Technology Enhance Students Motivation and Engagement in Class at Higher Education Level

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Abstract

In contemporary higher education, student motivation and engagement are essential for meaningful learning experiences and academic success. This quantitative survey research aimed to investigate the impact of technology on student motivation and engagement in universities across Karachi, Pakistan. A convenience sample of 114 students from various public and private universities was surveyed to explore their perceptions and preferences regarding technology integration in the classroom. The study revealed a significant positive relation between technology use and student motivation, with students reporting increased engagement when technology was effectively employed. Moreover, technology was found to play a critical role in achieving learning goals by facilitating personalized learning experiences tailored to individual student needs and learning styles. Overall, the majority of students expressed a preference for technology-integrated classrooms, appreciating the interactive and dynamic nature of technology-based learning environments. Positive student perceptions emphasized that technology not only made learning enjoyable but also accessible.

These findings underscore the importance of strategic technology integration in higher education to create inclusive, effective, and student-centered learning environments. Continued research and investment in technology-enhanced teaching practices are recommended to maximize the benefits of educational technology for student motivation, engagement, and academic achievement.

Key words: Educational Technology, Student Motivation, Student Engagement, Technology Integration, Learning Experiences, Classroom Technology.

Introduction

In contemporary education, fostering student motivation and engagement is recognized as pivotal to promoting meaningful learning experiences and academic success. Traditional instructional approaches often encounter challenges in sustaining students' interest and active participation throughout classroom activities. However, the integration of technology presents promising opportunities to address these challenges by offering innovative tools and strategies that can enhance student motivation and engagement.

Background of the study

Motivation, in education is the most important issue, is not properly define in basic programs and courses. Research (Hilde et al., 2015; Scruggs et al., (2012) proved that students perform better therefore, student can perform effectively if they are motivated and provided such an effective environment (Nawaz, 2017). Hence it is the foremost aspect to increase students' academic study and achievement (Elliot and Dweck, 2005). Teachers are facing one of the challenges in education that how to improve students' performance and Bell, (1996) has mentioned motivation, is one and thrice same as the educational inspiration of students given by teacher. Definitely in educational psychology, of motivation concepts provides information of theories &principles should be basic elements; but this is not really what educational psychology should beabout in foundation course. On the other hand, According to Uguroglu and Wallbert (2001) motivation is the best contributor in students' achievement. When making instructional decisions teachers have to identify the theoretical understanding relate to the school during their role of instruction.

According to Palmer (2007) for quality of education, motivation is an essential element that is necessary for students learning. How do we know when students are motivated? They show interest, they ask questions and answers, they begin the need to engage students is a common theme within higher (tertiary) education. However, the exact meaning of engagement is itself more nebulous. Engagement may working immediately on tasks assigned, and they become to be happy and enthusiastic. On the other hand, Roger Azevedo (2015) employed a research on Defining and Measuring Engagement and Learning in Science: Conceptual, Theoretical, Methodological, Be thought of as how much effort and active learning students make with their studies. There are some approaches to categorizing and measuring engagement (Krause & Coates, 2008) that can be helpful when planning teaching and learning and the supporting activities. The opportunity to monitor attendance, attempts at formative work and of accessing course materials offered by computer based and supported learning environments offers new opportunities to measure engagement.

The Integration of technology in education, often referred to as educational technology or "EdTech," has transformed teaching and learning processes, bringing about significant changes in how content is delivered, experienced, and interacted with by students. The use of technology in education aims to enhance learning outcomes, facilitate access to information, improve engagement and motivation, and prepare students for the digital world. The students of today are surrounded by technology, where access to a vast collection of information is only a fingertip away (Egbert, 2009). Many in the field of pedagogy state that technology integration is helpful, meaningful, and necessary for a school to function successfully. However, many teachers are reluctant to make the change, and many students are not motivated to try.

In today's emerging technological society, it stands to reason that the modern day classroom should reflect what is seen in society. By showing real world technological applications, intrinsic value can be brought to the learning process, increasing interest and motivation (Usher & Center on Education, 2012).

It Is also important for these classrooms to address the need of all students. Technology supports the need for divergent learning approaches, helping to create a sense of community as well as a meaningful experience (Futurelab, 2009). Appropriate use of technology can serve the regular education classroom by motivating students in all disciplines, such as math, social studies, and literacy (Heafner, 2004; Liu, 2016; Housand & Housand, 2012). Students who have identified learning disabilities can be served by the appropriate integration of technology through assistive technology devices, allowing students to access the information and maintain pace with a regular education classroom (Floyd and Judge, 2012).

The Integration of technology in higher education has been a focal point of educational research and practice over the past few decades. With the advent of digital tools and resources, there is a growing interest in understanding how technology can enhance student motivation and engagement in the classroom. This study seeks to build upon the existing body of literature by examining the role of technology in fostering an engaging and motivating learning environment for students at the higher education level.

Statement of the problem

In the global scenario, the major issue of 21st century is the engagement of the learners in a meaningful way (Scott, 2015). In today's classrooms, using technology is common to help with teaching and learning. However, it's not clear how much technology, when linked with activities that match students' interests, actually makes students more motivated and involved. Also, when teachers use technology in class, how it impacts students' learning and their ability to reach learning goals is still a big question.

Teachers often bring technology into the classroom, but finding the right way to use it to increase student motivation and engagement can be tough. Does having more digital tools and tech-based activities really make students more eager and involved? Do students find learning easier with technology, or does it present new challenges for them? Most importantly, are students open to having more tech-based activities in class?

This study aims to understand and address how technology can be used effectively to not only make students more motivated and involved but also make learning easier and help them achieve their learning goals.

Research Objectives

- Assessing the Impact of Technology on Student Motivation and Engagement in classroom.
- Exploring the Role of Technology in Achieving Learning Goals in the classroom.
- Investigating Student Preferences and Perceptions towards Technology Integration.

Research Questions

- How does technology affect student motivation and engagement in classroom?
- To what extent do technology-related activities contribute to the achievement of learning goals in the classroom?
- How do students' perceptions of classroom technology use influence their preferences for technology-based learning activities?

Literature Review

In the contemporary educational landscape, technology plays a pivotal role in shaping student motivation and engagement within classroom settings. As highlighted byEgbert (2009), today's students are immersed in a technological milieu, where information is readily accessible at their fingertips. Despite the widespread acknowledgment among pedagogical experts about the beneficial impact of technologyintegration, resistance persists among some educators, and student motivation towardstechnology adoption varies (Egbert, 2009).

Ehrlich et al. (2013) conducted a survey within Chicago Public Schools, revealing that while a significant majority of students possess technology and internet access at home, utilization of these resources for school-related tasks remains suboptimal. This finding underscores the need for targeted interventions to bridge the gap between technology availability and its academic application.

The democratization of technology, as noted by Edwards (2009), has transformed once- exclusive tools into ubiquitous resources accessible to a broad spectrum of learners. Growing up in this technology-rich environment necessitates a shift in teaching methodologies to accommodate the

preferences and expectations of today's digital- native students (Edwards, 2009). Effective integration of technology in classroom instruction requires more than mere accessibility; it demands a purposeful alignment with pedagogical goals. Teachers adapting to this paradigm shift must explore innovative methods to incorporate technology not only as a motivational tool but also as an instructional aid (Usher & Center on Education, 2012).

For students with specific learning needs, technology integration through assistive devices can level the playing field, enabling them to access content and participate effectively in regular classroom activities (Floyd & Judge, 2012).

Student Motivation Through Technology Use in School

Technology has become an integral part of modern education, offering new avenues for enhancing student motivation and engagement in the classroom. This literature review explores various studies that examine the impact of technology interventions on student motivation and engagement across different grade levels and subjects. Godzicki, Godzicki, Krofel, & Michaels (2013)

Godzicki et al. conducted a study targeting problematic behaviors among elementary and middle school students, such as non-completion of homework and unpreparedness for class, by implementing a technology-supported learning environment. They found a significant increase (9%) in student motivation and engagement after integrating technology into classroom activities.

Halat (2013) investigated the use of WebQuests—a method where all information comes from the internet—in 4th and 5th grade classrooms. Results indicated that students enjoyed using WebQuests and experienced heightened motivation to learn, showcasing the positive impact of technology-driven instructional tools. Koshino, Kojima, & Kanedera (2013) explored the influence of embedded systems on student motivation. They discovered that while the presence of technology itself did not always enhance motivation, limitations such as slow CPU performance hindered its effectiveness. Their solution, the educational board E+, demonstrated improved motivation levels and understanding among third grade students.

Heafner (2004) investigated the effects of technology on student motivation in a social studies classroom, specifically using PowerPoint assignments. Notably, students exhibited increased excitement and pride in their work when engaged in technology-based tasks, highlighting the potential of technology to enhance motivation and engagement.

State of Educational Technology Implementation

The integration of technology into education has become prevalent across public school systems in the United States, with a majority of teachers having access to classroom computers (Gray & Lewis, 2010). However, despite this widespread access, utilization of technology for instructional purposes remains inconsistent, with less than 40% of teachers using technology often (Gray & Lewis, 2010). This highlights a gap between technology availability and effective integration in classroom settings.

Research from Finland emphasizes the potential of technology to support pedagogy, although comprehensive studies on technology's impact on teaching practices are still needed (Nokelainen, 2006). Similarly, in the context of U.S. educational agencies, there is a growing pressure to close achievement gaps using innovative instructional methods, albeit constrained by limited resources and variability in technology implementation across schools (Gross et al., 2013).

Perspectives on Use of Technology in Education

Bolkan (2012) underscores the importance of exposing students to a diverse range of technologies in the classroom, yet gaps persist in meeting this educational need. Erlich et al. (2013) found that schools fostering positive attitudes towards technology integration tend to witness higher levels of technology use among students and teachers. However, challenges persist in preparing future educators to effectively utilize technology for teaching, as evidenced by Meyer et al. (2011), who identified a gap in technology implementation skills among preservice teachers.

Integrating Technology in Classrooms

Technology integration in classrooms has reshaped pedagogical practices, allowing teachers to design differentiated curriculum and elevate instructional quality (Mulrine, 2007). The success of technology implementation, as observed by Zimlich (2015), hinges more on the quality of its use by teachers rather than the sheer quantity of technology present. This emphasizes the critical role of educators in leveraging technology effectively to enhance student engagement and learning outcomes. Collaborative tools like Google Drive and Weblogs offer students unique opportunities for peer collaboration and publication of their ideas, fostering engagement and interactive learning experiences (Eckstein, 2009).

Motivating Students with Technology

Teo, Su Luan, & Sing (2008) explored pre-service teachers' intentions to use technology, revealing differences in perceived usefulness and ease of use across cultures but a consistent behavioral intention towards technology adoption. Similarly, Teo (2009) found that individuals' attitudes towards technology significantly influence its adoption in educational settings, as explained by the Technology Acceptance Model (TAM). Liu (2016) studied elementary school

classrooms and found that teachers predominantly used technology to enhance student engagement and motivation, citing its ability to cater to individual learner needs, manage behaviors, and create entertaining and literature-based connections.

Constructivism Theory

According to Jean Piaget's constructivist theory, children who actively experiment with activities create more active connections and are better equipped to "inter-coordinate," or incorporate, their experiences into their everyday life (Piaget, 1955). With technology becoming more and more ingrained in daily life, educators need to adopt a contemporary perspective on how to use it to enhance interconnected learning. According to this contemporary viewpoint, technology allows students to be flexible and adaptive across a variety of contexts and subject areas. Numerous teaching strategies can include technology (Ford & Lott, 2011. Although integrating technology can be challenging and daunting, modern educators who welcome change will discover that the exact thing that can be intimidating—technology—can provide many chances for students that would not otherwise be available (Ford & Lott, 2011).

Those in contemporary pedagogy who concur with Piaget's claims contend that active engagement rather than passive engagement is the primary source of learning's profound character (Ebert, 2015). This can take many different forms, ranging from practical, real-world scenarios to interactive activities (Gensburg & Herman, 2009). Additionally, real-world constructivist learning environments "…are more motivating to students through practical application of knowledge," according to Ebert (2015).

It's also critical to remember that constructivism actively promotes the idea of distinction. It's also critical to remember that constructivism actively promotes differentiation, or active assistance that enables learners at all levels to engage fully. When a teacher uses these strategies, their curriculum will be designed with the requirements of the students in mind—from the resources to the right pace (Gensburg & Herman, 2009). Differentiation occurs when teachers design learning activities that let each student approach learning objectives in a unique way and at their own pace. Students can then create knowledge and interpret the material being provided through differentiation. Teachers can use technology to differentiate instruction and make accommodations for varied classroom situations so that students can learn through a curriculum that is technology-centered. When utilized properly, technology enhances constructivist education and offers several channels for students with or without documented learning disabilities to learn.

Student Engagement in Class

Class holds an important position in the life of students. Their future depends on their participation in this place, and this significance can be observed in their curricular and extracurricular activities. This is why the students always tend to enjoy good relations and a sense of belonging with the faculty and the class fellows. Still some students fail to realize that academic success is relevant to their professional life later. In this case, they are likely to lose interest in engagement at school (Jenkins, 1995). It is also possible that they may back away from active participation in school, and sometimes display repulsive and rebellious reactions towards staff and classmates. The most challenging situation the administration may face is how to address the needs of the students who have been indifferent to schooling. The term engagement refers to the degree to which students realize the importance of schooling and involvement in its different activities. This definition is usually composed of psychological element that is related to students' sense of belonging and acceptance of school values, and a behavioral element related to school participation (Rock, 2007). The participation element of engagement involves a number of factors like attendance, class preparation, homework completion and extracurricular activities. On a broader spectrum, the term student engagement means attitude and active participation of the students in the school. On the other hand, the term disengaged from school refers to define the type of students who lose the sense of belonging to school and apparently do not take part in school activities anymore. In the first place, the term itself remains unstructured and the measures employed by the researchers also remain shapeless in this regard. That is why the reviews presented recently have stressed the definition of meta-construct to make way for future learning (Jimerson et al., 2008).

The Relationship between Motivation and Engagement

Whenever the encouragement of motivation in students is considered, in most situations we take engagement as a solution. Obviously if a learner shows engagement, it shows their motivation to explore and learn new facts. There is a clear difference between engagement and motivation. If a learner is reflecting engagement, it does not mean he is also motivated to learn. The difference between the two can be monitored through some explanation. The individuals who are motivated keep the outcomes in sight; it means they are ready to learn and achieve an advanced level of knowledge. On the other hand, individuals with engagement pay attention to the current activities in the process; they ensure the continuity of their effort to the end of the activity. Despite this concept, motivation and engagement are somehow interdependent. The motivation of an individual determines the method that Is used to engage them in training materials. If we take the example of an intrinsically motivated individual, such a person is easy to engage in learning process because they focus their attention on learning; whereas it is easier to engage extrinsically

motivated individuals if the learning process is in line with their ambitions. On the contrary, it is relatively difficult to induce engagement in an unmotivated individual. It is true that engagement and motivation are not the same things during learning activity. In this context, it is not necessary for an engaged individual to participate in intentional learning because they are accomplishing the course just because they find it interesting without keeping a specific outcome in mind; they are likely to be taking part in incidental learning. Though our main focus lies on intentional learning, the human mind is always inclined to incidental learning. It is a common observation that if we listen to a song repetitively enough to be able to sing it out of our memory, this is the example of incidentally learned lesson. In the same way, if a person memorizes the answer from a quiz show, this is also an instance of incidental learning. The attention paid to an individual's surroundings guarantees a great level of learning Even engagement is considered more important, when motivation does not seem quite successful; the reason behind this is it provides more chances to ensure incidental learning. This is one of the reasons why compulsory training courses are recommended to be engaging to a maximum extent. In case the learners lack motivation and subject matter does not carry any interest, then this is the duty of the instructor to design such a course that promises these qualities.

Research Methodology

This study was designed to find out the technology enhance student motivation and engagement in class at higher education level. For this purpose, the research design is quantitative survey research and the questionnaire is Likert scale and were adapted from three different research studies. These studies are

- The effects of technology on student motivation and engagement in classroom- based learning. (Francis, J. (2017).
- Increasing Motivation and Engagement in Elementary and Middle School Students through Technology-Supported Learning Environments. (Godzicki, L., Godzicki, N., Krofel, M., & Michaels, R. (2013).
- Using digital resources for motivation and engagement in learning mathematics. (Chao, T., Chen, J., Star, J. R., & Dede, C. (2016).

Reliability of Questionnaire

Reliability of the research instruments (questionnaires) was calculated by using Statistical Package for Social Sciences (SPSS). Reliability of each category of the respondents was presented in the following table:

Table 1

Reliability statistics

Cronbach's alpha	No of items
0.78	10

According to Field (2009), if the value of reliability is more than 0.70%, the questionnaire is considered as the most reliable. Table 1 indicates that there was a high reliability in the research instruments and the questionnaires were found valid and reliable for the study procedure.

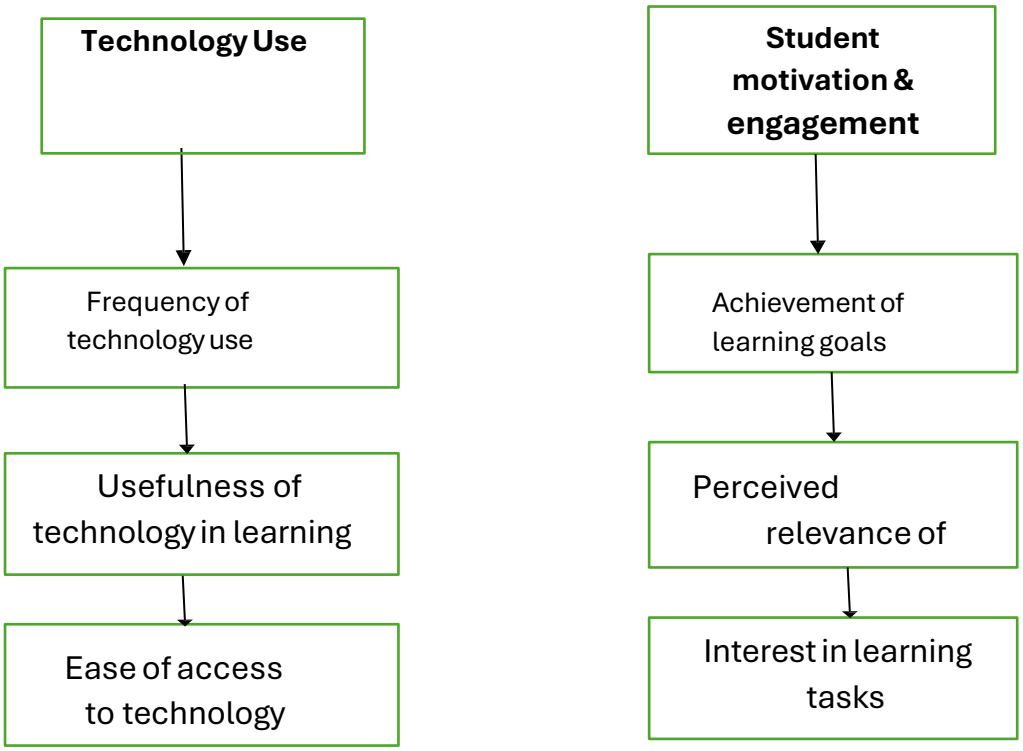
Population and Sample of study

The targeted population of the study was all districts of Karachi. There are different public and private universities in Karachi. All universities were included in the population. As our research study was related to higher education level so only universities were included in the population. Convenience sampling method is useful for the researcher in the research. In the Convenience sampling the sample is selected which is easily accessible for researcher like family friends, fellows, neighborhood, so Convenience sampling method was used in this study and different universities were selected for this purpose.114 students were selected as a sample of study. Total responses from different universities located in Karachi are given below:

Table 2

S.no	University Name	Respondents
01	Federal Urdu University	23
02	Karachi University	19
03	Iqra University	14
04	Dawood University	23
05	Bahria university	8
06	NED university	8
07	Sir Syed university	7
08	Other Universities	12

Figure 1
Conceptual Framework



Data Analysis

The collected data from the respective respondents through research instruments were properly tabulated, analyzed and interpreted by using appropriate statistical tools in terms of frequency percentages method to work out overall average score of each item in the light of objectives of the study. Value assigned to each response was based on 3- points Liker Scale given below:

Agree (A): 3, Neutral (N): 2, Disagree (DA): 3

Descriptive Analysis

Table 3

Teachers provide class activities that are related to your interest.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	70	61.4	61.4	61.4
	N	31	27.2	27.2	88.6
	DA	13	11.4	11.4	100.0
	Total	114	100.0	100.0	

According to survey results, 61.4% of participants said that teachers should assign tasks in class that are relevant to their interests, which suggests that this is a favorable opinion. On this issue, almost 27.2% of respondents had no opinion, indicating a need for more research or explanation.

Furthermore, 11.4% of respondents disagreed with the assertion, indicating potential areas for improvement or modification of teaching tactics.

Table 4

Usage of technology in the classroom affects your motivation and engagement.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	86	75.4	75.4	75.4
	N	16	14.0	14.0	89.5
	DA	12	10.5	10.5	100.0
	Total	114	100.0	100.0	

75.4% of respondents to the study agreed that using technology in the classroom increases students' motivation and involvement. On this issue, a smaller percentage (14.0%) was neutral, while 10.5% disagreed with the statement. These results imply that most participants believe technology may improve motivation and engagement, but others have different opinions that should be looked into more or take account when developing instructional strategies.

Table 5

Technology related activities benefited your learning.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	97	85.1	85.8	85.8
	N	11	9.6	9.7	95.6
	DA	5	4.4	4.4	100.0
	Total	113	99.1	100.0	
Missing	System	1	.9		
Total		114	100.0		

According to the poll results, 85.8% of participants concur that engaging in technology- related activities has improved their educational opportunities. 4.4% of respondents disagreed with the remark, while a lesser minority (9.7%) expressed neutrality on the subject. These findings imply that participants strongly agreed that technology-based activities improve learning outcomes. The opinions of those who are neutral or disagree, however, provide forth possible directions for additional research or thought in instructional technology integration plans.

Table 6

Technology is being used in the classroom often.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	67	58.8	58.8	58.8
	N	29	25.4	25.4	84.2
	DA	18	15.8	15.8	100.0
	Total	114	100.0	100.0	

According to the poll results, 58.8% of participants concur that technology is being used frequently in classrooms. On this topic, 25.4% of participants indicated they were neutral, and 15.8% disagreed with the statement. These results imply that respondents have a moderate degree of agreement about how frequently technology is integrated into learning environments. Nonetheless, the existence of indifferent and disapproving answers raises the possibility of differences in the ways that technology adoption strategies are implemented in various educational contexts or classroom settings.

Table 7

Technological activities help in achieving the learning goals in the classroom.

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	A	95	83.3	83.3	83.3
	N	14	12.3	12.3	95.6
	DA	5	4.4	4.4	100.0
	Total	114	100.0	100.0	

According to the poll results, there is broad agreement among respondents (83.3%), who believe that using technology in the classroom helps students meet their learning objectives. On this topic, a lesser percentage (12.3%) expressed neutrality, while 4.4% disagreed with the statement. According to these findings, the majority of respondents believe that using technology to support learning objectives is useful. The opinions of those who are neutral or disagree, however, provide forth possible directions for additional research or improvement in the use of technology to enhance learning results.

Table 8

Increased integration of technology enhances motivation and engagement.

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	A	88	77.2	77.2	77.2
	N	18	15.8	15.8	93.0
	DA	8	7.0	7.0	100.0
	Total	114	100.0	100.0	

According to the survey's findings, 77.2% of respondents concur that using technology more frequently improves motivation and engagement. Just 15.8% of respondents were undecided about the issue, and 7.0% disagreed with the statement. These results lead to a majority opinion that supports the beneficial effects of technology integration on student engagement and motivation. When adopting technology in educational contexts, it is important to take individual preferences and teaching methodologies into account, as seen by the availability of neutral and disagreeing replies.

Table 9

Technological usage in class makes learning easier.

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	A	94	82.5	82.5	82.5
	N	12	10.5	10.5	93.0
	DA	8	7.0	7.0	100.0
	Total	114	100.0	100.0	

According to the study results, 82.5% of participants concur that using technology in the classroom facilitates learning. Just 10.5% of respondents said they were neutral on the subject, and 7.0% disagreed with the assertion. These findings point to widespread agreement among participants on how technology might help make learning easier. The existence of comments that are indifferent or disagreeable draws attention to possible variations in personal experiences or educational settings that might affect opinions on how effective technology is at enhancing accessibility for learning.

Table 10

Technological usage in class makes learning challenging.

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	A	62	54.4	54.4	54.4
	N	20	17.5	17.5	71.9
	DA	32	28.1	28.1	100.0
	Total	114	100.0	100.0	

54.4% of respondents to the study agreed that using technology in the classroom made learning more difficult. On this issue, a lesser percentage (17.5%) held no opinion, whereas 28.1% disagreed with the statement. These results imply that respondents had differing opinions on how technology affects learning challenges. While a sizable majority believe that technology exacerbates learning difficulties, others have other opinions or do not believe that technology exacerbates learning difficulties. The varying answers highlight how crucial it is to take into account student preferences and teaching strategies when incorporating technology into learning environments.

Table 11

Students like to experience more technology-based activities in class.

Frequency			Percent	Valid Percent	Cumulative Percent
Valid	A	88	77.2	77.2	77.2
	N	18	15.8	15.8	93.0
	DA	8	7.0	7.0	100.0
	Total	114	100.0	100.0	

According to the poll results, 77.2% of participants concur that kids would like to participate in more technology-based learning activities in the classroom. Just 15.8% of respondents said they were neutral on the subject, and 7.0% disagreed with the statement. These results point to a majority viewpoint in favor of adding more technology-based learning opportunities to the classroom. In order to successfully incorporate technology into educational practices based on student preferences and requirements, it is crucial to take individual preferences and pedagogical tactics into consideration. This is shown by the existence of neutral and opposing replies.

Table 12

Students enjoy using different technology tools in class.

	Frequency		Percent	Valid Percent	Cumulative Percent
Valid	A	94	82.5	82.5	82.5
	N	16	14.0	14.0	96.5
	DA	4	3.5	3.5	100.0
	Total	114	100.0	100.0	

According to survey results, 82.5% of participants concur that pupils take pleasure in using various technological resources in the classroom. On this issue, a smaller number (14.0%) indicated neutrality, while just 3.5% disagreed with the statement. These findings imply that participants strongly agreed on the excellent experience children had using a range of technological tools in the classroom.

Discussion And Conclusion

Conclusion

The role of technology in education, particularly at the higher education level, is pivotal in enhancing student motivation, engagement, and overall learning outcomes. The literature review establishes a strong foundation by highlighting the transformative potential of technology in modern classrooms. Despite challenges such as resistance among educators and varying levels of student motivation, technology's democratization has reshaped teaching methodologies to accommodate digital-native learners' preferences.

The empirical study further solidifies these Insights by demonstrating that technology, when effectively integrated, significantly contributes to enhancing student motivation and engagement. Through quantitative analysis and reliability testing, the study showcases the positive attitudes of students towards technology use in education. The findings underscore the importance of leveraging technology to create meaningful and effective learning experiences that align with pedagogical goals and optimize student success.

Overall, the combined conclusions emphasize the need for innovative approaches in educational technology implementation. Educators, policymakers, and stakeholders must address challenges related to technology adoption while capitalizing on its potential to foster inclusivity, cater to

diverse learning needs, and support student- centered learning environments. By bridging the gap between technology availability and effective integration, educators can harness the transformative power of technology to optimize educational outcomes and prepare students for success in a digital age. This comprehensive approach highlights the critical role of technology in shaping the future of education and underscores the importance of ongoing research and strategic implementation to maximize its benefits for student learning and engagement.

Discussion

The purpose of this research was to investigate the relationship between technology and student motivation and engagement in various universities across Karachi, Pakistan. The findings shed light on current educational practices, particularly in terms of how technology impacts student interest and participation.

The research has clearly demonstrated a strong positive relationship between technology integration and student motivation, aligning with the theories proposed by Egbert (2009) regarding the transformative potential of technology in education. Students have shown higher levels of engagement when technology is used effectively. This supports the observations of Ehrlich et al. (2013) about the necessity of utilizing technology to bridge the gap in students' knowledge and awareness.

Specific technological tools highlighted in the research, such as interactive simulations, multimedia presentations, and online collaboration platforms, illustrate how technology can capture student interest and enhance engagement. These findings are consistent with previous research by Liu (2016), which emphasizes the role of technology in boosting student interest and engagement.

An Important outcome of this research is the supportive role of technology in helping educators achieve educational objectives more effectively. This aligns with constructivist principles emphasized by Ford & Lott (2011), demonstrating the crucial need for purposeful technology integration to create inclusive and effective learning environments.

The research also emphasizes the significance of adaptive learning technologies and educational apps in supporting student progress, as noted by Futurelab (2009) and Heafner (2004), showcasing the role of technology in motivating students within the educational domain.

Moreover, the research highlights that the majority of students prefer technology- integrated classrooms, appreciating the interactive and dynamic nature of technology- based learning environments. This finding resonates with the studies of Bolkan (2012) and Meyer et al. (2011), underlining the importance of fostering positive attitudes towards technology adoption.

Recommendations

1. Parental involvement in technology integration.
2. Role of technology in promoting inclusive education for students with disabilities.
3. Explore the relationship between students' digital literacy skills and their engagement with technology-enhanced learning environments.
4. Investigate the effectiveness of specific educational technologies (e.g., virtual reality, gamification, adaptive learning platforms) in enhancing student motivation and engagement.

Findings

Impact of Technology on Student Motivation and Engagement

The study found a strong positive correlation between technology integration and student motivation. Students reported higher levels of engagement when technology was effectively used in the classroom.

Specific technological tools such as interactive simulations, multimedia presentations, and online collaboration platforms were identified as particularly effective in capturing student interest and enhancing motivation.

Role of Technology in Achieving Learning Goals

Technology was found to play a critical role in helping educators achieve learning goals more effectively. It facilitated personalized learning experiences tailored to individual student needs and learning styles.

Adaptive learning technologies and educational apps were highlighted as tools that can support student progress towards mastering specific learning objectives.

Student Preferences and Perceptions Towards Technology Integration

The majority of students expressed a preference for technology-integrated classrooms. They appreciated the interactive and dynamic nature of technology-based learning environments.

Student perceptions towards technology were largely positive, with many acknowledging its role in making learning more enjoyable and accessible.

These findings collectively emphasize the positive impact of technology on student motivation, engagement, and learning outcomes. They highlight the importance of strategic and purposeful integration of technology in education to create inclusive, effective, and student-centered learning environments. Ongoing research and investment in technology-enhanced teaching practices are recommended to maximize the benefits of educational technology for all students.

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