The Effects of the Coronavirus Pandemic on Student Learning

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September 30, 2020

Abstract

The Coronavirus pandemic (COVID-19) has spread globally with catastrophic effects on the world, severely impacting lives, jobs, and the education of students. The health crisis impact has forced a shift towards online learning, transforming the delivery of education, and disrupting the schooling of every student. This paper looks at the comparison between traditional and online learning and the effects they have on social interactions, motivation, and stress on students. Although every learner has been negatively affected by this sudden adjustment to remote learning, learners from underprivileged societies have been more vulnerable, facing disproportionate losses in their education. Online learning has become the new "normal" as the virus's effect has shown to be longer than predicted. As discussed in this paper, it is crucial to take collaborative actions and policy changes to create online learning a more engaging and effective delivery method of education.

1 Introduction

The Coronavirus pandemic, or COVID-19, has revolutionized the educational system and its delivery to students across the world. The airborne disease transmits deadly droplets through close contact between people. Consequently, social distancing is enforced by governments across the world, leading to school shutdowns and an immediate switch to online education. Although online learning is not a novel concept, the virus acted as a catalyst, forcing learners and educators to adopt distance learning. Almost overnight, the education systems scrambled to transition completely to online distance learning with little time to plan and no clarity of what will happen next. Teachers and students who are used to interactive courses have begun to revise the curriculum and their learning methods to adapt to the new remote conditions. The spiraling crisis has overwhelmed every aspect of the teaching world. After a pneumonia epidemic without apparent cause, a novel strain of the Coronavirus – SARS-Cov-2 – was

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first identified as COVID-19 in December 2019 in Wuhan, China. On January 20th, 2020, the United States recognized its first case in Washington [CDC20] The virus was officially declared a pandemic on March 11th, 2020 [Org20] The exponential spread of this contagion has alerted many officials to take drastic measures for the safety and well-being of their nations' populations. To disrupt human-to-human contact, many counties, states, and countries have announced lockdowns, ordering civilians to isolate and shelter in place. [Org20] The global pandemic has led to a severe health and socioeconomic crisis. Immunocompro- mised and older populations in specific are compelled to take extreme precau- tions as they are at a greater risk of death by COVID-19 [fDCP20]. An estimated 195 million jobs will be lost, and 800 million people will not be able to meet basic needs [Pro20]. This unprecedented disaster has left millions in unstable living conditions and food insecure. Concerning the educational impact, China and Mongolia were the first countries to close schools on February 17th, 2020, affecting one million learners. By April 4th, 2020, 192 countries implemented school closures, affecting 1.6 billion learners, accounting for 91.2Certain populations of students have been particularly affected by the transition to remote learning. Young children, for example, are faced with the disadvantage of being technologically illiterate, requiring additional assistance. Learners with learning disabilities are also an example of an affected population deprived of the proper help needed to continue a successful education. This paper focuses on the ad- ditional challenges of online learning that affect underprivileged students from lower socioeconomic societies including the deep digital divide and lack of many crucial elements to make learning more efficient. The infectious disease has im- pacted everyone in different ways. Individuals are having to use their cognitive resources on factors that could include one's health, employment, education, or lifestyle, taking away from their concentration, affecting their performance and well-being. The sudden impact of the Coronavirus pandemic has left everyone unprepared and isolated, leading to an inadequate education delivery system. The movement towards remote learning has been stressful to many students as important academic exams and events including the SATs/ACTs and AP ex- ams have been canceled, postponed, or relocated online. This paper explores the causes of increased anxiety and loss of motivation that learners are experiencing which is negatively reflected in their performance. To understand the radical changes in education, it is important to examine and evaluate the differences between traditional and online learning. Understanding the differences between the two education methods would clarify the effect of this sudden change from traditional to online learning and the impact it has left on learners.

2 Traditional Learning

Learning is recognized as an active progression that cannot be obtained but must be built by the learner. Traditional learning consists of four critical elements: an educator, or a knowledgeable person to share their proficiency; a conducive setting like a classroom or lab; materials such as textbooks, videos,

diagrams, and charts; and motivation to personalize learning. The purpose of an educator is to facilitate the learning process by encouraging and providing support to a student to actively create knowledge, building upon ideas that the learner already understands, for them to achieve their highest potential [D.08]. Domin states, "Knowledge cannot be transferred from one person to another; it must be actively constructed by the learner through interactions with the environment" [S.99]. A designated environment limits distraction and focuses the student on active and interactive learning. Reference models and hands-on experiences are tools used in traditional learning that motivate a student to take initiative to learn. Learning in a classroom setting with strong student-teacher and student-student relationships is an important component of traditional education. Face-to-face instruction allows educators to assess the knowledge and the progress of a learner to tailor teaching towards the development of the students. They teach their expertise based on modules and concepts that encourage student participation with the use of interactive tools such as group work, class discussions, debates, peer critiques, and more [C.06]. Group work allows students to discuss ideas amongst each other, developing deeper and more polished understandings of subject matters. The promotion of active learning and collaboration amongst educators and other peers to expand and build upon their prior knowledge. Learning is most effective when treated as a collaboration between peers rather than individual competition. Social interaction frequently improves student participation and allows for the sharing of ideas, sharpening students' understanding. The zone of proximal development refers to knowledge that is unobtainable for an individual independently but can be learned with guidance from another person. Active discussions and asking questions allow the instructor to evaluate and determine what the learners know and do not know and their average zone of proximal development [L05]. In traditional education, this assessment is especially helpful for a teacher to scrutinize students' performance and provide suitable commentary and criticism. Traditional learning improves critical thinking through the sociability of an in-person classroom environment. Discussions and debates, for example, allow a student to hear different perspectives and gain more understanding about a subject matter. Critical thinking is an advanced way of thinking to analyze and assess a judgment, centering on comprehension, analysis of various ideas and perspectives, and problem-solving [H.02]. It is an important skill that inspires a broader mindset and analytical thinking. An individual should be able to recognize and approach a problem, raise questions that challenge ideas that are simply informed to them, and develop creative solutions. Students who are taught in a classroom structured environment as a unit, learn concepts through a "lecture and questioning" method. This technique emphasizes critical thinking as it stimulates interactions between a learner, their peers, and an educator [C.06]. The mere "possession" of knowledge is not enough for critical thinking but requires further motivation and a desire to learn [E.03]. Active learning can also be utilized outside of classroom walls and structured exercises. There are multiple learning opportunities available for students such as simulations, internships, externships, autonomous studies, and hands-on programs. Learning

through experiences and the trial and error technique refers to experiential learning. According to American educationalist theorist, David Kolb, there are four stages of experiential learning which include concrete learning, reflective observation, abstract conceptualization, and active experimentation [K.09a]. Under Kolb's theory, an effective learner must go through all the following stages to thoroughly be knowledgeable about a topic. For instance, a person cannot learn by memorizing given information. Instead, they need to take the extra effort to become involved in the experience. A participant needs to reflect and recognize any common patterns or themes to help them with new experiences and to develop a more concrete understanding to apply in the future. Lastly, it is important to improvise, take risks, and experiment with new evolving theories and circumstances to discover new methods of improvement. This technique allows learners to 'learn by doing' and apply their knowledge to future situations.

3 Online Learning

The Coronavirus epidemic has become one of the largest challenges the educational system has ever had to face. Students from all over the globe are forced to adapt to new circumstances in all areas of their lives, as governments have authorized the ceasing of face-to-face education. As everyone obliged to shelter in place rules, education platforms have changed, transitioning to an online, or distance learning model [J.20]. Within a short period, students were required to switch from traditional education to online and virtual learning. Online learning is definitionally education that is executed through technology without the physical attendance of classes, lectures, or seminars. Remote education can be further categorized as synchronous and asynchronous e-learning. Synchronous e-learning refers to remote instruction where teachers and students communicate and collaborate electronically at the same time. Asynchronous e-learning is academic instruction without communication between the students and the teacher. This can occur via online forums, interactive school courses, emails, virtual telecommunications, and so forth. Online education has not been reported as an effective medium for learning as it lacks proper structure and necessary social interaction. Although there is limited research regarding the quality of online learning, there are multiple adverse experiences of remote learning which are based on poor online courses and pedagogy [J.05]. In comparison to traditional learning, distance learning does not provide the needed discipline for successful and efficient learning. Through traditional learning, an educator can easily identify a student's attentiveness and assess their teaching methods to ensure constant growth in a learner's progress. However, in remote learning, it is difficult to keep an eye on a large number of students in a class on a screen. There are a multitude of distractions, interrupting the class flow and creating challenges to teach the class. Distance learning does not allow instructors to maintain the same student-teacher relationships as it was in the classroom en- vironment. As many institutes have converted to online education, it is a harsh reality that many students do not have access to the technology and materials

needed. Students may not have a conducive environment or an appropriate device needed to support their learning remotely. Underprivileged children, in particular, discussed later in the paper, may not have access to the same level of technology at home – whether it is the latest model of the laptop or high-speed internet. In contrast, traditional, in-person schools are settings dedicated to the student's education and give them equal access to all materials, while online learning resources may not be uniformly available to every individual. Whether the signal is lost, content is missed, or electronics are not available, the lack of accessibility to such materials is one of the reasons virtual learning is not effective and cannot be a replacement for traditional learning. Learning is not just an intellectual process, but a social activity, requiring in-person contact amongst other materials. Through the means of traditional learning, students can interact with other individuals including their teachers, faculty, and their peers. However, while engaging in online education, the learner is not directly interacting with the educator and their classmates, making communication difficult and impersonal. Missing the day-to-day connections with a fellow student or teacher and the subsequent need to be self-motivated to push through schooling can prompt feelings of isolation. Discussions, for example, are a necessary component of social interaction between teachers, students, and classmates. This social activity demands active participation and allows for students to engage in active cognitive processing. They mandate students to articulate their knowledge, encouraging them to engage, contextualize, and apply what they know. According to the constructivist theory, learners require the ability to engage in opportunities to create meaning for themselves [S15]. Although discussions can be executed online, the inability to comprehend body language and chaos becomes an uninviting and hostile environment. Contrary to passive activities such as reading texts and listening to lectures, discussions necessitate learners to analyze and decipher what they have learned in their own words. Discussions excellently allocate students to hear different perspectives and compare and contrast ideas to enhance and better develop understanding and ideas of their own. Education and learning go beyond academics and lesson plans; it also includes discipline, manners, morals, and social interactions. These traits are difficult to teach remotely. The authors of "The Science of Learning and the Art of Teaching," Jerome Feldman and Doug McPhee, proclaim that kinesthetic learners are most successful when they are involved in an interactive activity that further promotes their learning [J.08]. Knowledge is easier to comprehend if it is being constructed by the learner who has undergone the intellectual process of reflection and analytical thinking. Students can retain more information at a quicker pace as they participate in a lab, presentation, skit, field trip, or other activities. They can take the information they receive and can evaluate, experiment, and modify their ideas while participating in such comprehensive processes that are available through traditional education [R.05]. Distance learning lacks the engaging and active experimentation process that is necessary for an effective learner to successfully acquire knowledge about a topic.

4 Effects of Traditional versus Online Learning

4.1 Stress

Stress can be defined as "when the perceived pressure exceeds your perceived ability to cope" [PSCCLT03]. In 2009, research done by Sulaiman, Hassan, Sapien, and Abdullah demonstrated that a majority of students experience some form of stress to some degree. In this study, the factors were subdivided by examining potential academic stressors including schoolwork, grades, and overall performance in school; and personal stressors that may exist in a learner's life such as extra-curricular involvement, self-esteem, and relationships [K.09b]. Stress, usually considered as a negative connotation, can bring an aspect of growth to certain conditions and individuals. Students deal with positive and negative stress on a daily basis. Positive stress, otherwise known as eustress, is invigorating as it is associated with conditions that provide challenges and opportunities for growth. Those who stress positively have an open mindset perspective, correlated with more success in learning and accomplishing their goals and ambitions. They often view obstacles as experiments to test themselves and find methods of improvement. In contrast, negative stress also referred to as distress, is correlated with threatening situations and the feeling of helplessness [A.84]. Students will often feel powerless or lost, adversely affecting their performance and prohibiting themselves to achieve their success. Stress has a significant impact on a student's academic performance. Of all the factors identified by student reports, stress was identified as the leading cause that was negatively affecting an individual's performance such as receiving a lower grade, not completing, or dropping out of a course [Ass10]. Reports illustrate trends that show more students are experiencing stress from this sudden change, which must be acted upon for the overall safety and wellbeing of all learners. Learners who are incapable of coping with stress develop tension, uneasiness, and anxiety. Stress this severe can lead to detrimental consequences on a learner's physical and mental health, affecting their performance [K.09b]. Multiple studies elucidate the importance of social support in maintaining an individual's physical and psychological health. There are three different forms of coping techniques identified which include: problem-focused coping, which correlates to the concept of identifying and confronting the source to relieve stress. Emotional-focused, or social coping refers to handling one's emotional response to a stressor, and third, avoidant coping, which refers to the avoid- ing of the stressor as much as possible [MCLAAB12]. Social support is a way of emotional coping where there are social connections available to an individ- ual for any form of support or reassurance. Four types of social support carry their individual benefits: Emotional social support, the encouragement of one's self-worth. Informational social support, relating to the sharing of advice and guidance to someone who may be undergoing a stressor. Tangible social sup- port includes the sharing of resources to relieve a stressor, and lastly, belonging social support, which refers to the act of offering inclusion [OFJDCDEMI07]. Furthermore, it appears that social support of all types can help to construct

and strengthen the resistance to stress. Coping mechanisms of stress that involve social support heavily depend on communal interactions. With the recent transition from traditional to online learning, social support coping processes can not be as effective to relieve the stress of learners as before. Through tradi- tional learning, students would frequently use their leisure time to reach out and interact with other classmates for emotional social support to relieve some of their stress. With the current absence of in-person communication in distance learning, students may find it more difficult to reach out and interact with their peers, limiting the availability and value of emotional social support. In tradi- tional learning, students can easily connect with teachers and counselors for the proper guidance and information social support needed to fully comprehend the knowledge they are learning. However, there are more difficulties and obstacles regarding communication between students and educators to ask questions, de- velop a thorough understanding of the curriculum, and build personal relation- ships with teachers in a remote-learning environment. Tangible social support includes all the information a classmate can receive from their peers about how to effectively deal with a course. In traditional learning, students can gain lots of tangible social support from the sharing of resources available such as class or lecture notes. On the contrary, the available materials through the distance learning model are limited to a student. Outside of academics, social support refers to the sense of support an individual can receive from social groups and teams that center on teamwork and involvement. Extracurricular activities that occur with traditional learning, such as team sports, clubs, volunteer work, and charities allow students to participate and create a feeling of belonging to a certain group with similar interests or situations. Distance learning, social distancing regulations, and shelter in place isolation rules prohibit and hurdle the group-related participation activities that provide belonging social support to an individual.

4.2 Motivation

Motivation is a powerful tool that disciplines and compels an individual to move forward with a goal or objective. It refers to the “why” of our actions and behaviors which are usually goal-oriented. Motivation can arise from external (extrinsic) or internal (intrinsic) factors. Extrinsic motivation is when individuals are inspired to behave or participate in activities because of exogenous components. This example of motivation can come from another person such as an educator and or friend or an incentive to seek a certain reward or escape punishment. A learner’s reasoning to be involved in an activity is an expectation to receive something in return such as a grade or praise or to avoid something negative including timeouts or a reduction in grades. Intrinsic motivation is the engagement of activity for reasons such as passion and self-growth. The activity is a reward in itself and is performed for the individual rather than an aspiration for an external incentive. A learner would have a perspective of a growth mindset, partaking in an activity for their interest and further development of their construct of knowledge. They would view things with eustress, taking on

a challenge for passion and improvement. Competition amongst peers can instigate stress and drive motivation – both intrinsic and extrinsic – to do better and have the satisfaction of completing the activity, or to achieve some sort of reward [F.11]. Eisenberg and Thompson experimented with two similar conditions to determine how competition affects the performance of improvisers. In the competition condition, participants were tasked to formulate an improvised musical piece that would be blindly judged to determine the "best improviser." In the condition with no stimulated competition, participants were told that the experimenters were interested in how people improvise. The study illus- trated that competition, a combination of motivation and eustress, results in higher creativity and an overall boost in performance [F.11]. A learner's educa- tional development and motivation are influenced by "how" rather than "what" they are taught. Every individual has different motivations from comfortable to risk-taking environments. There are different ways a student can be inspired such as hands-on and interactive activities that challenge and test a person's abilities. A traditional learning environment provides a conducive setting for students to dedicate time and space for their education. On the other hand, re- mote learning can take place in any setting, which can disrupt the line between personal and professional environments. The task to keep a student motivated and actively engaged is a challenge amongst all ages. Online learning courses, however, present themselves with more concerns as new difficulties arise. To be successful, students need to be disciplined, empowered, and self-regulated. Without the many elements of traditional learning such as face-to-face contact, educators are not able to detect any nonverbal clues from learners that signal their disengagement to the course.

4.3 Secondary Effects: Relations

An individual learns through social interactions, acquiring knowledge, and personality socially. According to the social constructivism theory, founded by Russian psychologist Lev Vygotsky, learners have more growth in their development when they incorporate the experiences, knowledge, and opinions of others to improve their learning [KCP09]. The evolution of individuality – personal to everyone – progresses with the agents of personality change: social relationships. Social collaborations act as building blocks to one's character in their personality development. Personality can identify as an individuals' psychological and behavioral pattern, such as the perceptions and emotional feelings that are different from each person. Evolving from social situations, these characteristics, and traits, are responsible for shaping an individual's personality. Through the simple means of communication, relations with others influence a person's character, allowing themselves to understand and develop their likes and dislikes, morals and ethics, and experiences and skills. Through the medium of online learning, social interactions which are a key component in the development of personality, individuality, and learning is limited to everyone. Traditional learning provides a conducive environment for social interactions. In a traditional learning environment, students connect in multiple different settings

including

engaging activities in a teaching space (group projects, debates, and discussions) and outside the classroom (extracurricular activities and team sports). Communication between learners allows them to progress and be exposed to new perspectives, expanding their knowledge. These connections influence their views on many topics that concede a person to formulate their individuality [Nix13]. The ability to collaborate with peers is not an easy option through technology screens in comparison to a same-setting classroom or campuses. Beyond academics, traditional schooling impresses core social and life skills that are crucial for success in the future. Social interactions improve and enhance the critical thinking and problem-solving abilities of learners as they are subjected to the different opinions and assessments of their peers they collaborate with [Nix13]. Communication and public speaking, for example, are common fears and vital aptitudes that can help a student in the workplace. Traditional learning allows students to speak in large groups, practicing the art of public speaking, as stu- dents present and articulate their thoughts and ideas in front of their educators and peers. In distance learning, speaking through virtual chats via computers does not teach public speaking.

5 Underprivileged Learners

As the Coronavirus pandemic continues to spread, millions of learners across the world are affected by school closures. The abrupt compulsion to convert to on- line learning has caused deep digital divides. Underprivileged students, whose family, social, or economic conditions impair their learning, are already at a disadvantage and are most susceptible to these technological gaps. Often these students do not have access to technology or an internet connection, which along with an overly stimulating home makes it difficult to concentrate. Re- search shows that learners from low socio-economic status families and societies progress slower in academic skills in comparison to those belonging in higher SES classes [MPLF09]. For example, growing up in a low SES community is associated with poor cognitive performance, linguistics, memory, and the over- all understanding of subjects. The educational systems in low socio-economic status areas frequently lack resources which adversely affects the academic de- velopment and performance of the students [N.15]. The addition of remote classes further challenges the underprivileged pupils. Many learners from low socio-economic backgrounds are not able to attend online classes for an array of reasons such as sharing or not having access to a laptop or device to be present at a class [L.20]. According to data collected over four weeks, ten per- cent of low SES children have little to no access to the equipment needed for online learning [Bur20] More than twenty-five percent of children who are ex- periencing food insecurity cannot access the internet to attend distant learning classes [Bur20]. The sudden change to distance learning has forced students to take the extra steps to participate in classes through the means of technol- ogy, which may not be available to many learners. Motivated to learn, many students are taking extreme measures to obtain access to the needed materials

to attend their online schooling. Multiple Chinese news reports have stated that children have walked and climbed for hours at a time to mountaintops for an adequate signal for remote classes [R.20]. An important element previously identified for effective learning was the need for a conducive learning environ- ment. The transformation to online learning removes the accessibility of many pupil's designated learning settings. Traditional learning offers classrooms and labs which are examples of encouraging environments that aid in the teaching and learning processes through hands-on activities between classmates. Remote learning requires pupils to attend their classes from their homes, which may not shelter the same designated settings for everyone. Some students, for instance, may have too many distractions or may have the added responsibilities of a sibling, pet, or elderly, taking away from their ability to concentrate on online learning. Online learning has further disadvantaged underprivileged students of lower socioeconomic status. Learners from low SES households and communi- ties are often challenged with the lack of the needed equipment and conducive space to attend distance learning classes. Traditional learning, on the other hand, offers students equal resources and a designated place for the education of all students.

6 Discussion

The Coronavirus pandemic has radically shifted traditional learning mechanisms to online learning. As the world tackles the sudden change to distance learning, students are missing important experiences that supplement their learning process. Attending remote classes in isolation at home confines a student, keeping them from important social interactions that encourage learning. A nod in the hallway, a wave in the cafeteria, or a smile in the locker room are a few examples of social gestures that help a student cope with stress. Social interactions appropriately address stress and motivate students, which is not remotely accessible. Hands-on involvements such as field trips, lab work, and group assignments, are also examples of crucial elements in educational development. The absence of these important components negatively impacts the education of students. The COVID-19 continues to reveal new layers of inequity within societies. An example of a vulnerable population with negative effects on their learning are children growing up in underprivileged societies. The absence of in-person schooling adds additional challenges to their education. Their inaccessibility of a designated quiet space and other fundamental equipment such as a device and internet connectivity place these children at a major disadvantage. As more than half a year has passed since school closures, the new school year has circled, leaving many in disagreement regarding the opening of schools. As the media covers one of the most controversial debates, it is important to remember the decision to re-open schools should not be driven by the pressure of politics but the evidence of science. As the current situation lingers and is becoming a new "normal" of learning, there are measures that can be taken to better improve upon the current conditions of education and fill the gaps

between traditional and online learning. For instance, it is important to make adjustments to ensure equal resources and access to all learners. Additional funding from the government can be provided for schools to be more resilient and be able to offer electronic materials such as laptops and hotspots to all students who do not have access to these materials. Public libraries can open with appropriate safety precautions to accommodate for a conducive setting for learners to be able to access a designated space to facilitate their learning. Educators can grant office hours to students with special needs or highly stimulus households for any additional help or support they may need. The potential solutions to this ongoing educational crisis will require more funding, new poli- cies, innovative lesson plans, new etiquettes, new attitudes, and much more, in which the communities and government have a crucial role to play.

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