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The Impact of Technology on Students' Psychological and Educational Performance

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Abstract – The quality, availability, consistency, and accessibility of technology play vital roles in shaping learning performance and effectiveness. However, it is important to recognize that technology alone does not guarantee desired learning outcomes. Instead, the interaction between humans and technology, along with the design dimensions of educational tools, significantly influence students' learning outcomes and their psychological engagement with the learning process. Moreover, improper utilization of technology can pose obstacles to effective learning. This paper aims to provide a thorough examination of the effects of technology on the learning process, aiming to identify instances where technology serves as a facilitator or hindrance to learners. Furthermore, a diverse range of suggestions will be presented to optimize and enhance the role of technology in promoting effective learning experiences. The research highlighted the advantages and disadvantages of different technology aspects on students, and highlighted how keeping the learning outcome as a principle in course design will lead to the proper evaluation of learning outcome. By delving into these crucial aspects, this research endeavors to provide valuable insights and actionable recommendations for educators, policymakers, and stakeholders seeking to harness the full potential of technology in education.

Keywords – Technology, Learning Outcomes, Self-Efficacy, E-Learning

I. INTRODUCTION

Computer technologies have shaped our society over the past few decades, altering many parts of our life, including the way we interact with one another at home and at work [1]. Technology and computers are frequently promoted as having a positive impact on student motivation. During the 2020 pandemic, remote learning became more prevalent and eventually took over as the primary teaching method. These compliments, however, are frequently made without taking into account the particular features or uses of these technologies that serve as the inspiration for them. In this article, technological aspects are discussed together with their advantages and disadvantages, followed by suggestions for improving the usability of technology [2]. Earlier, the teaching-learning process is dominated by the role of the teacher, because it is called the era of teacher. Now, the teaching-learning process, are dominated by the role of lecturers and books, and on the future of teaching and learning process will be controlled by teachers, books, and technology. Hence, the scientific aspects has been changed due to technology as the psychological aspects, and both will be explored in this research.

II. RESEARCH METHODOLOGY

To understand the impact of technology on students, it has been divided to scientific and psychological aspects.

1. Scientific Aspects:

Internet represents one of the most important fields in which the technology involves with education, it is used as an instructor that the internet can improve knowledge about any subject matter. Internet use may improve knowledge of a subject and enhance understanding. It can also help students who have trouble studying in class grasp a subject that they found challenging while learning on their own. The Internet may increase the appeal of learning, improve attempts to provide the best learning results, and inspire a spirit of learning. By integrating internet learning initiatives, it can also lessen the tendency of asking friends for assistance [2].

The Internet may be used to quickly address all learning challenges, the going on the subject matter, and the going on difficulties [2]. Internet media can be used as mental tools for thinking and problem-solving to assist in finishing the mission of the school.

Through the use of the internet, network project communication is defined by academic and social contacts with colleagues and scientists, including the sharing of scientific information, recollections, and observations. These conversations provide chances for friendship and a deeper appreciation of other people's opinions. If properly enabled, cooperation is an efficient way to boost student success and motivation to learn, according to research on the social production of knowledge. The requirement for knowledge from others to accomplish project goals, such as the need to synthesis multiple data sets to discover patterns, frequently encourages collaboration [1].

Technology can replace or supplement the conventional function of printed materials as a means of content transmission by offering animation, computer-based tutorials, and richer and more dynamic information displays [3]. Technology may help students communicate with one another as a communication tool [4], increase instructor accessibility outside of scheduled classes and office hours, and complete administrative tasks like

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distributing course materials. According to researches, instructor-student interactions are twice as significant as student-student interactions (when they occur) [5][6].

2. Psychological Aspects of Using Technology in Education

Online discussions are frequently more fun for students who struggle with social anxiety [7] because they ease their concerns about receiving unfavorable feedback from others. Students may be more able to be themselves in asynchronous online conversations, but there are hazards associated with self-disclosure, thus they must be cautioned about this potential consequence and the online discussion board should be set up so that students may erase their own messages[8][9]. Self-efficacy is seen as a key element that motivates students to participate more actively in the learning environment, especially online learning.

Self-Efficacy:

According to Bandura [10], self-efficacy affects a variety of characteristics of learning, including as a person's choice of activities, effort, perseverance, and task successes.

Shunk and Hanson[11] talked about how seeing people behave well who are seen as being similar to you increases self-efficacy and encourages viewers to attempt or endure longer. Therefore, by using these online tools, people may locate peers who share many of their traits and who they can learn from as they succeed. According to studies, self-efficacy acts as a mediator between an individual and his or her conduct.

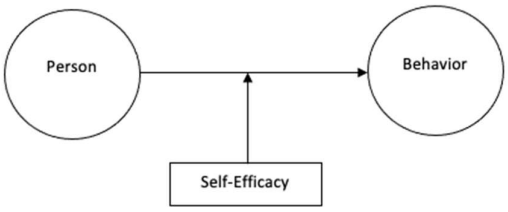

Fig 1. Self-Efficacy Mediates Students' Behavior [12]

Self-efficacy that leads to spend more time on a task indicates high confidence and enthusiasm in learning. The students' ability to locate a learning setting where their voices and those of their classmates were appreciated and respected, allowing them to regard themselves as effective participants in this new learning circumstance, was thought to be at least largely responsible for this change in emphasis. The confidence of students may be applied to other facets of their lives. Additionally, the Internet offers students the chance to employ professional-grade research and analytic tools. The real activities found in networked projects appear to have a favorable effect on student motivation, according to at least some research [1].

3. Limitations of Using Technologies

Despite the benefits of technology, studies show that students spend less time trying to analyze or evaluate the material they discover and instead concentrate on getting rapid responses and giving information a superficial interpretation [1]. Additionally, the internet makes it easy to find various answers, which reduces how much learners understand. Additionally, there is a risk of injury since it is simple for children to find websites with negative intents [9][8], such as bullying, blackmail, and give rude criticism that is not often addressed in personal conversation. The advantages and disadvantages of various technological services in the learning process are shown in Table 1.

Table1: Technology and its positive and Negative potentials in learning

Technology	Advantage	Disadvantage
Reading Contents Online	Wide availability of knowledge	Distraction
Studying using Mobile phones/Tablets	Flexibility of contents, easy search and highlight	Seeing devices as for entertainment not for study Long screen time
Communicating with Collogues	Have active environment and discussions	Chatting and wasting time
Self-expressing	Release pressure	Bullying
Recorded Lectures	Flexibility in time	Procrastination, active participation Lack of instructor-Student interaction

III. DISCUSSION AND ANALYSIS

In this section, several scientific and psychological aspects of enhancing the process of using technology are explored, including self-efficacy, technology-related teaching environment, revising technology usage, considering conscious and subconscious mind, and exploring learning outcome.

1. Enhancing Self-Efficacy

The definition of academic self-efficacy beliefs is assessments of one's capacity to achieve in academic endeavors. Students that have more self-efficacy will work harder and be more motivated. Higher expectations and values should be held by students for their academic performance [10][13]. And to accomplish this it is required to describe the significance of the subjects taught and make a connection between them and lives, habits, and aims of the students. In addition, it should be active, centered on motivating students, and flexible enough to let teachers choose the right assessments and assignments for individuals. Artificial intelligence (AI), for instance, may be utilized to assess the pupils' areas of strength and provide relevant scientific resources.

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2. Design a Suitable Environment

It's important to provide a setting where students may explore and reflect in safety on their comprehension of delicate subjects. Students may develop self-doubt or low self-esteem as a result of thinking about how important their own action is and how they grasp the implications and consequences of it. Students should feel free to express any disturbing feelings in a secure place [8]. Other factors were addressed in [14], such as the necessity for a motivating component, feedback, and a learning atmosphere that encourages students to ask questions in order to increase their interest in the subject. Online learning should also provide new avenues for access to education; therefore, it shouldn't restrict the availability of educational materials to only documents or presentations. Online students deserve more than just reading texts via the Internet. They could learn through videos, games or even augmented reality (AR) and virtual reality (VR).

3. Review Technology Use at The Educational Institutions

According to common sense, we must first determine whether the new technology phenomena is related to current practices before examining the viability of its application. To put it another way, educational institutions need to make certain that they comprehend new technology and whether or not it would be a better match than what we already have. Furthermore, will its implementation actually help the organization? If the new technology hasn't been sufficiently researched and comprehended, at the very least, be aware of its drawbacks [15].

4. Considering Conscious and Sub-Conscious minds

People have seen into the realm of cyberspace using their conscious and/or subconscious minds [16]. To encourage and prod individuals into acting in accordance with their desires on the Internet, the conscious mind is required. To build an atmosphere in the mind for what individuals wish to feel and envision via the Internet, the subconscious mind is required. This explains what visitors like and dislike about a specific location [17]. When working with young students, these characteristics need to be examined and connected to technology.

5. Considering learning outcome

One of the most important ideas to have better usage of technology is to think about the outcome from the beginning of course design, i.e., to get benefits of a class or a training, it's important to have clear objectives and learning outcomes to be to measure the expected results out of that learning experience. The main difference between learning objective and learning outcome is that learning objective focus on learners while learning objective focus on the teacher activities during learning process to achieve learning outcomes. Without setting clear learning outcomes before starting a course it will be not clear how this course will impact the learners. learning outcome can be classified into three groups [18]:

Psychomotor Outcomes: The psychomotor outcomes include efficiency, accuracy, and response magnitude [19] . Many studies tried to improve psychomotor outcome by using certain technologies, for example a study [20] used Leap Motion technology that enables humans to interact with object by moving it by their own hand. The 3D blocks are called objects in this study. Users can put the block into different positions to arrange objects to form new shapes. Another study [21], concluded that outcomes relating to psychomotor skills implementation improve the usage of VR as an educational involvement. That study was trying to answer the question of how VR simulation compare to simulated practice could help in the possession of getting psychomotor skills for pre-registration student nurses?

In other study [22] it recommends the use of robots and simulation software to teach engineering courses related to Robots, the study used a questionnaire for 40 students and asked them questions related to the acquired affective and psychomotor skills. Using simulation technology could improve psychomotor skills more than conventional labs sometimes according to study focused on using simulation in electronic technology courses [23]. In summary, many research work around the world suggest that using technology have potentials related to psychomotor skills.

Cognitive Outcomes: include knowledge, comprehension, application, and analysis[24]. Using latest features of technology can improve assessments of cognitive skills and make it more accurate [25], this is what is suggested by this study which was conducted in Saudi Arabia. The use of a mobile applications for simulation learning has helpful influence on nursing students' knowledge and skill performances as thus improving of learning cognitive outcomes [26]. Another study [27], suggested that technology could offer cognitive skills enhancement, in addition to improve everyday life quality for example using online and mobile apps for cognitive behavioral therapy, AI voice technologies such as Alexa which can support human-machine conversations to decrease loneliness and depression. Last but not least, a study confirmed that using cognitive simulation technology confirmed the efficiency of technology in teaching social and humanitarian topics [28].

Affective Outcomes: include students' perception of satisfaction, attitude, and appreciation for the learning experience. According to this paper [29], a positive affect has a crucial role in behavioral in technology adoption, hence continuous enhancement on the technological tools is required to generate positive affect on the learners.

IV. CONCLUSION

This research paper provides an in-depth examination and analysis of the diverse advantages and disadvantages

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associated with technology integration in education. Emphasizing the significance of considering factors such as student personality and learning outcomes, it underscores the need to carefully select appropriate technological schemes. Each technological solution presents its own distinct set of pros and cons, highlighting the existence of both positive and negative applications. It is imperative for educational institutions, managers, lecturers, and students to have a clear understanding of their objectives when incorporating technology and to utilize it effectively. By thoroughly exploring these considerations, this study aims to offer valuable insights that enable informed decision-making regarding technology integration in education. Ultimately, the research endeavors to optimize the benefits of technology while mitigating potential drawbacks, resulting in an enhanced learning experience for all stakeholders involved.

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