

## Analyze the Extent to Which Technology is Integrated into the Curriculum and its Impact on Student Learning Outcomes

**Dr Vinita Parashar**

Professor, College of Commerce, IPS Academy, Indore, MP

### Abstract

The incorporation of technology into the curriculum has the potential to greatly improve student learning outcomes, especially when utilized to engage students, personalize learning, and promote collaboration. However, the efficiency of technology integration is dependent on a number of factors, including resource availability, technology quality, teacher training, and bridging the digital divide. Continuous research and investment in professional development are required to its greatest potential in education. The educational curriculum due to technology integration has been a game changer in modern education, aimed at increasing student engagement, personalization of learning, and overall academic success. This study investigates technology integration aspects into curricula and how it affects student learning results. A complete investigation was undertaken with 88 respondents, including both pupils and teachers from various demographic backgrounds. The study found a somewhat positive association ( $r = 0.427$ ) between technology integration and student learning outcomes, with statistical significance ( $p < 0.01$ ). This shows that increased usage of technology in school correlates with higher academic performance.

**Keywords:** Technology, Integrated, Curriculum, Student Learning Outcomes

### Introduction

In recent decades, there has been extensive discourse and research on the integration of technology into educational curricula (Shalini, et.al., 2016). Teachers and educational institution managers are concerned about the impact of students' utilization of digital resources on their academic performance due to the rapid advancement of these tools and services. Technology integration refers to the incorporation of digital materials and applications into the classroom. Devices such as computers, iPads, interactive whiteboards, educational software, and learning facilitation websites all belong to this area of technology. The objective is to enhance education by rendering it more captivating, accessible, and customized to the unique requirements of each individual (Sharma, N., 2017).

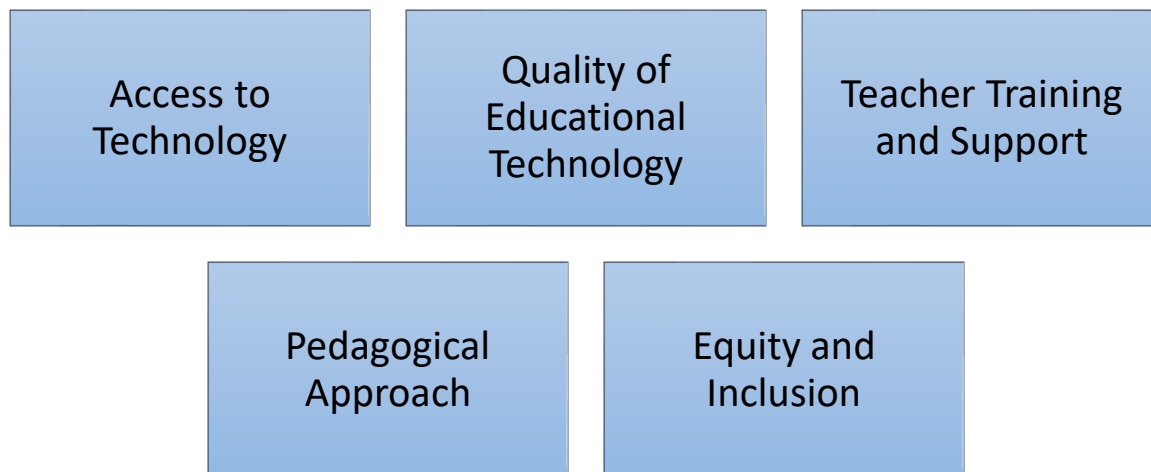
Each institutions and educational system possesses its own distinct level of technological integration. While several educational institutions have implemented a "one-to-one device program" where pupils are given their own digital gadgets, others depend on shared resources. In their study, (Zhao., et.al., 2003) discovered that schools that implemented technology more extensively possessed superior infrastructure and provided greater opportunities for teachers to enhance their professional growth.

Faculties must possess a high level of digital literacy and be capable of seamlessly incorporating digital technologies into their instructional practices. Research conducted by (Ertmer. et.al., 2010) suggests that teachers who have insufficient training can result in the improper or limited use of technology, ultimately leading to suboptimal learning outcomes.

There is a general consensus that technology can improve learning when used effectively, as the impact of technology on pupil learning outcomes has been extensively studied. Student motivation which can enhance the interactive and engaging nature of the learning process (Dubey, S., 2016). For example, interactive simulations and game-based learning can render intricate subjects more engaging and comprehensible. Digital tools facilitate personalized learning experiences, enabling instruction to be customized to accommodate the unique requirements of each pupil. Adaptive learning technologies can support differentiated instruction by providing customized feedback and adjusting the difficulty level based on student performance. These tools can facilitate collaborative work and assist in the development of communication skills, even in remote or hybrid learning environments.

### **Integration of Technology into the Curriculum & Impact on Student Learning Outcomes**

After pandemic, there has been a growing trend in educational institutions toward the widespread incorporation of technology into the instructional process. When it comes to student learning outcomes, this integration has the potential to have a major impact; nevertheless, its extent and efficacy are contingent upon a number of circumstances.



**Figure 1: Effective Factors after Technology Integration**

1. The availability of technology to pupils is one of the key factors that determines the influence that technology integration has. Generally speaking, schools that have sufficient resources and infrastructure to give each student with access to devices such as laptops or tablets are more likely to have effective initiatives to integrate technology. The advantages, on the other hand, might not be as noticeable in educational institutions where access to technology is restricted.

2. The quality of the educational software and tools that are being utilized should also be taken into consideration when determining whether or not technology is useful in boosting learning results. The use of instructional technology that has been thoughtfully designed to deliver tailored learning experiences, and provide students with quick feedback. On the other hand, technology that is not well designed or that is out of date might not have the desired effect and might even make learning more difficult.
3. The teachers are the most important people in the process of successfully incorporating technology into the curriculum. In order for them to comprehend how to utilize technology in meaningful ways that are in accordance with educational goals and standards, they require sufficient training and assistance. It is possible for educators to improve the quality learning easier for students when they are adept in the use of technology and when they are given with chances for ongoing professional development.
4. It is also important to consider how technology is incorporated into the educational process. It is not appropriate to employ technology as a replacement for more conventional means of instruction; rather, it should be utilized as a tool to supplement and improve the learning process. The incorporation of technology in a manner that encourages active learning, collaboration, and critical thinking abilities has the potential to result in significant improvements in the outcomes of learning.
5. Efforts to integrate technology must also address issues of equality and inclusion in order to bridge the digital gap and providing support for students who may encounter obstacles in gaining access to or making efficient use of technology, efforts should be conducted.

### Review Literature

The incorporation of technology into educational curricula has garnered much attention and inquiry in recent decades. Given the swift progress of digital tools and resources, educators and policymakers are eager to comprehend the impact of new technologies on student learning outcomes. This literature review examines the degree to which technology is incorporated into the curriculum and its influence on several facets of student learning. Examples of educational technology might encompass the utilization of computers, tablets, interactive whiteboards, educational software, and online learning platforms. The objective is to improve the educational experience by increasing the level of engagement, accessibility, and personalization in the learning process. There is significant variation in the extent to which technology is integrated into schools and educational systems. Certain educational institutions have implemented a one-to-one device initiative, wherein every student is provided with their own personal digital gadget, while others rely on shared resources. Research has indicated that schools that incorporate technology more extensively typically possess superior infrastructure and offer greater professional development chances for teachers (Zhao & Frank, 2003).

Proficiency in utilizing digital technologies and integrating them into teaching practices is essential for effective technology integration. Studies suggest that continuous professional development and assistance are essential for instructors to successfully incorporate technology into their teaching

practices (Ertmer. Et.al., 2010). In the absence of sufficient training, technology may not be fully utilized or correctly deployed, resulting in less than optimal learning outcomes. Game-based learning and interactive simulations have the ability to enhance understanding and enjoyment of complex subjects (Gee, 2003). Digital tools enable customized learning experiences, wherein training may be adapted to cater to the specific needs of each student. Adaptive learning technologies have the ability to offer personalized feedback and modify the level of difficulty according to the performance of students, hence facilitating differentiated education (Pane et al., 2015). Technology enables students to collaborate by utilizing resources such as online conferencing, discussions etc. These technologies facilitate the enhancement of communication skills and can provide assistance for collaborative work, especially in learning contexts that are remote or a combination of remote and in-person (Johnson et al., 2016). Research findings have been inconclusive on the precise influence of technology on academic achievement.

According to (Cheung., et.al., 2013), certain studies suggest that technology can enhance exam scores and academic performance, especially in topics such as mathematics and science. Nevertheless, alternative research indicates that the influence is more intricate and relies on variables such as the level of technology incorporation and the particular circumstances (Tamim et al., 2011). The disparity in the allocation of technological resources, commonly referred to as the digital gap, has the potential to worsen educational disparities. Students from economically disadvantaged backgrounds or attending schools with inadequate resources may have restricted availability of technology, impeding their access to educational opportunities (Warschauer & Matuchniak, 2010). The efficacy of technology in education is contingent upon the caliber and suitability of the tools employed. Not all educational technologies are of the same quality, and inadequately designed tools may not effectively engage students or assist in achieving learning goals (Clark & Mayer, 2016). The attitudes of teachers towards technology and their opinions regarding its function in education have a considerable impact on how they use it into their teaching. According to Ertmer (2005), teachers who doubt the advantages of technology or feel overwhelmed by its intricacies may be less inclined to apply it in a proficient manner.

### **Research Methodology**

This study is quantitative in nature. The preliminary data has been collected from private educational institutions where technology has been fully integrated. A structured questionnaire has been prepared to for relevant information so that edge of analysis can be achieved. Approached to 130 respondents in total 03 private institutions. But i9n total only 88 respondents fill proper information. SPSS has been used for analysis. Correlation test has been applied for results. Secondary data has collected from online sources only.

### **Objective of the study**

- To examine the demographic profiles of respondents
- To correlate technology integration based curriculum & positive student learning outcome
- To suggest resulted findings & Implications

### **Hypothesis of the study**

H01 : There is no significant correlation between technology integration based curriculum & positive student learning outcome

H01 : There is significant correlation between technology integration based curriculum & positive student learning outcome

**Results & Discussion**

**Table 1: Demographic Analysis**

					Total
Age	20-25	25-30	30-35	35- above 40	88
	12	35	23	18	
Experience	Less than 2 years	3-7 years	8-12 years	Above 12 years	88
	08	17	32	31	
Income Per Annum	5 Lakhs P.Annum	5-10 Lakhs P. Annum	10-15 Lakhs P. Annum	Above 15 Lakhs P. Annum	88
	14	38	21	15	
Expected Bank Funding/Private Funding	10 Lakhs	10-15 Lakhs	Upto 20 Lakhs		88
	22	45	21		
Type of Entrepreneurship	Online	Offline	Hybrid		88
	43	16	29		

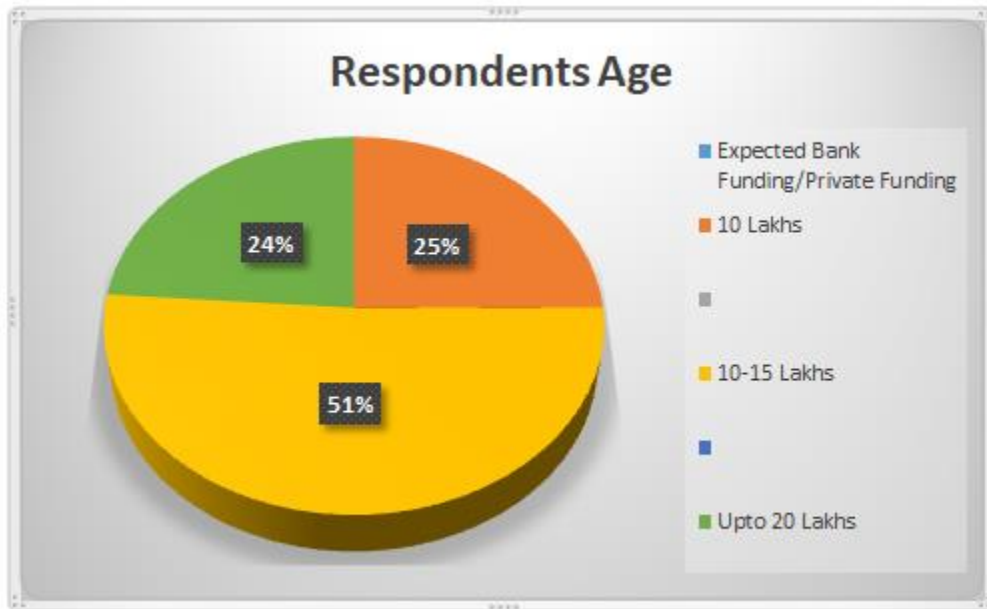


Chart 1- Age-Wise Responses

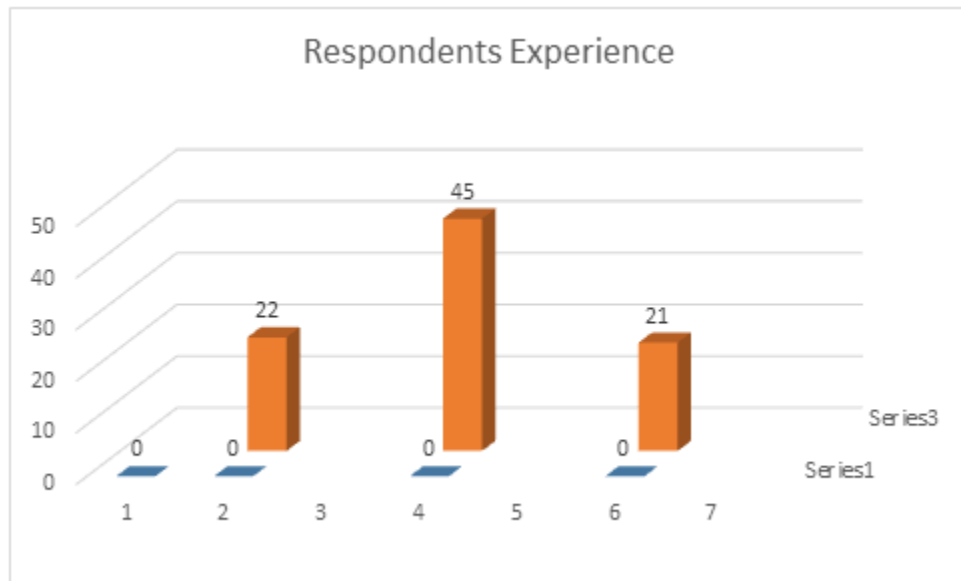


Chart 2- Experience-Wise Responses

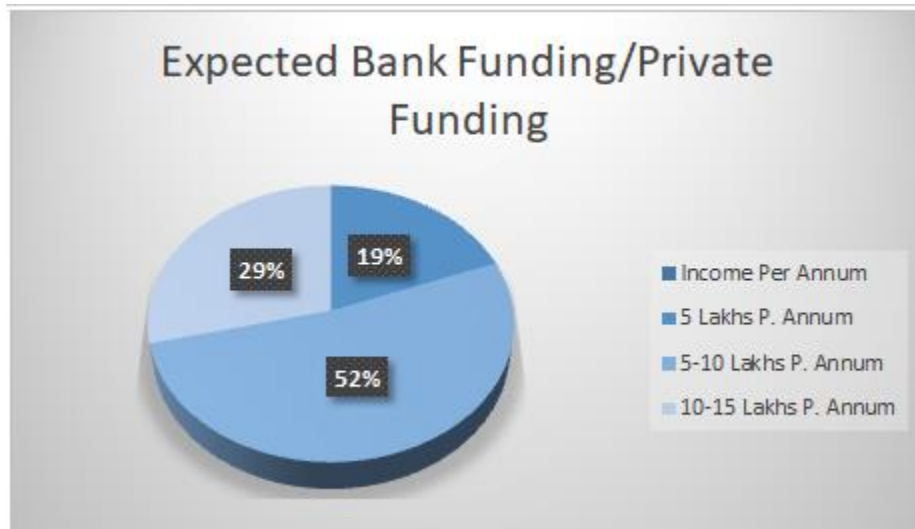


Chart 3- Responses Regarding Expected Bank Funding/Private Funding

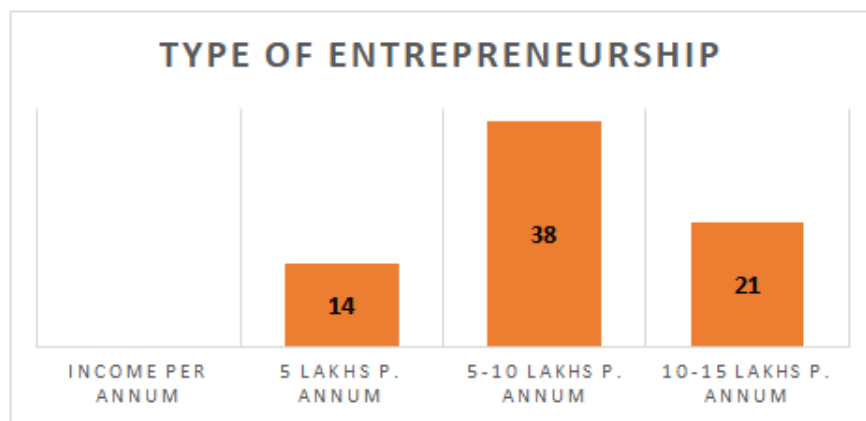


Chart 4- Responses Regarding Type of Entrepreneurship

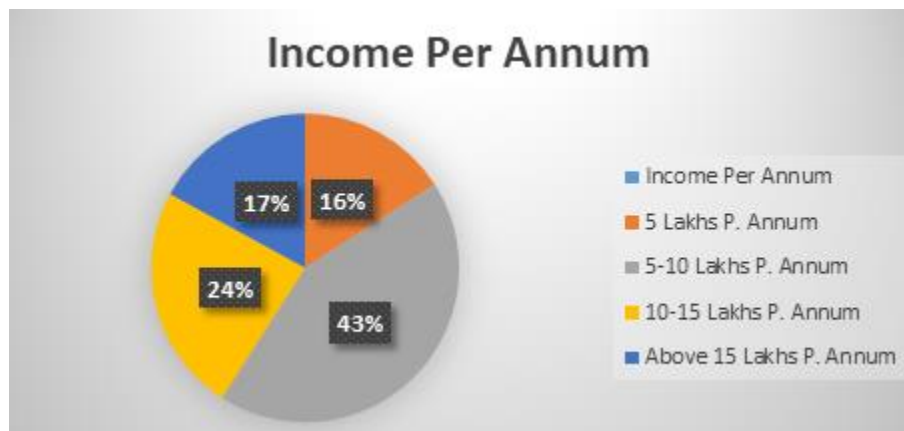


Chart 5- Income-Wise Responses

**Table 2: KMO & Bartlett's Test**

Kaiser-Meyer-Olkin Measure of Sampling Adequacy...		0.817
Bartlett's Test of Sphericity...	Approx.. Chi-Square....	2234.013
	Df.....	08
	Sig.....	.000

**Table 3: Correlations**

		Technology Integration in Curriculum	Student Learning Outcome
Technology Integration in Curriculum	Pearson's Correlation	1	.427**
	Sig. (2-tailed.)		0.000
	N	88	88
Student Learning Outcome	Pearson's Correlation	.427**	1
	Sig. (2-tailed.)	0.000	
	N	88	88

\*\**. Correlation is significant at 0.01 level*

The correlation coefficient between "technology integration in the curriculum and student learning outcomes" is  $r=0.427$ . This indicates that there is a strong relationship between the two. Because of this number, a moderately positive association can be inferred. Students typically experience an improvement in their learning results when there is a greater degree of technological integration in the curriculum. The level of significance, specifically the two-tailed significance level, is 0.0000, which is lower than 0.010. On the basis that the p-value is lower than 0.01, we conclude that the null hypothesis (H0) is not true. Analysis can be drawn from this is that there is a correlation that is statistically significant between the incorporation of technology into the curriculum and beneficial learning outcomes for students. When it comes to correlation analysis, the sample size (N) for both variables is 88, which is considered to be relatively significant.

**Findings of the study**

- The positive correlation also underscores the importance of teacher preparedness. Teachers who effectively integrate technology into their teaching practices can significantly impact student learning outcomes.



- The demographic analysis highlighted & these disparities can affect the extent to which technology integration benefits all students equally.
- The need for ongoing professional development for teachers was evident. Teachers require support and training to effectively incorporate technology into their teaching strategies.
- The quality and appropriateness of the technology used in the curriculum play a crucial role in determining its impact on learning outcomes.
- The Pearson correlation coefficient between technology integration in the curriculum and student learning outcomes was found to be  $r = 0.427$
- This indicates a moderate positive correlation, suggesting that as technology integration increases, student learning outcomes also tend to improve. The significance level (Sig. 2-tailed) was 0.0000.000, which is less than 0.01.
- The ability of technology to offer personalized learning experiences may contribute to the positive correlation. Adaptive learning tools that cater to individual student needs can help improve academic performance.
- Technology facilitates collaboration and communication among students, which can lead to better learning outcomes. Tools that support group work and peer interaction can enhance understanding and retention of information.

### Conclusion

Based on the “Pearson correlation coefficient and p-value”, we may conclude that there is a substantial positive relationship between the level of technology integration in the curriculum and student learning results. The findings show that incorporating technology into the curriculum has a good impact on student learning outcomes, with a strong correlation observed between the two. However, the magnitude of this impact is impacted by a variety of factors, including student and teacher demographics, technology access, and technology integration quality. Addressing the digital divide and providing proper professional development for teachers are critical steps toward maximizing the benefits of technology in education. This shows that when technology becomes increasingly integrated into the curriculum, student learning results improve. When done strategically and efficiently, technology integration can improve student learning outcomes by increasing engagement, customizing instruction, fostering collaboration, and offering access to a plethora of educational materials. To maximize the benefits of technology integration in education, the aforementioned variables must be considered, as well as problems such as access, quality, teacher training, and equity.

### Future Implications

Educational institutions should prioritize allocating resources towards technological infrastructure and offering comprehensive training programs for teachers to proficiently incorporate technology into their curricula. Although this study demonstrates a connection, it does not establish a causal relationship. Additional investigation could examine the precise elements of incorporating technology that have the greatest influence on student academic achievements and the processes

by which these impacts are manifested. This analysis provides evidence that the successful incorporation of technology in education can have a positive influence on student learning. It emphasizes the importance of ongoing efforts and investments in educational technology.

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