s Castro neighborhood, the home of gay rights activist Harvey Milk. This story was captured from the perspective of a bike rider in the city by attaching a VR camera to a student’s helmet as he rode to the streets and gave students in Lucknow a glimpse of the rainbow flags and adornments on streets and buildings. Some Prerna students were unfamiliar with the symbolism of the rainbow as a representation of gay pride and appreciated the advocacy on behalf of a marginalized community, noting similar efforts in their own community to support queer and “third gender” individuals. Inspired by the messages depicted in the Tinker School students’ story and wondering how the Tinker School students participated in community efforts and activism, students at Prerna were emboldened to showcase the struggles and successes that their own community faced in an effort to inspire their peers to similarly advocate for marginalized groups in their own communities.

Engaging in political discussions on a shared platform with peers enabled Prerna girls to depict their lives through the various challenges they faced, the decisions they made, and the efforts they undertook to affect systemic change within their community. In other words, building on aspects of the practices that were a regular part of their school's feminist curriculum, such as critical dialogues (Freire, 1968/2014), students had a platform using VR technology that enabled them to use their voices in creating and sharing their narratives to highlight the challenges they confronted in their daily lives as well as the strides they were making to address them. In fact, the Prerna girls were struck that the Tinker School video made no explicit mention of *how* the students engaged in activism themselves to bring about systemic change. Rather, the Tinker School video was interpreted as the San Francisco students taking on a more passive role on the sidelines of community efforts towards equality. Thus, the Prerna students felt illustrating their own daily participation structures in efforts to promote gender equality in their own community would provide their peers with strategies and inspiration to be agentive and engage in similar activism in their communities.

Power and Possibilities

The girls noted that VR technology quite literally captures “reality” since it gave them a sense of the full environment and allowed them to more accurately imagine what San Francisco might really be like, rather than restricting them to a square frame as most films typically do. In other words, the 360-space captured in VR worlds provides viewers with an immersive experience, a sense of being present in the virtual world they engage with. The Prerna girls articulated this experience of viewing their peers’ 360 films as feeling like they were walking through the streets of San Francisco’s Castro Valley. Seema describing her emotions at the sense of walking on the rainbow crosswalks added that the film made her “feel proud”, as if she were participating in a movement to support equality: it “connects a human to a human” she further explained to describe the tangible effort to support LGBTQ+ rights depicted in the Tinker School students’ story.

The vivid imagery the Prerna girls’ saw in the peers’ video inspired them to reflect on various forms of inequality and discrimination in their own community, many of which they were all too intimately familiar with. Janki remarked that in India discrimination against people who identified as “third gender” was rampant and having recently heard of an LGBTQ+ march in Lucknow recently, she wondered if there were ways that she and her friends could collectively undertake advocating for the *hijra* community. This reflection immediately sparked conversations among the group on ways to participate and engage to raise awareness and make change. The girls noted that in their critical dialogues at school, they had never interrogated the idea of third gender and wondered how they could more fully engage with these conversations in the future. Moreover, noting the affordance of the VR camera in powerfully and persuasively capturing space, the girls thoughtfully embarked in identifying ways to depict their efforts in promoting gender equality to render the same feelings of being able to identify and feel moved by imagery that they felt in viewing their peers’ story. The girls

capitalized on this visual affordance of the VR cameras to the fullest extent they could. “*Didi*²⁹, this [technology] is perfect”, the girls remarked when reflecting on the affordances of VR, noting that normally when one watches a film, they might forget the content in a “matter of a few blinks” but viewing immersive films enabled them to “remember” more and be “compelled” by messages depicted through this medium. The students explained that the technology itself becomes secondary to their viewing experience since rather than looking at the tool, they feel like they were experiencing the lived reality of what they viewed and suggested that this medium should be used around the world for “us to learn and teach [through films]”.

When their story was edited and read to be viewed, the girls expressed that although they were not entirely satisfied with the end result due to time constraints, they were nonetheless pleased with the lessons their story depicted. Seema, who had hoped from the outset of the project to illustrate the ways they actively engaged in community efforts said that their peers watching the video might feel inspired and realize that “if they want they can do all of these things; they can initiate critical dialogues. Kids will benefit from this, families will benefit from it, change will come about [in their communities]”. In other words, the Prerna girls leveraged the digital tools as a platform to illustrate how they participated in raising their voices towards dismantling patriarchy in their life worlds and hoped to inspire their peers to similarly stand up to various kinds of discrimination in their own communities.

Though the girls lamented the short time frame to work on their story, Janki, summarized their experience and satisfaction at their work saying, “We had many expectations, but we couldn’t do that much because maybe there wasn’t enough time. I guess whatever we could do and understand that itself is our success. But there is one thing that the work we did in 360 we benefited a lot from it plus we tried a lot to show everything as it is, be it our nature, our streets, or paths. *Didi* that is very important aspect about 360”. Thus, the modality of VR enabled students at Prerna to create and share knowledge on equal footing with their global peers, positioning them as agentive producers in an exchange of ideas, rather than passive consumers of information. Moreover, the technology was as the girls noted themselves, merely but a tool or a social artifact that offered certain possibilities, including in this case, the means to further engage in the kinds of critical pedagogy work that they were very much accustomed to practicing at their school.

Mindsets, Messages, and Media

As mentioned previously, in working with students at Prerna, it was abundantly clear that the use of cutting-edge digital tools augmented everyday practices and worldviews that students already held. VR is a tool wherein the modal affordances provide authors of digital stories with a platform that has the *potential* amplify their voices and share their daily experiences with various audiences. Simultaneously, once captured, the imagery in digital stories created using VR has the *potential* to shape, shift, and inform viewers’ perspectives.

²⁹ *Didi*, is a Hindi word used to refer to one’s older sister or to an older female (such as a teacher or family friend). The term *Didi* is used in this project as the latter instance wherein students referred to me, an older female teacher-researcher working with them as *Didi*.

However, these affordances can only be fully leveraged in the context of certain existing practices, as in the case of the students at Prerna.

The Prerna girls were quick to note depictions of equality in their peers' video due to their predispositions to identifying systemic inequities and solutions in their own worlds. Their previous practices of engaging in critical dialogues regularly no doubt shaped their worldview to be attuned to the experiences of marginalized groups and constantly reflect on their own positionality in society. Janki, an aspiring chartered accountant, says outside of school she likes to "discuss new topics with society", a keen interest that shows up in her schoolwork and the manner in which she engages with new ideas head on. Janki's cohort at Prerna similarly demonstrated a reflexive openness to listen, hear, and learn from others while constantly reflecting on ways to advocate for marginalized groups in their community, whether those groups included themselves or others.

Similarly, in thinking about the story they wanted to tell, the girls immediately sprang into action to depict practices that were consistent with tenets of critical pedagogy, an integral part of their daily school and home lives. It is noteworthy that projects of ICT4D generally paint a picture of beneficiaries of these projects as lacking a voice or being disempowered save for the technology itself. However, the girls viewed themselves as empowered and agentic in constructing bright futures for themselves and their families—unanimously the students expressed that their story would allow their peers around the world to "learn from us". Aditi and Seema elaborated that through their video they hoped to inspire other students. In particular they believed that by seeing how the girls were engaged in bettering their own lives and how their school encouraged them to be agents of change, their peers around the world would similarly take action to address inequities in their own worlds.

The Prerna girls' worldviews of themselves, their peers and communities proximally and distally located, and their own future professional aspirations were informed by much of the everyday curriculum at their school, which centered on advocating, training, and breaking barriers in ways that were meaningful, relevant, and long-lasting for students and families. The ability of Prerna students' to immediately notice and act upon inequities is unique in that the students' reflections were a result of the school's curriculum centered on Freirian critical pedagogy of *reading the world* in order to *read the word* through regular *critical dialogues*. It is noteworthy that the students we worked with at Tinker School did not engage in the same kind of inward reflection on systemic issues depicted in the films they viewed, but rather noted broader patterns and imagery like the similarities in experiences, brightness and colors, and other general aspects of everyday lives. In some rare instances, students even remarked that certain stereotypes they held of India were perhaps reified. For example, a student noted many people in the film were barefoot and concluded that this was evidence that people in India must be poor—this quick inference rather than reflection on why and when people in the video were barefoot resulted in the student overlooking the cultural norms in India wherein footwear is almost never worn indoors and often times removed outdoors in parks or other recreational areas.

Although a full analysis of the experience of the Tinker School students is out of the scope of this paper, it is important to highlight that the pedagogical practices at each site shaped students' ways of responding to others' stories led to different kinds of interpretations and considerations by students at each site. The Prerna girls posed questions, wanted to learn

more, attempted to find information to inform their understanding and interpretation of the film, and reflexively wondered how they could learn and apply new knowledge to their own lives; the students at Tinker School were quick to draw inferences, note similarities and differences in the environment in India compared to theirs, and viewed the exchange as an information sharing rather than a constructive process of creating and learning together with distal peers.

In other words, the openness of VR films where a viewer may chart his or her way through a story leaves room for interpretation and meaning making. At Prerna the girls instinctively reflected on what their peers' intended to convey in their story and how they could use the intended messages to understand and transform their own worlds. They also considered how their story would be received by their peers and took every effort to ensure their message would be heard. This perspective taking was the result of how the everyday teaching and learning practices they engaged in daily and arguably led to an experience that allowed them to engage in a dialogue with distal and more privileged peers on equal, if not higher, footing. In reflecting on the role that Prerna played in their lives and perhaps influenced how they participated in this project; several students expressed the sentiment that Sita noted. She mentioned she had learned so many lessons from Prerna that she "can't explain them, there are so many", from working on a team and collaborating with others to respecting members of her own family, and even engaging in constructive dialogues with community members. "Prerna is the secret of our energy," another member of the group shared, as they all agreed that through Prerna they learned how to confront their "problems" head on and make changes towards the betterment of society. These very practices and worldviews that the students had developed through the curriculum at Prerna enabled them to leverage the VR tools in agentive ways positioned as knowledge producers and change makers. The ways in which VR was leveraged and used in their project would have perhaps been more similar to that in the Tinker School were it not for the everyday practices and pedagogy that the Prerna girls regularly instantiated.

Unpacking the "Secret": Reframing ICTs and D

As previously mentioned, the Prerna girls attributed their successes and strengths to their teachers and the Prerna school community— "the secret" that sowed the seeds of their empowerment. The practices and worldviews the students developed through the critical feminist curriculum at Prerna enabled them to engage in reflexive and agentive ways of meaning making and community activism. Through their schooling, the Prerna girls had seemingly learned to approach their everyday lives with an equity lens, to reflect upon and transform their worlds, thereby always engaging in Freirean spirited *praxis* and approached the exchange herein with this lens. As such, the girls used different tools or technologies in conjunction with the skills and worldviews they developed through their everyday practices at school. In this section, I further interrogate how the school's critical feminist pedagogy informed students' experiences in the digital storytelling exchange, wherein the introduction of VR was situated in the existing practices and curriculum of the school, foregrounding expansive goals of education and development.

Development and Critical Pedagogy

An education informed by expansive notions of development is conceptualized through Nussbaum's (2011) and Sen's (1999) capabilities approach. As Walker (2012) articulates, education systems should further goals based on questions of what it means to be human and lead a dignified life. Sen's (1999) early conceptualizations on the distinction between the human capital and capabilities approach emphasized the need to go beyond the notion of human capital after acknowledging its relevance and reach to broaden our conceptualization of the goals of education rather than replacing human capital conceptualization with capabilities approach (Robeyns, 2017). In this additive and cumulative effort, an education informed by the capabilities approach can subsume the human capital approach in order to enrich the approach by creating a model "that recognizes the importance of the economic argument but goes beyond this in order to think well about an education which encourages the full range of human abilities – for example, curiosity, imagination, creativity, and intercultural understanding, the wonder of learning, and the power of good teaching" (Walker, 2012, p.388). In other words, the goal of education from a capabilities perspective foregrounds the intrinsic and non-economic aspects of education, rooting its goals in the lives of students as the ends of moral and political concerns (Robeyns, 2006; 2017).

The curriculum at Prerna school is informed by these very goals and conceptualizations, centering on empowering students through praxis and engagement with their communities while simultaneously providing them with tools and supports to develop skills that align with economic aspects of education. Centering on eliminating the barriers to achieve central capabilities and functionings creates a space for students to lead dignified lives, develop positive worldviews of themselves and others, actively engage in tackling systemic issues, and become financially literate and independent in the future. The curriculum and structures in place to support students and families at the school were conceptualized through a broad framework of development as the expansion of human freedoms and education as the *means* to achieve human freedom and capabilities. Contrary to dominant systems of schooling, education at Prerna is not simply a means to economic freedom and marketability but rather the *ends* to moral, political, and economic development centered on the lives experiences of students in the community.

The success of Prerna in empowering students is undoubtedly the result of the ethics of care and critical pedagogy woven deep into the fabric of the school's mission and philosophy (Shani, 2017). As the students expressed in the digital storytelling exchange, Prerna was the source of their strengths and successes, enabling them to thrive locally and globally, and giving them the courage to raise their voice for equality. The students' worldviews and reflexive skills enabled them to leverage various tools towards reflecting upon and transforming their worlds as illustrated through their digital story.

VR to share who WE ARE

The Prerna girls took to the VR technology with unbridled eagerness at the immersive experience the platform provided a new means to *hear* and *share* stories with their peers. VR was not the central focus of the digital storytelling exchange, but a tool that furthered the larger goals of the curriculum and practices the girls' lives centered on. Technology is often thought of as a silver bullet—the tool that will solve all problems. Different technologies have

been touted as the solutions for many issues ranging from being the teachers of the future to neutralizers of inequalities in the world. Yet, the reality is that any tool is but one of the means to certain ends depending on how the tool is used in the context of certain practices. In other words, technologies are not neutral artifacts, and each technology has its own affordances which can be leveraged towards specific ends or outcomes in practices determined by the goals and intentions of the person using the technology.

As the Prerna girls demonstrated, VR was a tool that allowed them to, quite literally, share their worlds with their peers due to the immersive affordance of the technology. They girls expressed that this experience of being able to see reality provides viewers with a memorable experience of being able to truly understand the world captured in the 360-space. At the core of the girls' desire in creating their film was to leverage this specific potential to disrupt what they felt were stereotypical global views of Indians as being a population that struggled in poverty and ailments. In stark contrast, the girls wanted to share their "reality" and dispel any false views about their lot in life to case themselves as the empowered individuals they felt they were by depicting their successes, strengths, and the ways they confronted challenges to bring about change. The technology or tool itself did not determine the outcome of the project but rather its uptake in the context of practices that the girls instantiated on a daily basis determined how VR was used and the subsequent outcome it had in the digital storytelling exchange.

The Prerna girls regularly engaged in a critically turned curriculum that is rooted in an ethics of care (Sahni, 2017). They were accustomed to engaging in dialogues about equality and justice through reflections, questions, and active engagement in civic life. Digital storytelling to raise awareness and construct identities was also a central part of their curriculum. As a result, how the girls leveraged the affordances of VR was shaped by their worldviews and critically oriented practices. It was natural for these students to create a narrative that tackled societal issues, depicting their struggles, their agency in enacting change, and their hopes for the future. The technology in this case was used towards tertiary ends (Sein & Harindranath, 2004) with the intent of providing the girls with the *means* to achieve their full *capabilities* (Nussbaum, 2011).

So, What's the D?

Development in ICT4D must be explicitly theorized in the context of every endeavor. As illustrated through the case of the girls' use of technology at Prerna, development must be consistent with expansive notions of the concept that enable stakeholders to leverage their strengths, be positioned as active constructors of knowledge, and feel a sense of agency through the project. As many have noted, ICT4D projects that take narrower views of development tend to focus on the intentions of the funders, researchers, or well-meaning outsiders attempting to modernize populations viewed as marginalized and disempowered (Arora & Rangaswamy, 2013; Tacchi, et al., 2014). These approaches tend to be patronizing, prevent beneficiaries from feeling empowered, and ultimately lead to dependency on their supposed benefactors. Consequently, most ICT4D projects fail or achieve modest change (Chipidza & Leidner, 2017; Hamel, 2010). Development as the end goal of ICT4D projects must then focus on promoting capabilities and functionings by identifying areas of *fertile functioning* to leverage and *corrosive disadvantage* to disrupt (Nussbaum, 2011). Such an approach would

ensure that projects emphasize and build on local resources and knowledge and mitigate potential barriers from the outset.

Although the case study highlighted in this chapter focuses on education, the conceptualization of development from an expansive approach is arguably imperative in any field. In working towards leveraging innovations to bring internet connectivity, a range of good and services, and promote the inclusion of rural populations in social, political, and economic issues in their community, Tacchi et al. (2014) describe two separate projects that were built to ensure the interventions were carried out in a participatory effort. The first project, *DakNet*, employed local resources, infrastructure, and human capital to ensure the needs of the community were being met in terms of hard to obtain goods (such as over the counter medications and cosmetics) and services ranging from matrimonial posts ads, to job postings and other informational services to a remote village in India. The second project, *Finding a Voice (FaV)*, enabled members of 15 rural communities in four Asian countries that led to democratic successes in community activism. Specifically, a co-constructed radio initiative that included voices of stakeholders within the community and elected officials brought about changes to the infrastructure of a north Indian village that was only accessible by foot from the nearest drivable road and in another remote village led to an increase in efforts to combat violence against women. These projects highlight how a focus on ensuring that initiatives towards development in commercial and gubernatorial sectors can be successfully implemented by ensuring the intervention is carried out by, with, and in communities rather than being done to or them (Tachhi et al., 2014). Individual freedoms must thus be the ends of projects of development wherein the focus is on improving the quality of individual lives and not simply achieving economic growth for the country.

For development to be the key to a better life that President Truman had perhaps originally intended in his first use of it, development must truly focus on the quality of life of individuals in any context. Without an explicit theorization of what development is, who it benefits, and how it can be carried out in a manner that seeks to improve the lives of citizens of a country, initiatives in this arena will continue to fall short and maintain the status quo. Further, the kind of technology, the specific role of the technology, and its feasibility and relevance in local contexts in the short and long-term must be considered. As others have noted before (Sein & Harindranath, 2004; Walsham, 2017), rather than leading to meaningful innovation and change, the end result of narrowly conceptualized projects will continue to foster dependency, exacerbate inequities, and serve as virtue signals to any real impact. In other words, the path forward from here for any ICT4D project must entail explicit and robust theorization along with local contextualization and collaboration.

Learning with Impact: Digitally Mediated Practices Online

In the Spring of 2020, the COVID-19 pandemic threw college students, instructors, and administrators into the world of virtual higher education overnight. With little time and support to meaningfully adapt teaching and learning to online contexts, no less during a time of globalized and localized suffering, students and instructors alike struggled to find a new normal. Those of us who had already been designing, implementing, and studying online learning spaces for years met the urgency of the moment to support our bewildered colleagues and students. Nonetheless, we are aware that the lack of appropriate resources and strategic learning design would likely undermine the potential of online education that we sought to illustrate in our work since prior to the pandemic. Now, as the pandemic appears to ease its restrictive grip in some parts of the world, it is likely that those who have been scarred by haphazardly designed virtual classes and are experiencing Zoom fatigue might experience heightened aversion and skepticism toward online learning. At the same time, others will undoubtedly continue to opt for online classes, having experienced the benefits of flexibility and, in some cases, accessibility, that virtual learning can afford; not to mention, the large investments institutions have made to procure requisite technology and licenses. Indeed, online learning has proliferated in many parts of the world, and in an era of widespread connectivity-- of technology and of disaster and disease—online learning is unlikely to disappear any time soon.

It is within this context that I seek to better understand and advocate for features of online education that might be most fruitful for student engagement and learning. This design-based research (Barab & Squire, 2004) has centered on building digital tools, which were deployed in undergraduate courses at the University of California, Berkeley spearheaded by Dr. Glynda Hull³⁰ and her interdisciplinary team of educators, researchers, engineers, designers, and graduate students. The genesis of this project stemmed from a desire to utilize the creative, collaborative, and analytic potential of digital tools to support student learning in an effort to offer pedagogical innovations in online teaching and learning. Towards this end, previous findings from this project have explored student creativity, remix, and multimodal design, as well as synchronous collaboration, using a host of digital tools that we designed to be integrated into an online learning platform (Scott et al., 2018; Sobko et al., 2020).

Building on these findings, in this paper, I turn my attention to the role that student-facing learning analytics can play in supporting students' learning, engagement, and participation in online and hybrid courses. I describe one such tool, the Impact Studio, that

³⁰ This chapter is based in part on research supported by the United States National Science Foundation under Grants No. 1623468 and 2013165362 in collaboration Dr. Amy Stornaiuolo (University of Pennsylvania) and Dr. Matt Hall (Baylor University). Any opinions, findings, and conclusions or recommendations expressed in this material are those of the authors and do not necessarily reflect the view of the National Science Foundation. We also gratefully acknowledge the support of the Chamberlain Foundation; the Peder Sather Foundation; the University of California's Innovative Learning Technology Initiative; the Graduate School of Education at the University of California, Berkeley; and the Educational Technology Services at the University of California, Berkeley. Sincere thanks to the researchers, designers, programmers, students, and staff who've been key to this effort. They include (in alphabetical order): Jessica Adams, Anne-Sophie De Baets, Kyle Booten, John Crossman, Jen Dizio, Flint Hahn, Adrienne Herd, Matt Hall, Oliver Heyer, Paul Kerschen, Keith Martin, Nicolaas Matthijs, Phil Nichols, John Scott, Sophia Sobko, Amy Stornaiuolo, Jenn Stringer, and Rian Whittle.

provides students and instructors with data trails, including a nodal visualization of one's connections with other members of the community, a timeline of activity that indicates when and how one's work is taken up by others in the community, as well as comparisons of one's activity and the uptake of their work compared to the class in general. This tool was designed to enable students to reflect on and further their learning in an online course. Simultaneously, the tool allowed students to identify specific parts of their work they may want to modify for better uptake and reception by the community of their peers. In this paper, I interrogate the potential of the trails of student-facing learning analytic feedback and the practices of teaching and learning that surrounded the use of the Impact Studio and trails of data provided through its use.

Online Teaching and Learning

The widespread presence of social media platforms for social, cultural, and professional uses creates a new kind of sociality wherein in just four years, from 2007-2011, the number of internet users over the age of 15 who logged onto a social media site went up by 76% (Dijck, 2013). This number no doubt continues to rise with the availability of increasingly low cost and scalable technologies. In fact, recent reports estimated the use of artificial intelligence (AI) in education to grow by 48% or higher from 2018-2022 (Rajecki, 2019), a number that is likely to be higher given the forced adoption of distance learning amidst the pandemic. To wit, even before the onset of the pandemic we saw an increase in online colleges and university program offerings in response to a call for the provision of flexible and scalable instruction in an effort to ensure schools remained financially sustainable by cutting some of the overhead costs required in maintaining physical spaces (De Gagne & Walters, 2010; Hensley, 2005; Scott et al., 2018; Scott, 2018; Sobko et al., 2020). Cloud computing, learning analytics (LA), social learning analytics (SLA), artificial intelligence (AI), big data, information science (IS), machine learning (ML), AI in education (AIED), and educational data mining (EDM) are a short list of terminology that have entered higher education discourse and inform the use of a range of technologies and pedagogical practices across disciplines (Bates et al., 2020; Cheung et al., 2020; Fujita, 2020; Long & Siemens, 2011; Renz & Hilbig, 2020; Shum & Ferguson, 2012)³¹.

Despite the proliferation and widespread use of digital technologies in online spaces, intentional and effective pedagogical practices that surround the uptake of these technologies, are in contrast, not very ubiquitous. Researchers have documented a range of quality and content delivery in online spaces (Hew et al., 2020). Many argue that our best efforts to use newer technologies simply replace older ones rather than leveraging the full potential of these innovations. Others note a lack of attention to pedagogical practices and curriculum design that support meaningful learning and enhance student engagement, such as the use of assignments that promote critical thinking, opportunities for students to make real world connections, and other practices that allow students to be active agents of their learning (Bricknell & Muldoon,

³¹ For clarity and consistency, I employ the term S/LA. I draw on definitions of LA and SLA provided by Long & Siemens (2011) and Shum & Ferguson (2012) to conceptualize S/LA as a tool to better understand and support learning within the larger discipline of AI; AI is a field more generally focused on simplifying cognitive processes by teaching machines to simulate human thinking (Renz & Hilbig, 2020).

2013; Frey & Sutton, 2010; Fujita, 2020; Hensley, 2005; Khan et al., 2020). An illustrative case of such shortcomings is the use of the popular video conferencing platform, Zoom. For example, Gallagher and Palmer (2020) note that the use of Zoom web conferencing to provide live lectures is akin to video conferencing software from the 90s, thereby simply replacing an older technology with a newer one. While some educators utilize the breakout room feature available on Zoom in order to create a collaborative environment for rich small group discussions (cf., Khan et al., 2021; Sobko et al., 2020), it is important to note that such efforts to change the teaching and learning practices that surround the use of newer technologies are not always the norm.

It is not surprising, then, that, efforts to promote online education have been met with mixed reception about the future of technology, ranging from unbridled optimism to cautionary trepidation (Cheung et al., 2021; Long & Siemens, 2011; Renz & Hilbig, 2020; Hensley, 2005; Godwin-Jones, 2014; Kessler & Wall, 2016). Nor is it unexpected that most students and teachers hold negative attitudes towards online courses and often view online education as being of inferior quality to traditional face-to-face instruction (Gierdowski, 2019; Hodges, 2020; Brooks & Pomerantz, 2017). This paper is an effort to address some of the shortcomings identified in online classrooms, specifically by exploring the role of a student-facing learning analytic tool in supporting innovative and intentional pedagogical practices in higher education.

Data Trails in Education: Overview

Broadly speaking, learning analytics have been defined as “the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs” (1st International Conference on Learning Analytics & Knowledge, 2011). Building on this definition, Shum and Ferguson (2012) propose Social Learning Analytics (SLA), a form of learning analytics that is grounded in pedagogy of learning and is relevant to thinking of learning in a participatory online culture wherein students are engaged in social activity either through direct interactions with others or through the use of platforms that leave traces of activity for others to engage with.

S/LA feedback can be made available to students as student-facing data trails in order to provide students with feedback on various aspects of their work as well as content within the course (Hull & Scott, 2017; Scott, 2018). For example, students can leverage metrics about how their contributions to an online course community are taken up and responded to by peers, use feedback from gamification tools to measure and modify their participation, and draw on resources from shared repositories of knowledge to deepen their understanding of course content (cf., Khan, Atta, & Jawaid, 2021; Holcomb et al., 2010). S/LA feedback can be presented in a variety of forms, ranging from qualitative feedback (as comments from the community most often seen on asynchronous discussion boards) to a quantifiable number (indicating an overall “score” on a “leaderboard”, as is seen in the use of applications where users are awarded points for the number of contributions they make; such feedback is akin to the accumulation of likes on social media platforms).

Long and Siemens (2011) note that within online education learning management systems (LMSs), learner-produced data trails have the potential to provide valuable insights into the kinds of learning that occur and allow educators to identify not only learning processes but also specific students who may be ‘at risk’. Recent reports document the use of S/LA data

trails to predict student final performance based on their work from earlier in a course as well as estimate drop-out and retention rates and admission likelihood (Akcapinar et al., 2019; Scott, 2018; Zawacki-Richter et al., 2019). Consequently, such information serves a pedagogical purpose, wherein instructors can use information from these learning analytic systems in order to gain formative feedback on students' learning and interests, identify and provide additional support to students who might need it, and make modifications to course content and structure in order to align with insights from such feedback (Long & Siemens, 2011) — a vital tool especially in large courses with large student-to-teacher ratios where the likelihood of students falling through the cracks is high.

In addition to predicting student outcomes and profiling students to meet their needs, work in the field illustrates efforts to bring S/LA and AI in higher education by providing educators and administrators with tools that cover a range of supports. Some examples of these uses of S/LA include the provision of tutoring services, identification of gaps in student learning, facilitation of collaboration, assessment and evaluation using multiple forms of feedback, and use of systems that utilize adaptive algorithms and personalization to further student learning (Renz & Hilbig, 2020; Zawacki-Richter et al., 2019).

Data Trails in Education: Critiques

Efforts to leverage data trails in education have had mixed results in terms of their success, and most efforts to use data trails in online classrooms are susceptible to a range of shortcomings. Some systems provide little to no impact on student learning, some are viewed negatively by students and teachers, many are disconnected from theories of teaching and learning, and others are driven by companies' goals of profitability (Hew et al., 2020; Renz & Hilbig, 2020; van Dijck, 2013). Recent review indicates that the use of S/LA is critiqued for relying too heavily on techno-deterministic approaches to learning and a disregard of pedagogical considerations. In other words, educators are often unsure of how to take advantage of the available digital tools placed in classrooms based on naïve assumptions about their pedagogical power; the use of the tools thus remain disconnected from theories of learning (Raffaghelli et al., 2020; Zawacki-Richter et al., 2019). Moreover, as the widespread adoption of educational technology platforms controlled by large corporations permeates universities and other educational institutions, many have called for careful reflection about the social and ethical underpinnings of how data trails created by students and teachers are mined and used for profit, at times without their knowledge (Broughan & Prinsloo, 2020; Manca et al., 2016; all cited in Raffaghelli et al., 2020; Renz & Hilbig, 2020; Zawacki-Richter et al., 2019). As a result, efforts are underway to better understand how S/LA and other forms of AI might support student learning and engagement informed by pedagogical theories and practices while advocating for data transparency (Abuhassana et al., 2020; Cerro Martínez et al., 2020; Zawacki-Richter et al., 2019).

Given that advocating for an approach to using data trails with complete transparency and informed through pedagogical models is of paramount importance, our research team sought to contribute to implementing such approaches. In particular, the use of the Impact Studio tool, a student-facing learning analytics tool, which I describe in more detail later, is an effort towards increasing data transparency and pedagogical innovation. Towards this end, this work is firmly guided by the belief that when data on student participation and learning in a

course are made available to students, meaningful opportunities for learning emerge and some social and ethical concerns about the collection of such data may also be alleviated (Broughn & Prinsloo, 2020; Zawacki-Richter et al., 2019).

Theoretical Framework

Online and hybrid courses are constituted by multiple individuals and tools—students, teachers, course platforms, and word processing software, among others— and the interplay of their multiple influences on each other, which enable educational spaces to serve as sites of meaning making through participation in various kinds of learning practices. It is the interplay of these individuals, tools, and their mediating potential that underpin learning in the context of online and hybrid courses at the college level that I seek to make visible in this paper. Thus, I draw on sociocultural conceptualizations of literacy and learning to explore the role that student-facing learning analytics play in supporting pedagogical practices and transformative learning in online classrooms (Abuhassana et al., 2020; Cerro Martínez et al., 2020; Scribner & Cole, 1981; Vygotsky, 1978; Zawacki-Richter et al., 2019). In what follows, I review theorizations about learning and literacy, notably the works of Scribner and Cole (1981) and Vygotsky (1978), that inform how I conceptualize the role of various students, teachers, and digital tools, implicated in learning. These theorizations allow me to explore how student learning and engagement are mediated by student-facing learning analytics in the context of hybrid and online classrooms.

Learning: A Practice

In an effort to provide a robust understanding of literacy, Scribner and Cole (1981) articulate the concept of a practice as a “recurrent, goal-directed sequence of activities using a particular technology and particular systems of knowledge” that “utilize coordinated sets of actions” or “skills” in “applying this knowledge in particular settings” in order to “accomplish tasks” (p. 236). In other words, the three primary components of any practice are: (1) technologies, i.e., physical or material tools available, (2) knowledge, i.e., culturally shared information, and (3) skills, i.e., processes involved in the application of this knowledge. I extend Scribner and Cole’s (1981) notion of practice to unpack learning practices that take place at the nexus of “people and things” (Brandt & Clinton, 2001, p.346) in online and hybrid educational spaces.

This idea of a learning practice provides a useful conceptual apparatus to explore how available technologies and knowledge influence the specific skills or consequences associated with student learning in online and hybrid courses. Members of a course engage in learning practices through their shared participation in activities that entail using available technology, knowledge, and skills in order to accomplish outcomes that hold significance to them. More specifically, online and hybrid courses are spaces constituted by individuals (e.g., students or teachers) with shared goals (e.g., exploring a particular topic or seeking an “A” grade) who engage in utilizing specific tools (e.g., course materials, such as a textbook or course platform) and knowledge (e.g., a shared understanding of how to engage with course materials) via skills (e.g., application of the knowledge to engage with course materials via sensory-motor, linguistic, cognitive or other processes).

Development as an Outcome of Learning

To further understand the practice account of learning, it is helpful to turn to the work of Vygotsky (1978), who inspired Scribner and Cole's (1981) research, and who emphasized individual and societal development as the ultimate outcome of learning. For Vygotsky (1998), learning or the shifts in "forms and content of thinking" (p. 32), via a process referred to as internalization, leads to development. Learning and development are interrelated processes; exploring the relationship between these two processes provides insights into how everyday small shifts in individual learning that take place through one's participation in various (learning) practices eventually lead to larger, more noticeable growth or maturation (development). These shifts can be better understood by ascertaining an individual's zone of proximal development: "the distance between the actual developmental level as determined by independent problem solving and the level of potential development as determined through problem solving under adult guidance or in collaboration with more capable peers" (Vygotsky, 1978, p. 86).

In a Vygotskian sense, then, all human development has its origins in the social world from psychological tools that mediate the process of development as these tools become appropriated or internalized. Key to Vygotsky's project is an emphasis on psychological tools—tools that support mental or thought functions—and how psychological tools interact with material tools in one's environment as learning and, more importantly, development take place at individual and societal levels. Further, Vygotsky's theorization illustrates how forms of thinking are associated with participation in particular cultural activities; participation in certain activities, including the physical and psychological tools used for such participation, makes possible the development of certain forms of thinking or the use of specific skills towards specific ends. Proleptic shifts in thought processes originating in social worlds take place over time through participation in various shared activities each associated with different kinds of thinking, allowing learners to move forward in their learning, and ultimately, their development.

Learning (and Development) via Tools, Knowledge, and Skills

Conceptualized in this way, learning is a ubiquitous and ongoing process that takes place at an individual level in almost every social interaction, mediated by available tools and people. Development, however, is only realized in an individual when there is a marked shift in one's maturation level due to the internalization and assimilation of a set of learned skills. At societal level development is only visible when larger societal structures for participation in practices and available cultural or material tools change. Thus, the recursive and mutual influence of individual and societal development that occur when cultural (material) tools enable certain kinds of thought processes leads to the creation of new ways of participation that emerge over time. Put another way, "tools, both ideal and material, provide the cultural medium that supports the development of people who in turn develop new tools that support the development of the culture" (Freedman et al., 2016, p. 13).

A quintessential illustration of such shifts in individual and societal development can be seen in the technologies of communication that have evolved over time, ranging from letters distributed via mail carriers to electronic mail distributed via the internet, or broadcasting via radio now possible via live stream through multiple social media platforms. The possibilities

that these different mediums present and the distinctly fast speed and reach of communication through newer forms of media have significantly shifted how people consume and share daily correspondence, news, and other communication. Similarly, the kinds of technologies available for use in educational spaces continue to evolve and present possibilities for new learning practices, creating opportunities for educators to shift classroom pedagogies to leverage and respond to these new possibilities.

Vygotsky goes Online: Research Questions

Interpreting Vygotsky's arguments in the context of the present digital moment of education characterized by the availability of a gamut of digital technologies that Vygotsky could not possibly have imagined begets the need to further explore the material dimensions of the presently available tools that make possible certain activities and forms of thinking. In online and hybrid courses, cutting-edge digital technologies, including S/LA tools, provide new forms of engaging in learning activities via social networks. As previously mentioned, learner-produced data trails can provide information to students as qualitative or quantitative feedback. The potential of these technologies to persist as mediating tools even in the absence of active human engagement creates opportunities for students to engage in learning practices and collaboration with their peers that endure through the technologies themselves. Recognizing these dimensions of currently available S/LA as a salient part of the online teaching and learning environment furthers current understandings of the possibilities and potentials of digitally mediated learning contexts.

For college students, learning practices in the context of hybrid and online courses can foster new kinds of thinking, and over time, these everyday shifts in thinking eventually lead to individual development; that is, over time the shifts in individual development lead to larger shifts in subsequent learning practices in the course community. As a result, societal development, at the level of the classroom, takes place in response to the individual shifts in development. To illustrate this iterative cycle, in this work, I explore how individual learning and development are mediated by available tools and knowledge as students participate in everyday learning practices in a course. In particular, I focus on the use of the Impact Studio, a student-facing learning analytic tool, exploring how it provides opportunities for students to engage in learning by leveraging the information (i.e., knowledge) available to them to engage in specific kinds of learning practices. The S/LA feedback students receive from the use of the Impact Studio enables them to reflect on their learning in the course and identify specific parts of their work they may want to modify for better uptake and reception by their peers.

To unpack the recursive influences of tools and individuals in the course, and more specifically their role in mediating what learning and development in online or hybrid courses might look like and how learning and development might take place, I ask: *In what ways do digital tools, specifically student-facing learning analytics, and activities surrounding the use of these tools, mediate learning practices in online and hybrid courses? More specifically, how do students leverage information from data trails ensuing from student-facing learning analytics to subsequently modify the activities they participate in while engaging in learning practices in these spaces?*

Research Methodology

The focal course in this paper, a longstanding undergraduate Education course titled “The Art of Making Meaning: Educational Perspectives on Literacy and Learning in a Global World,” entailed the use of a range of digital technologies to further the teaching and learning goals of students and instructors. Each semester (i.e., 15 weeks in the fall and spring semester each academic year), the course was offered as a fully online course and a hybrid course with identical content; the only difference between the two formats was that the former had weekly class meetings via Zoom and the latter had in person meetings on campus. The course was hosted on the Canvas Learning Management System (LMS), the platform of choice at the University of California, Berkeley, where it was taught. The course engaged students in the reading of theoretical pieces from the field as well as gaining hands on experience through placements at local schools to participate with and observe the literacy practices of children and youth. Through their work in the course, students conceptualized literacy from a sociocultural perspective while engaging in research and practice on pedagogies informed from this perspective.

Initial work for this design-based research project began in 2013 in an effort to reimagine online classrooms as educational spaces that privileged participation and collaboration, unlike more traditional Massive Online Open Courses (MOOCs). Since then, the research team engaged in multiple iterations of revising and implementing new course content and making updates to the digital tools in response to data collected from multiple stakeholders each year (Scott, 2018; Scott et al., 2018; Sobko et al., 2020). Many of the researchers involved in this project were also instructors for the course, which enabled them to have an understanding of the course from a pedagogical as well as a research perspective. In this paper, I focus on data collected during the academic semesters from Fall 2016 through Spring 2021 on the use of the Impact Studio, which I describe in more detail below.

Digital Tools Overview

In planning curriculum for the course, instructors and researchers considered ways to implement best pedagogical practices to create an innovative learning environment for students. The research team began with prototyping digital tools that would privilege practices of creativity, collaboration, and learning through multimodality. Additionally, Dr. Hull’s long-held commitment to bridging in-school and out-of-school literacy practices (Hull & Schultz, 2001) guided the vision of these tools to leverage students’ proclivity with everyday media platforms engaging them in learning through a host of similarly designed digital tools for learning in the course. These goals led to the creation of four digital tools collectively referred to as “SuiteC” and included the Impact Studio (IS), the student-facing learning analytics tool I focus on in this paper.

The IS was created 3 years after the initial deployment of the first three SuiteC tools (Appendix A). The purpose of this tool was to increase transparency on back-end data gathered through student participation in the course and leverage the potential of these large data trails in furthering student learning. Thus, the tool was created and intended to address ethical dilemmas in the use of digital tools while also furthering pedagogical goals. The IS tracks and visualizes back-end data generated from student participation using the SuiteC tools and Canvas LMS. When the IS tool is launched, a user lands on their data visualization and profile

page, organized into four sections that provide students and instructors with data trails, including: (1) an Activity Network which provided a nodal illustration of one’s connections with other members of the community (Figure 1), (2) an Activity Timeline of activity that illustrates each user’s total contributions and impacts³² over the course of the semester (Figure 2), (3) Total Activities, which provide a comparison of each user’s contributions and impacts in relation to others in the course (Figure 3), and (4) thumbnails of the most impactful and trending assets in the course and for each individual (Figure 4).



Figure 2. This is a screenshot of the Activity Network within the Impact Studio that shows students how they are connected to other members of the community. NOTE: Image intentionally blurred



Figure 3. This is a screenshot of the Activity Timeline visualization of the Impact Studio tool. The data presented here allow students to see how their work is taken up by the community. NOTE: Image intentionally blurred.

³² *Contributions* and *impacts* are important terminology in the IS tool. Contributions refer to the activities an individual participates in or does whereas impact refers to how others respond to the activities of an individual. The activities that are captured and quantified by the IS algorithm to measure contributions and impacts are divided into three categories: views or likes, interactions (i.e., commenting, pinning, or remixing an asset), and creations (i.e., adding a new asset to the AL used to measured contributions) or reuses (i.e., the use of one’s asset in someone else’s work, used to measure impacts).



Figure 4. This is a screenshot of Total Activities visualization of the Impact Studio tool. The data presented here allow students to see how their work is taken up by the community. NOTE: Image intentionally blurred

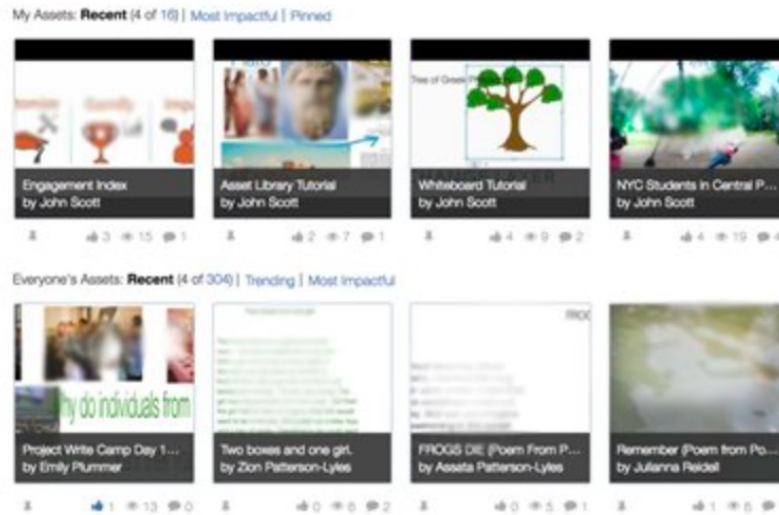


Figure 5. This is a screenshot of the impactful and trending assets in the course as seen in visualizations provided by the Impact Studio tool. The data presented here allow students to see how their work is taken up by the community. NOTE: Image intentionally blurred

In addition to the SuiteC tools, students and instructors also used Zoom video conferencing software (for the online version of the course) and commercial word processing and presentation software (e.g., GoogleDocs, PowerPoint, etc.) for written assignments, presentations, and other course activities. As much as possible, all digital tools were integrated into the Canvas LMS to make their use as seamless as possible.

Participants

Participants in this study were in the main undergraduates at the University of California, Berkeley campus enrolled in the course during the fall and spring semesters in the academic years from Fall 2016 through Spring 2021. Occasionally, students from other campuses within the university system signed up for the online version of the course. Across all semesters there was one high schooler who took the online version of the course. Based on data from a survey administered each semester of the course, students each semester represented a (self-reported) range of demographics in terms of class year, academic major, gender identities, and race/ethnicity. Many students had some aspirations to work in education-related professions and were enrolled in the Education Minor at the university. The course also fulfilled a campus graduation requirement for students to take coursework in

American Cultures and as such lent itself to attracting students from various disciplines, with especially large numbers from cognitive science, psychology, and computer science majors. Each semester there are 90-120 students enrolled across three to four sections of the course offered. All students are encouraged to complete surveys and are invited to participate in interviews at the end of the semester as explained further below.

Course Structure

The structure of the course followed what instructors referred to as a “pedagogical arc” and consisted of 4 distinct learning phases within each module, starting with an introduction to the topic and culminating with learning opportunities to reflect on and synthesize learning within and across modules. In this course, one learning module was conceptualized as the weekly set of activities and assignments that students completed about a particular topic related to literacy (i.e., the focal topic of the course). Within each module, students used the SuiteC tools as part of their coursework while they engaged in various activities, such as designing individual and collaborative Whiteboards to illustrate their thinking, responding to the work of peers via comments on assets posted to the Asset Library, and making theory-practice connections by reflecting on their experiences at field sites.

Data Collection and Analysis

Each semester, data were collected and triangulated for research across the following sources:

Suite-C tool use survey. Since the Fall of 2017, at the end of each semester students were asked to complete a short survey to share their experience with using the SuiteC tools. The survey was administered via Google Forms and consisted of multiple choice, multiple answer, likert scale, and open-ended questions. Students were asked questions about their perceptions on the use of each tool in terms of technical features of the tools and the role the tools played in shaping their learning in the course. Students were also asked to compare their use of the SuiteC tools in this course with digital tools used in other courses and were given the opportunity to provide feedback on the SuiteC tools.

Interviews. During and after each semester, instructors and researchers reached out to students to invite them to participate in semi-structured interviews to share information about their experiences in using the SuiteC tools and reflect on their learning through these tools. During these interviews, students were asked to look back at specific course assignments they had completed to respond to questions asked by the interviewer. Interviews were conducted in person or via Zoom depending on the respondents’ preferences. All interviews were audio recorded and transcribed.

Data were analyzed using tabulation and frequency counts for likert scale, multiple choice, and multiple answer responses to survey questions. Inductive codes were used to analyze open-ended survey responses and transcribed interviews in order to generate themes that allowed me to explore my research questions (Miles, Huberman, & Saldaña, 2014).

Findings

In response to survey questions, over the semesters, when asked to agree with statements about whether students found the SuiteC tools to be engaging and/or beneficial to

their learning in the course, we found that consistently most students expressed that the Impact Studio (55%) had some engaging and/or beneficial effect on their learning. Students reported that using that Impact Studio provided a range of benefits to their engagement and learning in the course such as opportunities for everyday dialog with peers and positive feedback from seeing how one's work was used by peers, among others. Data from student interviews corroborated survey responses and further revealed how the intentional integration of the IS within weekly assignments offered students opportunities to engage with course content while using the tool to further support their learning. The data trails provided students with various kinds of information that they leveraged in the context of weekly class activities to collaborate with peers and to reflect on and modify their own learning and participation in the course. To reveal how student facing learning analytics mediated student learning, below I illustrate how students' learning practices shifted in response to their use of the Impact Studio and how students themselves understood these shifts in their practices.

Catalyzing Shifts in Participation

Many students interpreted the learning analytics presented to them via the Impact Studio as snapshots of the community's interconnectedness. For example, when asked to reflect on the Impact Studio in a class assignment, students articulated it as a visual representation of their learning process, via the connectivity of students and instructors within the course. One student, Jenna³³, explains that the Activity Network illustrates how learning takes place in the course via a "two-way street" of learning fostered amidst learning practices wherein students share perspectives on course content with one another through their assets (in the AL). Another student, Kate, concurs: "The activity network reveals how interconnected we are in the classroom. Without my peers I wouldn't be able to learn as much as I am [learning] now." In other words, the IS symbolizes learning captured from the interactions between the members of the community; the tool is the place that captures how moments of connectivity and learning, which have an otherwise scattered and ephemeral quality, particularly in online spaces, are aggregated and made visible for the student audience. Students therefore associate the connections represented by data visualizations in the Impact Studio with their learning in the course.

Networks of Participation. The visualization of how students were connected to one another seen in the Activity Network allowed them to learn each other's names in an online space where they may have otherwise not had opportunities to get to know their peers, and further encouraged them to reciprocate peers' interest in their work. Commenting on the nuanced analytics from the Activity Network, which show students whom they have interacted with, and in what capacity, and whom they have had no interactions with, Kate explains, "With the web, not only do you get the green circles for looking for contributors, but then you also see who you're actually connected with." Jenna shares, "... the common names I saw were the ones connected to my circle. And then I think I reciprocated by commenting on their posts too. Because they're interacting with me, so I should probably do the same to them. It definitely influenced my participation. Even if it was just me interacting with the students who interacted

³³ All names are pseudonyms

with me. I feel if I didn't see that I wouldn't know. So, then I wouldn't be able to reciprocate that". It appears that knowing who and how one interacts with through the visualizations presented in the IS, while having opportunities to engage in meaningful conversations with one another, encouraged students to get to know the people 'behind the dots', so to speak, and humanized work in the course with peers who otherwise would only be present to them as nameless others in the context of the virtual classroom.

Mary corroborates Jenna's experiences, adding that the feedback from being able to see how her peers interacted with her work served as a motivating factor in encouraging her participation and engagement in the course. She explained that information from the Activity Network "was something that I think I enjoyed and that made me feel like okay, I definitely in the future want to put more time into my assets. If, you know, people are going to like comment, and then if they're going to, I guess take away something from them." Mary felt that whereas in other online courses participation often felt like "busy work", the Impact Studio data provided visible proof that others in the community were seeing and responding to her work. Further, the nature of the assignments when encouraging students to comment with one another provided students with specific guidelines to respond to each other in ways that promoted a substantive discussion, a pedagogical move that Mary appreciated since it allowed students to engage in meaningful conversations about content and showed that, "people were actually interacting with the material and seeing what I was doing and also taking that to heart".

Other students took a different approach in determining how they participated in the course based on feedback from the learning analytics in the IS; they sought out work that had not received as much interaction as others in an intentional effort towards making all members of the community feel seen and heard. This practice of going beyond simply engaging with familiar or the most popular or trending posts allowed students to create an inclusive and supporting community and also to find ways to engage with different perspectives and hear new opinions—an unintended outcome of their altruism. One student, Jessica, summarized her experience in seeking out peers to engage with: "I want to make them feel like someone's really interacting with what they posted, instead of interacting with the same single posts that everyone already saw, that everyone's thinking the same way. And I want to be able to address it." Jessica's own commenting behaviors were partially driven by empathy, but they also reflected her own academic and scholarly desire to see a variety of perspectives. She used her own influence as a commenter to challenge everyone 'thinking the same way.' Importantly, the student-facing learning analytics visible in the Impact Studio did more than represent learning; the learning analytics also seemed to influence students' attitudes and behavior in the class in ways that furthered their engagement with various course structures.

Interactivity and Learning. Students reflected on how learning was taking place through their interconnectedness as represented in the IS, carefully attuned to the ways various tools and practices interacted with each other. For one student the analytics seen in the IS provided an overview of her participation and completion of her work, but she felt she “learned the most through Asset Library” [student interview Kate]. Other students concur on this point: “the impact studio as its own tool... I want to say it's stuck with me, it was just interesting to see who and how many. But the real content rested in what everyone else had to say, and we can't access that through the impact studio. We see it through the asset library.” [student interview Jenna].

In other words, to the extent that the Impact Studio motivated and directed students to engage with their peers’ work in the AL, it indeed contributed to supporting students’ learning. The asynchronous learning itself primarily happened through engagement with the AL via the IS. The AL was the primary site for students to share the personal connections and meaning they were making around course content and thematic topics, as directed by course assignments. As Kate reflected, the Asset Library became a place where students would turn when they didn’t understand a concept, knowing another student would have shared their own perspective on it, or explained it in their own words. Thus, the Impact Studio motivated students to engage with the Asset Library (including the posts and comments), indirectly influencing learning, but it was not where the learning itself always occurred.

Students contrast the IS’s function to provide an overview of contributions and interactions, with the AL’s affordances of hosting content and facilitating interaction around the content. Kate, who emphasized the role that her peers’ assets had on her learning several times, outlined how she understood collaborative learning to occur via the asset library: “And like, like, honestly, there were at times, like, where I didn't even understand a concept. And I’d look at someone else's and be like, oh, that's what it was like, I think Scribner’s three metaphors... Like one of them was like, literacy is a state of grace, I was like, I have no idea what this means. Let me just look at somebody else's, and like, hopefully gain something and like, I would be like, oh, that's what it meant this whole time!”

The AL was the primary site for students to share the personal connections and meaning they were making around course content and thematic topics, as directed by course assignments. As Kate says, the Asset Library became a place where students would turn when they didn’t understand a concept, knowing another student would have shared their own perspective on it, or explained it in their own words. Again, the Impact Studio motivated students to engage with the Asset Library (including the posts and comments), indirectly influencing learning, but it was not where the learning itself occurred. Thus, while students appreciated the Impact Studio as a visual representation of their learning and a tool for enhancing collaboration, it wasn’t without careful consideration about its affordances and limitations.

Interrogating Impact

Students expressed skepticism and were at times “conflicted” [Mary student interview] about is how impact was operationalized by the algorithmic calculations of the IS. Although the term impact itself was never explicitly defined to students, in several assignments students were asked to reflect on what posts or resources in the course had been impactful in shaping

and/or shifting their thinking about concepts in the course; it was implicit in these instructions that something was impactful if it had an effect on one's learning. In contrast, the metric of the Impact Studio calculated an "impact" score for each individual based on the number of interactions (i.e., views, likes, comments, re-mixes, or pins) that their contributions to the course received. The quantified nature of this algorithm was influenced by various factors, including a limited subset of information that could easily be counted and reduced to a single metric. As students aptly noted, what the algorithm quantified as most impactful did not always account for the assets that students felt were most useful and discounted the quality of the actual content in any post.

Almost all students observed that early posting time resulted in greater interaction, and thus higher impact as measured by the algorithm: "those people that were consistently the ones with the early post" were the ones who ended up having "higher interactions" [Jessica, student interview]. Thus, the Impact Studio was seen as a system that privileges people who complete their assignments early a conundrum in a course that requires students to both post and interact with peers' posts by a certain date. While some students expressed frustration at the feelings of competitiveness that this algorithm might spark, others used the feedback from this tool as a learning opportunity to modify their work schedule and complete their assignments sooner.

Overall, however, students seemed unphased by the nature of the algorithm and felt that despite the increased number of views early posters received, other metrics of impact, such as comments or likes, would only be given if the post truly was engaging to the community. As they reflected on the metrics, many found their initial trepidation was perhaps moot since other influences perhaps contributed to balancing out how impact was determined. For example, Jenna expressed that since the algorithm accounts for multiple metrics, it "makes sense" that the influence of early posting does not compromise how accurately impact is thought about by the course community. Mary noted that the algorithm allows for moments to pause and wonder what one could do differently to increase engagement on their posts while also allowing students to feel "very seen" and "validated" when they do receive high impact scores. Students thus recognized that, while the algorithm signaled a certain message about posts identified as impactful, the students themselves had agency in deciding whether they placed any value on such messages. Expressing the complicated nature of how the agency of students and the algorithms operated here, Jessica makes a comparison to social media practices:

There's, there's a whole idea of like, social capital and your ability to kind of have a higher standing in this community, dependent on your presence in a social space... if you get more likes, maybe the person who liked it doesn't necessarily think that it's a big deal. It's like, okay, like, I just like everything that's on my timeline. But to somebody else, they're like, oh, that Instagram post, that tweet that has a lot of likes, it probably means something, I should probably see it with this different perspective. And I think that the same could definitely apply to the Asset Library, for example. So, like, when I saw those posts that had a bunch of views or a bunch of comments, I would go and check them out and be like, okay, what is this about? And then, yeah, it would kind of be my initial reaction to go and check those.

In other words, Jessica extrapolates the role of social capital and standing in social media to the socially designed virtual classroom. Like on social media, her first instinct is to look at the posts with the most responses, even as she is aware the popularity is influenced by early posting times. Indeed, the algorithm marks these posts as “most impactful asset” and provides numerical data on views, likes, and comments, inevitably drawing student curiosity. Surprisingly, however, social capital and high numbers are not the only drivers of students’ responses, and as mentioned before, many students were also drawn in the other direction to give attention to posts that lack likes and comments in an effort to create a more inclusive and engaging community for all students.

Learning: An Impactful Experience. Besides altruistic behaviors in supporting classmates, the actual impact of an asset seemed also to be influenced by how students themselves conceptualized impact. When students were invited to offer their own perspectives on the concept of “impact”, several students defined impact as interaction between classmates. Jessica observed: “I guess to me, impact is kind of the weight that your interactions with others kind of exists. And so like, the more impact you have, the more the more like, I would say, not necessarily connection, but like, I guess interaction in that sense?” Kate echoes this: “I think I can describe it as like how much interaction you have with others. Because you can always contribute something. But that doesn't necessarily mean that it can impact someone or influence them in any way. So I think it's like, the interaction. And like, in this course, though, it's more of in a positive, like, academically stimulating way” (Kate).

For Kate, posts (contributions to the AL) and views do not necessarily imply impact, as they are not sufficiently interactive. The impact lies in the interaction between classmates, via responses such as liking and commenting. Furthermore, this interaction is characterized by ‘academic stimulation’ - implying that the interaction catalyzes learning. Jenna builds on this, suggesting that impact be thought of as influence that sparks a change in thinking:

I would define it as a lasting impression. But this lasting impression can be exhibited in many different ways, whether it's liking something and commenting on something in 140, I hear a lot of students who say, ‘Oh, I didn't think about this before this topic, or I never thought about it in that way until we had this conversation.’ And that's where I think impact rests in, where it's all ‘Oh, I'm changing the way that I think because I read this or a student said this’, and the asset library in terms of like, impact, is a hotspot for that.

Jenna goes beyond the notion of interaction to suggest that for student-uploaded content to be impactful, it must influence or even alter student thinking-- that of others or even one’s own. Indeed, this was how she described leaving comments, as explained earlier in this paper. Interestingly, she identified likes and comments as potential representations of influence or lasting impression, and her observations, like those of her peers, illustrate how students’ learning and the surrounding learning practices are mediated by multiple individuals and tools in the course.

Students were quick to remind us that the learning analytics offered by SuiteC should not be the only measure of one’s impact in the course since the IS tool exists in a context that involves additional course structures, such as students’ synchronous discussion and media production:

“I also think it was important to recognize the space inside of the classroom on Zoom. And, I mean, I recognize the people who talked more in class more than those that had higher interactions on their assets, those people who are actually interactive and seem interested in the material, and were making an effort to stay engaged in the class. And I feel like that's a pretty important aspect of the class even more so than these online tools that we had.” (student interview Jessica)

Reflecting on their overall experience in the class, students, such as Jessica above, highlighted synchronous discussions—whether in person or via Zoom—as an additional site of engagement and interaction that left a lasting impact. Further, these spaces also allowed students to develop the social capital mentioned earlier, where through their comments in synchronous online or face to face interactions, some students might develop a reputation that might cause others to seek out their work online. Not only do the online data analytics not include contributions made in the synchronous discussion space, but also those verbal contributions (sometimes oral and sometimes chat-based contributions) do not have their own numerical analytics, despite the fact that they leave what Jenna refers to as a “lasting impression” on community members.

For most students, social and intellectual curiosity were enough to drive them to the Impact Studio. However, students have shared that they visited the Impact Studio at first mainly because they were asked to do so by their instructors; once there, they engaged with analytics that influenced them to connect with others. We thus see how various individuals and tools work together to create moments that mediate learning in specific ways. Without the data trails students received through the IS that prompted them to explore and subsequently modify their own behavior, the feedback loop that engaged them in furthering conversations with peers would perhaps not exist.

Development and Learning Online

Learning takes place in the context of meaningful social interactions or activities using a specific set of tools and knowledge to enact specific skills (Scribner & Cole, 1981; Vygotsky, 1978). So too in the context of an online course, the shifts in learning and the interactions around coursework that students have on a daily basis, constitute a larger set of meaningful and patterned activities towards a specific learning goal, whether the achievement of an “A” grade in the course, continuing their learning about course topics, or simply fulfilling a graduation requirement, among others. Student interviews provided insight into how the relationship between students’ development and the learning practices they participate in are mediated via S/LA. The data presented through S/LA create a feedback loop (Figure 5) that consists of: (a) student created artifacts, (b) subsequent interactions with these artifacts by others in the community, (c) student-facing learning analytics data based on interactions, and (d) modifications in students’ learning practices in response to learning analytics data.

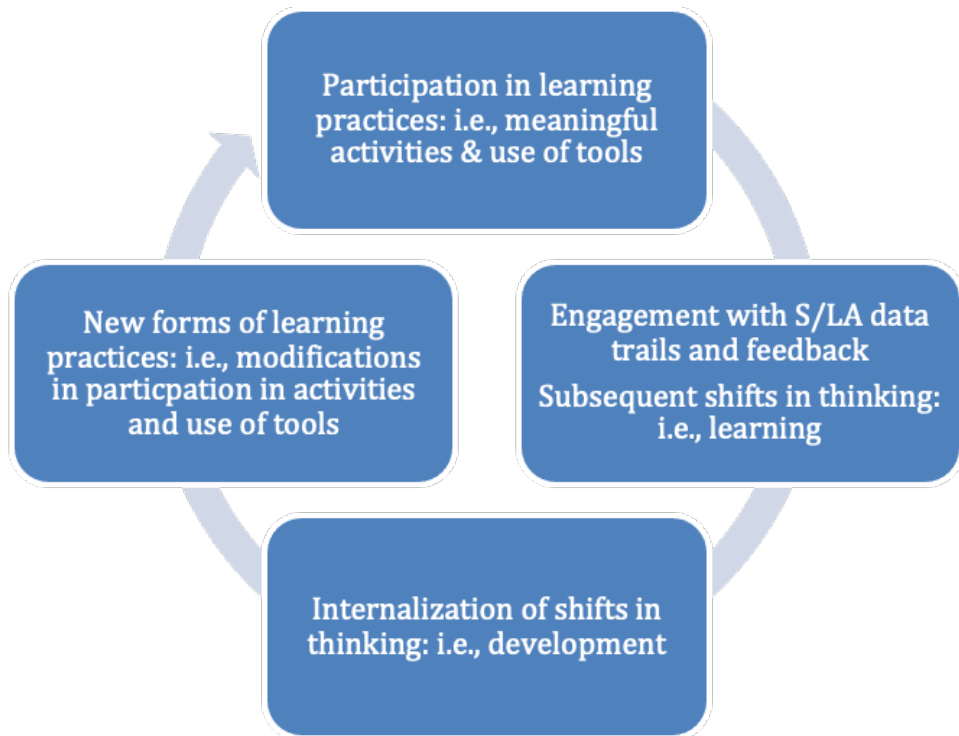


Figure 6. An illustration of the S/LA feedback loop. This feedback loop illustrates how individual and collective (i.e., course wide) development is mediated by individuals and tools in the course.

To better understand what learning and development are and how these processes might take place in the context of an online or hybrid course, students' responses to the question of "what is impact?" are helpful to return to. Students conceptualized impact, a metric used in the S/LA trails seen in the IS, as a phenomenon characterized by influential interactions with peers that are academically stimulating, leave a lasting impression, and lead to shifts in one's thinking. Put another way, students view impact and development as synonymous in that something impactful in the context of an online and hybrid course allows one to further their understanding of course material, thereby moving forward in their learning, and eventually internalizing this learning as a step towards development. The outcome of being impacted, as students describe it, is not unlike the proleptic process of development that Vygotsky (1978) articulates, though the nuance of what these shifts might look like in the context of using S/LA provide important points of clarification.

Data presented in this chapter illustrate how students engaged in learning practices that are characterized by repeated and meaningful participation in activities using available tools. These recursive practices enabled shifts in thinking about course concepts and changes in the ways of participating to further one's learning as a result of information presented through the tools. Eventually the internalization of this learning led to development at the level of individual students and over time, collectively, all students in the course. In other words, the IS allowed for certain kinds of learning practices creating pedagogical sites that allow for learning and development to take place as iterative processes driven by data (student and instructor facing learning analytics) and the intentional modification of learning practices in response to this data. This process explains predicted outcomes, as Shum and Ferguson (2012) also note, and

provides a pedagogical tool in ensuring that instructors are able to identify students who might need additional support. Importantly, this enables instructors to create an environment that promotes student success proactively through a data-driven approach.

Students' shifts in learning are seen through the ways students participated in different activities each week as they posted or contributed to the Asset Library. These shifts were made visible at least in part due to the mediating potential of the tools that impacted how and what students learn with and from one another—sometimes even without synchronous dialogue but nonetheless the presence of student voices through the technologies that carry them. The ways that digital tools and meaning making take place in this course allow for the multiple and at times divergent interests of students, instructors, and the digital tools to foster meaning making in collaborative and networked ways (Sobko et al., 2020). The appropriation of commercialized algorithms to build transparency and put to meaningful work the data trails captured by the digital tools is another facet of the possibilities that the IS allows. By enabling students access to the learning analytics that the platform has the potential to capture, students are not only aware of what kinds of data are collected about them but also can use this information to further their own engagement and participation based on the information presented through such data.

The reality of online and hybrid courses in their current form is that these exist as a metaphorical tangled web wherein discerning how various individuals and tools mediate learning practices is elusive. In other words, online courses are often not intentional in leveraging meaningful pedagogical practices nor do they consider the role of individuals and tools in mediating literacy and learning within these sites (Abuhassana et al., 2020; Cerro Martínez et al., 2020; Zawacki-Richter et al., 2019). This work provides insight into how online and hybrid courses might leverage the potential of student-facing learning analytics to further student development while creating a course environment that students themselves view as engaging and meaningful to their own learning.

Chapter 5: Conclusion

Through my dissertation, I sought to explore several questions that enabled a nuanced understanding of the following big questions about how our currently digitally mediated life worlds influence educational spaces:

1. What skills, dispositions, and practices are entailed in participating in digitally mediated worlds? What role does education play in fostering these skills, dispositions, and practices?
2. What structures enable media spaces to privilege subversive practices and value multiple kinds of ethically oriented knowledges? How should participation and knowledge in these spaces be produced, circulated, and learned?

Digital technologies and other media platforms have been variously studied in the in-school and out-of-school lives of children, youth, and young adults (Cope & Kalantzis, 2009; Hull & Schultz, 2001; Hull, & Stornaiuolo, 2010; van Dijck, 2013). The implications of these changing networks that the role they play in shaping the everyday skills, dispositions, and practices of learners across age ranges must be regularly interrogated to keep up with the rapidly evolving technologies. In this dissertation, I bring together an exploration of students' literacy and learning practices in digital spaces across age groups, from elementary through higher education. The three data sets I drew on consist of distinct digital tools and media platforms that are salient in the lives of the youth involved in the projects through various everyday practices they engage in. Collectively, the insights from each paper in this dissertation illustrate that with thoughtful and intentional reflection on the possibilities and potentials of various digital technologies, the ensuing practices of meaning-making can result in dispositions that allow learners to further their learning and participate in constructing ethically oriented knowledge.

In Paper 1, I explored the media practices elementary school students engaged in in their video-making practices on *YouTube*. I found that the introduction of a digital peer network and a curriculum centered on digital participation shifted the kinds of practices students engaged in. In particular, students' *scales of composition* and *digital practices* became more *critically* turned in relation to considerations of imagined audiences (Darvin, 2017; Stornaiuolo et al, 2017). Students' practices went from mimicking viral and hurtful *trolling* to practices that were more consistent with hospitable imaginings of self and other (Appiah, 2006; Hull & Stornaiuolo, 2010; Silverstone, 2006), wherein they used the platform to participate in practices that allowed them to reflect on issues in their worlds and considered steps they could take to address these issues in an effort to bring about change in their communities (Freire, 1968/2014). This paper illustrated how pedagogical practices might leverage students' interest and proclivity with social media as well as their attunement to existing social issues in the community, to harness their knowledge in traversing such spaces in ways that instantiate criticality and cosmopolitanism in an effort to transform the practices that typically dominate these spaces.

In Paper 2, I explored how digital storytelling through the use of immersive VR technology provides a platform for marginalized women to amplify their voices and engage in sharing their stories to inspire peers around the world. In particular, this project sought to illustrate how critical feminist pedagogies (Freire, 1968/2014; Sahni, 2017) and these young women's own understanding of their positionality in the world leveraged the potential of VR

technology towards realizing goals of development that are consistent with the capabilities approach (Nussbaum, 2011; Sen, 1999). In other words, the narratives the girls from the Perna School crafted represented how the practices entailed in projects of ICT4D can be oriented towards promoting the development and use of skills that allow students powerfully and persuasively share their voices in challenging oppressive societal structures.

In Paper 3, I explored the use of student-facing learning analytics in the context of online and hybrid higher education in an effort to understand how these data trails facilitate learning practices and engagement among students (Long & Siemens, 2011; Raffaghelli et al., 2020; Scribner & Cole, 1981; Shum and Ferguson, 2013; Vygotsky, 1978; Zawacki-Richter et al., 2019). This paper is an example of how digital platforms can be appropriated to further student learning and development while building transparency and collaborative participant structures (Raffaghelli et al., 2020; Zawacki-Richter et al., 2019). Students' use of learning analytics in this context led to the creation of a collaborative community of learners and the creation and modification of learning practices in order to further their meaning-making in the course.

The findings across these three chapters enable me to contribute to nuanced understandings of the nexus of globalization, mediatization, netizenship, and digitization on education. However, before a full discussion of the implications of these findings, it is important to identify some shortcomings in carrying out and cautions in interpreting this work.

Constraints within this Research

In a world where the creation of new technologies and media platforms outpaces our abilities to keep up with what constitutes new, we are perhaps writing about the obsolete by the time we have insights on any technology. For example, the work described in Chapter 2 was carried out (from implementation to writing) from 2017 through 2019 at a time when the media platforms TikTok and Discord, were platforms of the future and had not even been considered in the top social networks used by adolescents until late 2019 and 2020 respectively. Most recently available data from Statista (2021) however indicate that TikTok is the most popular social network for 30% of US teens and Discord is most popular among 5% of this population. Similarly, the pandemic entering its third year, fundamentally shifted the nature of online teaching and learning, where face-to-face instruction was no longer an option and the necessity to rely on distant learning where the tools and resources were limited, threw universities into chaos. As such, the work described in Chapter 4 began in 2016 at a time when we were able to aspire for best practices and had the privilege to design, develop, and deploy technologies that supported our pedagogical beliefs and intentions. However, this was not a reality for the many students and instructors who had no choice but to try to adapt to a new normal, rather than explore the new possibilities that could present themselves through the use of innovative technology. Thus, while this work seeks to unpack the possibilities of using digital technologies to foster critically turned dispositions among students, some of the insights might already be susceptible to having reached their half-life as I type these words.

The pandemic also brought to bear many of the harsh inequities that existed prior to its onset, in particular, the vast divide that exists in access to digital devices and media platforms or social networks in the US (Chakravorty, 2021; Schaeffer, 2021) and internationally (Opp, 2021; United Nations, 2021). These recent reports indicate that gaps in digital connectivity are the result of multiple factors, including socio-economic status due to lack of affordable

infrastructure, poor accessibility of devices for students with disabilities, and other socio-political factors that prevent equitable access across communities. Similar factors influence access to digital technologies internationally in addition to social norms, particularly around gender, that prevent girls and women from having their own digital devices in Asia, for example (Shanahan, 2019; UNICEF). Consequently, studies such as those in this dissertation, centered on the presence of technologies and their use, does not account for the ways in which many populations remain at the periphery, unable to access the skills, knowledge, and practices that take place around these tools. As such, my dissertation is susceptible to these shortcomings wherein I focus on interrogating the potential and possibilities of cutting-edge digital technologies and their use; I unfortunately neither provide space to interrogate the skills, knowledge, and practices that might similarly take place in communities through different tools or media when such technologies are inaccessible, nor explore the implications of the inequities in access to certain technologies and their use.

I hope that my work in the future will take a more robust approach to understanding the consequences of digital technologies and address inequities in access more fully.

Understanding Digital Technologies

My dissertation chapters shed light on a particular aspect of digital technologies, one that centers on situations where aspirational work is possible, and resources to carry out this work are available. Through an exploration of how innovative digital tools can be taken up in the context of certain pedagogical practices, I contribute to understandings of how educators might foster critically turned dispositions and skills among students as they navigate digital spaces. My work illustrates some key themes across formal and informal educational settings in elementary, adolescent, and college-aged students:

Purposeful Practices: Deliberate Design and Intentional Integration.

A key outcome from the analyses of the three data sets I drew on is an illustration of purposeful practices that surround the use of various technologies. Innovative technologies used in this project were not positioned as panaceas to achieve various educational goals; instead, their use was negotiated by the pedagogical and learning intentions of teachers and students. In other words, the technology was put to work for the goals of the tasks stakeholders in each project were engaged in. We see how this purposeful pedagogy played out through a process of deliberately designing the projects and intentionally integrating the use of technology into the goals of the project. For example, in the context of elementary and middle schoolers whose proclivity with various social media practices was leveraged to enable the use of these technologies towards fostering more critical dispositions. Similarly, the technologies used at Prerna and in the undergraduate course at UC Berkeley were leveraged towards specific purposes.

A salient part of engaging in purposeful practices was carried out on the part of educators and researchers in these projects by engaging in thoughtful and deliberate designing of their curriculum. This process considered the potentials of the technologies available, the intended goals of the project/course in focus, and the interests, skills, and other relevant characteristics of the students involved. The deliberate design of each project entailed an integration of technology into the larger goals of the project in a way that the technology was

not a focus of the project, but rather a tool to use along the course the project. Thus, the technologies in each instance were appropriated into each context as meaningful tools to support specific goals.

Lasting Learning: Crucial Criticality and Harnessing Hospitality

Another significant aspect of the goals of each project, was a focus on working with students to navigate participating in spaces that are increasingly mediated by digital technologies. As such, the goals of learning via the available technologies were not only integrated into existing practices at each site but were also centered on promoting practices that consider ethical entailments of participating in digital spaces with and through these technologies. For example, the students at Prerna used their understanding of the school's critical feminist curriculum (Sahni, 2017) and their predisposition to reflect upon inequities in their worlds in their interpretation of their peers' stories as well as in the creation of their own stories. Similarly, the avid social media users in the Bay Area and the undergraduates at UC Berkeley considered notions of audience and the interpretation of their messages as they participated in co-constructing meaning with their peers.

The focus on learning across these projects privileged fostering dispositions of criticality (Freire, 1968/2014; Darwin, 2017) and cosmopolitanism (Appiah, 2010; Hansen, 2010; Hull & Stornaiuolo, 2010). Each project necessitated participating in and through digital technologies while communicating with others in local and/or global contexts. As such, supporting students in navigating these spaces was a necessary part of the pedagogical efforts in these projects. Thus, each project involved an effort to foster everyday practices among students that allow them to traverse a world that is vastly interconnected, yet deeply divided" (Hull & Stornaiuolo, 2010, p.86).

Next Steps

As I near the end of my dissertation, I find myself coming back to a question I have often asked myself over the past few years: "What's the point [of this work]?". I have asked myself this question in moments where it seems like perhaps I could "do more" if I did not have to write my dissertation and in moments where I felt like I would never finish my degree. I find myself revisiting this question hopeful that we will begin to recognize—in fact, we have to recognize—the importance to reimagining the skills students need to be successful, and more importantly, to be *citizens of the world* (Appiah, 2006).

Each chapter in this dissertation is an effort to contribute towards this reimagination, within specific contexts. At each of the three sites in this dissertation, I traced how the educational and learning goals of each project enabled students to engage in reflexive understandings of themselves, their peers, and their larger communities. The collaborative practices of knowledge construction and sharing also position students as agentive meaning makers in their learning and educational endeavors. These outcomes were in part possible because the practices and philosophies that were already a part of the institutions at which these projects were carried out were consistent with such reimagination efforts. My hope is that this work illustrates possibilities for a better future through the reimagination of educational goals.

Currently, multiple calamities continue to fester the world over and serve as a grim warning of a dystopian future. Headlines from the past few months paint a murky picture of current events as we confront a third year in a pandemic, reel from tragic wars in different parts of the world, and deal with the increasing shifts to extremist views that threaten democratic values here in the US and internationally. On a global scale, we are faced with worsening crises, including food shortages, as people continue to be displaced and the need for humanitarian aid grows (Foulkes, 2022). Many note the selective attention to the plight of refugees and ongoing wars in many countries and call for the same levels of compassion and solidarity as that shown to Ukrainians towards people and wars in other countries (Foulkes, 2022; Gharib, 2022). We are now also seeing reports of long-term consequences of the pandemic on the student learning. A recent report referring to first graders claimed, “pandemic kids lack basic life skills”, such as tying their shoelaces, cutting with scissors, or opening a water bottle (Natanson, 2022); another expresses similar concerns about students arriving to college unprepared after having their high school experience disrupted (Sanchez, 2022). As I note the issues highlighted in recent events and underlying assumptions in these publications, I can’t help but wonder, if we might lose our moment to re-think and re-imagine what kinds of skills and dispositions we expect of our students at each stage of their schooling. What if “basic skills”, were not simply focused on tasks or foundational skills for academic learning, but rather, included goals to provide students with skills to think of their moral obligation to others? What if we sought to ensure that schools aimed to provide students with skills and dispositions that would allow them to respond compassionately to all human beings facing calamity? Would we then avoid the biases we see in how people respond to others and the selective attention that is paid to the suffering of various communities?

Some responses to recent tragedies have illustrated what a better future could look like; a future that centers equipping our students today with skills that will allow them to traverse different spaces in ethically oriented ways. The *Peptoc* initiative is an illustrative example and was inspired by the positive attitudes of students at West Side Elementary in California³⁴ after having experienced devastation from wildfires and the recent pandemic. Two teachers at the school harnessed students’ “creativity and resourcefulness” in order to leverage art forms and conversations to “contribute to the world” (Florido & Ahmad, 2022). The result is a hotline that provides callers with encouraging words and advise in an effort to create a space filled with the “level of joy and love and imagination” that the students themselves demonstrate. Teachers in the project noted that learning from the disposition of their students “is what’s going to save us in the end” (Florido & Ahmad, 2022). In the US, youth led movements are on the rise as student activists advocate for Black Lives, Voting Rights, and other issues (Paterson, 2021). Young people around the world similarly have taken to raising their voices against oppression through their annals of history (Roberts, 2015), much like the young girls at Prerna. How can we as educators then, make sure that the goals of educational institutions meet the needs of our children to prepare them for their tomorrow? In other words, my hope is to continue to re-define, re-imagine, and re-think the goals of education and to do so at a much larger, global

³⁴ For more information on PepToc see [here](#), [here](#), and [here](#).

level. Our students/children are asking us to do better to secure their futures; we owe it to them.

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Appendix A

The three additional tools that are a part of SuiteC and are important for contextual relevance in Paper 3 include:

1. Asset Library (Figure 7): The AL was designed with the intention of serving as the collective intelligence of the course—a repository of student and instructor generated artifacts or resources (called “assets”)—that would continue to be built over the duration of the semester. The display of assets as thumbnails that one scrolls through creates a visually similar experience to that of the dynamic media feed seen on social media platforms, such as Instagram. Further, assets can be categorized by topic, user, week of the semester, and other categories that enable students to find and access information easily. The multimodal nature of the AL allows for students to create artifacts using a range of modes and gives them agency in choosing how they want to represent their ideas to the community. This tool allows students and instructors to be positioned as equal constructors and contributors of knowledge in the classroom and enables students to share their voices through multiple means, while also listening to the voices of classmates. Students can also build on each other’s work in the course of their knowledge construction and are encouraged to learn with and from each other, reframing a narrative of competition that many students express in many of their courses. The AL is thus a digital tool that is used in service of creating a space where students are positioned as active constructors of knowledge and have agency in choosing what structures of participation they use to participate in information sharing and dialog on the course platform.

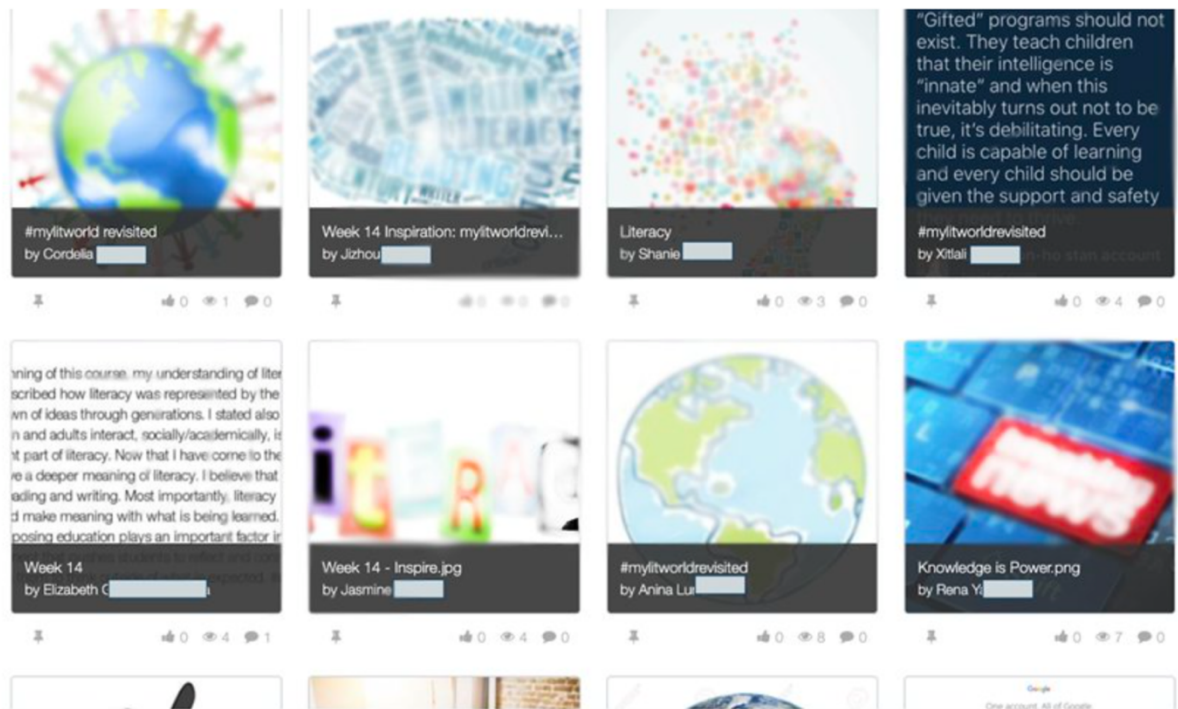


Figure 7. This is a screen shot of the Asset Library tool, where student and instructor generated content can be shared.

NOTE: Image intentionally blurred.

2. Whiteboard (Figure 8): The digital Whiteboard tool is an infinite Canvas that expands in any direction and allows students to sketch or represent ideas using multimodal tools and serves as a space to bring together different course concepts. It is a space similar to posterboards or whiteboards in face-to-face classrooms. The Whiteboard allows students to add new assets and draw on existing assets or whiteboards from the course AL and publish any creations back to the AL. It also links directly to assets used, and the original asset shows what whiteboards the asset has been "remixed" into. The WB can be used by students individually or for synchronous or asynchronous collaboration. While the WB is a central part of students' collaboration, it mainly serves in contributing to the AL rather than as a student-facing tool by itself.

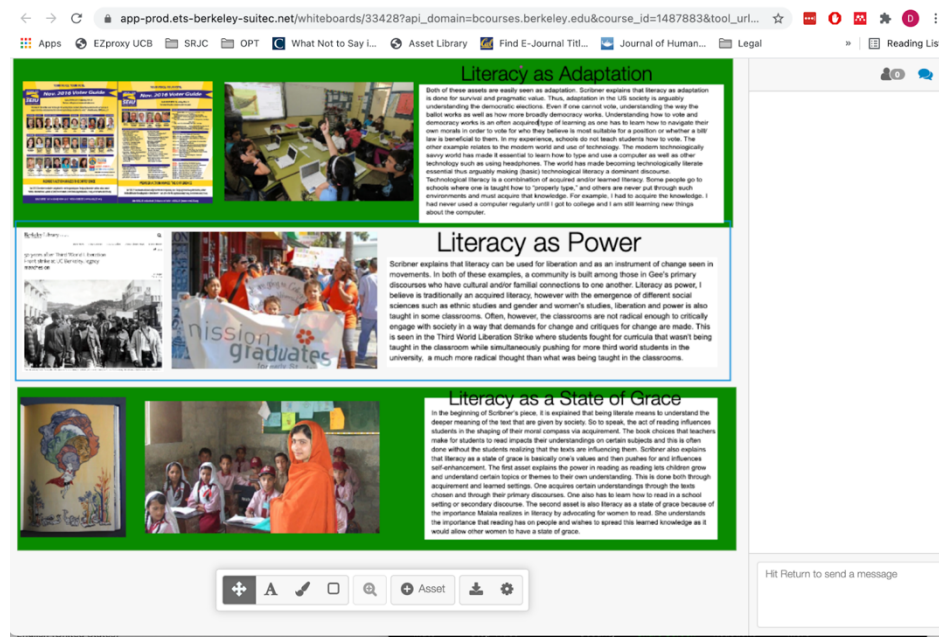


Figure 8. This screenshot of the Whiteboard tool shows an example of a student created multimodal artifact using tools such as those seen above, including a chat box for students' to communicate with collaborators.

3. Engagement Index: The Engagement Index (EI) is a leaderboard that tracks students' contributions to the course based on their activity. Students can see where they rank on the leaderboard in relation to their classmates, and instructors can use this tool for rapid feedback on students' participation each week. The data captured by the EI is fed directly into the Impact Studio tool described earlier and was essentially retired from use in the course since the introduction of the Impact Studio. The EI was a preliminary pedagogical tool but was integrated into the IS and was not a tool used by itself in the everyday pedagogy of the course and is therefore limited in its utility since the creation of the IS tool.