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ADVANCING TECHNICAL EDUCATION: IMPLEMENTATION OF E-LEARNING INITIATIVES IN PUNJAB'S STATE UNIVERSITIES

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ABSTRACT

This study explores the implementation of e-learning initiatives in technical education programs at five state universities in Punjab: Punjabi University, Punjab University, Guru Nanak Dev University, Maharaja Ranjit Singh Punjab Technical University, and IKG Punjab Technical University. The research focuses on postgraduate students in computer science and management and undergraduates in architecture, pharmacy, and engineering, with a sample size of 720 students and 240 faculty members selected across five universities. Faculty and students' perceptions of e- learning tools were also analyzed. E-learning strategies examined include flipped classrooms, gamification, social learning sites, and mobile learning technologies. Results reveal that while flipped classrooms and gamification techniques are perceived as less effective by 50% and 46.25% of respondents respectively, social learning sites and mobile learning technologies are viewed more favorably, with 26.25% and 30% of respondents finding them highly effective. Platforms such as Zoom (80%), WhatsApp (98.4%), and Google Classroom (74.4%) emerged as dominant tools during the COVID-19 pandemic, reflecting a shift toward interactive and accessible online learning. The findings emphasize the need for refining certain e-learning strategies while leveraging the potential of widely accepted tools to enhance the teaching-learning paradigm. This study contributes to understanding the role of technology in advancing technical education and highlights opportunities for optimizing e-learning initiatives in Punjab's state universities.

KEYWORDS: E-learning initiatives, Technical Education, Digital learning platforms, Teaching- learning paradigm

INTRODUCTION

Organizations today emphasize the quality of services as a critical factor for gaining a competitive edge. High-quality services not only help retain existing customers but also attract new ones. This growing focus on competitiveness has transformed the education sector into a marketplace, significantly impacting institutions, particularly technical ones. For technical educational institutions, delivering exceptional educational services is vital as it plays a key role in driving the industrial, economic, and social development of a country. The ongoing changes in the technical education landscape align with the broader revolutionary shifts occurring at the macro level. These transitions are reshaping the teaching-learning paradigm, bringing about significant advancements in the field. Among these changes, education in India has experienced a significant transformation, with a shift toward online learning initiatives, particularly driven by the impact of the COVID-19 pandemic.

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The Indian government and state-level institutions have implemented various e-learning platforms to ensure educational continuity (Singh et al., 2021). State Open Universities have shown varying levels of e-readiness in terms of institutional capacity and faculty preparedness for online education (Gade & Agarwal, 2018). Students, particularly in agricultural education, have demonstrated a preference for online learning using smartphones, with recorded classes and quizzes being favored formats (Muthuprasad et al., 2020). However, challenges such as broadband connectivity issues in rural areas persist. States like Rajasthan, Kerala, and Madhya Pradesh have leveraged social media and digital technologies to enhance learning during the pandemic (Karanam & Sahoo, 2022). Despite the challenges, these online learning initiatives have shown promise in maintaining educational processes and reaching students during the crisis.

This study examines the adoption of e-learning initiatives within technical education programs at five state universities in Punjab. The research targets postgraduate students in computer science and management, as well as undergraduate students in architecture, pharmacy, and engineering, with a sample size of 720 students and 240 faculty members drawn from these universities. Additionally, the study analyzes the perceptions of both faculty and students regarding e-learning tools.

LITERATURE REVIEW

Online learning initiatives in Indian state universities have gained traction, with Massive Open Online Courses (MOOCs) complementing traditional learning environments and providing opportunities for skill development (Kundu & Bej, 2020). However, participation remains low, particularly among female students, due to awareness and infrastructure issues. The COVID-19 pandemic accelerated e-learning adoption, with the Indian government launching initiatives like Diksha and Swayam Prabha to support online education (Singh et al., 2021). The introduction of online learning in Indian open universities, such as YCMOU, has highlighted the importance of strategic course selection and service development to enhance flexibility and efficiency while considering learners' computing contexts (Chari & Haughey, 2006). Stubbé et al. (2016) demonstrated the effectiveness of custom-built tablet games in improving mathematical skills among out-of-school children in remote areas. The study, conducted on two groups (control and experimental), showed significant improvement in the experimental group’s post-test scores compared to no progress in the control group, highlighting the potential of technology to provide education where traditional schooling is inaccessible.

Zainuddin et al. (2016) examined Moodle as a distance education platform, focusing on its tools like forums, quizzes, chats, assignments, and web conferencing. Students from Malaysia University perceived Moodle's synchronous and asynchronous communication tools as beneficial for real-time student-teacher interaction and effective learning.

Chiappe and Lee (2017) explored open teaching concepts linked to MOOCs and Open Educational Resources (OER). They argued that MOOCs and OER should complement traditional teaching, providing flexible, collaborative learning environments. Open teaching was identified as a way to empower learners to adapt, share, and self-direct their education, fostering lifelong learning.

Sánchez-Mena and Martí-Parreño (2017) investigated factors influencing teachers’ adoption of gamification in education. Gamification was found to enhance engagement and make learning enjoyable, motivating both teachers and students. However, barriers included a lack of knowledge about integrating gamification and concerns over its applicability to certain subjects.

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Ng and Wong (2020) analyzed mobile learning (m-learning) practices in Chinese universities using the FRAME model, which evaluates device, learner, and social aspects. The study highlighted mobile phones' potential as a widely accessible tool for distance learning. Activities like video conferencing, e-reading, and resource sharing were found to vary across disciplines but were broadly effective in enhancing learning.

Ansari et al. (2020) investigated the benefits of mobile devices and social media in education. These platforms were shown to enhance knowledge sharing, engagement, and academic performance when used strategically. They also facilitated connections between students, peers, and academicians, proving productive in both learning and research contexts.

These studies collectively underscore the transformative role of technology in education. From gamification to mobile learning and open teaching, digital tools have expanded access, engagement, and effectiveness, particularly for underserved populations. However, challenges like technological literacy and subject-specific constraints remain areas for improvement.

RESEARCH METHODOLOGY

Universe of the Study

Five state universities—Punjabi University in Patiala, Punjab University in Chandigarh, Guru Nanak Dev University in Amritsar, Maharaja Ranjit Singh Punjab Technical University in Bathinda, and IKG Punjab Technical University in Kapurthala—offer courses in Punjab in a variety of subjects, including management studies, computer science, engineering and technical courses, pharmacy, and hotel management and catering. Students and faculty members at these universities provided the primary data. Postgraduate students in the fields of computer science and management provided the primary data. as well as undergraduates studying architecture, pharmacy, and engineering.

Sample Size

Primary data at the university level (for students): Out of the five major universities, thirty students per department/discipline were selected for the study, with around five departments selected per university. Thus, thirty students' times five departments are 150 students per university, or 150 students' times five universities, or 750 students at the university level. But there were 720 students in the entire sample as there was no department of pharmaceutical sciences at IKGPTU, Jallandhar. *Basis of Sample Selection*

According to university regulations, each unit or class has 60 pupils. Therefore, we will use the sample as 50% of the unit's overall strength as permitted by AICTE and NAAC. It will be: Each course or discipline has 30 students, or 50% of the unit (60 students). The above basis is presented in Table 1.

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Table 1: Sample Base of Students at University Level

Universities and Departments /Disciplines	Management Deptt.	Comp. Sci. Deptt.	Engineering and Technical Course Deptt.	Pharmacy Deptt.	Hotel Management and Catering Deptt.	Students per University
Punjabi Uni., Patiala	30	30	30	30	30	150
P.U., Chandigarh	30	30	30	30	30	150
GNDU, Amritsar	30	30	30	30	30	150
MRSPTU, Bathinda	30	30	30	30	30	150
IKGPTU, Kapurthala	30	30	30	00	30	120
Total Student Sample Size=720						

Respondents' Profile (Faculty Members)

The profile of the faculty members who participated in the study on the efficiency of teaching- learning procedures in technical education programmes is presented in this section. It gives a summary of important personal and professional traits, such as age, length of teaching experience, department or course, tenure, university affiliation, and department. The objective is to provide a framework for comprehending the various viewpoints that contributed to the overall findings, allowing for a more in-depth examination of the variables affecting instruction and learning in technical education programmes provided by the state universities.

Table 2: Age of the Faculty Members

Age group	Frequency	Percent		
Up to 30 years	26	10.83		
31 to 40 years	132	55.0		
41 to 50 years	74	30.83		
Above 50 years	8	3.33		
Total	240	100.0		

Descriptive Statistics (Age)					
	N	**Minimum**	**Maximum**	**Mean**	**Std. Deviation**
Age	240	24	58	38.48	7.184

The age distribution of the faculty members taking part in the study on the efficiency of teaching- learning processes in technical education programmes is depicted in Table 2. The age ranges, which go from "Up to 30 years" to "Above 50 years," show that the faculty is diversely represented. Interestingly, a sizable fraction—55%—falls between the ages of 31 and 40, suggesting a high concentration of educators in the middle of their careers. This demographic information is especially pertinent to the study since it could affect how teachers

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approach their lessons, how well they adjust to new pedagogical techniques, and how they view educational technology. The faculty members' average age, or mean age of 38.48 years, represents the central tendency, while the age distribution's dispersion which is indicated by the standard deviation is 7.184.

Table 3: Working Profile of the Faculty Members

		Count	Column N %
University	Punjabi University, Patiala	50	20.8%
	Panjab University, Chandigarh	50	20.8%
	GNDU, Amritsar	50	20.8%
	MRSPTU, Bathinda	50	20.8%
	IKGPTU, Kapurthala	40	16.7%
Department	Management Studies	50	20.8%
	Computer Sciences	50	20.8%
	Engineering and Technical course	50	20.8%
	Pharmacy	40	16.8%
	Hotel Management and Catering	50	20.8%

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Work Experience	1st year	6	2.5%
	1-2 years	10	4.16%
	3-5 years	51	21.25%
	6-10 years	49	20.42%
	11-15 years	61	25.42%
	16-20 years	28	11.67%
	More than 20 years	35	14.58%

Table 3 provides an overview of the working profile of faculty members across various universities and departments. This distribution shows an even representation from four universities, each contributing 20.8% to the sample. However, IKGPTU has slightly fewer representatives, contributing 16.8% as there was no Pharmacy department here. This relatively balanced representation ensures a broad and diverse input from various academic institutions within the region, making the study more comprehensive and inclusive of different university environments.

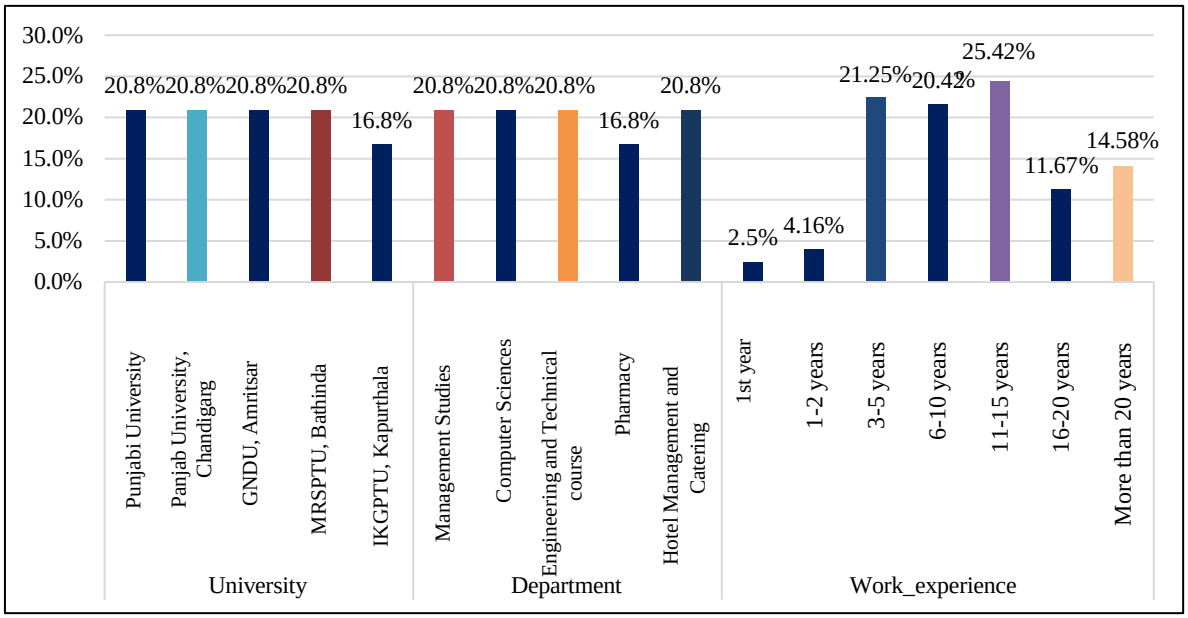

Figure 1: Working Profile of the Faculty Members

The work experience of faculty members is also shown in Fig. 1, depicting that 21.25% of them have 3-5 years of experience, while a sizeable portion (25.42%) have 11–15 years. This data is useful for assessing faculty members' experience levels, which may have an impact on their pedagogical approaches and ability to adjust to new ideas.

Table 4: Descriptive Statistics of Number of Students in Classes

Statement	N	Minimum	Maximum	Mean	Std. Deviation
On Average, throughout the year, how many students are in your classes?	240	8	200	103.50	225.06

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Table 4 gives a thorough picture of the dynamics of class size by presenting descriptive statistics on the number of students in each class. With a standard deviation of 225.06 and a mean of 103.50 students per class, there is a noticeable range in class sizes. The context in which faculty members operate must be understood in order to fully appreciate the significance of class size in terms of teaching methods, student-teacher interactions, and overall learning experiences.

Table 5: Descriptive Statistics of Students Characteristics in Classes

Statement	Scale	Count	olumn N %
How would you describe the cognitive ability of students in your classes?	Much lower-than-average ability	8	3.2%
	Slightly lower than average ability	11	4.6%
	Average	131	54.6%
	Slightly higher than average ability	81	33.8%
	Much higher than average ability	9	3.8%
How would you describe the level of self-directed learning ability of students in your classes?	Much lower than average ability	19	7.9%
	Slightly lower than average ability	25	10.4%
	Average	121	50.4%
	Slightly higher than average ability	69	28.8%
	Much higher than average ability	6	2.5%

Table 5 provides insightful information about how instructors view the cognitive and self-directed learning capacities of their students. The Table 5 reveals teachers' opinions regarding their students' capacity for self-directed learning. The majority of teachers (50.4%) believe that students' capacity for self-directed learning is average. Remarkably, 27.6% of teachers believe they are slightly more adept than average at self-directed learning. Relatively few teachers believe that students' capacities for self-directed learning are either significantly below or significantly above average.

It is essential to comprehend how faculty members view students' abilities in order to contextualize instruction, offer individualized support, and match instructional tactics to the perceived needs and abilities of the student body.

Table 6: Descriptive Statistics about Ability of Students

	N	Minimum	Maximum	Mean	Std. Deviation
How would you describe the cognitive ability of students in your classes?	240	1	5	3.29	0.748
How would you describe the level of self-directed learning ability of students in your classes?	240	1	5	3.07	0.880

Descriptive statistics about how teachers evaluated their students' cognitive and self-directed learning skills in their classes are shown in Table 6. The mean score for cognitive ability is 3.29, with a minimum of 1 and a maximum of 5. This implies that instructors believe their students have cognitive abilities that are on average just above the middle of the scale.

The mean score for the ability to learn independently is 3.07, with a minimum score of 1 and a maximum score of 5. This suggests that instructors generally believe students to possess a moderate degree of self-directed learning aptitude.

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Table 7: Number of Hours Spent on Teaching/Administrative Work

Statement	Category	Count	Column N %
Teaching of students in the institution (either whole class, in groups or individually)	0	5	2.1%
	1-2	11	4.6%
	2-4	69	28.8%
	4-6	45	18.8%
	More than 6	110	45.7%
Planning or preparation of lessons either in the institution or outside (including marking of student work)	0	2	0.8%
	1-2	45	18.8%
	2-4	64	26.7%
	4-6	68	28.3%
	More than 6	61	25.4%
Administrative duties either in the institution or outside (including university's administrative duties, paperwork and other duties you undertake in your job as a professor)	0	7	2.9%
	1-2	53	22.1%
	2-4	59	24.6%
	4-6	56	23.3%
	More than 6	65	27.1%
Or any other work taken outside the institution	0	41	17.1%
	1-2	65	27.1%
	2-4	28	11.7%
	4-6	43	17.9%
	More than 6	63	26.2%

The distribution of faculty members' reported hours spent on different professional activities, such as teaching, lesson planning or preparation, administrative responsibilities, and other work completed outside the school, is shown in Table 7. The data is divided up into various time periods so that a thorough grasp of how faculty members divide their time among these important duties can be obtained.

The Table 7 provides important insights into how faculty members distribute their efforts across various professional domains by illuminating their varying time commitments. Comprehending these trends is crucial for evaluating workload and task prioritization, which in turn affects how well teaching-learning processes function in technical education programmes.

Respondents' Profile (Students)

The age distribution of the respondents is shown in Table 8, which provides insight into the makeup of the student sample. Remarkably, 58.3% of participants are between 19 to 21years old, and 41.7% of participants are between the ages of 22 and 24 years.

Table 8: Age of the Respondents (Students)

	Frequency	Percent
19-21 years	420	58.3
22- 24 years	300	41.7
Total	720	100.0

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This demographic information points to a varied representation of students in various age groups. The age group that makes up the majority suggests that there is a sizable cohort of undergraduate and graduate students. The significant percentage of respondents who were between 19 to 21 old, on the other hand, suggests that younger undergraduates are well-represented, showing the necessity of attending to their unique needs and expectations. The age distribution essentially highlights how important it is to modify instructional strategies to meet the various requirements and expectations of students in different age groups.

Table 9: Descriptive Statistics (Age of the Students)

	N	Minimum	Maximum	Mean	Std. Deviation	Skewness		Kurtosis	
	Statistic	Statistic	Statistic	Statistic	Statistic	Statistic	Std. Error	Statistic	Std. Error
Age	720	19.0	24.0	20.368	2.8786	.096	.089	-1.225	.178

The age-related descriptive statistics for the students are shown in Table 9. The sampled students' average age is 20.368 years, with a minimum age of 19.0 years and a maximum age of 24.0 years. The results suggest that the student body has a rather small age range, with a centre of influence around early twenties.

Table 10: Demographics of the Students

		Count	Column N %
Gender	Male	337	46.80%
	Female	383	53.2%
Class	Under-Graduate	420	58.33%
	Post-Graduate	300	41.67%
Course	Management Studies	150	20.83%
	Computer Sciences	150	20.83%
	Engineering and Technical Course	150	20.83%
	Pharmacy	120	16.67%
	Hotel Management and Catering	150	20.83%
University	Punjabi University, Patiala	150	20.83%
	Panjab University, Chandigarh	150	20.83%
	Guru Nanak Dev University, Amritsar	150	20.83%
	MRSPTU	150	20.83%
	IKGPTU	120	16.67%

Figure 1 and Table 10 outlines the demographic profile of students engaged in the study, detailing their distribution by gender, class, course, and university. The data showcases a balanced representation across gender, with 337 male students (46.80%) and 383 female students (53.2%). In terms of academic status, 420 students are Under-Graduates (58.33%), while 300 are post- Graduates (41.67%). Table 5.3 and Fig. 5.1 further delineates student enrollment across various courses, with 150 students each from Management Studies, Computer Sciences, Engineering and Technical Course, and Hotel Management and Catering, along with 120 students from Pharmacy. Similarly, it illustrates an equitable spread across universities, with 150 students each from Punjabi University, Patiala; Panjab University, Chandigarh; Guru Nanak Dev University, Amritsar; and MRSPTU, while 120 students are from IKGPTU as there was no Pharmacy department in this university. This comprehensive breakdown facilitates a nuanced understanding of the student demographics,

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ensuring adequate representation for meaningful analysis and interpretation of study outcomes.

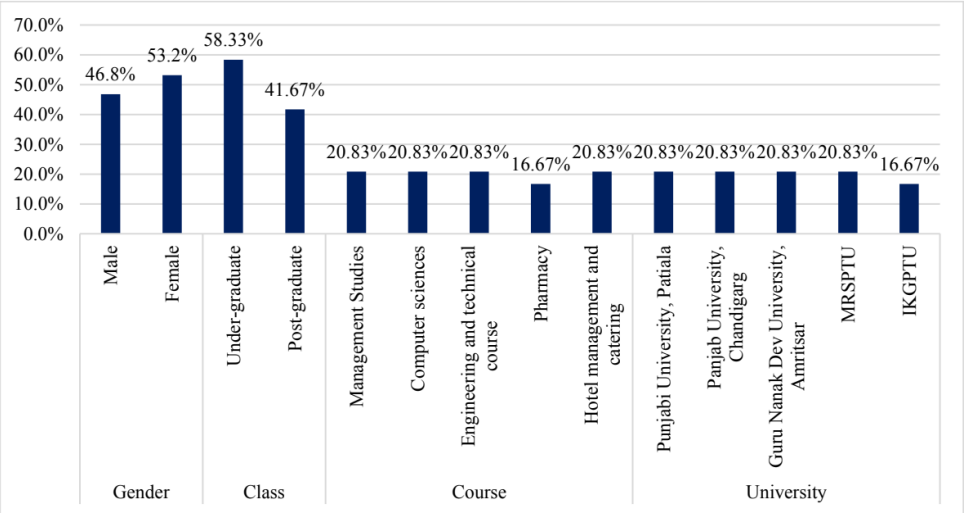

Figure 2: Demographic Profile of the Students

E-Learning Initiatives Adopted by the Technical Education Programs Offered by State Universities of Punjab

The study looks into how technical education programmes at Punjab's state universities are implementing e-learning initiatives. These efforts include the use of social learning sites, mobile learning technologies, gamification strategies, and flipped classrooms. In order to shed light on these strategies' influence on teaching and learning processes, the research attempts to offer insights into the prevalence and faculty perceptions of these tactics. The examination of e-learning initiatives in this setting advances our knowledge of how technology is influencing technical education at Punjab's state universities.

Frequency Distribution of E Learning Initiatives

The frequency distribution of e-learning initiatives as shown in Table 11 reveals that 50% of respondents perceive (P) the flipped classroom and invisible pedagogy as less effective than expected (P<E), 37.5% as equally effective (P=E), and 12.5% as more effective (P>E). Similarly, 46.25% view gamification techniques as less effective (P<E), 41.25% as equally effective (P=E), and 12.5% as more effective (P>E). In contrast, the use of social learning sites is seen as less effective by 30% (P<E), equally effective by 43.75% (P=E), and more effective by 26.25% (P>E). The provision of mobile learning technology shows a balanced perception with 30.83% viewing it as less effective (P<E), 39.17% as equally effective (P=E), and 30% as more effective (P>E). These results suggest that while flipped classrooms and gamification techniques might need further refinement to meet expectations, social learning sites and mobile learning technology are generally perceived more favorably, indicating their potential as effective e-learning tools.

Table 11: Frequency Distribution of E Learning Initiatives

	P<E		P=E		P>E	
	Count	**Row N %**	**Count**	**Row N %**	**Count**	**Row N %**
Use of the concept: Flipped classroom and invisible pedagogy.	120	50.00%	90	37.50%	30	12.50%
Use of gamification technique to	111	46.25%	99	41.25%	30	12.50%

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explain concepts						
Provision for the use of Social Learning sites as virtual learning platform for students.	72	30.00%	105	43.75%	63	26.25%
Provision for the use of mobile learning technology to facilitate variety of teaching methods.	74	30.83%	94	39.17%	72	30.00%

Descriptive Statistics of E Learning Initiatives

On a scale of 1 to 7, Table 12 presents descriptive statistics regarding the opinions of faculty members regarding different e-learning initiatives in technical education programmes. The mean scores show that there is a moderate level of acceptance for the use of gamification techniques (Mean: 3.35), the concept of a flipped classroom and invisible pedagogy (Mean: 3.33), and the option to use social learning sites as a virtual learning platform (Mean: 4.00). Significantly, the provision of mobile learning technology to support a range of teaching methods receives the highest mean score (Mean: 4.11), indicating a comparatively stronger positive perception among respondents for this particular e-learning initiative.

Table 12: Descriptive Statistics of E Learning Initiatives

	Minimum	**Maximum**	**Mean**	**Std. Deviation**
Use of the concept: Flipped classroom and invisible pedagogy.	1	7	3.33	1.334
Use of gamification technique to explain concepts	1	7	3.35	1.391
Provision for the use of Social Learning sites as virtual learning platform for students.	1	7	4.00	1.383
Provision for the use of mobile learning technology to facilitate variety of teaching methods.	1	7	4.11	1.435

The standard deviations show some variation in viewpoints, revealing different perspectives among faculty members on the merits and efficacy of these projects. These results shed light on the general attitude and range of opinions regarding various e-learning strategies, which can help shape future tactics for incorporating technology into technical education curriculum.

Student's Perception

E-Learning Initiatives Adopted by The Technical Education Programs Offered by State Universities of Punjab

Table 13 shows how Punjab state institutions' students used different e-learning initiatives during the COVID-19 pandemic. The information sheds light on the frequency of particular digital resources used in online learning. With 80% of responses, Zoom Cloud stood out as the most popular platform, demonstrating how widely used it is for online learning. Other well-liked technologies are Webinars (83.6%) and WhatsApp (98.4%), demonstrating the importance of dialogue and interactive learning in the e-learning environment. One particularly notable example of a frequently used platform for curriculum delivery is Google Classroom (74.4%). In addition, the inclusion of platforms like MOOCs, YouTube/Facebook streaming, Cisco WebEx, Swayam Prabha Educational DTH channels, Quizlet, Kahoot, and Quizlet app illustrates the wide range of resources used for online education.

Types of E- Learning Initiatives

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To improve the overall quality of their e-learning programme, state universities ought to think about making investments in and optimising these platforms. The growing popularity of MOOCs, educational DTH channels like Swayam Prabha, and streaming videos on YouTube and Facebook, as shown in Table 13 underscores the trend towards a variety of learning tools. This means that in order to accommodate students' varied interests and learning methods, educational institutions should keep researching and implementing a range of digital content. Furthermore, the particular use of apps such as Quizlet and Kahoot highlights the potential advantages of adding interactive components to the e-learning curriculum in order to improve student engagement. It is imperative that educational establishments assess the efficiency, usability, and user contentment linked to every e-learning asset.

Table 13: E-Learning Initiatives

S. No.	Name of E-Learning Initiative	Number	N%
1	Kahoot app	17	2.36%
2	Quizlet app	11	1.52%
3	Zoom cloud	600	83.33%
4	Cisco Webex	252	35.00%
5	Google classroom	558	77.50%
7	Webinars	627	87.08%
8	Swayam Prabha Educational DTH channels	417	57.92%
9	YouTube/ Facebook streaming	289	40.14%
10	WhatsApp	709	98.47%
11	MOOC’s	491	68.19%

CONCLUSIONS

The study highlights the transformative impact of e-learning in technical education, focusing on tools and strategies that enhance engagement and learning outcomes. Among the e-learning initiatives analyzed, social learning sites and mobile learning technologies emerged as the most effective, with 26.25% and 30% of respondents rating them highly. Platforms such as Zoom, WhatsApp, and Google Classroom were extensively used, particularly during the COVID-19 pandemic, due to their accessibility, ease of use, and adaptability to diverse educational needs.

Flipped classrooms and gamification, while promising, require further refinement to fully engage learners and meet their expectations. The study reveals that effective e-learning strategies must address challenges such as technological literacy, infrastructure limitations, and the need for personalized learning experiences. These insights suggest a shift toward a more learner-centric approach, leveraging technology to create interactive, flexible, and inclusive educational environments.

The findings emphasize the critical role of e-learning in shaping the future of technical education. By optimizing the use of widely accepted tools and continuously improving less effective strategies, institutions can bridge gaps in engagement and accessibility. This approach not only enhances learning outcomes but also prepares students and educators for the dynamic demands of a technology-driven world.

In conclusion, the study provides a roadmap for leveraging e-learning to transform technical education. It underscores the importance of ongoing evaluation and adaptation to ensure that e- learning strategies remain relevant, effective, and aligned with the evolving needs of learners and educators.

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SUGGESTIONS

To enhance e-learning in technical education, targeted strategies should focus on refining and optimizing tools and techniques. While flipped classrooms and gamification require further development to align with expectations, the positive reception of social learning sites and mobile technologies highlights their potential as effective e-learning tools. State universities should invest in and optimize these platforms to improve their e-learning programs.The rising popularity of MOOCs, educational DTH channels like Swayam Prabha, and streaming platforms such as YouTube and Facebook underscores the need to diversify digital content to cater to varied learning styles. Incorporating interactive tools like Quizlet and Kahoot can further enhance engagement.

Educational institutions must regularly evaluate the efficiency, usability, and satisfaction of e- learning resources through feedback systems. Leveraging positive student opinions about social media can motivate learners by making assignments shareable. A centralized Learning Management System offering study materials across multiple subjects can significantly enhance students' perceptions of online learning.

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