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DIGITAL LEARNING UNDER CRISIS: EXAMINING DIFFERENCES IN UNDERGRADUATE STUDENTS' ATTITUDES, ENGAGEMENT, AND ACCEPTANCE OF E-LEARNING DURING COVID-19

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ABSTRACT

This paper examines differences in undergraduate students' attitudes, engagement, and acceptance of e-learning during the pandemic. Particular attention is given to students' willingness to participate in virtual classes, perceived usefulness of digital platforms, technological readiness, interaction with teachers and peers, motivation, satisfaction, and intention to continue using online learning. The crisis demonstrated that students did not respond to digital education uniformly. Differences in internet access, digital literacy, academic discipline, learning environment, technological confidence, and institutional support contributed to variations in students' attitudes and engagement. While some students valued flexibility, accessibility, convenience, and digital resources, others experienced technological barriers, reduced motivation, social isolation, screen fatigue, and concerns regarding assessment and learning quality. The paper argues that acceptance of e-learning is determined by the interaction of technological, pedagogical, psychological, and institutional factors. Understanding these differences can help universities develop more inclusive and sustainable digital and blended learning strategies beyond emergency situations.

Keywords: Digital learning, e-learning, undergraduate students, COVID-19, student attitudes, student engagement, technology acceptance, higher education.

I. INTRODUCTION

Physical campuses were closed in many countries, requiring teachers and students to communicate through online platforms. Video-conferencing applications, learning management systems, electronic resources, recorded lectures, online assignments, and digital assessment became central components of academic life. This rapid transition demonstrated the capacity of technology to maintain educational continuity but also exposed major differences in students' ability to participate. The pandemic therefore provided an important context for examining attitudes, engagement, and acceptance of e-learning among undergraduate students.

Attitude toward e-learning refers to the extent to which students view digital education positively or negatively. It may involve beliefs about usefulness, convenience, effectiveness, interaction, workload, flexibility, and satisfaction. Engagement refers to students' behavioural, emotional, and cognitive involvement in learning activities. Acceptance, meanwhile, concerns students' willingness to use digital technologies and their intention to continue using them. These concepts are closely related but not identical. A student may believe that online education is useful while remaining insufficiently engaged because of poor connectivity or low motivation. Similarly, a student may participate in online classes because attendance is compulsory without actually accepting e-learning as an effective educational approach.

The Technology Acceptance Model developed by Davis (1989) provides a useful theoretical perspective for understanding students' adoption of digital learning. According to the model, perceived usefulness and perceived ease of use influence individuals' attitudes and behavioural intentions toward technology. During COVID-19, these factors became particularly relevant because students were required to use technologies regardless of their previous preferences. Students who found digital platforms easy to operate and academically useful were more likely to develop positive attitudes. However, technological acceptance was also influenced by contextual conditions such as internet availability, teacher competence, institutional support, and home learning environments.

Student engagement became another major concern during emergency online education. In traditional classrooms, teachers can observe students' participation and respond immediately to signs of confusion or disengagement. Online environments make this more difficult.

Students may attend virtual sessions without actively participating, switch between applications, or experience distractions at home. At the same time, online education can provide opportunities for asynchronous learning, recorded content, discussion boards, collaborative tools, and individualized study. Therefore, examining differences in engagement is necessary to understand why some students benefited from digital learning while others struggled. This paper explores these differences and evaluates the implications for the future of higher education.

II. DIFFERENCES IN STUDENTS' ATTITUDES AND ENGAGEMENT WITH DIGITAL LEARNING

Undergraduate students' attitudes toward digital learning during COVID-19 were shaped by their previous exposure to technology. Students who had already used online educational platforms, digital libraries, learning management systems, or virtual communication tools were often better prepared for the sudden transition. For such students, the shift to online education could appear relatively manageable. In contrast, students with limited digital experience could experience anxiety and frustration. The sudden requirement to learn both academic content and unfamiliar technological systems simultaneously increased the cognitive and practical demands of education.

Perceived usefulness was an important determinant of positive attitudes. Students were more likely to appreciate e-learning when they believed that digital platforms enabled them to access lectures, learning materials, assignments, and academic communication efficiently. Recorded lectures were particularly valuable because students could review difficult topics. Online databases and electronic resources also expanded access to educational materials. Davis's (1989) Technology Acceptance Model suggests that perceived usefulness plays a central role in technology acceptance. During the pandemic, usefulness was not merely an optional benefit; digital technology became the principal means through which students could continue their education.

However, engagement varied considerably among students. Online learning requires greater self-regulation because students often have more control over their time, attention, and study environment. Students with effective time-management skills could organize their academic responsibilities successfully, whereas others struggled with procrastination and distractions. Martin and Bolliger (2018) emphasized the importance of learner engagement strategies in

online learning environments. During the pandemic, engagement could be weakened by repetitive lectures, limited interaction, poor instructional design, technical disruptions, and excessive screen time.

Teacher-student interaction strongly affected engagement. Students often reported difficulties when online classes became one-way lectures without opportunities for questions, discussion, or feedback. Active learning strategies such as polls, breakout discussions, quizzes, collaborative projects, and question-and-answer sessions could increase participation. Rapanta et al. (2020) emphasized the importance of teacher presence and meaningful learning activities in online university teaching. This indicates that engagement depends not simply on whether a class is delivered online but on how the online learning experience is designed.

Peer interaction was another source of variation. University education involves social relationships that contribute to motivation, identity formation, collaboration, and academic support. Online education reduced spontaneous peer contact, particularly when students attended classes with cameras and microphones turned off. Some students experienced loneliness and isolation, while others used messaging platforms and collaborative digital tools to maintain relationships. Aristovnik et al. (2020) demonstrated that the pandemic affected university students' academic and personal lives in multiple ways, highlighting the importance of social and psychological dimensions.

Technological inequality further differentiated student experiences. A student with a personal laptop and high-speed broadband could participate more easily than a student relying on a shared smartphone and unstable mobile data. Technical problems could interrupt lectures, examinations, presentations, and assignment submissions. These problems could reduce both engagement and acceptance even when students had positive attitudes toward online education in principle. The digital divide therefore represents not only an infrastructure problem but also an educational participation problem. Effective digital learning requires equitable access to the technological resources necessary for meaningful participation.

III. ACCEPTANCE OF E-LEARNING, INSTITUTIONAL FACTORS, AND FUTURE EDUCATIONAL IMPLICATIONS

Acceptance of e-learning during the pandemic was strongly connected with students' perceptions of convenience and flexibility. Online education eliminated the need for physical travel and provided access to learning from different locations. For students living far from

campus, this could reduce time and transportation costs. Digital materials could also remain available outside scheduled class hours. Such flexibility supported independent learning and enabled students to organize their study according to personal circumstances. However, flexibility could become a disadvantage when students lacked self-discipline or faced competing household responsibilities.

Institutional preparedness played an important role in determining student acceptance. Universities with established learning management systems, digital libraries, technical support, and experienced online teaching staff were better positioned to respond to the crisis. Institutions without such systems had to develop digital arrangements rapidly. Students consequently encountered differences in platform quality, communication practices, course organization, and technical assistance. Hodges et al. (2020) emphasized that emergency remote teaching should not be equated with deliberately designed online education. This distinction explains why some students had unsatisfactory experiences despite the broader potential of e-learning.

Teacher digital competence was equally important. Effective online teaching requires more than the ability to conduct a video call. Teachers need to organize digital content, facilitate interaction, provide feedback, monitor engagement, and select appropriate technologies. Dhawan (2020) observed that online education presented both opportunities and challenges during the pandemic, particularly concerning technological infrastructure and pedagogical adaptation. When teachers demonstrated confidence and responsiveness, students were more likely to perceive online learning as credible and useful. When instruction was poorly organized, student acceptance could decline.

Assessment also influenced acceptance. Students were concerned about technical failures, unfair advantages, privacy, academic integrity, and differences in internet connectivity during online examinations. Continuous assessment, assignments, presentations, projects, and open-book examinations were adopted in different contexts. These methods could provide greater flexibility but required careful design. If assessment expectations were unclear, students could experience increased stress. Transparent assessment criteria and alternative arrangements for students facing technical difficulties were therefore important components of an inclusive online learning system.

The pandemic also highlighted the psychological dimension of digital learning. Students

experienced uncertainty regarding examinations, academic progression, employment, and future careers. Prolonged online interaction could produce fatigue and reduce motivation. Excessive screen exposure and limited social interaction affected some students' enthusiasm for digital learning. At the same time, students who became comfortable with digital tools developed competencies that could remain valuable beyond the pandemic. The crisis therefore produced both immediate difficulties and longer-term learning opportunities.

The future of higher education is likely to benefit from lessons learned during the pandemic. Rather than viewing online and face-to-face learning as mutually exclusive alternatives, institutions can develop blended approaches that combine the strengths of both. Online platforms can provide recorded lectures, digital resources, flexible communication, and supplementary learning opportunities, while physical classrooms can provide interpersonal interaction, practical activities, laboratory work, and collaborative experiences. Means et al. (2010) suggest that blended learning can be particularly effective when online and face-to-face components are deliberately integrated. Future strategies should therefore focus on accessibility, pedagogical quality, student engagement, teacher training, digital literacy, and technological equity.

IV. CONCLUSION

The COVID-19 pandemic significantly accelerated the adoption of e-learning in higher education and demonstrated that undergraduate students differ considerably in their attitudes, engagement, and acceptance of digital education. Some students viewed online learning as convenient, flexible, and useful, while others encountered barriers involving connectivity, devices, motivation, interaction, and learning environments. These differences demonstrate that e-learning cannot be evaluated solely according to the availability of technological platforms.

The study also indicates that technology acceptance is influenced by perceived usefulness, ease of use, digital competence, institutional support, and teaching quality. Davis's Technology Acceptance Model provides a useful foundation for understanding why students may accept or resist digital learning. However, the pandemic context shows that acceptance is also influenced by social, economic, psychological, and institutional conditions. A technologically advanced platform cannot compensate for inadequate connectivity, poorly designed instruction, or insufficient academic support. Student engagement is equally

important. Effective online learning requires active participation rather than simple attendance. Teachers can strengthen engagement through interactive activities, discussion, collaborative tasks, regular feedback, and well-structured digital resources. Institutions should also provide training in digital literacy and self-regulated learning. Students need the skills to manage time, evaluate online information, participate in virtual collaboration, and maintain academic motivation. In conclusion, the experience of digital learning during COVID-19 provides valuable lessons for the future of higher education. The objective should not be to reproduce emergency remote teaching but to develop carefully designed, inclusive, and pedagogically effective digital and blended learning systems. Universities should reduce digital inequalities, strengthen teacher training, improve technological infrastructure, provide student support, and regularly evaluate student experiences. By incorporating these lessons, e-learning can move from being a crisis-response mechanism to becoming a sustainable component of flexible and learner-centred higher education.

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