International Journal of Enhanced Research in Science, Technology & Engineering
ISSN: 2319-7463, Vol. 14 Issue 12, December-2025

Refurbishing Education with Technology: A Reality Check from the Teacher Education Institutions of West Bengal

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ABSTRACT

Technological progress has profoundly altered schooling and space in the previous two decades. The domain of educational technology has seen a rebirth due to transformative breakthroughs in Information and Communications Technology (ICT), especially concerning computers, mobile devices, and the internet. The Covid-19 pandemic and social distancing measures have affected all facets of life, including schools and education-system. Educational institutions have been necessitated to swiftly adapt to the potentiality of executing online operations to sustain educational continuity. The use of technology in educational environments engenders a transformative shift in the learning experience, leading to enhanced accessibility, engagement, and results. This research paper has explored the effect of technology in the teacher education institutions. The researchers used ICT in a flipped classroom instead of giving traditional one-way lectures. Video clippings were sent as learning tools and PPT were uploaded in LMS (Learning Management System) as reading materials. This study revealed that students can assume responsibility for their education as technology enables real-time feedback, participation in collaborative activities, and rapid access to information. Students are more adequately equipped for success in the digital era due to the manner in which educational technology fosters innovation, creativity, and critical thinking. This technology is utilized in online courses, virtual classrooms, and adaptive learning driven by artificial intelligence. By integrating traditional pedagogical methods with contemporary technologies, educators may create a more inclusive, efficient, and successful educational system that influences future generations.

Keywords: technology; education; student; virtual classroom; Learning Management System; Flipped Classroom.

INTRODUCTION

The COVID-19 pandemic has brought about a significant change in the education sector. Technology has become an essential part of learning, and students have quickly adapted to this new normal. Online classes, hybrid classes, and smart classrooms with virtual boards have become commonplace among the younger generation. These digital tools have made learning more engaging, interactive, and accessible. However, the scenario is different in rural West Bengal, where technology has not yet made a substantial impact on education. Many rural schools lack the necessary infrastructure and resources to implement technology-based learning. Nevertheless, with the increasing availability of the internet, students in these areas can now access online resources and educational content. Colleges in West Bengal are also embracing technology to enhance the teaching-learning process. Digital tools are being used to create interactive lectures, virtual field trips, and collaborative projects, making learning more enjoyable and effective. Teachers are using online platforms to share study materials, provide feedback, and communicate with students. Overall, technology has transformed the educational landscape, and its impact will only continue to grow in the coming years.

Modern technology is not only, as traditionally conceived, a new tool that we use to enhance our lives in the physical world, but has created a whole new digital world. A completely new term 'Ed-Tech' has been coined by this renaissance to refer ICT in the improvement of education. In this new world, we use different technologies to seek and provide resources and information, express ourselves, communicate with others, create, consume, and play, often assuming new and multiple identities. The scope of the digital world is comparable to that of the physical world; from online gaming and online dating

to e-learning and e-business. At the same time, the size of the involvement in the digital world is phenomenal and its growth is dramatic.

Education has been revolutionized by technology, which offers several advantages. Through gamification, simulations, and interactive content, it raises engagement and increases student motivation and involvement. By providing access to high-quality educational materials, online resources and digital libraries help close socioeconomic and geographic divides. Flexible learning is made possible by online courses and virtual classrooms, which may accommodate a range of schedules and learning preferences. Technology improves student results by enabling real-time feedback, adaptive exams, and personalized learning. Digital tools can help students prepare for the digital workforce by encouraging teamwork, communication, and critical thinking. Data analytics and automated administrative work also simplify school administration, freeing up teachers to concentrate on instruction. All things considered, technology transforms the educational landscape by integrating learning, boosting productivity, and creating new opportunities. Molnar, in 2017, unveiled that the choices for schools become more difficult because of Ed-Tech- wave.

REVIEW OF RELATED LITERATURE

Norman D. Kurland's study paper, "The Impact of Technology on Education," explored how technology is currently being developed to be used in education. Its introduction and uses in education will be influenced by the decisions that are currently being made. Educators will not be involved in these decisions. Instead, industry, business, government, and other stakeholders will make these decisions. Or we may let this process happen by accident. He believes that the educators' involvement is vitally necessary and crucial.

According to the study ‘Bridging the Gap: Technology Trends and Use of Technology in Schools’ a significant amount of money has been spent on integrating technology into classrooms, and these expenditures have in fact produced numerous "success stories." Nonetheless, there are two important gaps in the way technology is used in education that need to be filled. The first is a gap in usage. An outcome gap is the second. The benefits that schools receive in terms of lower expenses and more production are much less than those that come from investing in technology in non-educational industries. This article explores the reasons for these two gaps and offers solutions, such as committing to technology planning and having conversations about good teaching.

The paper ‘The Influence of Young Children’s Use of Technology on Their Learning: A Review’ provided a thorough literature evaluation of empirical research on the effects of technology on young children's learning. Three new study areas emerged between 2008 and 2013: "technology evaluation," "adults' roles," and "teaching approaches." Children with special needs or from low-socioeconomic or immigrant families were included in about one-third of the research. The vast majority of the studies that were examined showed that the technologies improved children's performance in all areas of development. The majority of research, especially in the social domain, demonstrated that technology improved children's ability to collaborate, engage with others, and cultivate multiculturalism. Furthermore, there is a growing trend of studying how children acquire digital literacy, which includes looking into the abilities required for and attitudes towards using technology. Last but not the least, although the majority of research focused on children as technology users, their function as producers has received less attention and merits more study.

Now, Governments, schools, and other stakeholders are focusing upon technology as a central partof the teaching-learning process, and invest accordingly (Bulman and Fairlie 2016). The article "Digitizing Education in India: Key Issues" discussesthe initiatives like digital classrooms, digital boards, etc. at the school level and SWAYAM and MOOCs at the university level, India aims to digitize education at both the school and university levels. Access to education can be greatly enhanced by digitalizing education. Nonetheless, a cautious approach to digitalization is required, meaning that both the positive and negative effects of modern technologies on learning must be carefully considered. For instance, it could exacerbate the isolation of children from low-income households who cannot afford digital gadgets like computers and laptops. Furthermore, unrestricted internet access and digitization can result in a variety of new issues, such as cyber stalking and cyber bullying. Therefore, this article argues that it is crucial to use properstrategiesand technologies in the education sector because the digitalization of education has both benefits and drawbacks.The rapid proliferation of new technologies in the education sector is like double-edged sword, as the main stakeholders are youngsters. Providing unlimited access to internet and technology may have ill effect on the young minds.

Activities related to education technology are grouped together with Computer-Assisted Learning (CAL), which refers to the meaningful applications of software, as well as other applications that are designed to improve academic skills. The cognitive skill development process of pupils is the primary emphasis of online courses and classes that are arranged by educational institutions. Because it is beneficial to a person's ability to think, read, write, and learn, we believe that the

cultivating of cognitive skills is the most important thing that can be done for another person. However, the non-cognitive abilities of both the teachers and the students are equally vital in a modern classroom as well as in any inclusive environment. These talents include emotional intelligence, social intelligence, and personality. We anticipate that information and communication technology will provide a vast amount of access, which will allow learners to acquire a greater amount of knowledge and, in a broader sense, can bring about an openness to their personality, which will then be followed by a high level of emotional and social intelligence.

Numerous studies emphasize the significance of ICT in empowering teachers and learners, improving teaching and student achievement. The paper titled "Teacher Educators Attitude of West Bengal towards ICT" examined teacher educators' attitudes towards ICT. To accomplish the study objective, the researcher created a 5 point Likert scale, "Scale for attitude towards ICT", with a high reliability ($\alpha = 0.727$). A simple random sampling technique was used to survey 180 samples from 30 teacher education colleges in West Bengal. The data was analyzed using SPSS 22.0 and t and F values were assessed at a 0.05 significance level. The study found that most teacher educators have a good view towards ICT use. No substantial difference was seen in the attitudes of male and female teacher educators towards ICT.

Research Questions:

1. Is there any difference between the outcome of an ICT enabled classroom and a traditional classroom?
2. Is there any positive outcome if the students get study material prior to the class?
3. Is there any positive outcome if study materials are available at Learning Management System and students can learn at their own?
4. Are video materials and video contents more effective than one way lecture?

Hypothesis:

$H0_1$: There does not exist any significant difference in the outcome of an ICT enabled classroom and a traditional Classroom.

$H0_2$: There does not exist any significant difference in the self-efficacy level of the students in a flipped classroom and traditional classroom set-up.

METHODOLOGY

The researchers had the trainee teachers at Adamas University's School of Education learn in a classroom that was equipped with information and communication technology. It is possible that the availability of information and communication technology will be able to overcome the fundamental limitations that are linked with the usual teaching-learning process. When it comes to this particular instance, the central library of the institution does not always have a enough quantity of volumes available. The students were split into two groups by the researchers: one group served as the control group, while the other group was the participants in the treatment group. For the purpose of selecting students for each group, they utilized the approach of purposive sampling, which did not interfere with the normal structure of the class.In advance of the lesson, the researchers uploaded a PowerPoint presentation of each subject into the university's Learning Management System and delivered video snippets that contained the relevant material. One day prior to the session, the researchers also sent out emails containing both sorts of subject matter. They put this procedure through its paces for the treatment group of students in the first semester. They employed typical teaching and learning tactics for the second set of students that were enrolled in the first semester, which was the control group. These strategies included a one-way lecture and a few question-and-answer discussions. Under the conventional classroom arrangement, there was no provision of flipped content. This method was followed by the researchers for a period of two months. Both written and oral examinations were carried out at the conclusion of this experiment. During the written examination, both groups were given fifty questions of an objective nature, each of which carried two marks. These questions were totally based on the subject matter that was covered in the classes. Two points were awarded for the correct response, while zero points were awarded for the incorrect answer. In addition to this, the researchers devised a questionnaire consisting of fifteen questions in order to gain an understanding of the amount of self-efficacy possessed by the students in both the standard classroom setting and the flipped classroom setting. Every inquiry was connected to the use of information and communication technology in the classroom, including its benefits, drawbacks, and outcomes.

Analysis:

After the test, the researchers checked the copies and it was shown that the mean of the treatment group was 64.7 and that of control group was 61.12.

$H0_1$: There does not exist any significant difference in the outcome of an ICT enabled classroom and a traditional Classroom.

Table 1: Difference between the mean of the scores achieved by treatment group and control group.

Variations	Sub sample	Sample size	Mean	SD	SED	t	remarks
Mode of teaching-learning Process	Treatment group (Received ICT enabled teaching-learning process)	50	64.7	2.96	0.6	5.97	significant
	Control group (Received traditional one-way lecture)	49	61.12	3.02			

On perusal of the table 1.1, it was observed that the value of 't ratio' 5.97 is higher than the table value at 0.05 level (1.98) and 0.01 (2.626). Thus, the null hypothesis "There does not exist any significant difference in the outcome of an ICT enabled classroom and a traditional classroom" was rejected.

Interpretation:
The result of the table 1.1 indicates that there is significant difference in the outcome of an ICT enabled classroom with that of traditional classroom, which means significant differences was found based on ICT usage. The mean of the marks secured by treatment group, i.e. the students who received flipped video materials and LMS materials, was higher than that of the control group, which clearly indicates that the score secured by the treatment group (sample 50) was higher than the score secured by control group (sample 49).

In the article "Enhanced Agility of E-Learning Adoption in High Schools" it was found that teachers and students have had fair experiences with e-learning tools. There is, however, limited access to multimedia-rich materials, and using them for learning is practiced too early. These results were mapped to models for e-learning uptake, which also showed that the schools were in the first phase. Also, giving schools computers and e-learning materials doesn't always mean they will be adopted successfully. Because of this, schools need to think about ongoing maintenance and upgrades, re-evaluate their lessons to fit the adoption, and aim for the next level in the e-learning adoption model they have chosen. As a result, the experts came up with an agile adoption model. This study suggests that schools will be able to lower the number of failed attempts to use e-learning because of changes in technology and acceptance that wasn't meant to happen.

In another article "Comparing the Effectiveness of Classroom and Online Learning: Teaching Research Methods" The study looks at how successful online and classroom learning are by looking at more than just grades. It tries to make sense of how students interact with each other, how well they meet their learning goals, and how long they stick with it. The study's results show that while student performance is the same no matter how they are taught, some classes, like Research Methods in Administration, are harder for students who stay in the virtual setting instead of the classroom. Online classes may also make it easier for people to participate and improve the quality and number of interactions. The results have many effects on how students learn, how courses are made, and how the program is planned. The ability to connect with others online can help students learn, especially those who are shy in the classroom. The effects also go beyond the study and use of measuring the results of online learning.

$H0_2$: There does not exist any significant difference in the self-efficacy level of the students in a flipped classroom and traditional classroom set-up.

Table .2: Difference between the mean of the scores achieved by treatment group and control group.

Variations	Sub sample	Sample size	Mean	SD	SED	t	remarks
Mode of teaching-learning Process	Treatment group (Received ICT enabled teaching-learning process)	50	59.66	1.79	0.36	16.36	significant
	Control group (Received traditional one-way lecture)	49	53.77	1.82			

On perusal of the table 1.2, it was observed that the value of 't ratio' 16.36 is higher than the table value at 0.05 level (1.98) and 0.01 (2.626). Thus, the null hypothesis "There does not exist any significant difference in the self-efficacy level of the students in a flipped classroom and traditional classroom set-up." was rejected.

Interpretation:
The result of thetable 1.2 indicates that significant difference exists among the level of self-efficacy of the treatment group and control group; which means, the level of self-efficacy of the students of a flipped classroom varies from the level of self-efficacy of the students of a traditional classroom. The mean of the treatment group is 59.66 which is higher than that of control group (53.77), and that means the self-efficacy level of the students of treatment group was higher than the self-efficacy level of the control group.

In the article titled "Comparison of the effectiveness of flipped classroom and traditional teaching method on the components of self-determination and class perception among University students", with a control group and a pre-test and post-test design, the researchers conducted an experimental study. All female students enrolled in the 2019 academic year at Farhangian University in Ahvaz City made up the study population. Convenience sampling was used to pick 36 students for the sample. Participants were split into experimental (n = 18) and control (n = 18) groups at random by the researchers. The findings showed that university students' perceptions of their classes and their sense of self-determination were more affected by the flipped teaching approach than by the standard approach.

According to the findings of the article, "The Differentiate Effect of Self-Efficacy, Motivation, and Satisfaction on Pre-Service Teacher Students' Learning Achievement in a Flipped Classroom: A Case of a Modern Educational Technology Course", pupils who participated in flipped classrooms outperformed those who attended traditional classes. Regarding the learning accomplishment component, information was gathered and the effects of the flipped classroom were evaluated using a post-test, a transfer assignment, and four practice assignments. Students who got flipped classes outperformed the control group in the pre-test, post-test, assignment practices, and transfer assignment, according to the data analysis. The difference in average practice assignment scores between the experimental group and the control class was steadily growing as the weekly learning content became more challenging. When compared to the control group, the results demonstrate that the flipped classroom paradigm improves students' learning outcomes.

Annexure:

Table 1.3:

Serial Number	Question	Answer				
		SD	D	N	A	SA
1.	Technology helps me to learn many new things.					
2.	I don't feel using technology in learning is necessary.					
3.	I believe that students can improve their understanding and learning skills using technology.					
4.	I believe ICT enabled classroom can help students to understand the subject in a very good way.					
5.	I think traditional lecture and classroom discussions are enough in school curriculum transaction.					
6.	I believe video clippings can help the students to visualize the content matter.					
7.	I believe traditional classroom discussions can enhance the communication skills of the students.					
8.	I think flipped classroom technique can help to increase academic achievement.					
9.	Flipped classroom promotes the development of communication skills.					
10.	ICT enabled classroom gives teachers the opportunity to be learning facilitators instead of information providers.					
11.	Traditional classroom can enhance students'holistic development better than ICT enabledclassroom.					

12.	ICT enabled classroom helps to accommodate students' personal learning styles.					
13.	Flipped materials help the students to join class with basic knowledge on subject matter.					
14.	Flipped learning motivates and allows the students in active participation in the teaching-learning process.					
15.	Flipped strategy makes the students confident during teaching-learning process.					

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