THE KNOWLEDGE | RESEARCH ARTICLE

Role of Digital Tools for Enhancing Students Learning Outcomes at University Level

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Abstract

The scenario in higher learning institutions has changed dramatically due to the integration of cyber educational materials that enable better engagement and performance as well as development of analytical abilities among learners. The research emphasis is on digital tools and their significance in improving learners' performance at a higher educational institution. The research adopts a quantitative approach and involves a survey of 400 Bachelor of Science students from the University of Kotli Azad Jammu & Kashmir via a convenient sampling method. The research used a designed five-point Likert scale questionnaire for data generation. The study population includes four thousand nine hundred Bachelor of Science students from all faculty members. The questionnaire consisted of four sections i.e. a) Demographic information, b) Use of digital tools, c) Learning outcomes, d) role of digital tools in enhancing students learning outcomes. The responses were analyzed by using different statistical techniques (mean and standard deviation) are calculated. While the results indicate that students do use various digital tools, these technologies are not yet deeply or consistently embedded into the core curriculum. Higher order cognitive abilities like critical thinking and problem solving are also supported by digital tools. Consequently, the study advocates for a more systematic integration of these tools across all academic departments.

Key Words

Digital Tools, Learning Outcomes, Digital Resources, Academic Achievement

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Introduction

Online learning has grown to be an essential component of academic life and a key component of educational institutions' long-term strategies throughout the last ten years. Traditional learning environments have changed as a result of the quick development of digital technology, globalization, and the growing need for accessible education. The technology integrated education is gaining momentum, providing new ways to learn. In addition to increasing access to education, the transition from traditional classroom-based instruction to mixed and entirely online learning models has altered pedagogical approaches, evaluation techniques, and student involvement (Correia & Good, 2023). The main components of information technology integrated education are creating instructional activities for digital learning and using technology tools in a meaningful way.

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Among the most exciting and quickly evolving fields in educational technology is the application of digital tools. The current shift in values toward transparency and sharing of information facilitated by digital platforms and cloud-based learning management systems plays an important role in this shift. It is due to this that the use of e-learning tools, virtual classrooms, and collaboration tools has been made possible, resulting in a more dynamic learning environment (Correia & Good, 2023). Due to the availability of digital tools such as simulations, online learning, and open learning, students are now taking greater initiative. It is true that there is greater personalization in learning, with greater emphasis on the quality of knowledge and development of the individual. These Changes reflect broader transformations in the global markets and production system driven by rapid growth and widespread adoption of digital technologies associated with new industrial or digital evolution (Uvarov & Frumin, 2019).New teaching strategies that promote problem solving and critical thinking can be implemented through the use of multimedia and communication technology.

In education, learning management systems, video conferencing tools, document collaboration tools, game-based learning, Google Docs, PowerPoint, and Microsoft Word are frequently utilized. The teaching-learning process in education has been completely transformed by educational platforms, which are digital technologies. Relevant data has been collected from a host of authors and experts in the field through a process which adopted the bibliographic style. Students enjoy learning without restrictions of place and time, and at their needs, thanks to these platforms' accessibility and flexibility. Each online educational platform allows for students and teachers to communicate and even collaborate via discussion boards, online chats, and shared spaces. These platforms emphasize flexibility and personalization: "Allow learners to follow customized learning paths and use content at their own pace." Moreover, assessment and progress monitoring, allowing tools for the execution of online tests and the development of detailed performance reports are among the main features. Besides, an educational platform enriches the teaching-learning process by offering a host of instructional resources like texts, videos, and interactive exercises. In summary, systematic and bibliographic-approach-driven education platforms have transformed education by bringing together rich learning resources, allowed assessment and progress tracking, interaction, collaboration, and personalized learning experiences (Uvarov & Frumin, 2019).

Technology is a core driver for innovation in the learning/educational process because it allows educators to use a learner-centered approach that caters to different learning styles and capabilities. Technology assists educators in meeting learning objectives because it makes teaching more interactive and needs-driven for learners. In institutions of higher learning, learning technology is paramount because it enhances interactivity, personalization, and flexibility, which are key factors for better success outcomes for learners. The use of technology allows for easy interaction between learners and educators; this is even more essential for learners entering the labor market because they are able to work well under a teamwork and communication environment with their co-workers. Tech-exposed kids gain technology literacy; this provides ability for evaluation of information available on technology platforms. The use of digital tools, artificial intelligence, and collaboration tools has completely transformed the traditional learning setting, providing a flexible learning experience (Kamalov, et al., 2023). Technologically enhanced learning and innovative learning strategies such as the flipped classroom method, gamification learning, among others, have not only improved learning but have been shown to positively impact learning motivation. It is imperative to highlight that learning in the 21st century requires skills that are imparted through technology-enabled learning. For example, communication and collaboration platforms allow proper interaction with lecturers and peers; whereas constant interaction with technology enables learning skills that allow learners to critically evaluate all the information that is available on the web.

Recently, artificial intelligence has been one of the key drivers in education, as it enables more personalized learning. AI-based applications like intelligent tutoring systems, automated grading systems, and predictive

analytics have been shown to have the potential for improving student engagement, teaching procedures, as well as educational achievement (Farhan et al., 2024). Based on the views of Chiu (2021), such improvements have allowed teachers to better understand student learning styles; identify students who may be struggling in their learning; as well as provide them with necessary interventions to keep them academically upright. The negative consequences of current levels of digital technology use in education, combined with the heightened risk of affecting the educational performance of students, is another modern-day concern associated with the extensive application of digital technology in education. Students' extensive use of digital technology results in multitasking activities that might hamper academic learning due to the simplicity of online learning. A productive balance between the application of digital technology for academic achievement and the subsequent negative consequences is thus one of the prominent issues in education study for the current academic period (Chiu, 2021; Aivaz & Teodorescu, 2022).

The purpose of this study is to examine how digital tools can improve students' learning outcomes at the university level in Kotli City. This research is significant because it seeks to understand the role of digital tools in enhancing students' academic performance, engagement, motivation and critical thinking skills.

Statement of the Problem

Even while the usage of digital technologies in the education is growing, it is still unclear how well they will improve students' learning outcomes. There is little effect on academic achievement since many teachers utilize technology as an add-on rather as an essential component of their lessons. This brings up the issue of how to employ digital tools to improve student accomplishment, comprehension, and engagement.

Objectives

1. To identify the type of digital tools commonly used in education at university level.
2. To determine the student learning outcomes at university level.
3. To understand the relationship between integration of digital tools and student learning outcomes at university level.

Research Questions

1. Which digital tools are most frequently used by university students for learning and collaboration?
2. How effectively do university students attain the intended learning outcomes in their courses with the integration of digital tools?
3. To what extent do students' attitudes toward digital tools influence their learning outcomes?

Literature Review

Teaching and learning techniques around the world have been profoundly impacted by the integration of digital technologies and online learning platforms at the university level, which has become a transformative force. The many facets of this integration are examined in this review of the literature, with particular attention paid to how it affects learning outcomes, student engagement, and the difficulties that both teachers and students encounter.

Digital Tools in Higher Education

In education, digital tools are software, platforms, or apps that support, improve, and streamline the teaching and learning process. Learning management systems, educational applications, multimedia materials, and communication technologies are some of the tools that support engagement, teamwork, and individualized learning in both traditional classroom settings and virtual ones (Dabbagh & Kwende, 2021). A wide range of technologies

intended to improve the instructional process which is included in the category of digital tools in higher education. It is evident that the usage and acceptance of digital technologies by students themselves is a prerequisite for their ability to provide value for academic objectives and foster effective learning in higher education.

Digital tools are designed for individualized and learner-centered learning, take into consideration a variety of learning styles, allow learners to proceed at their own pace, contribute to greater responsiveness, and can inspire a higher level of overall student engagement, digital tools are typically associated with enriching benefits. In this regard, Mayrberger (2017) observes that "the quality and quantity of the potential scope for student engagement and participation are decisive" (Mayrberger, 2017, p. 20) rather than the employment of the newest digital technology, which results in transformed learning. Learning Management Systems (LMS), educational applications, virtual labs, and collaborative platforms.

Learning Outcomes

Learning outcomes are precise and unambiguous descriptions of what students may know and be able to demonstrate at the end of their course of study. They are usually described in terms of the attitudes, abilities, and information that must be learned in order to meet the educational purpose for which the course was created. According to Pye et al. (2015), student engagement is a proxy for learning outcomes and mainly focuses on the time and effort students invest into the educational activities to attain the targeted learning outcomes. Therefore, it is important to develop systems and implement techniques that promote, encourage, and reward students' engagement in order to improve their learning effectiveness and satisfaction (Hu & Hui, 2012).

Digital Tools and Students Learning Outcomes

Digital resources promote participation, collaboration, critical thinking, and personalized learning to enhance the learning outcomes among students. The students can avail learning opportunities from varied sources, receive immediate feedback, and learn at their own pace through the use of technology such as learning management systems, interactive applications, simulations, or online evaluations. The resources enhance learning achievements and skill acquisition as they provide learning opportunities that can be interactive, flexible, and centered on the needs of the learners (Dabbagh & Kwende, 2021).

Digital technologies in education include learning management systems (LMS), educational applications, virtual laboratories, and collaborative platforms. Studies indicate that LMS platforms such as Moodle, Blackboard, and Canvas provide structured yet flexible learning environments that support both synchronous and asynchronous modes of learning. Student learning outcomes serve as a gauge for the effectiveness of the educational process. A number of factors, including the knowledge, abilities, and attitudes that students acquire throughout the learning process, can be used to quantify student learning outcome. As a result, improving student learning outcomes is a top priority in education. Using technology in the classroom is one strategy to enhance student learning results. Technology may be a useful tool for improving education and giving students a more engaging and pleasurable educational experience. Multimedia, e-learning, and augmented reality are a few of the technologies that have been applied to education. Students can more easily comprehend the subject being taught when a variety of media, including text, voice, video, and graphics, are used in a single presentation thanks to the usage of multimedia in education.

Many researchers examined the impact of digital tools on student learning outcomes. A meta-analysis conducted by Means et al. (2013) found that students in online and blended classroom perform better than traditional classroom. This improvement is often attributed to the flexibility and accessibility of digital learning platforms, which allow learners to study at their own pace and revisit course content whenever needed (Means et al., 2013). Digital technologies can also improve one's ability to think critically and solve problems. For example, it

has been demonstrated that using simulations and virtual labs in STEM education enhances students' capacity to apply theoretical ideas to real-world scenarios (De Jong et al., 2013). Similar to this, students can collaborate on projects and assignments using technologies like Google Docs and Microsoft Teams, which promotes communication and teamwork (Cole et al., 2014). Tests or other academic evaluations are typically used to monitor learning outcomes in the setting of formal education. The objectives of learning in this activity include understanding, application, and problem-solving. However, it is worth noting that both assessments and exams are not the sole methods through which the objectives of learning can be attained by students. Learning outcomes related to social behaviors, namely working together with fellow human beings, communication of ideas, and working as a team, also form part of it.

Methods and Procedures of the Study

In this study, the research design was quantitative and involved descriptive research. Additionally, data was collected using a cross-sectional study design, targeting Bachelor of Science students at University of Kotli Azad Jammu and Kashmir (UOKAJK). The whole population was, therefore, comprised of Bachelor of Science students. To get the sample, the researchers relied on convenient sampling. This is because they chose students from both male and female sections at random. Additionally, the researchers crafted a questionnaire, which had five points on its Likert scale and was split into three parts. To ensure research was on target, two education scholars were involved in approving the questionnaire. Prior to its administration, the researchers embarked on pilot testing to ensure the questionnaire was precise and friendly. In this study, as part of its research, they used questionnaires to test its reliability. The researchers gave out questionnaires to students amounting to 30. To test its reliability, they relied on Cronbach Alpha, and fortunately, it was accurate (α=.725). Then, the researchers analyzed data using the Statistical Package for the Social Sciences (SPSS). The researchers looked at mean scores and standard deviation.

Results
Table 1
Types of Digital Tools used in Education

Statements	N	Mean	SD
I regularly use digital tools (e.g.apps, Teams, Zoom, AI, online resources) to support my learning.	400	3.99	.959
I am confident in using graphic design tools like Canva and Adobe Express.	400	3.98	.901
I collaborate with others using tools like Google docs or Microsoft Word online.	400	2.14	.973
My instructors integrate digital tools effectively in classroom teaching.	400	2.16	1.034
I frequently use presentation tools (e.g. PowerPoint, Google slides).	400	2.25	.949
ChatGPT and Deep seek are effective digital tools.	400	4.06	1.008
Digital tools are available for every student in my class.	400	4.05	1.066
I use AI tools for my writing and assignments.	400	3.95	1.098
My teachers use digital libraries to support my deeper academic understanding.	400	2.00	1.138
I prefer digital collaboration tools over traditional methods.	400	3.00	1.159
Overall Mean		3.158	

As the mean scores indicates that most of the students are showing partial agreement with the statements except the statements "I collaborate with others using tools like Google docs or Microsoft Word online" (M=2.14), "My teachers use digital libraries to support my deeper academic understanding" (M=2.00), "My instructors integrate digital tools effectively in classroom teaching" (M=2.16),and "I frequently use presentation tools (e.g. PowerPoint, Google slides)" (M=2.25).

Table 2

Students' Learning Outcomes

Statements	N	Mean	SD
I can recall and explain core concepts from my courses.	400	3.87	1.063
I can understand complex topics more easily.	400	4.08	.890
I feel confident evaluating the creditability of sources.	400	4.07	.974
I am able to distinguish between facts and opinion	400	3.99	1.010
I can break complex problems into manageable parts.	400	4.04	1.100
I can apply theoretical knowledge to solve real world problems	400	2.07	2.255
I consider multiple perspective before drawing conclusions.	399	3.08	1.013
I can synthesize information from various sources to create new ideas.	400	4.02	.971
I can apply critical thinking skills in real-life situations.	400	3.99	1.048
I can evaluate different viewpoint arguments objectivity.	400	4.08	1.014
Overall Mean		3.729	

As the Table 2 is presenting that students show agreement to the use of digital tools in education can improve their students' learning outcomes except the statement, "I can apply theoretical knowledge to solve real world problems" (M=2.07).

Table 3

Role of Digital Tools in Enhancing Students Learning Outcomes

Statements	N	Mean	SD
Digital tools help me understand complex topics more easily.	400	4.24	.981
I am more motivated to learn when using digital tools.	400	4.30	.889
Use of digital tools enable me to analyze information critically.	400	4.05	.985
Digital tools help me to learn on my own pace.	400	4.10	1.040
I achieve better grades or performance when digital tools are used in teaching.	400	4.03	1.105
Digital tools help me retain and apply knowledge more effectively.	400	4.10	1.029
Video-based platforms enhance my understanding of complex concepts.	400	4.14	1.043
AI tools improve the quality of my writings and assignments.	400	4.06	.949
My teachers use digital libraries to support my deeper academic understanding.	400	2.81	1.185
I retain information longer when I use digital resources.	400	4.30	3.479
Overall Mean		4.013	

Table 3 indicates the results that respondents agreed that the digital tools play a positive role in enhancing students learning outcomes at university level. The use of digital tools in education at university level is perceived as effective.

Conclusions

The findings lead to the following conclusions.

1. The findings show that while a variety of digital technologies are utilized in teaching and learning, they are neither widely used nor substantially integrated.
2. Different departments or teachers may use these digital tools less frequently or inconsistently in terms of their usefulness, diversity, or frequency.

3. It is also found that using digital tools in the classroom improves students' academic performance, conceptual understanding, and knowledge retention.
4. Critical thinking and problem solving are also supported by digital tools.
5. Rather than being sporadic or supplemental, the use of digital resources in higher education is seen as influential and productive.

Recommendations

The following are the recommendations:

1. As conclusion 1 indicates, a variety of digital tools are used at the university level, but they are not well integrated. Universities may make sure that they are systematically integrated into all departments' teaching, learning, and evaluation processes.
2. To improve teachers' digital abilities and empower them to use cutting-edge tools efficiently, regular training sessions and seminars may be organized.
3. To enable efficient and continuous use of digital tools, institutions may make investments in dependable internet access, modern technology, and digital libraries.
4. When choosing and utilizing digital technologies, educators may make sure they are in line with specific learning objectives.
5. To influence future policy and practice, educators may be encouraged to try out cuttingedge digital techniques.

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