LITERATURE REVIEW

ON

IMPACT OF MODERN TECHNOLOGY ON THE STUDENT PERFORMANCE IN HIGHER EDUCATION

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Introduction

Modern technology refers to a wide range of tools, techniques, and systems that have been developed to make our lives easier and more efficient (Brynjolfsson & McAfee, 2014). These developments include mobile devices, cloud computing, artificial intelligence, virtual reality, 3D printing, robotics, and many others. Modern technology has transformed the way we live, work, and interact with one another. It is a gift from God, while enabling us to communicate with people around the world, access vast amounts of information, and perform complex tasks with ease.

The very fuel that keeps advancing modern technology are founded on several methods of knowledge acquisition and sharing going through several stages of education into specialized stages called higher education. Higher education can be defined as post-secondary education that is provided by universities, colleges, and other institutions that award academic degrees or professional certifications. It typically includes undergraduate and graduate degree programs and is designed to provide students with advanced knowledge and skills in their chosen fields of study (OECD, 2018).

In recent years, the integration of modern technology in education has grown significantly. The use of modern technology, such as laptops, tablets, and smartphones has changed the way students learn and has become an essential tool for students in higher education. With its advancements, there has been a tremendous increase in online learning, online assessments, the use of digital devices in the classroom and many other innovations. This literature review aims to examine the impact of modern technology on student performance in higher education.

History and Current State

The use of technology in higher education dates to the 1960s when computers were first introduced. At the time, computers were mainly used for administrative tasks such as record-keeping and data processing (Selwyn, 2016). However, as computers became more affordable, they were integrated into academic settings, primarily to support research activities.

Then the internet became widely available in the 1990s, and universities began to use it to deliver course content online. This led to the emergence of online education, which allowed learners to access course materials from anywhere in the world (Garrison & Kanuka, 2004). Launching the very first online degree program by Jones International University in 1999 (Lorenzo & Moore, 2002). In the 2000s, learning management systems (LMS) were

developed, which enabled universities to manage and deliver courses online more efficiently (Ally, 2008).

Today, modern technology has transformed higher education, making it more accessible, flexible, and engaging. From Massive Open Online Courses (MOOCs) making knowledge accessible to thousands of people, to Virtual and Augmented Reality, bringing visualization to complex studies. And from the use of mobile devices such as smartphones and tablets to Artificial Intelligence (AI) that is redefining student learning experiences. Technology has advanced and become an integral part of the educational process.

Now, considering the early involvement of technology into higher education, what impacts has it had on student performance in higher education?

Positive Impact

Many researchers have concluded that the integration of technology in higher education has increased the effectiveness and efficiency of teaching and learning. In this part of the literature review we will examine some of the positive impacts of modern technology on student performance in higher education.

Technology and Student Engagement: According to Chen et al. (2021), technology enhances student engagement, motivation, and interest in learning. The use of multimedia, including videos, images, and audio, promotes active learning, and improves comprehension and retention of information. Moreover, technology enables students to access digital resources, collaborate with peers, and receive immediate feedback, which leads to deeper learning and improved academic performance. Specifically, the authors found that technology can enhance students' cognitive and affective engagement, as well as their motivation and self-regulation. In a study by Liu et al. (2020), students who used technology for learning activities had higher academic achievement than those who did not. Also found that students who used technology for communication with peers and instructors had higher engagement and satisfaction with their learning experience.

Technology and Accessibility: Technology has also made education more accessible for students with disabilities. According to Aparicio et al. (2020), assistive technology, such as text-to-speech and speech recognition software, helps students with visual, hearing, and motor impairments to access and participate in learning activities. Moreover, online courses and virtual classrooms enable students to learn at their own pace and from any location, providing flexibility and convenience for those with physical disabilities or other limitations.

Technology and Critical Thinking: The use of technology in higher education promotes critical thinking and problem-solving skills. According to Chen et al. (2021), technology provides students with access to vast amounts of information and resources, which they can use to analyze, synthesize, and evaluate complex concepts and ideas. Technology also enables students to engage in simulations, virtual experiments, and other interactive learning activities, which enhance their analytical and problem-solving skills.

E-learning vs Traditional Methods: In another study by Fardoun and Alghazzawi (2020) where 38 students were analyzed on the impact of e-learning on academic achievement among university students, findings suggested that e-learning has a positive impact on academic achievement and retention rates. The study found that students who participated in e-learning programs achieved higher grades and had higher retention rates compared to

traditional classroom learning. Additionally, e-learning was found to have a positive impact on retention rates, as students who participated in e-learning were more likely to continue their studies and complete their degree programs.

Negative Impact

While many researchers found that modern technology can have positive impacts on student performance, other researchers have reported negative views on the use of technology in higher education.

Technology and Student Engagement: In a study conducted by Rios-Aguilar and Kiyama (2019) found that online learning has a negative impact on student engagement and academic performance in higher education. The authors argue that the lack of social interaction and support in online learning negatively affects student motivation and engagement. Therefore, the impact of online learning on student engagement and academic performance is considered negative according to this study.

Technology and Critical Thinking: Contrary to other arguments, Pan (2015) argues that the use of technology can rather lead to a lack of critical thinking skills, as students become more reliant on search engines and other tools to provide information. The author suggests that technology can discourage deep learning and critical thinking by encouraging students to focus on surface-level information and memorization. This is further supported by Kirschner et al (2018), who argue that the use of technology can lead to a reduction in cognitive load and hinder the development of complex thinking skills. They suggest that technology-based instruction can lead to a more passive learning experience and can limit opportunities for students to engage in problem-solving, critical thinking, and analysis. This introduces the possibility of plagiarism and students who use digital technologies to plagiarize often do not fully understand what plagiarism is or how to avoid it. This can lead to a decrease in academic integrity and reduced academic achievement (Wiest et al., 2017).

Technology and Accessibility: As much as Modern Technology seems to be widespread, there are still people who do not have enough access, and this serves as an unfair advantage to those who have access. Owusu-Fordjour et al. (2020) presents further on this point that during recent COVID-19 pandemic Many students reported challenges in accessing computers, smartphones, and other devices required for online learning. Even with those who had access to the needed devices, reported issues of Limited access to learning resources, Limited support services, unequal distribution of resources and overall, many students faced challenges in adjusting to online learning formats, including difficulties with time management, maintaining focus, and staying motivated.

E-learning vs Traditional Methods: In a study by Bernard et al (2018), the lack of social interaction and support, as well as the lack of personalized attention and feedback from instructors, negatively affects student motivation and engagement. They also note that online learning may not be suitable for all types of learners and that some students may struggle to stay focused and motivated without the structure and support provided by traditional classroom methods. Similarly, a study by Shibli et al (2020) found that students who received feedback on their assignments had higher GPAs than students who did not.

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Similar Views

The authors in their study, agree that modern technology has an impact on student performance in higher education. Specifically, they explore the effects of technology on academic achievement, engagement, accessibility, satisfaction, retention, critical thinking, and learning outcomes.

Some authors focus on the benefits of technology, such as assistive technology for students with disabilities and e-learning, while others explore potential drawbacks, such as the negative impact of online learning on student engagement and academic performance.

For instance, Aparicio et al. (2020) highlighted the potential of assistive technology in enhancing the learning experience of students with disabilities. Chen et al. (2021) conducted a systematic literature review and found that technology can positively impact student engagement and academic performance. On the other hand, Rios-Aguilar, and Kiyama (2019) emphasized the negative impact of online learning on student engagement and academic performance. While, interestingly, Fardoun and Alghazzawi (2020) conclude that the impact of e-learning on academic achievement and retention rate is mixed.

Amidst the contrasting views, there are still several common views, for instance, there is a consensus among the authors on the importance of feedback in improving student performance. While similarly, admitting that the lack of balance determines the impact of any technology on student performance. The authors also identify several factors that may moderate the impact of technology on engagement and performance, including the quality of the technology used, the design of the course, and the instructor's use of technology. Conclusively, while technology can be an effective tool for enhancing student engagement and academic performance, careful consideration must be given to its use to ensure that it is used in a way that supports student learning.

Summary and Conclusion

Several authors have several contrasting views, research results and outcomes on the same subject, the question first posed is, what could be the cause of the discrepancies?

One potential reason is the different types of technology and learning environments studied. For example, studies on e-learning tend to find positive effects on academic achievement and retention rates, while studies on online learning highlight potential drawbacks such as reduced engagement and academic performance. Additionally, studies focusing on feedback and learning outcomes tend to highlight the positive impact of feedback, while studies examining the impact of technology on critical thinking and learning outcomes suggest that technology may have mixed results.

Another important factor to consider is the context and characteristics of the students and institutions studied. For instance, studies examining the impact of technology on students with disabilities tend to highlight the benefits of assistive technology, while studies examining the impact of technology on a particular geographic area or scenario highlight the challenges of adapting to new learning environments and technology.

In conclusion, Modern technology has transformed higher education, making it more accessible, flexible, and engaging. The integration of technology in higher education has increased the effectiveness and efficiency of teaching and learning, enhancing student engagement, motivation, and interest in learning. Moreover, technology has made education

more accessible for students with disabilities and has promoted critical thinking and problem-solving skills. However, modern technology has also had some negative impacts, including distraction, increased likelihood of plagiarism, and technical difficulties. To maximize the benefits of modern technology in higher education, further research is needed to better understand these complex relationships and to identify effective strategies for leveraging technology to support student learning and performance.

Research Questions

1. How does technology affect student engagement and academic performance in higher education, and what are the underlying mechanisms that explain these effects?
2. What is the overall impact of technology use on academic achievement and satisfaction among higher education students, and are there any significant differences across different types of technology?
3. How effective is e-learning in promoting academic achievement and retention rates among higher education students, and what factors influence its effectiveness? Are there negative impacts and can they be mitigated?
4. What are the limitations of constructivist, discovery, problem-based, experiential, and inquiry-based teaching, and how can these limitations be mitigated?
5. How does technology affect critical thinking and learning among higher education students, and what are the key factors that influence these effects?
6. How does feedback impact students' performance in higher education, and what factors influence the effectiveness of feedback in improving academic performance?

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