Original Article

DIGITALIZATION IN TEACHING AND LEARNING: IMPACT ON STUDENT ENGAGEMENT AND ACADEMIC ACHIEVEMENT

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ABSTRACT

Digitization has revolutionized the process of teaching and learning worldwide and in the post-pandemic world. The incorporation of technological applications like Learning Management Systems (LMS), virtual classrooms, and multimedia materials, and artificial intelligence has revolutionized the pedagogical practice greatly. The current research question focuses on exploring how student engagement and academic performance at secondary level is affected by digitalization. The method of a descriptive survey was chosen. The 400 students of secondary education institutions were used to collect the data on the basis of a structured questionnaire and academic records. Such statistical methods were employed as mean, standard deviation, t-test, and correlation analysis. The results indicate that online instructional practices are majorly more effective in engagement, motivation, and performance among students as compared to the conventional one. But there exist challenges of digital divide, poor infrastructure as well as gaps in teacher training. The research concludes that digitalization when wisely used can make a significant contribution to the learning results and equip students with the skills of the future.

Keywords: Digitalization, Educational Technology, E-learning, Student Engagement, Academic Achievement, Teaching Learning Process

INTRODUCTION

Digital technologies are rapidly transforming education systems in the world. Digitalization in teaching and learning simply means incorporation of digital technologies, applications and learning resources into the learning process to advance a more effective instructional process and participation among learners in the learning process. Digital initiatives like DIKSHA, SWAYAM, and Smart Classrooms have made the use of digital education relatively fast in India. Online learning environments are flexibly structured, provide access, provide customized learning opportunities and are interactive. They not only allow the students to learn at their own speeds but they also give the teachers the ability to utilize various multimedia tools to teach them difficult concepts. Nevertheless, issues associated with fair access, technological proficiency, and pedagogical customization continue to be of concern especially in the developing nations. The efficacy of digitalization is this understanding, which policymakers, educators, and institutions need to look into to develop sustainable and inclusive models of education in the future.

REVIEW OF LITERATURE

According to the previous research, there are high enablers of digital learning in enhancing the outcomes of education. Means et al. (2014) indicated that blended learning systems yield superior academic outcomes than the conventional face-to-face learning. As pointed out by Selwyn (2016), digital technologies facilitate the adoption of independence in learners, cooperative learning, and critical thinking. Dhawan (2020) noted the critical nature of online education since the onset of the COVID-19 pandemic in which the digital channel ensured education continuity even when the institutions were closed. The study by Bond et al. (2020) revealed that interactive digital tools are an effective way to engage students in the process of learning when used in an interaction with active teaching methods. Equally, UNESCO (2021) emphasized the need to be digitally ready, have good infrastructure, and train teachers in order to succeed in integrating them. In spite of the positive results evident in the literature, conflict of digital divide, lack of device access, ineffective connectivity, and poor teacher preparation are also evident in several studies, which may limit successful implementation. Although much has been studied on digital learning, few empirical researchers have considered the combined effects of digital learning on student engagement as well as academic performance at the secondary school level regarding the Indian context. Thus, this gap is filled by the current research.

RESEARCH GAP

Whereas it has been observed that many studies have arranged the advantages of online learning and technology integration in education, the majority of the current research has been mainly narrowed down to the higher education or the online emergency teaching during the COVID-19 pandemic. There is not much empirical research on the joint effect of digitalization on student engagement and student achievement at the secondary school level, and especially in developing countries like India. In addition, numerous research works have investigated digital tools independently without taking into account the general levels of digital exposure between students and the effect of digital exposure on learning outcomes. The differences between students that are taught via online means and those that are taught via the conventional classroom instruction have not been sufficiently studied with the use of large representative samples. Thus, conducting a structured study to evaluate the role of digitalization in engagement and academic performance co simultaneously in actual school environments is required. This gap is addressed in the present research by exploring the extent of digital learning exposure and student engagement and performance of secondary school students.

OBJECTIVES OF THE STUDY

- To investigate the degree of digitalization of teaching and learning at the secondary school level.
- To determine the extent of student involvement in online classrooms.
- To examine the influence of digital teaching processes on the academic performance of students.
- To establish the comparison of the performance of students taught using digital tools and traditional teaching techniques.

HYPOTHESES

H01: No significant difference exists between the academic performance of students who received digital teaching instruction and those instructed using conventional methodology.

H02: The exposure to digital learning and student engagement are not significantly related.

METHODOLOGY
RESEARCH DESIGN

The current research has used a survey approach (descriptive survey) to examine how the process of digitalization of teaching and learning affect student engagement and performance. The research design was descriptive survey design since it helps the researcher to gather systematic data on a large population on the current conditions, practices and associations among variables without the need of controlling the study environment. This layout will help to study exposure of the students to digital learning aid, the degree of their engagement as well as their performance in schools in normal environments. It also enables the comparison of various groups and finding the trends and patterns of digital education practices.

POPULATION

The study population included all students at Classes IX and X in both government and private schools in the selected district studying in the secondary school. The secondary school students were selected due to the fact that this is the most critical part of formal education where students are introduced to more content in subjects, exams, and an increase in the application digital

learning tools. The sample sampled both the government and private institutions to accommodate both different socio-economic statuses, access to digital resources, and differences in the instructional practices.

SAMPLE

The target population was stratified into 400 students sample where stratified random sampling was used. To represent the population proportionately, the population was first stratified in terms of the type of school (government and private) and gender. Each stratum was then randomly chosen to sample out students in order to reduce sampling bias and increase the generalization of the results. The participants of the selected sample were students of the urban and semi-urban schools so that there would be diversity in access to digital infrastructure, devices, and internet access. This sample was found sufficient to conduct a statistical analysis and make significant conclusions about digitalization measurement in teaching and learning.

TOOLS USED

Strategies that were utilized in collecting data comprised a mixture of standardized and self-developed instruments. The researcher created the Digital Learning Exposure Scale, which was used to assess the frequency of use, access, and familiarity of online classes, educational apps, multimedia resource, and learning management system as digital learning tools among the students. Student Engagement Scale was used to evaluate behavioural, emotional, and cognitive student engagement in digital learning environments. Moreover, the academic success of students was assessed based on official examination scores received through school records thus objectivity and reliability of performance data was insured. Diverse tools used made it possible to assess the independent and dependent variables in a thorough way, as well as improve study validity.

DATA COLLECTION PROCEDURE

Data collection was made with permission of school authorities beforehand. The selected students were given questionnaires to determine the degree of their exposure and involvement in digital learning. The scores of academic achievements were gathered through the official school records. The data were gathered very well and the data was put together coded in preparation of the statistical analysis.

STATISTICAL TECHNIQUES

Mean, Standard Deviation, t-test, Pearson Correlation and Percentage Analysis.

ANALYSIS AND INTERPRETATION

Table 1

Table 1 Level of Digital Learning Exposure among Students (N = 400)		
Level	**Frequency**	**Percentage**
High	160	40%
Moderate	180	45%
Low	60	15%

Interpretation:

The statistics reveal that most of the students have moderate exposure to digital learning tools, which constitute 85 percent of the sample. It implies that the digital education has become common in the sampled schools, but a minor fraction of students continues to have reduced access.

Graph 1
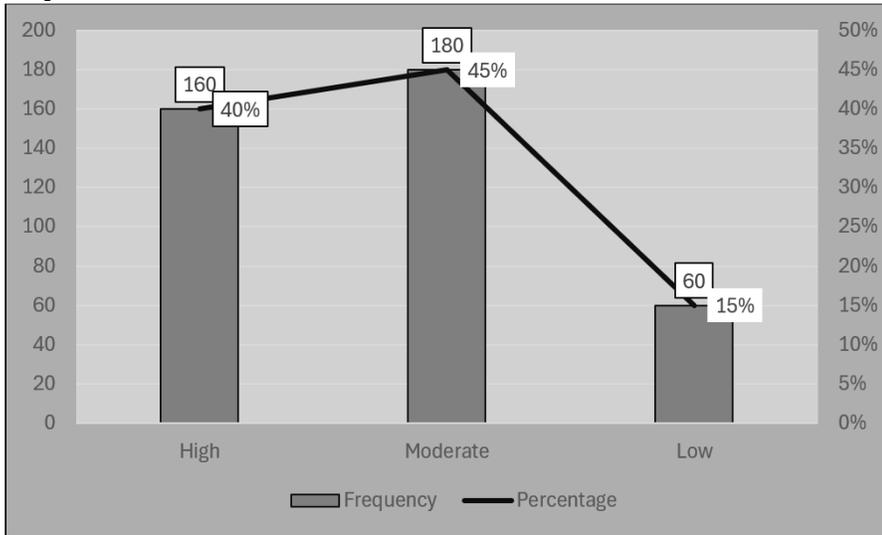
Graph 1 Level of Digital Learning
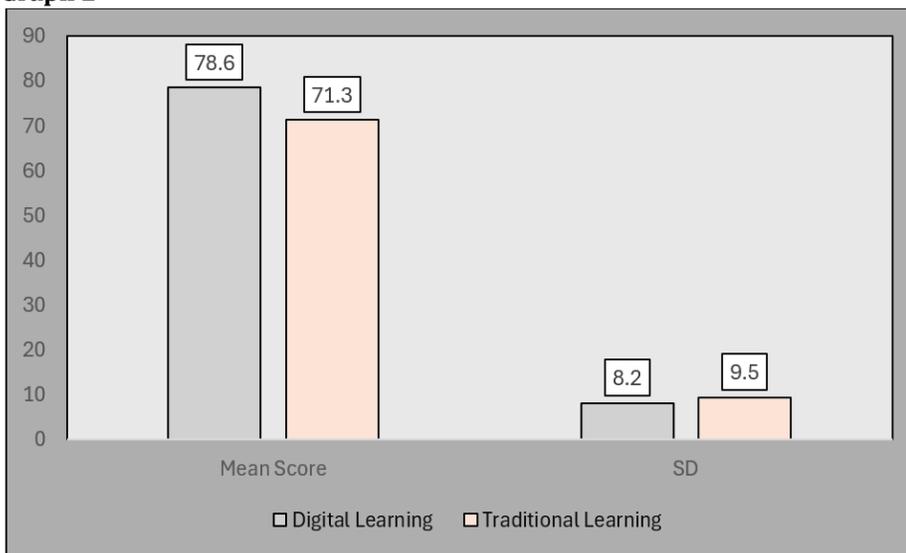
Table 2

Table 2 Comparison of Academic Achievement		
Teaching Mode	**Mean Score**	**SD**
Digital Learning	78.6	8.2
Traditional Learning	71.3	9.5

t-value = 6.42 (Significant at 0.01 level)

Interpretation:

The learners who were exposed to digital learning performed significantly better than their traditional counterparts and this means that learners who underwent digital instructional strategies also had a very positive impact on their academic performance. The t-value obtained proves that the difference is statistically significant who rejects the null hypothesis.

Graph 2

Graph 2 Comparison of Academic Achievement

Table 3

Table 3 Correlation Between Digital Learning and Student Engagement	
Variables	**r-value**
Digitalization & Engagement	0.68

Interpretation:

There is a great positive relationship between digital learning and student engagement which implies that animalization of digital tools can be more influential as a result of more student engagement, interest and motivation. Thus, the test of the null hypothesis on the non-existence of a relationship is rejected.

CONCLUSION

In the study, it is concluded that, digitalization is a significant factor in increasing engagement of students and academic success at secondary level. The digital tools pose an interactive learning experience, accessibility to a wide variety of education and instructional customization. Even with these strengths, it needs proper infrastructure, good connectivity and teacher training so as to create a level of equity to access and meaningful learning opportunities to all the students.

EDUCATIONAL IMPLICATIONS

The results suggest that schools implement the models of blended learning that involves digital and traditional teaching method to achieve optimal learning results. Education programs should include some training on digital pedagogy to give educators the requisite technological skills. Reduction of the digital divide should be the primary consideration among policymakers to create infrastructure and affordable devices and connectivity to the internet network. Moreover, the curriculum needs to address the needs of the knowledge economy by inculcating digital literacy skills to the students.

FUTURE SUGGESTIONS

Future studies could be based on longitudinal research on the effect of digitalization on learning outcome over an extended period of time. It would be more enlightening to conduct comparative studies in various topics, grades, and rural-urban settings to determine its success. It is also possible that researchers can research how emerging technology, including artificial intelligence, adaptive learning systems, and virtual reality, can be applied to improve educational experiences and study the attitude and readiness of teachers to the digital transformation.

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