**Online Education: Harmful and Ineffective**

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**Abstract**

Online education has proven to be harmful to the average student over the last few years. It was shown to be less effective towards teaching material due to the structure of requiring a student to use technology in order to turn in their work. Aside from this, it was much more difficult for students, as it punished those who were not predisposed to working with computers. Not only this, but being on a computer in a video call as opposed to in class resulted in less effective lectures due to using less of a student’s working memory capacity. Students with ADHD were impacted much more heavily than others through higher risk of setbacks such as greater difficulty in organization and participation (S. Cortese et al, 2020), as well as raising antisocial behavior even after students were moved back to in person classes (Becker et al, 2020; Adegboye et al, 2021).

**History**

Online education and distance learning has had a fairly slim history, as it had a major increase in relevance during the COVID-19 outbreak in 2020. While it wasn’t too common before this, it did exist through online universities, with the main objective being to provide a quick and cheap method of obtaining a degree in various fields. These online courses were not quite comparable to an in person, brick and mortar-based university with much more history and prestige. It did provide a solid option for those not able to attend an in-person college for various reasons, mainly lack of time and money. Once the COVID outbreak began, all American universities were pushed to operate online only, in order to prevent the spread of this virus. While successful in its objective, distance learning proved to be much less effective for the average student, and even drove many to opt out of their education until lessons had returned to the classroom.

**Effectiveness**

The effectiveness of distance learning has shown to be quite questionable in the past years which it was most common. This is largely due to how students will differently experience internet cognitive fatigue (ICF) and mind unwandered.

Results indicated that participants’ ISE (Internet self-efficacy) and SEILC (Self efficacy of interacting with learning content) were positively related to mind-unwandered, but negatively related to ICF during online learning, while ICF was positively associated with PIOL (Perceived ineffectiveness of online learning) (J. C. Hong et al., 2022)

To simplify, a more focused and less fatigued student will see more effectiveness in an online learning environment than one who is not focused and is distracted. Though this seems to be simple on paper, keeping students from becoming distracted and fatigued is much more difficult within an online class, due to the ability for one to perform other tasks while attending the class. Such examples could be to open another tab and watch videos, play games, or even just turn off the webcam and leave the room altogether. As an online classroom lacks any real structure and motive to prevent the student from 'checking out' of the lecture, this allows ICF to increase and mind unwanderedness to decrease.

To add on to the issues surrounding internet cognitive fatigue, self-efficacy of interacting with learning content (SEILC) goes hand in hand in that it is naturally at a disadvantage in modern society which perceives distance learning to be less effective than in-person teaching. Lower SEILC not only causes a student to perform in a less efficient manner during lectures and assignments, but it also causes the student to feel less fulfillment while completing classwork.

Online learning does not provide individual satisfaction for students, especially when their ability to use technology is not optimal hence the content of teaching materials that have been prepared by lecturers cannot be studied optimally. (R. Ramadhani et al., 2021)

Self-fulfillment is a driving factor in a student's desire to perform well in education. Without this, one would see less desire to attend classes and seek education. Decrease of SEILC and in turn self-fulfillment risks a student becoming less interested in their education, and thus may cause them to drop out and pursue a different path in life.

For example, teachers should provide guidance for those students with low Internet self-efficacy and self-efficacy of interacting with learning content. They can provide reminders when students’ minds start wandering, and increase learners’ interaction within the teaching tool to prolong their mind-unwandered (Ha & Im, 2020; Sun & Yeh, 2017)

The previous quote provides a solution to online instructors as to how they may be able to reduce a student's ISE and increase their mind unwanderedness by being more cognizant of the students who may be showing signs of distraction or fatigue. By being trained in doing these things, teachers of future distance learning classes may be able to increase the success rate of students as well as increase a student's internet self-efficacy and self-fulfillment.

**Difficulty**

Working memory is crucial to the retention of information, particularly in an educational environment. It ties in directly with factors such as cognitive ability and self-efficacy, such that a student with greater self-efficacy will experience a lower burden on working memory resources than an individual with less self-efficacy (Mayer et al., 2001). In order for a student to endure a lengthy high-level course and retain the information given to them, not only do they have to be cognitively sufficient, but they need to be able to keep their self-efficacy high enough so that they don't reduce their working memory capacity. This directly correlates to the discussion of self-efficacy versus internet cognitive fatigue and mind unwanderedness. For a student to be able to retain most of their material in a lesson or assignment, they need to be able to stay focused and have pre-existing experience with the internet in order to prevent cognitive fatigue. Most students though, do not have this ability as they have only interacted with the internet recreationally, as opposed to using it for a full or part time job which requires them to use it for several consecutive hours.

Another added difficulty which is commonly overlooked is the struggle of many students to comfortably use various programs which are required for their class. Given how the COVID-19 pandemic caused everyone to suddenly move to the online classroom, many were not prepared for this change, and their education suffered as a result.

.... students also feel anxious and insecure when the learning process changed from face-to-face to online learning, and in which students are not ready to use technology in the learning process and the low level of technology-mastery makes the use of e-learning and some types of online learning ineffective. (R. Ramadhani et al., 2021)

Such examples of programs which students were not prepared to use once the switch to distance learning may be but are not limited to Matlab, GeoGebra, Desmos, Scilab, OrCAD, Microsoft Excel, Wireshark, and just about any programming IDE. Some of these programs may come easy to some students, however many required several weeks of in person lessons in order for a student to become comfortable using them. The struggle that comes with learning a new program should not be applicable to the learning process, though it is when it comes to taking online classes. This will cause unnecessary anxiety in students, as well as further reducing individual satisfaction from completing assignments (S. F. Sihotang et al., 2021).

**Students with ADHD**

Those most heavily affected by the disadvantages of online learning are neurodivergent students, namely those with ADHD. These students are at a much higher risk of setbacks due to difficulty in organization and raised antisocial behavior, given how online classes typically take place in a student's own home. A neurodivergent student may find it more difficult to stay on top of due dates given how most assignments are only posted online, and how many online classes only meet once or twice per week with no mention of said assignments. This requires a student to go and frequently check the calendar for the due dates, which is much more difficult for someone with ADHD to remember to do. A student with ADHD will typically be in a different mindset depending on the room they're in during a lecture. This means that a student in an online class in their own bedroom will not think about assignments, while one attending a traditional lecture in a classroom will constantly be reminded while in that area.

Contextual focus is when in a neurodivergent student will be attentive to whatever area they are surrounded with, as opposed to the material in front of them. Meaning, a student with a reading assignment in front of them will have more success focusing on the material in a classroom or library, but will struggle to focus somewhere such as their home or a park. (C. Farmer, 2022)

This also ties in with how a neurodivergent student is at a higher risk of non-participation within online classes. The biggest factor of this is the surrounding area a student is placed in while taking the class. Referring back to contextual focus, a student will be much more inclined to go do something else unrelated to the class if they are taking it in their own home. For the vast majority of students this was the case, given how the COVID-19 pandemic caused all public places to be shut down for so long, leaving home to be the only option.

Antisocial behavior became much greater among students with ADHD, even after classes had gone back to the traditional classroom. Antisocial behavior in this particular case refers to lying, disrespect, some types of aggression, fights, violence, and others (Đurišić & Gajić, 2016). Attending school in person is especially beneficial to the social development of younger kids with ADHD. It gives them the ability to shape their relationships with peers and teachers, as well as learn rules, structure, and understand how the school content is beneficial to the student themself (Ђурић-Здравковић, 2020). The transition to online classes has eliminated the resources necessary for a neurodivergent student to grow properly, and has further increased hyperactivity and impulsive behaviors.

It has been noted that, with reverting to school teaching, relationships with peers, self-management and the quality of social competence as a whole, were statistically significantly worse than before online classes.... Regarding the antisocial behavior, it is noted that students with ADHD, when examining all forms of behavior, showed significant deterioration when they returned to school teaching. (A. Đurić-Zdravković et al., 2021)

The studies done here have provided more than enough evidence to claim that online education is especially harmful to neurodivergent students. This is especially true with those with ADHD, as being in a social environment is crucial to their behavioral and social development.

**Conclusion**

Not only is online education much more difficult to the average student, it is also less effective for the time it consumes, and leaves students much less satisfied and confident in the education they received. When possible, online education is to be avoided particularly by students with neurological disorders such as ADHD, as they are affected the greatest by the lack of focus and sociality that goes with being in a classroom with students. It goes without saying that the years the world went without in person classes definitely had a negative effect on the students of the time, not only drawing back intelligence wise, but also within the aspects of mental and social health.

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