**The Impact of Modern Technology on Student Learning Experiences in Higher Education**

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# **Introduction**

At present, higher education institutions are undergoing a significant change in how they embrace modern technology, this is a paradigm shift whereby modern technology is now conceptualised as a multifaceted and interconnected system that facilitates digital learning. As a result, the focus is more on the students' learning experiences rather than the technology itself (Abad-Segura et al., 2020).

This literature review examines the impact of modern technology on student learning experiences in higher education institutions. It provides historical background, frameworks, and models for technology integration. The review evaluates prevalent technology in institutions, its influence on students' engagement and motivation, and the challenges faced by students. It also explores students' perceptions and attitudes towards technology integration in their learning experiences.

# **Historical Background**

Fahmy (2004) has categorised the evolution of technology in higher learning into three major revolutions. The initial revolution dates back to 2500 years ago when written language complemented spoken communication, replacing memorisation with written and printed texts.

The second transformation started when educational institutions allowed students and educators to use shared facilities, encouraging the formation of an educational community and campus culture. This collaboration introduced previously inaccessible financial support, resulting in a multifaceted educational setting that involved teachers, administrators, technicians, support staff, students, and publishers.

The third revolution, commonly known as the technology revolution, became feasible due to advancements in computing, video, and telecommunication technologies. This transformation has greatly increased the learner population and fundamentally altered how higher education provides its services (Fahmy, 2004).

The evolution of technology in higher education highlights the need to balance modern teaching methods with timeless educational principles. Learning from history, embracing new technologies, preserving core educational values, and creating a lifelong learning system are essential. Striking a balance between these aspects ensures that technology enhances education, making it adaptable and accessible while retaining the fundamental principles of learning and knowledge (Muttappallymyalil et al., 2016).

# **Theoretical Foundations**

The use of theoretical frameworks and models is essential in integrating technology into higher education. These tools aid implementation and offer a systematic way to comprehend the influence of modern technology on teaching and learning in higher education. Moreover, educators, instructional designers, and decision-makers can utilise these frameworks to ensure that the modern technology they use correlates with sound principles and best practices (Chugh et al., 2023).

The unified theory of acceptance and use of technology (UTAUT) evaluates the degree of acceptance of technology, which is based on the influence of performance expectancy, effort expectancy, social influence, and enabling conditions in the field of education and information technology (Marikyan & Papagiannidis, 2023).

Numerous studies have validated that the UTAUT is a reliable model for elucidating and forecasting users' acceptance behaviour concerning the adoption of new technologies across higher education and various contexts (Almaiah et al., 2019).

The UTAUT model not only clarifies the acceptance of technology but also sheds light on their actual usage. Due to its ability to amalgamate various Technology Acceptance Models (TAMs), the UTAUT model significantly enhances the understanding of technology acceptance and usage, (Chao, 2019).

The integration of technology in higher education aids these institutions in achieving diverse teaching goals, and scalable technologies can effectively support these objectives. However, for technology to be effective, user acceptance is crucial (Sprenger & Schwaninger, 2021).

The Technology Acceptance Model (TAM) examines the impact of technology on users' beliefs and intentions. It includes user behaviour, behavioural intention, perceived usefulness, and perceived ease of use. TAM is a fundamental framework for studying users' acceptance of emerging technologies (Yawen & Moyan, 2021)(Tambum et al., 2020).

Education is dynamic and evolves with time, with teachers being significant influencers. Technological Pedagogical Content Knowledge (TPACK) refers to the effectiveness of delivering lessons through the integration of technology.

(Santos & Castro, 2021). TPACK is vital when transitioning to technology, taking into account the educational system's demands, students' requirements, and educators' capabilities. TPACK acts as a guiding principle, illustrating the interconnectedness between instructors' technology (T), pedagogy (P), and content (C) knowledge, ultimately enhancing teaching practices (Hamam & Hysaj, 2021).

Handayani et al. (2023) further states that the swift advancement in technology, especially in the era of Industry 4.0, has rapidly expanded knowledge. Consequently, educational institutions face the pressure to be more creative and innovative. To adapt to this changing landscape, the education sector must develop strategies to incorporate evolving technologies effectively. This involves integrating elements like technology, teaching methods, and subject matter knowledge, known as TPACK.

# **Modern technology and its influence on student engagement and motivation**

Integrating technology into education boosts student motivation and participation through behavioural, emotional, and cognitive engagement. It encourages students to invest more time and effort in learning activities, positively influences attitudes towards learning, and expands mental capacity. Technology provides increased opportunities for communication, interaction, and active learning. Examples include gamification, simulation, and online learning systems like Moodle (Schindler et al., 2017)(D’Angelo, 2018)(Bond et al., 2020).

The use of technology in Higher Education is becoming increasingly popular, particularly through the introduction of digital gaming-based learning and gamification. This type of learning involves the incorporation of gaming into the learning experience in order to increase engagement and motivation. Tugun (2020) states that playing games is the second most common technology use among students at higher education institutions. This has led to the development of the term 'edutainment', which combines entertainment and education in an effort to capture the learner's attention and keep them engaged (Greve & Tan, 2021).

The use of simulation technology in education is also becoming prevalent as it encourages active student involvement, allowing for the practice of skills and the application of knowledge. Simulation provides students with the ability to control the pace and repetition of processes, allowing for flexible learning. Simulations also provide a safe environment for making mistakes and provide students with the opportunity to experience virtual environments that are difficult or impossible to replicate in real life, for example medical professionals in surgery and aviation students (Ahalt & Fecho, 2015).

Online learning technologies such as Moodle and Blackboard are widely-used online learning management systems in higher education. Aljawarneh (2020) explains that they provide students with the flexibility to design study schedules and course curriculums, making it an ideal choice for furthering higher education. Additionally, learning management systems offers a range of discussion and communication features to facilitate effective student-lecturer interaction, as well as the ability to create learning materials, such as multimedia resources.

Furthermore, it offers the flexibility to assign grades and facilitate efficient assessment, making it ideal for meeting specific requirements for higher education courses (Bhaskar, 2023). Incorporating multiple technology platforms allows students to develop their cognitive abilities, enhance communication, engage in problem-shooting exercises and dialogue, critically analyse content, and hone digital skills (Schindler et al., 2017 ).

Research by D’Angelo (2018) has also demonstrated that students who are taught with the aid of modern technology, such as gamification and simulation, outperform those who are taught without it in terms of academic achievement. Additionally, other studies have indicated that the introduction of technology into the classroom increases students' motivation to comprehend and complete tasks.

# **Challenges of modern technology in higher education institutions**

Existing literature has identified a number of difficulties associated with the incorporation of modern technology into higher education. These difficulties can be divided into four distinct categories: technological, individual, cultural, and course-related. Furthermore, it has been observed that these challenges vary significantly between countries, reflecting differences in culture, context, and preparedness (Almaiah et al., 2020).

In order for digital education to be successful, it is essential to have the necessary infrastructure, such as Moodle in place. Additionally, it is essential for professors and students to be adequately trained in online delivery methods. Furthermore, online education can help to bridge the digital divide; institutions must invest in IT infrastructures, allocate bandwidth, and provide technical support. Furthermore, universities must ensure that disadvantaged students are not excluded from this digital transformation (García-Morales, 2021).

Schmidt & Tang (2020) state that the utilisation of modern technology to enhance education has presented a new challenges in terms of access, which has raised both technical and moral questions. This can be partially summarised in the discussions surrounding digital literacy. As technology advances, the need for faster and more reliable access to the internet has increased.

Higher education institutions are confronted with additional impediments to their transformation, such as financial constraints and limitations in their IT infrastructure. Government funding for public universities is decreasing, and student enrolment is declining due to the economic uncertainty. Furthermore, the IT infrastructure available to higher education institutions restricts their ability to adopt modern technology, necessitating investments to improve their technical capabilities (Krishnamurthy, 2020).

Another challenge in technological transformation is the human factor. Successful higher education transformation requires strong institutional leadership and support, engaging stakeholders such as faculty, students, and technical staff. In order to enhance the preparedness for crisis management and strengthen institutional resilience in the face of future challenges, it is imperative that faculty training and established policies are implemented (Marinoni et al., 2020).

The proliferation of modern technology has raised ethical issues regarding cyber security and privacy rights (Cavus et al., 2022). Higher education institutions must adopt codes of conduct to provide clearness and to establish a secure and dependable framework for technology-led instruction in order to address these challenges (Jensen, 2019).

The development of smart campuses, which rely heavily on large-scale personal data, necessitates a high level of security and data privacy. Compliance with legal regulations is of paramount importance (Cavus et al., 2022). Higher education decision-makers must prioritise cybersecurity and uphold students’ privacy. New laws and regulations should strike a balance between the protection of personal data and the need for contextual understanding (Dong et al.,2020).

According to European University Association (2020), despite the difficulties associated with this transition, universities have expressed a positive opinion of it. In a recent survey of European Higher Education institutions, 92% of universities declared their intention to investigate novel teaching approaches and enhance digital capabilities in addition to the existing challenges (European University Association, 2020).

# **Students’ Perceptions on modern technology in higher education**

Analysis of students’ perspectives on modern technology integration in higher education holds significance importance. This comprehension aids in providing insight on how students are impacted by the technology in their learning experiences, and also allows for improved planning of future educational initiatives and policies pertaining to technology integration (Bahja et al., 2022).

A study by D’Angelo (2018) suggests that when implementing technology into the education, it is essential to take into account how students will perceive the attributes of the technology. Generally, students find technology to be engaging and beneficial for their learning, and are likely to take advantage of it to improve their comprehension of course material. Factors that make technology attractive to students include flexibility, availability, ease of use and engagement.

Studies have consistently shown that students are highly satisfied with the utilisation of educational technology due to its ability to facilitate interactive learning. Furthermore, students have reported that technology helps them to gain a deeper understanding of course material, improve their academic performance and better prepare them for a technology-dependent future (D'Angelo, 2018).

Research by Al-Rawashdeh (2021) found that technology lacks face-to-face interaction, which is a main disadvantage for students. Co-curricular learning with peers is essential for comprehension and knowledge exchange. Students prefer group settings and social interaction. Excessive social media use can harm concentration.

The online learning experience of students is contingent upon a variety of elements. Studies on students' perception of the beneficial and difficult aspects of technology-based learning have indicated that a lack of community, a lack of comprehension of instructional objectives, and technical issues posed obstacles to their learning. Other researchers have also identified learner characteristics and the structure of the learning environment as potential contributors to the student's online learning experience (Yang & Cornelius, 2004).

# **Conclusion**

In recent years, higher education has been subject to a range of technological developments, including the transition from oral to written communications, the formation of learning communities in shared environments, and the development of computing and communication technology. It is essential to balance modern teaching methods with traditional educational principles in order to ensure the integration of technology. This is evidenced by theoretical frameworks such as UTAUT and TAM, as well as TPACK.

In essence of the literature, Technology has been found to be beneficial for students, as it increases their motivation, engagement, and cognitive ability on a behavioural, emotional and cognitive level. Additionally, tools such as gamification and simulation, as well as online learning platforms like Moodle or Blackboard, have been found to enhance student engagement and performance. However, the integration of different technologies can lead to difficulties in terms of understanding instructional objectives and technical issues, as well as the need for strong institutional support and financial investment in order to ensure successful technology integration. Additionally, student characteristics and learning environment can also influence the students’ learning experiences positively or negatively.

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