**Studying with Emerging Technology in Higher Education: A Literature Review**

Today, students at higher education institutes use not only pen and paper but also rely on a variety of emerging software and hardware technologies in their daily study lives. Emergent technologies, including artificial intelligence (AI) systems and robotic assistants, have significantly contributed to improving the work of both students and teachers on campus, particularly in terms of enhancing study performance and teaching efficiency (Leoste et al., 2021). One of the most popular AI tools, ChatGPT, can immediately and precisely identify errors in programming code when users copy and paste their code into the chat column. However, while it provides convenient study assistance, it has also raised some privacy concerns on campuses. This literature review first discusses the benefits of enhanced student learning performance and teaching efficiency for educators. Subsequently, it delves into the impressive positive aspects and potential challenges related to these emerging technologies. This literature review aims to issue a broad exploration concerning the impact of emerging technologies, including AI systems and robotic assistants, on higher education. The integration of emerging technologies, including AI systems like ChatGPT, into higher education has shown promising benefits in enhancing student learning performance and teaching efficiency, while also raising important privacy concerns that require careful consideration and responsible implementation.

**Advances in Students’ Study Performance due to Emerging Technologies**

Students can improve their learning performance in higher education tasks through the assistance of emerging technology. Various useful applications have come to our sight, such as ChatGPT, Grammarly, and Google Drive. First of all, the approaching trend of intelligent learning tools is spreading in the academic environment (McGrath et al., 2023). It means that people can obtain impressive solutions to complex problems through casual chats almost instantly (Chaudhry et al., 2023). At the meantime, a large number of higher academic institutes have an idea that AI technology has the potential to enhance students' learning achievements (Kuleto et al., 2021) by helping students create a personalized and suitable study environment (Leoste et al., 2021). Therefore, thanks such technologies helping, the study model about self-learning has been gradually replaced educator teaching model, because it gives students more flexible opition whether in pace or location and function for learning (Leoste et al., 2021). Likewise, student from worldwide studying in open online courses (MOOC) without enrolment requirements or fees, easily schedule their class timetable and study progress by themselves (Kuleto et al., 2021). MOOC research by Rizvi et al. (2019) found that given that learning is a process, students may examine learning by recording specific encounters with learning materials like videos, quizzes, and interpersonal interactions, and then analyse how learners proceed through these materials.

The research uses data techniques like data visualization, machine learning, and learning sciences, focusing on semantics. AI learning of neural network collects student data to identify their strengths and predict their future competencies. This accepts institutions to take proactive action easily. In addition, AI's adaptable learning capabilities, enabling students to identify their learning gaps and benefit from these technologies in their studies through learning analytics technology. As a result, students can be aware of their shortages only for a little while when getting study help from this technology.

**Implication of Emerging technology for Educator’s Teaching Methods and Tools**    
There are two advantages with a drawback while teachers teaching with emerging technology tools. One example in the educational environment of Agriculture, Food, and Natural Resources (AFNR), the research examines that upcoming technology can help teachers give students a better understanding outside of lectures, such as unmanned aerial vehicles, vertical farming equipment, and precision agriculture sensors (King et al., 2019). Research from Hartanto et al. (2019) give a specific example for variety use of unmanned aerial vehicles in agriculture industry is regard its powerful camera types. By recognising certain materials on those things, the image obtained from the hyper-spectral camera gives more details that can aid in the discovery of specific objects. Though doing this practical observation, the students can be giving more certain professional information from their university. Also, it links to an online popular study tool, open educational resources (OER), which provides people teaching and learning materials with open licence that allow users to use, and remix with their original resources as a complementary information (Crompton et al., 2020). Teachers using OER can enhance student’s self-management skills while studying on online learning platforms (Kim et al., 2020). They underlined the advantages of OER-supported online learning platforms as a tool for promoting students' independent learning. They emphasised the platform utilised in the study, Khan Academy, has a number of features, including a monitoring tool and adaptive evaluation materials, resulting in student’s self-evaluation outside of class. Besides, they also discovered that using OERs in i-Classroom, a mobile learning platform, helped students build important self-regulated learning skills including motivation for learning, studying management, and self-monitoring abilities. However, OERs also facing a problem about its relative policy in some countries, lack of official policy support is the dilemma which influence the development (Wong & Li, 2019). Wong and Li (2019) revealed that many Australian institutions' institutional strategy plans do not include OER development. Without addressing issues like intellectual property rights, quality control, and finance assistance, this restriction may have an impact on instructors' understanding of OER and desire to use them.

**Emerging Technology User’s Challenge in Privacy Issue**

While technology brings a variety of benefit to students, a serious problem regarding user’s privacy also comes to a fore. Two recent studies (Kuleto et al., 2021; McGrath et al., 2023) have highlighted that new technology introduces privacy issues that require attention and improvement, as it often carries a high potential security risk through widespread data sharing on the internet. Valuable private information such as account number and detailed driving license information tend to be stolen by hackers in the context of losing data (Sue Conger & Loch, 2013). In the United States from 2005, hacks including personal identifying information have affected more than 550 million records; further 200 million data are included in reported global losses (Conger & Loch, 2013). Comparing with the non-efficiency traditional protect method of de-identification, secure multiparty computation (MPC) frameworks provide the privacy data securely when multiple computer devices have a collaborate analysis (Berger & Cho, 2019). As a result, it has been recommended firstly to improve the technology in framework’s scalability and relative policies, resulting in boosting entire upcoming technology environment (Berger & Cho, 2019). The second suggestion is that enhance blockchain technology due to it keeps the security strongly in data transaction and exchange (Parry & Battista, 2019). The study conducted by Zhang et al. (2019) reveals that the essential security properties of blockchain are attributed to advancements in cryptography and the establishment and use of Bitcoin. The blockchain has many inherent security properties, including consistency, tamper-resistance, resistance to Distributed Denial-of-Service (DDoS) attacks, pseudonymity, and immunity to double-spending assaults (Zhang et al., 2019). As a result, given the fast growth of developing technologies, it is essential for individuals to prioritise the safeguarding of data against both purposeful and inadvertent breaches.

**Conclusion**

The integration of emerging technologies into higher education has shown substantial potential benefits for both students and educators. From online virtual tools to physical devices, whether AI tools, MOOC, OER, and unmanned aerial vehicles are applicable technology in most of study areas. Emerging technologies are used to optimise instructional methodologies employed by educators and provide a more immersive and pragmatic educational encounter for pupils. However, the advent of developing technologies simultaneously presents potential issues that pose a danger to the protection of users' privacy. Ensuring a harmonious equilibrium between using the advantages of developing technologies and upholding the privacy and security of all stakeholders engaged in the educational process is of utmost importance for institutions and policymakers. Therefore, the responsible implementation of these technologies is crucial to address privacy concerns and ensure that teachers’ and students' personal information remains secure though building on data protecting technology. By doing so, higher education can continue to adapt and thrive in an increasingly digital world.

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