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A STUDY TO EVALUATE THE RELATIONSHIP BETWEEN DIGITAL LEARNING AND ACADEMIC PERFORMANCE

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ABSTRACT

The introduction of digital learning technologies has brought about significant changes in the way education is delivered and experienced, completely altering the educational environment. Using data collected from a cross-sectional survey of 290 students, this research looks at how digital learning tools affect students' happiness and success in the classroom. Students with expertise or active use of digital learning tools were surveyed using a convenience sample approach in a descriptive study design. With 32.4% claiming a moderate improvement and 27.9% a strong improvement, the effect of digital learning on academic achievement was substantial. Overall, students were pleased; 33.8 percent were happy and 24.5 percent were very satisfied. The findings of the analysis of variance showed that digital learning had a substantial impact on academic achievement ($F = 72.1$, $p < 0.001$), proving that using digital learning tools leads to improved academic results.

I. INTRODUCTION

The exponential growth of digital technology in the 21st century has had far-reaching and revolutionary effects on every facet of society, but maybe none more so than the field of education. In a broad sense, "digital learning" means facilitating the learning and teaching processes via the use of digital tools and platforms. Learning has progressed from the static chalk and board to a living, breathing interaction between humans and technological assistance, taking place in the limitless digital universe rather than in any static classroom. Digital learning has gone from being an ancillary tool to a primary form of education delivery in recent years, notably in higher education institutions, especially after the COVID-19 epidemic. Digital platforms have been especially used by higher education to improve accessibility, engagement, and performance because of the vital role they play in academic and professional development. Worldwide, educational institutions have begun to employ a variety of online tools, including Learning Management Systems (LMS), virtual classrooms, Massive Open Online Courses (MOOCs), and other resources, to facilitate student learning. Not only has this change broadened access to education, but it has also paved the way for more individualized approaches to education. Nearly 90% of Indian colleges embraced online instruction in some way during the epidemic, according to the All India Surveyon Higher instruction. A rigorous review of the effects of this fast digital revolution on students' learning outcomes and academic achievement is necessary.

Because it can accommodate the demands of a wide range of learners, digital learning has the capacity to have a beneficial impact on students' academic achievement. When compared to conventional education, which often follows a cookie-cutter approach, digital resources provide more leeway in terms of when, how, and how fast one learns. Interactive tests, a worldwide library of information, and recorded lectures are all available to students. Students in organized online courses outperformed their in-person counterparts on standardized tests by 6-10%, according to a World Bank study (2022). The reason for this improvement in academic performance is that digital learning environments are more conducive to higher-order cognitive development due to their interactive and adaptable qualities. The advantages of online education, however, do not trickle down to everyone. There is still a long way to go before online education is accessible to all students due to the

digital divide, which affects both technological literacy and infrastructure. In India, students from lower-income rural areas sometimes have poor access to digital amenities, such as smartphones, computers, and high-speed internet, in contrast to those from more affluent metropolitan areas. The National Sample Survey (NSO, 2021) found that only 24% of Indian homes have internet connectivity; in rural areas, that percentage went even lower to 12%. According to these numbers, there is a severe inequality that makes it hard for digital learning to benefit everyone.

II. REVIEW OF LITERATURE

Aftab, Faiza. (2022) By integrating the Social Learning Theory and the Theory of Reasoned Action, this study seeks to investigate how student involvement mediates the relationship between digital learning features and student accomplishment in Pakistani entrepreneurship programs. 450 students enrolled in business and entrepreneurship programs in Pakistan were surveyed face-to-face. The results of the Structural Equation Modeling (SEM) show that students' involvement is favorably impacted by their digital competency. The results also showed that in Pakistani business and entrepreneurship programs, student involvement mediated the relationship between students' digital competence, digital readiness, and e-learning attitude, all of which had an effect on students' academic performance. It is feasible to assess kids from other schools and nations using the same methods as this research. It would be beneficial to do further research on the opinions of school administrators and instructors on students' attitudes towards online and traditional forms of e-learning.

Imizuokena, Iroriteraye-Adjekpovu&Iroriteraye-Adjekpovu, Janice Imizuokena. (2022) This study examined the impact of digital technology on students' academic achievement and retention in secondary schools. Ethiope East Local Government Area, Delta State was used as a case study. The study took into account the significance of digital technology in education in the 21st century. The investigation was predicated on 4 hypotheses and 4 research questions. 120 volunteer respondents from five different secondary schools in the study region were engaged in the study using a descriptive survey as the research design. The data was collected using a standardized and well-structured questionnaire that had a Cronbach alpha reliability rating of 0.77. A student's t-test was used to assess the hypotheses at a significance level of 0.05, and data analysis was performed using Microsoft Office Excel Version 2016. The sample mean and standard deviation were also examined. Students who

were taught using digital technology outperformed those who were taught without it, according to the study's results. According to the survey, kids who had access to the internet via their home computers and mobile phones outperformed their peers who did not. In addition, the data demonstrated that pupils who were taught using digital technology outperformed their counterparts taught using conventional methods. Curriculum developers should reorganize secondary school curricula to accommodate digital teaching and learning methods, teachers should receive ongoing professional development on how to effectively use digital tools in the classroom, and the government should provide modern and relevant digital facilities for secondary school instruction.

Khan, Tanuja et al., (2021) As a field of study, digital learning aims to simplify the process of achieving educational objectives via the use of technology. It provides a foundation upon which to build a variety of techniques and approaches. Consideration of new systems and materials, invention of instrument, discovery of technique, and correct solution thinking to educational problems might all be aided by this in the field of education innovation. The results of this research showed that pupils who used computers had an influence on both their math performance and their attitude towards arithmetic. And they gain from learning to use computers, which leads to improved performance.

Bernacki, Matthew et al., (2020) Dropouts from STEM (science, technology, engineering, and mathematics) programs often cite a lack of proficiency in critical thinking and learning as the reason they did not finish their degrees. We conducted two tests to determine the impact on students' test scores of a short digital learning skills training program that we integrated into their university learning management system course site for their big lecture math and science classes. The first study looked at the possibility that undergraduate science students would benefit from receiving short trainings on learning techniques inside their STEM course site in the first few weeks of class. The goal was to see whether this would motivate students to develop better study habits and increase their test scores. Extra studies looked at the advantages for first-generation college students, who are underrepresented in STEM jobs. Compared to the control group, students who invested time into training used resources that helped with planning, monitoring, and cognitive strategy usage more effectively, and they also did better on both the first and final tests. The second study looked at the possibility of using domain-general learning skill training in a collegiate algebra course and whether or not it would have any impact. The second unit of the course began with a random assignment of

students to either the treatment or control groups. On the subsequent two-unit tests, participants in the skill-training condition did better than a control group that was given more algebraic problems to answer. Training had comparable benefits on students from the first generation and the continuing generation across studies.

Bertheussen, Bernt & Myrland, Øystein. (2016) The purpose of this research was to examine the impact of digital learning activities on the academic performance of 120 undergraduate finance course participants. Throughout the first half of the course, every student had access to interactive practice and test problem files, and their download activity was automatically logged. Deliberate practice and problem-solving utilizing the interactive spreadsheet files were significantly related with academic success, as measured by the midterm test. Additionally, there was a strong correlation between previous math grades and subsequent academic success. Students who want to know how to maximize their time for study and how to improve their grades may find this research's results useful. In addition, this research will be helpful for institutions that are trying to decide how to divide up limited resources among different forms of educational output.

III. RESEARCH METHODOLOGY

Research Design

In this study a descriptive cross-sectional survey approach was used.

Sources of Data Collection

The study is based on both primary and secondary sources of data to ensure comprehensive and accurate findings.

Primary Data: Primary data was collected directly from students using a structured questionnaire specifically designed for this research.

Secondary Data: Secondary data was gathered from published literature, including scholarly journals, research articles, educational reports, e-books, and online academic databases.

Sample Size and Sampling Technique

A total of 290 students were included in the study. The sample size was determined throughout the data collection period based on accessibility and the intention to participate. To get responses from students who are readily reachable and who use or have used digital learning tools, the researcher utilized a convenience sample technique.

Data Analysis

Frequency distributions, percentage and ANNOVA were used to analyses the data.

IV. DATA ANALYSIS AND INTREPRETATION

Table 1: Gender of the respondents

Particulars	Frequency	Percentage
Male	132	45.5
Female	168	54.5
Total	290	100

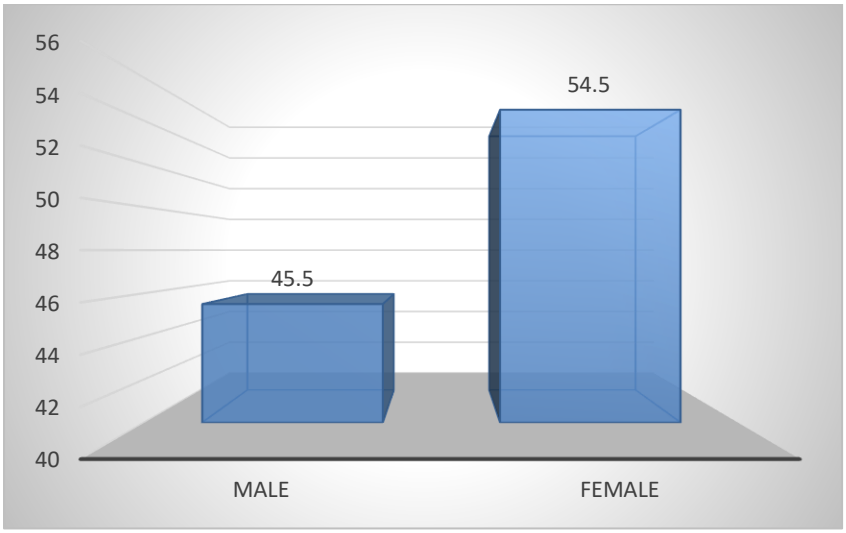

Figure 1: Gender of the respondents

Among the 290 pupils, 168 are female and 132 are male, for a gender ratio of 45.5%. As a result, the study's sample is reasonably balanced between the sexes, with female students slightly outnumbering male students.

Table 2: Frequency of Usage of Digital Learning Tools by Students

Particulars	**Frequency**	**Percentage**
Daily	85	29.3
2–3 times a week	75	25.9
Once a week	60	20.7
Occasionally (rarely)	45	15.5
Never	25	8.6
Total	290	100

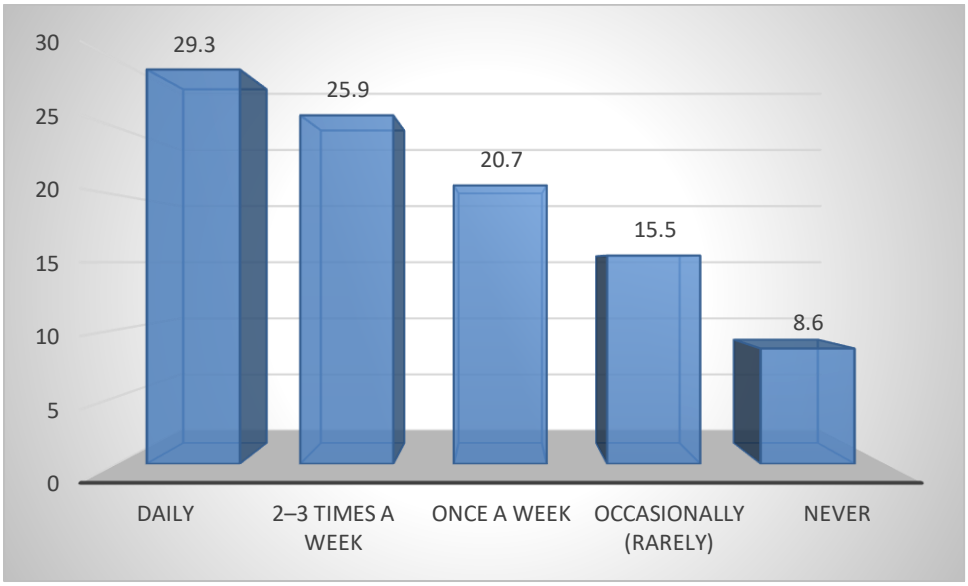

Figure2: Frequency of Usage of Digital Learning Tools by Students

The fact that 29.3% of students utilize digital learning tools every day shows how deeply embedded these technologies are in their learning habits. In a moderate use pattern, about

25.9% of students use these tools 2-3 times a week, whereas 20.7% use them once a week. Only 8.6% of students had never used digital tools, while a smaller percentage, 15.5%, acknowledged using them sometimes. Online education is becoming more popular and reliant on students' use of digital tools for study habits, as shown by these data.

Table 3: Impact of Digital Learning on Academic Performance

Particulars	**Frequency**	**Percentage**
Significant improvement	81	27.9
Moderate improvement	94	32.4
Slight improvement	55	19.0
No change	38	13.1
Decline in performance	22	7.6
Total	290	100

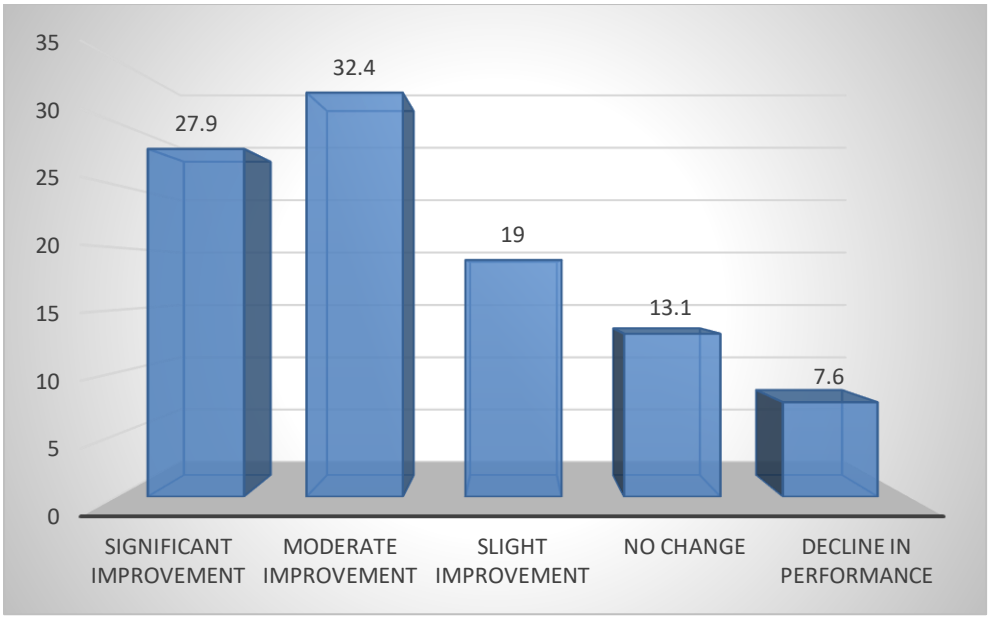

Figure 3: Impact of Digital Learning on Academic Performance

The biggest group, consisting of 32.4% of students, indicated a modest increase in performance, while 27.9% claimed a great improvement. Only a small percentage of pupils (19%) saw any discernible improvement. At the same time, 13.1% said nothing changed, and 7.6% said their performance went down. The majority of students are able to achieve academic success with the use of digital learning tools, according to the report.

Table 4: Student Satisfaction with Digital Learning Experience

Particulars	**Frequency**	**Percentage**
Very satisfied	71	24.5
Satisfied	98	33.8
Neutral	64	22.1
Dissatisfied	36	12.4
Very dissatisfied	21	7.2
Total	290	100

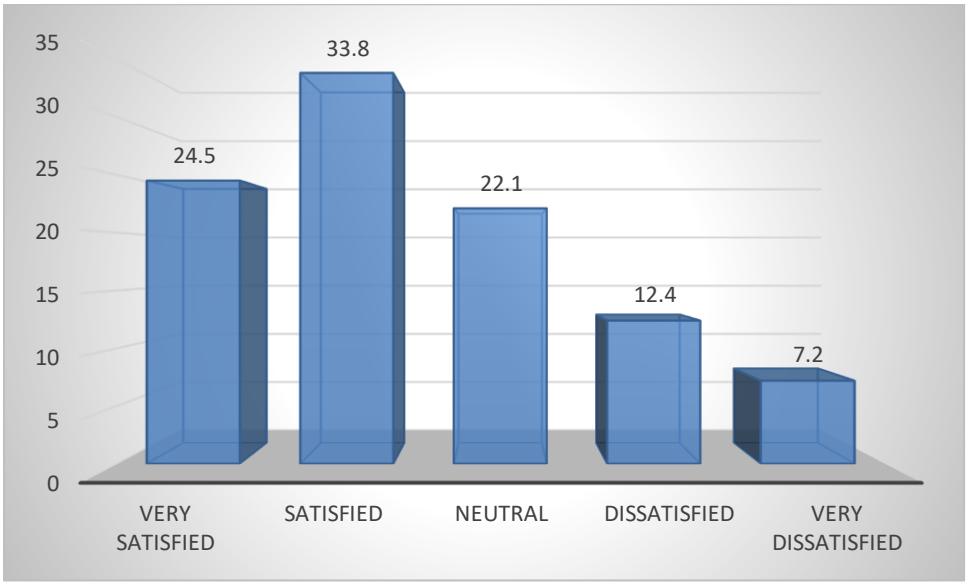

Figure 4: Student Satisfaction with Digital Learning Experience

The majority of students had a good opinion of digital learning, as expressed by 33.8% of students who were pleased and 24.5% who were extremely satisfied. A reasonable number of students (22.1%) chose to stay impartial. On the other hand, 12.4% were unhappy and 7.2% were very unhappy, showing that there is a minority that has issues with the online education. The majority of students seem to have a soft spot for online resources for education.

Table 5: ANOVA results showing Effect of Digital Learning on Academic Performance

Source of Variation	**Sum of Squares**	**Mean Square**	**F-value**	**p-value**
Between Groups	546.8	136.7	72.1	<0.001
Within Groups	548.2	1.92		
Total	1095.0			

Table 5 shows that there is a statistically significant influence of digital learning on students' academic achievement, according to the ANOVA findings. An F-value of 72.1 indicates that there is a significant amount of variance between the groups, with a Sum of Squares of 546.8 compared to 548.2 within the groupings. This discrepancy is very significant and probably couldn't have happened by chance, according to the corresponding p-value (<0.001).

V. CONCLUSION

Students' academic performance and learning experience are greatly improved by digital learning tools, according to the research. The majority of students said that their academic performance improved somewhat to significantly after regularly using digital tools. A high level of student satisfaction with digital learning indicates that students have a favorable impression of education that is improved by technology. According to the results of the analysis of variance, there is a statistically significant correlation between the amount of time spent studying online and variations in academic achievement. Educational institutions should keep integrating and supporting digital learning tools to improve student engagement and academic performance, as these results demonstrate the vital importance of digital learning in contemporary education.

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