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The Impact of E-Learning on Teaching and Learning Process: A Cross Case Study Approach

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Abstract:- The primary purpose of the study is to understand the impact of e-learning to the teaching and learning process of the Primary and Secondary schools in Mumbai, India. E-learning is playing a vital role in the existing educational setting, as it changes the entire education system and becomes one of the greatest preferred topics for academics. In an educational environment, there are lots of learning-related processes involved, and great amounts of potential rich data are generated in educational institutions continuously in order to extract knowledge from those data for a better understanding of learning-related processes. This qualitative paper uses a cross-case design method of primary and secondary schools in Mumbai, India. The interviews were scheduled and recorded accordingly. For better understand and clarity it was transliterated. The cases were analyzed individually tracked by a cross-case synthesis of the results. Validity was done as per the academic guideline's mandatory for the excellence of the case study analysis. The results indicate that Teachers viewed learning as a beneficial tool for improving instruction delivery and developing knowledge acquisition skills through the transfer of learning. This study provides a framework for experts who may be inclined for starting their Primary and Secondary schools in Mumbai, India. It also delivers the impact of e-learning on social change observed by the four colleges who are running the under graduate program in India. Research has shown that such studies have not surveyed the impact of e-learning on social change across the globe and India. Usually, most studies on Primary and Secondary schools in Indian setup implement the quantitative method- this study uses the cross-case analysis which is considered as modern and unique in its research.

Keywords*:* E-Learning and India, Education System, India, Social Change.

1. Introduction

E-learning has become a disruptive force in education, changing the way that teaching and learning take place at universities all around the world. A paradigm change in educational approaches has been made possible by e-learning platforms, which have led to a move from traditional didactic methods to more interactive and student-cantered learning experiences. Research has demonstrated how e-learning promotes student participation, group projects, and tailored education, which helps students understand concepts more deeply and retain what they have learned. The transition from traditional chalk and duster way of teaching to more interactive and student-cantered learning experiences has been made possible by e-learning platforms. Studies have demonstrated that personalized instruction, group projects, and active involvement are all promoted by e-learning, which helps students retain and understand material better. The teaching and learning process has been completely transformed by the incorporation of cutting-edge technology like virtual reality, gamification, and artificial intelligence into e-learning settings. These developments in technology improve student engagement, foster critical thinking, and offer immersive educational opportunities. Furthermore, customized feedback and adaptive assessments are provided by adaptive learning algorithms integrated into e-learning platforms, meeting each student's unique learning needs and maximizing learning results. Besides these E-learning implementation poses a number of issues and obstacles for educators and educational institutions, notwithstanding its transformative potential. Adoption of E-Learning is hindered greatly by problems including the digital divide, technology infrastructure,

teacher training, and intellectual property rights. In addition, worries about social isolation, student motivation, and the quality assurance of online education call for cautious design and pedagogical adaptation to minimize any negative effects.

This paper examines the impact of e-learning to the teaching and learning process of the primary and secondary schools in India. An extensive review of related literature has been done to impact of e-learning to the teaching and learning process of the primary and secondary schools in different parts of the world. Section three focuses on the research methodology adapted for the research paper. It is further divided into subsections as research design, case selection, data collection, and data analysis. Section four presents the discussion and analysis of the case studies. Finally, Section five offers the conclusion and policy implications of the research paper.

2. Review of Literature

E-learning is a viable teaching tool and an excellent subject for research on how well it affects students' acquisition of information and how best to educate. The purpose of this review of the literature is to investigate the complex ways that e-learning has affected the process of teaching and learning, as well as the consequences that this has for teachers, students, and educational institutions. While educational institutions utilize technology and the internet to improve the quality of education, many firms use e-learning to train their staff (Simmons, 2002; Sahin & Thompson, 2007; Selim, 2007). Academic institutions are under pressure to provide courses online due to the e-learning trend (Siragusa, 2002).

The incorporation of E-Learning has significantly broadened and enhanced the approach to teaching and learning in higher education. (Cappel & Hayen 2004. While some students who utilize e-learning do better academically and have a more positive attitude, Kirby et al., 2007); others have negative opinions about e-learning because of its complexity, workload, lack of technological know-how, and inability to provide face-to-face contacts (Picciano, 2002). When instructors actively contribute to the creation and delivery of high-quality courses, it creates a successful E-Learning environment. (Rovai, 2002; Wakefield, 2009). When courses are offered online, learners have the flexibility to study whenever and wherever they choose, instructors are relieved of the burden of teaching and classroom management, and the organization may reach a global clientele. (Anderson, 2011).

3. Research Methodology

Research Design

This part of the research paper relies on experimental research design to understand the impact of e-learning to the teaching and learning process of the Primary and Secondary schools in India. Yin (1989, p. 17) notes that "what" inquiries could be utilized to comprehend a particular research design if the study is exploratory, as it is in this research paper.

The research's exploratory process is based on the case study technique, which allows for the discovery of a deep and empirical understanding of those research areas that are meant to receive some attention by specialists, primarily when they take place in dynamic environments (Eisenhardt, 1989; Yin, 1989). According to Pettigrew (1990), "adopting a case study approach means to study a set of periods longitudinally in time" in order to clearly show how the episodes of interest have evolved over time. More specifically, a comparative-case studies approach was chosen, in which five cases were thoroughly examined in order to develop comprehension using a comparison logic.

Case Selection

When studying multiple case studies, the number of cases to be number of examples to investigate is crucial. The sampling logic presupposes that the case study's sample size is meaningless (Yin, 1989). We do several experiments and replication logic must be used in a comparable way, which calls for a thorough examination of each instance. impact of e-learning to the teaching and learning process of the Primary and Secondary schools in India is as follows:

Table 1: Inclusion and Exclusion criteria for a cross-sectional multiple case study approach with impact of e-learning to the teaching and learning process of the Primary and Secondary schools in India

Inclusion Criteria	Exclusion Criteria
Year of establishment > 10 years	Refusal to give one to one interview
All the firms should be located in Mumbai, India	Schools not adopted E-learning
All the firms should be from same education trust	

In order to have a thorough examination of the topic, it is equally important to choose multiple case studies and to have convenient access to those organizations throughout a specific time frame. “Purposive sampling” was the sample strategy employed to maximize study depth. The more appropriate sampling technique for qualitative research is purposeful or judgmental sampling, especially when choosing participants for certain scenarios. In this sample technique, instances are chosen based on the expert's judgment or with a specific goal in mind by the researcher. Purposive sampling is helpful for the case study in three situations: (1) when a researcher wants to select unique cases that are exceptionally informative, (2) when a researcher would like to select members of a difficult-to-reach, specialised population, and (3)) when a researcher wants to identify particular types of cases for in-depth investigation. The goal is to comprehend those specific case types on a deeper level (Neuman, 2009). The two Primary and Secondary schools that were chosen were some of the leading ones in the area of location. The time frame for identifying the case and conducting its study depended on the data's accessibility. In qualitative research, there is no set rule for calculating sample size. One respondent's comment might be included, particularly when researching novel traditions, practices, or customs. Rather than emphasizing the number of respondents, it depends more on the researcher's abilities and talents to gather, analyse, and interpret material in an understandable and logical manner (Patton, 2002). It depends on a number of variables, including the goals of the study, the selection of the data, the availability of funding, time restrictions, etc. (Krueger & Casey, 2000; Patton, 2002). Safman et al. (2004) The sample size in qualitative research is a topic that sparks discussion and disagreement among researchers. Additional information about sample size for qualitative study was suggested by Burns and Grove (2009). They suggested that the researcher should initially grasp the investment domain, aiding in the determination of the appropriate number of respondents. Yin (2009) observed that because of the case study approach's nature, traditional sample size criteria are inconsequential. Instead, the emphasis should be on gathering comprehensive information about the different facets of the case. This sampling process is called 'purposeful maximal variation' by Creswell (2007). He proposes that there isn't a set quantity of respondents required for interviews in qualitative research; rather, it hinges on how well it meets the study's requirements.

Data collection

Case studies typically combine different sources of evidence and data collection methods (Yin, 1989; Eisenhardt, 1989). To understand the with impact of e-learning to the teaching and learning process of the Primary and Secondary schools in India multiple sources are required. For that reason, this chapter is based on several causes of the indication to comprehend it better. The primary source includes semi-structured interviews where different questions related to the year of establishment, implementation of E-learning, student engagement, challenges in implementation, learning outcomes, etc. were asked. A secondary source of data was used to verify and strengthen the suggestion strained from the primary source. For the same, it was collected through websites, journals, books, records, etc.

Data analysis

Data collected was analysed using cross-case analysis. For every two cases, an interview was scheduled, and the case was developed. After all the two cases were developed, the cross-case analysis method was used to analyse the study. The evaluation of numerous examples in a variety of methods is documented by the cross-case analysis. This could not have been accomplished with a single case study. A cross-case study's purpose is to enable the researcher to look past the initial impression of the data Eisenhardt (1989). Thus, data were analysed in all the two cases. The researcher tried to look for similarities within the schools coupled with inter-group differences to understand any pattern. It could be recognised regarding the two firms' procedure. Finally, a cross-case report

offering a holistic interpretation was prepared. The cross-case analysis enabled us to construct a coherent chain of evidence to comprehend the factors influencing district firm growth. (Yin, 1989; Miles and Huberman, 1994).

4. Discussion and Analysis of the Findings

Background of all the Firms

Swami Vivekanand English Primary School is a well renowned English Medium School established in 2005 under the patronage of Vivekanand Education Society. At Swami Vivekanand English Primary School, the commitment is to fostering an enriching educational environment is unwavering. They strive to cultivate a space where the teaching-learning process flourishes, ensuring each student receives the tools they need to succeed, not only in their present studies but also in preparation for the Secondary School Certificate Examination. Their academic curriculum is meticulously crafted with a keen understanding of the demands of the contemporary world. They also emphasize a holistic approach that balances essential subjects with practical skills, nurturing well-rounded individuals capable of navigating the complexities of the modern era. Core subjects such as English, Mathematics, and Science form the foundation of our curriculum, empowering students with fundamental knowledge and critical thinking skills. Additionally, we recognize the importance of nurturing creativity and self-expression, which is why Art & Craft is integrated into our curriculum, providing students with opportunities to explore their artistic talents.

Swami Vivekanand High School, believes in motivating students to ask questions, challenge assumptions, and apply their learning to real-world. By actively involving students in the classroom, SVHS encourages them to be curious and build their self-confidence. The academicians push the students to not only be creative but also critical thinkers. The syllabus is thoroughly built and developed by faculty with an aim to enhance students' academic skills, deliver accurate content, and push students to cope with the meaning of the subjects. SVHS envisions the all-round development of students in harmony with the comprehensive approach to education and therefore, highlights incorporation of co-curricular activities with curricular ones. The curriculum promotes individualized learning and strives to explore the potential of students. With a refined academic direction students evolve into wise young adults with a sense of real self-confidence. Considered as one of the most reputed institutions of Mumbai, a recent survey showed that the Swami Vivekanand High School is in the top 2% in Maharashtra. The school has all the facilities of Music Library, Sports Academy, Laboratories, highly dedicated & experienced staff. All the classrooms are fitted with interactive boards & LCD projectors.

Based on a detailed literature review and the study, a Conceptual framework for the impact of e-learning to the teaching and learning process of the Primary and Secondary schools in India was developed. The Conceptual framework would act as a pattern that can be matched in the context of two schools and the impact of e-learning to the teaching and learning process.

Table 2: Conceptual framework for impact of e-learning to the teaching and learning process of the Primary and Secondary schools in India

Factors	Sub Factors
Background of the Heads	• *Experience* • *Expertise*
Planning	• *Vision* • *Goals*
Benefits	• *Increased student engagement* • *Personalized learning experiences* • *Expanded access to educational resources*
Challenges	• *barriers to adoption* • *technical constraints* • *resistance from stakeholders*
Support & resources	• *Implementing E-Learning initiatives*

Factors	Sub Factors
	• *Funding sources* • *Professional development opportunities* • *Technical Assistance* • *Collaboration with external partners or educational institutions*
Pedagogical Approaches	• *integrating E-Learning into the curriculum and instructional practices.* • *pedagogical strategies for designing effective online learning experiences,* • *fostering collaboration and communication among students and teachers,* • *and assessing learning outcomes in virtual environments*
Student & Teacher Engagement	• *strategies for promoting student and teacher engagement* • *initiatives to motivate students to participate actively in online learning support teachers in adapting to new instructional methods* • *create a supportive learning environment conducive to virtual interactions*
Evaluation & Assessment	• *methods for evaluating the effectiveness of E-Learning programs* • *assessing their impact on teaching and learning outcomes* • *metrics for measuring student achievement* • *feedback mechanisms for continuous improvement* • *mechanisms for monitoring program implementation* • *compliance with educational standards*
Future Directions	• *vision for the future of E-Learning in their school* • *potential areas for growth and innovation* • *plans for scaling up successful initiatives* • *addressing emerging challenges* • *staying abreast of advancements in educational technology and pedagogy*

The above table indicates the factors that affect impact of e-learning to the teaching and learning process of the Primary and Secondary schools in India. The major factors which can impact e-learning could be as follows: challenges, Support & resources, Pedagogical Approaches, Student & Teacher Engagement, Evaluation & Assessment, Future Directions

5. Cross Case analysis of the Two Case Studies

Table 3: Cross Case analysis of all the two Case Studies

Factors	Sub factors	Case 1	Case 2
Background of the Heads	*Experience*	MS. Neelam Kannoji has experience transitioning from a Hindi medium to an English medium school. (Pre-primary & Primary School)	Praniti Mitra has 24 years of overall experience in education and has served as principal for the last 8 years. (Ves High School)
	Expertise	The head is experienced in integrating technology with traditional teaching methods.	Praniti Mitra has experience in adopting digital platforms and innovative teaching methods.
Planning	*Vision & Goals*	Emphasis on personalized education and continuous improvement.	A balanced approach with a 60% emphasis on traditional teaching methods and 40% on E-learning.

Factors	Sub factors	Case 1	Case 2
Benefits	*Increased student engagement*	Achieved through personalized learning experiences and access to educational resources.	Enhanced by interactive digital platforms and subject-specific content.
	Personalized learning experiences	Teachers create tailored videos and utilize multimedia content.	Utilization of Educomm digital platform and subject-specific notes.
	Expanded access to educational resources	Integration of technology provides a variety of resources in multiple languages.	Utilization of digital platforms and websites for subject-specific content.
Challenges	*Barriers to adoption*	Limited resources and infrastructure, especially for purchasing advanced software and hardware.	Financial constraints and the need for tech-savvy teachers.
	technical constraints	Adaptation to available resources due to constraints in purchasing advanced technology.	Inconsistent tech support hindered learning.
	resistance from stakeholders	Creative adaptation and modification of existing systems to suit needs.	Training programs offered in Excel and basic computer skills.
Support & resources	*Implementing e-learning initiatives*	Integration of interactive panels, Smart TV, and e-learning tools.	Adoption of Educomm digital platform and training programs for teachers.
	Funding sources	Leveraging available resources creatively to address financial constraints.	Training programs offered to overcome financial constraints.
	Professional development	Continuous engagement in training seminars to improve skills.	Training programs in Excel, basic computer skills, and other relevant areas.
	Technical assistance	Utilization of user-friendly platforms with good technical support.	Training programs offered to enhance technical skills.
	Collaboration with external partners or educational institutions	Partnership with educational organizations for resource sharing and community engagement.	Collaboration with local universities for teacher training programs and industry partnerships for career counselling initiatives.
Pedagogical Approaches	*integrating E-Learning into the curriculum and instructional practices*	Balanced approach between traditional teaching methods and technology integration.	Adoption of blended learning approaches.
	pedagogical strategies for designing effective online learning experiences	Flipped classrooms and personalized learning approaches.	Utilization of interactive digital platforms and subject-specific notes.

Factors	Sub factors	Case 1	Case 2
	fostering collaboration and communication among students and teachers	Enhanced peer interaction and collaborative learning.	collaboration and communication have enhanced learning outcomes.
	assessing learning outcomes in virtual environments	Assessment methods for evaluating effectiveness and compliance with educational standards.	Challenges in providing timely feedback and assessments.
Student & Teacher Engagement	*strategies for promoting student and teacher engagement*	Emphasis on motivating students to participate actively in online learning and supporting teachers in adapting to new instructional methods.	Utilization of interactive digital platforms and live classes.
	initiatives to motivate students to participate actively in online learning	Strategies could include gamification, interactive content, to engage students actively.	Strategies could include creating interactive quizzes, virtual rewards, or peer competitions to encourage active participation in online learning.
	support teachers in adapting to new instructional methods	Continuous engagement in training seminars to improve skills.	Training programs offered to overcome challenges in technology adoption.
	create a supportive learning environment conducive to virtual interactions	Emphasis on personalized education and continuous improvement.	Utilization of interactive digital platforms to enhance student engagement.
Evaluation & Assessment	*methods for evaluating the effectiveness of E-Learning programs*	Effective feedback mechanisms and varied assessment methods implemented.	Challenges in providing timely feedback and assessments.
	assessing their impact on teaching and learning outcomes	Improved academic performance and skill development observed.	Mixed results on academic achievements.
	metrics for measuring student achievement	Test scores, Exam score, project completion marking system, or participation levels is to be considered.	Test scores, Exam score or participation levels is to be considered.
	feedback mechanisms for continuous improvement	Effective feedback mechanisms implemented such as from parents/Guardian or from teachers.	Challenges in providing timely feedback.
	mechanisms for monitoring program implementation	Mechanisms includes regular assessments on teaching &	Mechanisms includes regular progress reports or performance assessments.

Factors	Sub factors	Case 1	Case 2
		learning process from teachers & parents.	
	compliance with educational standards	Compliance with educational standards is emphasized, indicating a focus on meeting the requirements set by educational authorities to ensure quality education.	The nature of educational institutions to adhere to regulatory requirements.
Future Directions	*vision for the future of E-Learning in their school*	Emphasis on personalized education, continuous improvement, and staying abreast of advancements in educational technology and pedagogy.	It includes goals for further integrating technology or improving teaching methods.
	potential areas for growth and innovation	Potential areas could include expanding E-learning resources, implementing new teaching strategies, or adopting emerging technologies.	potential areas could include expanding digital resources, enhancing teacher training programs, or exploring new educational technologies.
	plans for scaling up successful initiatives	Plans could include expanding successful E-learning programs to additional grade levels or subjects, or replicating successful teaching strategies across classrooms.	Plans could involve expanding successful E-learning initiatives to reach more students, or implementing successful teaching methods in additional subjects.
	addressing emerging challenges	Addressing challenges could involve finding solutions to overcome barriers to technology adoption, addressing teacher training needs, or adapting teaching methods to changing educational landscapes.	Addressing challenges could involve finding solutions to financial constraints, improving tech support, or enhancing student engagement strategies.
	staying abreast of advancements in educational technology and pedagogy	Indicating a proactive approach towards integrating new developments into the teaching practices.	staying updated could involve attending conferences, professional development, or networking with educators and technology experts.

Factors related to Challenges

Every new technology has its own challenges, it mostly depends is the head of the institute ready to take up those challenges related to the deployment of e-learning. Many students may not have access to computers, tablets, or other digital devices required for online learning, particularly those from underprivileged or rural locations. The digital divide increases gaps in educational opportunities and prevents marginalized groups from participating.

Inadequate infrastructure can make it difficult to deliver E-Learning services and information. Examples include obsolete gear, slow internet, and unstable electrical supplies. Online activities are disrupted by slow internet speeds, network congestion, and power outages, which can be frustrating and impair the learning process.

Factors related to Support & resources

In order to facilitate effective teaching and learning processes in educational institutions, support and resources for e-learning are essential. Delivering E-Learning information and enabling virtual interactions between teachers and students require a sufficient technical infrastructure, which includes dependable internet connectivity, PCs or tablets, and suitable software platforms. Providing educators with chances for ongoing professional development is crucial to enhancing their ability to successfully use technology into their instructional strategies. Teachers can learn how to use E-Learning resources to improve student engagement and learning results, as well as explore new teaching approaches, by participating in training programs, workshops, webinars, and mentoring activities. The schools should provide frequent training sessions and workshops on pedagogical approaches, best practices, and e-learning tools. Topics such as online learning platforms, producing interesting digital content, leading online discussions, and online student learning assessment can be covered in these seminars.

Factors related to Pedagogical Approaches

The reach and impact of e-learning initiatives can be increased outside of the classroom by collaborating with outside groups to improve outreach and community engagement programs. In order to create community-based projects, service-learning opportunities, or internship programs that bridge the gap between classroom instruction and real-world experiences while addressing regional needs and difficulties, schools can work in partnership with neighbourhood companies, community organizations, or non-profit organizations. Schools should provide interactive learning resources that actively engage students and promote experimentation, inquiry, and discovery, such as multimedia presentations, films, simulations, tests, and virtual labs. Use of interactive features that encourage deeper engagement with the content and active learning, such as branching situations, clickable hotspots, and drag-and-drop exercises should be encouraged.

Factors related to Student & Teacher Engagement

Schools should provide engaging and entertaining interactive learning resources for students to use, such as games, simulations, quizzes, multimedia presentations, and virtual experiments. Use of gamification components to reward progress and encourage participation, such as leaderboards, points, and badges should be part of the curriculum. Assigning teachers to work closely with technology integration specialists or instructional coaches who can create E-Learning lesson plans, troubleshoot technological problems, and offer individualized assistance and feedback should be implemented. These experts can act as a point of contact for instructors and IT support personnel, assisting in the integration of technology and pedagogy. Specific time for developing curricula should be assigned with an emphasis on integrating e-learning. Inspire interdisciplinary teacher teams to work together to create cross-curricular E-Learning projects, exchange materials, and come up with creative teaching strategies that use technology to improve student learning.

Factors related to Evaluation & Assessment

Teachers can obtain a thorough grasp of students' learning outcomes, engagement levels, contentment, and general success in online learning settings by assessing student achievement along these dimensions. By using a comprehensive approach to assessment, teachers may pinpoint their students' areas of strength and growth, adapt their lesson plans to fit the different needs of their students, and encourage ongoing enhancements to their teaching and learning methodologies. To get further insight into students' learning experiences, preferences, difficulties, and suggestions for improvement, ask open-ended questions, hold focus groups, or conduct interviews.

Factors related to Future Directions

Educational institutions can expand their reach and impact, successfully scale up successful online learning programs, and bring about long-lasting change that benefits communities, educators, and students alike by putting these plans and methods into practice. Schools should participate in joint research and innovation initiatives to

investigate new technologies, instructional strategies, and learning models with coworkers, academic institutions, business partners, and community stakeholders. They should also learn about digital content creation, technology-enhanced learning environments, and successful instructional design principles by attending professional development sessions, workshops, and consultations led by technology specialists. The schools should also motivate teachers to get their research work published in research articles, case studies, and reviews on educational technology and pedagogical innovation by subscribing to scholarly journals, newsletters, and web publications.

6. Conclusions and Policy Implications

E-learning has significantly changed the teaching and learning process in higher education and helped to usher in a new age of educational innovation and accessibility. Education is a dynamic field, thus educational institutions and teachers must deliberately incorporate e-learning technologies to maximize their potential to enhance teaching methods, increase student access, and develop lifelong learning skills. With its ability to take advantage of opportunities and overcome challenges, e-learning has the potential to completely transform education and provide students the skills they need to prosper in the digital age. Policymakers must prioritize investments in digital infrastructure, such as internet connectivity and technology resources, to ensure that all students have equitable access to e-learning platforms. This can mean collaborating with academic institutions and telecom companies to improve internet connectivity and provide impoverished individuals with access to the necessary hardware. Policies should provide funding for comprehensive professional development programs in order to enhance teachers' pedagogical skills and digital literacy in online learning environments. This can mean giving money for training seminars, mentorship programs, and online courses so that academic staff members can successfully integrate technology into their teaching. Policies in e-learning environments should encourage teachers, administrators, and students to develop their ethical standards and digital citizenship skills. To achieve this, educational institutions may need to develop a culture of digital ethics and integrity, raise awareness of online safety and responsible technology use, and include instruction in digital literacy in the curriculum. From the above research paper, we can say that E-Learning on Teaching and Learning Process has impacted the schools under study and it can be taken as role model and can implemented in other primary and secondary schools across India and other parts of the world.

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