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WHAT WE HAVE LEARNED FROM COVID-19, A LITERATURE ANALYSIS

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Abstract

In 2020, Covid -19 brought around massive changes to nearly every aspect of our daily lives. One of the areas most impacted by this virus was the education field with schools being forced into lockdown and transitioning all learning to an online format. Now that two years have passed, and schools are returning to the way they once were, we can look back and examine the literature that was developed during this time to examine what kinds of impact the pandemic had on the field of academia. In this paper I aim to analyze the literature developed between 2020-2021 in regards to the impact of COVID-19 on education. The topics I will discuss in this paper are the impacts to the educational structures and assessment, student success, mental wellbeing during confinement, and also address issues of access to education in a virtual environment and steps needed to be taken as we move into the future. By addressing these topics I intend to discuss the researchers' predictions of outcomes in the early stages of the pandemic and compare their findings to those of newer findings to see how their predictions have held up in the reality of the pandemic. The aim of this paper is to quickly compile information that we have learned from the pandemic and how it has altered the entire system of education in such a short amount of time and how we should interpret the information to create positive changes for students as we move into the future.

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Introduction / Background

March of 2020 is a time that many of us can remember well as it marked the beginning of the Covid-19 global shutdowns of nearly all public services. The virus was spreading rampantly and altered nearly every aspect of our daily lives, with some aspects having to make drastic changes seemingly overnight. One of these areas that suffered the most amount of change in response to the shutdown was the field of education. Schools were no longer allowed to have students come to campus in fear of infection and so schools across the world were forced to adopt a fully virtual setting to continue their work. First impressions of this online school environment were not great but with no other choices available many students simply had to learn how to adapt to this form of education. It is now 2022, two years have passed and schools have only recently begun to reopen their campuses for students, but many schools are still offering hybrid or completely online class options. As we begin to make changes back to the way things were pre-pandemic, we will still be surrounded by the effects that covid had on education and the use of technology in the classroom for many years.

In order to fully understand this situation we must first lay out the differences between online education and emergency remote teaching. Traditional online teaching consists of classes that are built from the ground up to be delivered virtually (Hodges et al., 2020). Everything from the curriculum to the assignments is developed over time to best suit student needs and teacher capabilities in order to provide the best learning outcomes possible. However, schools did not get the development time to prepare for the switch to virtual schooling so it has been classified as emergency remote teaching. Emergency remote teaching, or ERT for short, changes a curriculum designed for traditional classrooms into a fully remote option. The issue with this change is that not only are students unprepared for the switch, many teachers are also underprepared and undertrained to teach a class in this format (Hodges et al., 2020). With both students and teachers

inexperienced in this field we should see worse performance from students (Boardman et al., 2021), but that is exactly why we must do the research to determine the actual effects it has had.

The last two years have been filled with questions about the effects that emergency remote teaching has had on students. Research on this topic has been plentiful and aims to determine any and all effects that students experienced in this rapid transition into an online environment. In fact, this question has been the major focus of hundreds of peer reviewed papers since the beginning of the lockdown. The purpose of this paper is to synthesize the findings of the research done in the last two years to examine the results that have been found on how the world of academia and its students were affected during the Covid -19 pandemic.

Methods

All articles used in this paper were acquired through the UCR library databases. I conducted multiple searches using the keywords COVID-19, education, impact, success, wellbeing, access, disability and future. These keywords were chosen to gather papers in regards to the following sections of this paper; Impacts on education as a whole, student success during the pandemic, mental impacts of confinement, access to education, and the future of education. Fifty papers were identified and chosen in the first wave of searches and then each was analyzed for relevant information to the above topics. After the analysis was finished and papers containing information not relevant to this paper were dismissed, the list was lowered to twenty eight papers that fit the needs of this literature analysis. Each paper was then carefully examined and the following review is the product of the findings.

Impact on Education as a Whole

The onset of the Covid-19 pandemic created a massive structural change for the entire world of education. Schools were forced to be shut down by the government and all learning was to be given in a completely virtual format. This transition to a fully online learning environment has changed the way the world will forever view technology as a tool in the classroom. Many researchers believe that even after the pandemic technology will continue to be a vital resource used by educators. Hybrid models of education will likely become the norm for education moving forward as technology seems to improve with every year and students begin to show higher levels of technological literacy (Kuhfeld et al., 2020). The inclusion of online elements in the classroom was not a new tool at the start of the pandemic, but their uses have been widely broadened in the last few years and even more tools are created every day to help educators and their students succeed.

However, this change is not entirely without its own set of issues. Socioeconomic inequality can lead to students lacking the proper tools for their success (Clark et al., 2021). Students whose families are not able to afford the tools necessary for their success will face difficulties keeping up with their peers if changes are not made to address this issue. The struggles of this change are not solely placed on the students alone, educators also face many difficult challenges with adapting to this new form of teaching. Between adapting curriculums to best fit online tools and managing student engagement with the material to ensure their success, educators have been faced with difficulties they have never had to handle in traditional classroom settings.

While the teaching and learning aspect is of major concern to the world as a whole, it is not the only educational structure that was severely impacted by the onset of the pandemic. Assessment and learning measures were among the most impacted factors of education in this

regard. Student assessment can be defined as the process of making a value judgment about the merit of the student's academic accomplishment to aid in the improvement of future student learning (Brookhart & Nitko, 2019). Schools typically alter standardized learning goals from year to year based on the results from the prior year, but with the transition to remote learning and deviance from the traditional learning curriculum has made the results from the 2019 -2020 school year unable to be calculated for measurement (Middleton, 2020). Not being able to properly assess how students are doing creates massive negative impacts on future student success and prevents schools from fully understanding how best to adapt the curriculum. The challenge of creating a system to continue these learning assessments is a high priority for schools and policy makers to work out as we move toward the future of hybrid education.

As we move toward the future, changes need to be made with the education system that aim to address these problems and provide a structure that allows both students and educators to achieve the greatest level of success in the new world of education.

Student Success During Remote Learning

Expectations / Predictions

As schools transitioned into an fully online state, many researchers began to draft up predictions for the impact that the change would inevitably have on students. The most frequently occurring prediction is that students would experience a learning loss across the board (Di Peietro et al., 2020). This was expected to happen due to the lack of preparation time available for both students and teachers alike. Both of these parties were thrust into an unfamiliar environment with little time to gather themselves before having to fully dedicate themselves to an online learning environment. It was predicted by one set of researchers that students would

only gain roughly 50% of the learning gains in this type of teaching when compared to an in person school year (Kuhfeld et al., 2020). These predictions also took into account many external factors that could have impacted student success. With students being at home there were many more distractions available to them at any given time, absenteeism rates from virtual meetings would be greater than a traditional year, and motivation to learn and succeed would fall behind due to the lack of personability in the classroom (Kuhfeld et al., 2020).

Looking past the short term issues of learning gains, researchers predicted that remote learning would result in long term issues for students. Researchers became concerned for the social aspects of school that would be lost for students, such as peer interactions, that lead to better success and motivation to succeed in school (Di Pietro et al., 2020). Remote learning and lockdown restrictions left students (especially elementary and middle school) with very little social outlet among their peers. This issue could affect students in the long term of their educational careers by changing the way they view school from being a place to be with friends and succeed with one another, to a very distanced process they are no longer motivated to participate in.

However, these predictions of losing ground are not universal to all students. Some predictions stated that students who were already high performers in traditional school settings would begin to see improvements in their grades during remote learning (Kuhfeld et al., 2020). This is due to the students ability to personalize their learning to best suit their schedules and needs. Being online allows for much more flexibility that high performing students would be able to take advantage of while lower performing students would struggle with (Kuhfeld et al., 2020).

These predictions were made in the very early stages of the pandemic and transition into remote teaching but time has passed since their creation. Research has continued to analyze the effects of Covid-19 on education and their results show differences when compared to these predictions.

Reality

The reality of the situation is actually quite contradictory to the hypotheses set forward by researchers in the early days of the pandemic. Most research was able to identify some kind of positive trend in regards to student success, or at least results that showed no changes from pre to post shutdown. In a study conducted on university students it was reported that only 17% of students experienced a drop in their grades while the remaining 83% of students saw no change or an increase in their grades during confinement (Stewart et al., 2021). Further research found that students experienced an increase in learning outcomes and success in distance learning when compared to face to face styles of teaching in previous years (Refae et al., 2021). Across the board, student success seemed to increase with the introduction of online learning and research has concluded that the future of education needs to include online aspects in order to continue these results among students.

Many researchers contribute this improvement to changes in educational habits by students. One study found that compared to prior years, students have changed their study habits to a more continuous schedule which has helped to improve their efficiency (Gonzalez et al., 2021). Students are able to control their own schedules more than ever before and as a result they are spreading out their schedules across the day rather than cramming all their learning into the limited school hours. As a result they are taking more time for their education and allowing themselves to set a more continuous schedule for themselves. Also, the addition of computers

and online applications in the day to day process of schooling has introduced a unique learning tool that students have managed to adapt well to. Many students in the modern world have extensive experience working with computers or the internet and so the incorporation of online tools have helped them apply those skills to their education (Gonzalez et al., 2021).

Overall the trend of student success leans toward the positive end according to most research. The vast majority of students either experienced no change at all in their grades or saw improvements when compared to pre confinement semesters (Engelhardt, Johnson, Meder, 2021). However there was still a minority of students who did suffer during this change from online. The transition from face to face learning did have negative effects on some students, especially those who were already struggling with the traditional ways of teaching (Refae et al., 2021). These students are the exceptions to the trends found by researchers but they still need to be accounted for when analyzing the effect of the pandemic as a whole.

Exceptions

Not every student managed to find success in the fully online environment that they had been forced to adapt to. In fact roughly 13% of students reported having to delay their graduations due to complications with their education during the pandemic (Aucejo et al., 2020). Many of these students had circumstances that arose during the pandemic that has made their success in school fall behind that of their peers. Be it access to computers, income levels, knowledge of how to navigate an online environment, or even a disability such as ADHD that is disproportionately affected by the transition to online. Although the trend of the majority of students was positive, we can not ignore the students who fell behind and look for ways to support them as we prepare for the future.

A topic that needs to be discussed is how students suffering from disabilities have been impacted by the transition to online. We can conclude that students who already had learning disabilities have been negatively impacted as the online environment is not flexible to their specific needs (Breux et al., 2021). Students with ADHD reported decreasing GPAs as semesters passed when compared to their peers as the ability to be distracted from class has become even more of a problem for them than before (Breux et al., 2021). These students have been disproportionately affected by the move to online and have fallen behind their peers in their studies because the structure as we use it today is unable to adapt to their needs.

Another set of students at risk of failure during the pandemic were children of low-income households. Low-income students earned both lower grades and completed less college credits during the pandemic when compared to their high-income peers (Rodriguez-Planas, 2021). The world of education is not the only place where change occurred during the pandemic and with many families struggling for money, some students had to reduce their schooling in order to support themselves or their families. It is because of changes like these that low-income students were 55% more likely to delay their graduations by taking fewer classes (Aucejo et al., 2020).

We also have to consider the students who already struggled with traditional learning during this change. Students who were low-performers during traditional face to face teaching experienced an 11% drop in their performance with the transition to distance learning (Refae, Kaba, Eletter, 2021). As we move toward the future these students need to be considered as we develop our understanding of technology in the classroom to prevent them from falling even further behind.

Mental Impact of the Lockdown

Another concern of researchers during this time was that of the mental impacts that the lockdown could potentially bring to students. With such a massive change to their education being put in place so quickly, many researchers felt concerned that students would suffer negative impacts to their mental well being and also their levels of satisfaction with their education. Both of these areas were examined by researchers around the world to help and determine what effects, if any, had befallen students during their time in the lockdown.

Satisfaction

Student satisfaction with their education is an extremely important factor when trying to measure potential learning outcomes within the students. If the student is not satisfied with the class structure or coursework other issues begin to arise such as lacking motivation, absenteeism, and suffering grades. With the sudden shutdown of all in person education and the adoption of fully online methods, researchers worried that students would not be satisfied with the experience of a fully virtual learning style.

In the early stages of the pandemic, many researchers hypothesized that students would begin to show lessening satisfaction with their education when participating virtually (Bawaneh, A., 2021). However, time and further research has shown the opposite effect on students. Much of the research done on this topic shows positive attitudes toward online education (Mirahmadizadeh et al., 2020). It was found that students enjoyed the freedom of control that the online environments allowed them to have over their education when compared to the traditional classroom setting (Cain, Bell, & Cheng, 2016). Although the initial shock of the transition was difficult for students, many were able to find positive outcomes from the change. The aforementioned freedoms and grade improvements helped students to find success in an

environment that was new to them. The successful implementation of virtual learning has led to researchers believing that hybrid applications in classrooms are essential to the future of education as a whole (Refaat El Said, 2021).

The other dimension of student satisfaction that was researched was how students felt emotionally about the change to online in response to the pandemic. Researchers wanted to learn if students felt that the change was appropriate and handled well within the context of student opinions. The results of this research found that the majority of students were in fact satisfied with the change and felt that it was a proper response for the continuation of education despite the ongoing pandemic (Al-Azzam, Elsalem, & Gombedza, 2020). Students were worried about the quality of education they were receiving in the beginning of the transition, but as schools and teachers learned how to operate in this environment and improved their methods student satisfaction rose steadily (Bawaneh. A., 2021).

Wellbeing

While satisfaction deals with students' opinions on the quality of education they have been receiving during the pandemic, another aspect of mental impacts is that of their personal well being during the lockdown. Feelings of stress, depression, anxiety, and uncertainty were widespread among students (Murphy, Eduljee, & Croteau, 2020) as they dealt with the challenges presented by remote learning. Fully online education was something that many average students had not experienced before and so negative emotions in the early stages of the transition were another obstacle that students were forced to overcome. Researchers worked tirelessly to understand what emotional changes students were enduring, what was the cause of them, and how schools and educators could help to combat them.

At the onset of the lockdown students began to experience a flooding of negative emotions and mental health issues. However, in the initial stages, these emotions consisted of primarily externalized problems and attention problems when dealing with school (Copeland et al., 2021). Students were thrust into a very unfamiliar situation with little experience with the new problems they were facing in their day to day routines and so they began to blame outside circumstances for issues they were facing. The drastic change in their learning format made focusing on their classes more difficult than ever before as many of them had never taken any form of online education up to that point leading to increasing lack of attention to their studies. These initial negative effects then led to more internalized problems as the pandemic went on. As the lockdown went on, internalized negative emotions such as anxiety and stress steadily increased as students became less optimistic that the shutdown would end quickly (Copeland et al., 2021). As the lockdown persisted into more and more semesters/quarters of school, students stopped blaming external issues for their problems and began to focus their negative emotions within themselves resulting in a steadily declining state of mind.

Another area in which students began to suffer is the lack of connection to their education that they once felt when attending face to face classes. Students began to feel less connected to their peers despite efforts from their professors to foster group work scenarios (Boardman, Vargas, Cotler & Burshteyn, 2021). The simple fact is that a virtual environment leads to the lack of interaction with one's peers when in a classroom environment, this has led to students feeling more isolated in their learning than ever before. This decline in community feelings resulted in students feeling less motivated to do their work and rates of procrastination significantly increasing when compared to pre pandemic surveys (Boardman et al., 2021). The feelings of belonging one has for their schools or community is vital to their success within that community

as they are motivated to stay in good standing as a member. When belonging is absent, students feel less motivated to complete their work or strive for success due to their lowered feelings of commitment to the group.

Although these findings represented the average student during the time of the pandemic, many schools offered services to combat these issues such as wellness programs and social gatherings over zoom. While many students did not take advantage of these services available to them, the ones who did found reduced internalized mental impacts (Copeland et al., 2021) and also greater reported feelings of community and belonging (Boardman et al., 2021). Universities understood the damage that the lockdown was having on students' mental health and did what they could to provide solutions that were readily available to students. These programs were shown to be successful in the aforementioned ways, but still, the average student did not take part in them and began to suffer the effects of the lockdown. Still, universities and even outside companies continued to offer various forms of student support that were available to help aid in improving positive emotions and connectedness despite not being able to reach every student.

Access to Education

Computer Access / Knowledge

With the transition to an online environment many disparities became present between income levels. As computers and the internet became the primary delivery method of all education, students in low-income families began to struggle when compared to their high-income peers. In the beginning of the pandemic roughly 17% of students did not have access to a computer or device, 18% did not have a broadband connection, and 10% did not have access to either (Di Pietro et al., 2020). Even in households where there was a device, many times the family only had one device that they shared among them all. With parents working

from home and the possibility of multiple children having to attend different classes at the same time many students simply were not able to attend their classes and absenteeism rose quickly. Schools did eventually develop programs to give students in this situation a way to connect to the internet but these programs took time and students affected by it were already set back behind their peers.

In this same category of lacking the required equipment necessary for success we have to consider that not all devices allow for the same levels of success. Students who used a tablet or smartphone as their main device to receive their education performed worse on exams when compared to their peers who used a computer or laptop (Clark et al., 2021). Although these students did have a device to access their classes, the method of access brought with it a set of problems that is not present with a computer. The freedom of movement that a tablet or smartphone allows a student to have is a massive distraction when trying to learn as they are able to be distracted by things in their environment more than a student who is sitting at a computer in a fixed location. These devices are also typically used for fun activities such as games or watching videos and so if a student gets bored of their classes it is very easy for them to switch their focus from class to one of these other activities with little work. It is for these reasons that if a student is using one of these devices researchers recommend that parents are encouraged to watch them and ensure that they are using the device properly and staying focused on their classes (Di Pietro et al., 2020).

Another aspect to consider is the student who may have access to a computer but have little to no experience using it in an academic setting. The current generation is typically regarded as being “tech savvy” but the reality for most students is that their experience with computers and technology are primarily for entertainment reasons (Drane, Vernon & O’Shea,

2020). For many students this was the first time that they had encountered online classes or used online components for assignments. This lack of knowledge on how to properly use their devices for their education was another issue that resulted in negative impacts for students. Students who reported low computer skills began to show negative psychological impacts such as anxiety, lethargy, poor focus and the inability to be self-reliant on their teaching (Alomyan, 2021, p. 596). Many schools and universities provided very little skills training when it came to online education and expected teaching to continue at a similar rate as it had before the lockdown. Students were forced to teach themselves how to learn in this setting and many struggled to keep up with all the new challenges presented to them. Although they had all the tools they needed to be successful, they lacked the proper understanding of how to apply them to their learning and thus began to fall behind in their studies until they were able to learn the skills necessary.

At Risk /Disabled Students

For the average student, transitioning to remote learning was definitely a bump in the road but most were able to adapt to changes quickly and learn to take full advantage of the situation. However this was not the case for many students who have some sort of learning disability or those who require special education. For these students online school only presented them with more challenges that could be much more difficult to overcome due to the lack of programs available to them. Three areas of research interest focused on students with attention deficit disorders, students struggling with autism, and students in the moderate/severe categories of special needs.

When it comes to attention disorders in students, education has always been a large hurdle that they have had to learn to overcome. Most students find some way of receiving help for their disorder, such as medical help or school programs and services, in order to find success

in their education, but COVID-19 has changed the environment entirely. On average students who suffer from ADHD were reporting significant GPA declines after the transition when compared to their peers (Breux et al., 2021). With classes being held online from the comfort of one's home, these students had a much harder time being able to remain focused and avoid distractions when attending class. Many parents found it challenging when they attempted to get their children the necessary support for their education as programs and opportunities were not available from schools or other means to aid with student disabilities (Breux et al., 2021). Even when it was sought out, support for these students simply did not exist and left these students to struggle and figure out their own ways through this new means of learning. Researchers have suggested the development of an individualized emergency plan for students with disabilities in order to prevent the declines we have seen from happening again if another emergency situation were to happen. (Boon et al., 2012).

Students with more severe mental deficits such as intellectual disability and autism spectrum disorder, or ASD, also experienced their own share of difficulties with this transition. Students suffering from these types of disabilities often show problems with critical thinking and adapting to new ways of learning (Buchnat & Wojciechowska, 2020). This means that students with these types of disabilities experienced a significantly more difficult challenge when having to transition into online learning. Unlike their peers, they were not able to adapt as quickly and therefore began to see suffering grades and learning outcomes in the beginning of the pandemic. Teachers also needed to learn how to best help these students and sometimes had to create specialized plans for these students, but as a result students felt more marginalized from their peers in the remote environment (Buchnat, 2020). Students with these disabilities were able to function in this new environment but experienced greater hardship than their peers and even

started to feel isolated as a result of their disabilities. However, these students were still able to participate in their education with help from their teachers and despite struggles in the beginning they have managed to stay on track with their peers (Yakut, 2021).

The saddest of developments to come to the field of education as a result of the pandemic was the suspension of moderate / severe special needs education. In one study it was found that nearly 46% of special education had been limited in some capacity or even completely halted in areas of the world leaving these students completely out of their education for nearly two years (Yakut, 2021). These students are the most at risk of falling behind their peers and the effects that COVID-19 has had on their education will leave irreversible effects on their lives as they were not able to receive a proper education for such an extended period. Every moment of teaching counts with these students and to lose so much time is something we can never get back for them.

Moving Forward

It is clear that the field of education has been forever changed by the COVID-19 pandemic. Regardless of schools returning to in person classrooms we will continue to see changes made during this time implemented into teaching for years to come. Many researchers on this topic have provided insights and ideas on how schools and teachers should adapt their teaching as we move forward in order to incorporate all that we have learned during this time.

The use of technology in the classroom was not entirely new to education before the pandemic but its integration during the school shutdowns was on a completely different scale. In the beginning students were not trained or prepared for online education but now after two years researchers predict that elearning tools will become a vital part of distributing education as we move forward (Rashid & Yadav, 2020). We have learned so much about the use of elearning

tools and the benefits it has provided to students and so it is reasonable to predict that these tools will not simply disappear with the reintroduction of in person classes. Even students have stated their preference for online tools in classes as it allows them to work at their own pace and keep track of the things expected of them (Soni, 2020). In the context of college and higher education, the accessibility that online courses offer to students has been a point of high praise from students who are able to take courses they otherwise could not have. In places around the world the ability to access education from anywhere in an online environment has led to an increase in students attending university as they are no longer limited by travel or housing costs on campuses to attend in person lectures (El Said, 2021). All around we have learned that students have found great advantages of technology in classrooms and so as we develop the field of education into the future we must consider it to be a vital tool and implement it in the proper ways.

However, this change does require training on the part of educators in order to properly implement tools into their classrooms and form a hybrid setup. Many researchers state that schools and universities alike should aim to create courses that properly integrate a hybrid style of learning (El Said, 2021). This means creating the course from the ground up with elearning tools in mind and how to use them to enhance the learning outcomes of the course while still focusing on proper delivery of the information in person. Improper use of these tools could lead to confusion from students and result in negative effects on success and so it is crucial that staff be trained extensively on this topic and find ways to properly apply it (Bawaneh, 2020).

The final area of consideration that must be taken into account moving forward is the availability of support programs for students. Throughout the pandemic there was a trend of universities falling short in the department of proper student services, especially to those with

disabilities of some kind. As the lockdown persisted many universities did begin to open up services that could aid in helping students adjust and as we come to an end of the lockdown many have developed and grown programs to help students with anything they may need. As we move forward it is the job of universities and program coordinators to continue providing resources to students who may need them in order to ensure that every student has the opportunity to be successful in their education despite any challenge they may face.

Discussion

The literature available to us that has been produced over the last two years allows us to take an insightful view on how the field of education has adapted and changed in reaction to the pandemic. The internet in education is nothing new, but the use of it during this pandemic was unlike anything else we had experienced. With the schools being shut down and all in person meetings being suspended, online classrooms were the only method of distribution that teachers had available to meet with students. Although researchers initially believed that grades and learning outcomes would suffer from this change, trends began to show the opposite result taking place. The average student was seeing either no changes to their grades or experiencing improvement. However, we were also able to learn from the literature that many students were disproportionately affected by this change and despite the positive trends overall. The field of education still has a long way to go to ensure that all students are able to achieve their potential. As the pandemic becomes history, research is still being done as to the effect that it has had on education. It is our job to learn from this research and continue to develop the field of education in order to provide students with the tools they need for a successful life.

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