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Importance and Outcome of E-learning in Primary/Elementary Education

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Abstract:
Electronic learning (e-learning) is becoming popular in education worldwide. It represents a modern form of distance education in which training or educational material is delivered through the Internet. Particularly after the outbreak of the COVID-19 pandemic has accelerated the integration of e-learning into the teaching and learning processes. This research adopts an empirical and quantitative approach by utilizing primary data gathered from 150 Indian primary/elementary school students and teachers by using Google form questionnaires as information. These questionnaires are based on demographic features like age, income, gender and organization, alongside types of e-learning tools used. The primary data is analyzed by utilizing SPSS software. This research aims to assess the importance and outcome of e-learning in Indian primary/ elementary education, and the impact of social and emotive gaming/playing elements, parental involvement, and student satisfaction related to e-learning in primary/elementary education is determined. This study provides insight that can strengthen e-learning implementation in Indian primary/elementary students.

Keywords: E-learning, demographic factors, Indian, primary/elementary education, social and emotive, game, parental involvement, student satisfaction.

Introduction:

Indian education is transforming and inclusive of all classes of people. It has become a part of self-identity of an Indian. This education has evolved over a period of time which has provided sustainability and balance to itself and our country (Chui et al., 2024). This has also given millions of skilled employees across the country who has contributed to the Indian GDP and its progress. Social transformation and movement towards classless society was achieved with this education only.

Techno orientations have provided new outlook, thinking and prospects for Indian education. This Indian education has added cultural, social and political aspects which have shaped its progress and evolution since independence. With the Covid millions of Indian school children lost their regular mode of education. The physical contact oriented class room and teaching learning practices became obsolete. There was a need for new transformatory education for which the teachers and students had to become mentally oriented (D'amore et al., 2023). This perceptual transformation coupled with establishment of e-learning infrastructure was another challenge. Implementation of e-learning in India had its own issues and problems. Student mindset, pace of learning, assessment and monitoring were huge challenges in this process. Students and teachers have adapted very well to this modern inclusive education.

E-learning process has positively affected all forms of Indian education and at all levels. It has indeed transformed even primary/elementary education as it has provided new impetus, novelty and standards.

The new forms of video, picture based, game based learning methods were interactive and it has given new approaches on elementary teaching and learning process (Chui et al., 2025). However the scope and importance, its relevance and significance along with its outcomes has not been evaluated or studied. This can provide new insights and understanding on effective implementation of e-learning in Indian primary/elementary schools. This study is exploratory and conclusive in its nature and approach. This study is empirical and quantitative. Primary data for this study would be collected from Indian primary school students and teachers. The collected data would be analyzed with SPSS as it can provide new insights and approaches (Singh and Mishra). The study also intends to evaluate the nature of importance and outcomes of e-learning in Indian elementary schools. The next section would deal with literature review.

Literature review:

(Ramadevi et al., 2024) had done quantitative research on e-learning and its transformative mechanisms. This study has focused on higher education in India. In this study the various ways and means to empower higher education has been evaluated and suitable strategies has been given using SEM analysis. It is found in this study that students are favorable towards e-learning across gender as it shapes their mental perception and orientation positively. For this study primary data has been collected from 200 e-learners in Tamilnadu.

It is concluded in this study that e- learning practices has to be effectively integrated in Indian higher educational practices. However it is also found that researches have not been done on importance and outcomes of e-learning practices in Indian primary/ elementary school education as this research is an attempt on it.

(Dubey, 2024) has evaluated the changes and transition of educational systems and its process during Covid. This shift has brought in new e- learning systems and practices which has evolved in India. This study found that e-learning process and systems were adopted in Indian schools during Covid times. This has really brought in new changes and transformations in Indian school education. However the importance and outcomes of e-learning in Indian primary/ elementary schools has not been studied as this study is an attempt on it.

(Sharma et al., 2024) had done research study to evaluate the web based learning approaches among Indian students. The role and impact of Techno adoption and acceptance has been evaluated with a theoretical model. This has really given new impetus and directives for modern techno based educational systems and practices. Primary data for this study has been collected from 197 Punjab university students as the data has been analyzed with exploratory factor analysis. It is found in this study that quality learning methods and adaptive practices would be the futuristic challenge in e- based learning systems and practices in India. However it is also found that the role and impact of e-learning in Indian primary/ elementary schools has not been studied or evaluated as this study is an attempt on it.

(Mukherjee and Srishti, 2024) had done research study on the ways and means to improve teaching learning process and its outcomes. The impact of edtech on Indian education and its transformations has been evaluated in this study. It is stated in this study that India would transform in to one trillion economy by 2027-28. It is also stated in this study that Indian educational system must focus more on establishing e-learning infrastructure and its effective implementation. New course curriculum, methodologies & practices has to be evolved and managed. These new practices would transform Indian primary/elementary

schools and its management. As research studies have not been done on these aspects and dimensions in Indian context this research is an attempt in this direction for the first time.

Research methodology:

Aim of the study: This study aims to evaluate the role and impact of e-learning practices in Indian education. This study aims to assess the importance and outcome of e- learning in primary/ elementary education. The role of access and experience in e-learning towards transformative education in primary/ elementary education would be assessed. The effects of e- learning in primary/ elementary education would be determined.

The role and effects of e-learning on academic performances in primary/ elementary education would be found. The social and emotive impact of e-learning in primary/ elementary education would be known. The role and impact of game/play/video oriented e-learning systems in Indian primary/ elementary school educational system and practices would be evaluated. The effects of parental involvement in e- learning practices in primary/ elementary education would be evaluated. The nature and extent of student satisfaction towards e-learning in primary\ elementary education would be understood.

Type of research: This research is exploratory and conclusive in nature. This research is exploratory as it explores in to the various aspects and dimensions in importance of e-learning & its importance in primary/elementary education would be determined.

This study is conclusive in its nature as specific conclusions, recommendations and strategies for effective implementation of e-learning in Indian primary/elementary education would be provided.

Research method: This research is empirical and quantitative in its nature & applications. For this study primary data would be collected from Indian primary school students & teachers as the data would be analyzed with SPSS.

Need and significance of the study

Techno orientation and integration has effectively transformed Indian educational systems (Akoka et al., 2023) (Vertovec, 2023) and practices. It is also evident that these modern e-learning systems have changed the educational landscapes with new orientations, thinking & implementation methods. Although we could see this e-learning practice could change the modern educational system with new thinking, orientation and transformative outcomes. However there is an immense need to assess the specific e-learning practice and procedure which can transform Indian primary/ elementary education.

There is also an immense need to evaluate the access, experience, learning methods, impact on academic performances, social emotive impact, parents involvement and student's satisfaction of e-learning (Kubarek et al., 2023) (Makhdievna, 2023) (Marlow, 2023) (Patton, 2014) in Indian primary/elementary education.

As these aspects & dimensions has not been evaluated or studied this research could provide new impetus and directives for e-learning oriented transformative Indian primary/ elementary education. As this research is significant on these aspects – the research on these directions is justified – so this research is carried out in this direction.

Objectives

1. To evaluate the role and impact of e-learning practices in Indian education.
2. To assess the importance and outcome of e- learning in Indian primary/ elementary education.

3. To find out the role of access and experience in e-learning towards transformative education in primary/ elementary education
4. To assess the effects of e- learning in primary/ elementary education on teaching learning practices
5. To find out the effects of e-learning on academic performances in primary/ elementary education
6. To know the social and emotive impact of e-learning in primary/ elementary education
7. To assess the role and impact of game/play/video oriented e-learning systems in Indian primary/ elementary school educational system and practices
8. To determine the effects of parental involvement in e- learning practices in primary/ elementary education
9. To assess the nature and extent of student satisfaction towards e-learning in primary\ elementary education

Hypothesis

H1: The role and impact of e-learning practices in Indian education is positive and transformative

HO: e- learning practices are not important as they do not lead to educational transformatory outcomes in Indian primary/ elementary education

H1: The role of access and experience in e-learning towards transformative education in primary/ elementary education is very positive and encouraging

HO: There is no effect of e- learning in primary/ elementary education on teaching learning practices

H1: There is social and emotive impact of e-learning in primary/ elementary education among students and teachers

HO: There is no impact of game/play/video oriented e-learning systems in Indian primary/ elementary school educational system and practices

H1: The effects of parental involvement in e- learning practices in primary/ elementary education are crucial, determinal and encouraging

HO: There is no involvement & student satisfaction towards e-learning in primary\ elementary education

Data collection

Primary data for this study has been collected from Indian primary/elementary school students and teachers using questionnaire. Primary data for this study would be collected using convenience sampling method. Primary data would be obtained from 150 Indian primary/elementary school students and teachers using Google form questionnaire. Secondary data for this study would be collected from various published sources.

Data analysis methods

The primary data collected from Indian primary/elementary school students and teachers across India would be collected using a structured questionnaire as information would be collected on various factors – demographic factors like age, income, organization and gender along with types of e-learning tools and usage in Indian primary/elementary schools. The data would be collected using Likert seven point scale (Bonnell and Hunt, 2023) (Carter et al., 2023) }which ranges from strongly disagree, disagree, somewhat disagree, either agree or disagree, somewhat agree, and agree. This data would be entered in an excel sheet and it would be uploaded in SPSS software. This software would analyze the data and provide results.

1. Correlation would be done which would measure whether there is relationship between two factors and whether it is significant. For example age and type of e-learning practices - whether it is related could be evaluated and if the score is more than 0.5 it would mean that these two factors are positively related and if it is below it – it means there is no relationship between these factors and a score of 0.8 or above would mean that there is a strong relationship between these two factors.
2. Regression value and significance: Regression score would test the relationship between the variables given in the hypothesis. Here if the score is 0.05 it shows that there is no actual difference between the variables and null hypothesis could be rejected.
3. Factor analysis: It is a test conducted to know the most significant factors in effective understanding (Blanca-Mena et al., 2022) on applications of e-learning in Indian primary/elementary schools.
4. It could be concluded that e-learning has a strong positive impact on Indian primary/ elementary education as it is very important towards future.
5. In an analysis 4 to 5 major factors could emerge which are important for effective implementation of e-learning in Indian primary/ elementary schools would be provided.
6. SEM model: This can be developed as a SEM model which can be done automatically with SPSS.
7. In this diagram the major significant variables which lead to effective e-learning practices in Indian primary/ elementary schools could be found.
8. This provides an overall comprehensive empirical strategy for Indian primary/elementary school which could provide transformation of student's performances and their outlook.

Scope and limitations

1. This study is attempted as an all India study
2. Convenience sampling method is used to collect primary data from Indian primary/elementary schools
3. The primary data for this study has been obtained from students and teachers as other employees do not form a part of this study
4. Data analysis has been done with SPSS and other forms of data analysis tools has not been used in this study
5. The perception and opinions of Indian students and teachers could be biased or influenced due to various factors.

Outcome of the study

1. This study would determine the role of e-learning in Indian primary/elementary schools
2. The impact of e-learning on Indian primary/elementary schools would be given
3. The study would identify specific e-learning approach for Indian primary/elementary schools towards future
4. The role of game oriented e-learning systems and practices and its impact on Indian primary/elementary schools would be determined
5. The study intends to provide an SEM model on e-learning strategy for Indian primary/elementary schools. This would ensure that effective implementation of e-learning practices in Indian primary/elementary schools towards future.

Data analysis & Interpretation

Table 1: Demographic analysis

Age	**Frequency**	**Percent**
9 - 10 years	102	65.80
11 - 12 years	37	23.90
13 - 14 years	16	10.30
Grade level	**Frequency**	**Percent**
4 - 5	102	65.80
6 - 8	53	34.20
Do you have access to a computer at home?	**Frequency**	**Percent**
Yes	125	80.60
No	30	19.40
Do you have a reliable internet connection at home?	**Frequency**	**Percent**
Yes	123	79.40
No	32	20.60
What kind of e-learning or online apps or platforms do you use?	**Frequency**	**Percent**
Zoom	127	81.90
Google Meet	16	10.30
Telegram	3	1.90
Whatsapp	3	1.90
Whiteboard	6	3.90
How often do you use e-learning tools and platforms for your studies?	**Frequency**	**Percent**
Daily	6	3.90
Weekly	28	18.10
Monthly	63	40.60
Never	58	37.40
How often do you interact with your teachers through e-learning platforms?	**Frequency**	**Percent**
Daily	3	1.90
Weekly	5	3.20
Monthly	22	14.20
Never	125	80.60
Do you feel more confident using e-learning tools now than when you first started?	**Frequency**	**Percent**
Yes	124	80.00
No	31	20.00
Total	155	100.00

The demographic study offers a perceptive summary of the traits and experiences of the subjects about e-learning tools and platforms. The age distribution shows that the most of the respondents (65.8%) fall within the 9–10 years range; followed by 23.9% in the 11–12 years group and 10.3% in the 13–14 years group. This points to a distorted view of younger primary school children, which is also seen in the grade-level distribution wherein a noteworthy 65.8% of respondents fall in grades 4–5 and 34.2% fall in years 6–8. The predominance of younger pupils implies that the results of this research especially apply to early elementary schooling. About home technology access, most (80.6%) of respondents said they had access to a computer and 79.4% verified they had a consistent internet connection. Though a small minority (19.4% for computers and 20.6% for internet access) still encounter obstacles, these numbers show that majority of the students in the sample are ready for e-learning. This difference highlights the digital gap that can restrict the inclusion of e-learning programmes for certain kids, especially those in underprivileged or resource-limited homes.

While other platforms like Google Meet (10.3%), Whiteboard (3.9%), and messaging applications like Telegram and Whatsapp (1.9% each), the statistics on the kinds of e-learning platforms used show the predominance of Zoom, which is used by 81.9% of the respondents. This points to a strong inclination or institutional acceptance of Zoom as the main e-learning technology, maybe because of its availability and utility. Nonetheless, the restricted usage of certain platforms might indicate a lack of exposure or training in other technologies, which would call for development of e-learning projects. Different pupils use e-learning tools at somewhat different frequencies. Although only 3.9% of people use these tools every day, the most (40.6%) interact with them once a month; 37.4% never use them at all. This discrepancy in use might point to gaps in the way e-learning is included into the kids' normal academic schedules, maybe resulting from technological difficulties, poor instructor involvement, or insufficient parental support. Comparably, contact with instructors using e-learning systems are infrequent; 80.6% of students say they never engage with their teachers in this manner. This absence of communication reduces the interactive and cooperative possibilities of e-learning and can thus lower student interest and involvement. Fascinatingly, despite difficulties with regularity and involvement, most (80.0%) of students feel more secure today utilising e-learning tools than when they initially began. This result emphasises students' increasing familiarity with digital platforms and their capacity to change with time towards technology tools. It also implies that e-learning might become naturally part of their educational process with correct direction and regular use.

Table 2: Correlation

Correlations	Role and Impact	E-Learning Practices	Access and Experience	Effect in Learning	Social and Emotive	Impact of game	Effect of parental involvement	Student Satisfaction	Overall Outcome
Role and Impact	1	.663**	.620**	.701**	.816**	.739**	.684**	.733**	.691**
E-Learning Practices	.663**	1	.578**	.757**	.727**	.838**	.684**	.791**	.735**
Access and Experience	.620**	.578**	1	.547**	.534**	.611**	.830**	.700**	.418**

Effect in Learning	.701**	.757**	.547**	1	.758**	.693**	.672**	.750**	.766**
Social and Emotive	.816**	.727**	.534**	.758**	1	.678**	.624**	.676**	.743**
Impact of game	.739**	.838**	.611**	.693**	.678**	1	.645**	.863**	.748**
Effect of parental involvement	.684**	.684**	.830**	.672**	.624**	.645**	1	.773**	.561**
Student Satisfaction	.733**	.791**	.700**	.750**	.676**	.863**	.773**	1	.754**
Overall Outcome	.691**	.735**	.418**	.766**	.743**	.748**	.561**	.754**	1

With "Social and Emotional" (.816), the component "Role and Impact" shows a substantial positive association, meaning that the social and emotional aspects of e-learning are tightly related with its apparent influence. This implies that among students, the incorporation of social and emotional elements in e-learning improves its apparent relevance and efficiency. Moreover, the "Role and Impact" element shows significant links with "Impact of Game" (.739), "Student Satisfaction" (.733), and "Effect in Learning" (.701), thereby stressing its whole importance on students' learning experiences and results. Emphasising that good e-learning practices greatly contribute to the interactive and interesting features of education, which in turn lead to higher student satisfaction levels, "E-Learning Practices" show a strong correlation with "Impact of Game" (.838) and "Student Satisfaction" (.791). Furthermore shown by the close correlation between "E-Learning Practices" and "Effect in Learning" (.757) is the need of properly used e-learning solutions in improving learning results.

Strongest correlation between "Access and Experience" (.830) and "Effect of Parental Involvement" (.830) indicates that access to e-learning tools and platforms is tightly correlated with the participation of parents in their child's education. This emphasises how important parents are in helping e-learning, especially with regard to tools and direction. Although "Access and Experience" has modest correlations with most other variables, its quite low correlation with the "Overall Outcome" (.418) suggests that access by itself, without efficient use and engagement, may not be enough to ensure favourable outcomes. Strong correlations between the "Effect in Learning" (.758), "Student Satisfaction" (.750), and "Overall Outcome" (.766) show that social, emotional, and satisfaction-related aspects greatly affect how well learning results turn out. This implies that optimising the efficacy of e-learning depends on a whole strategy including these elements.

Maintaining a strong correlation with "Overall Outcome (.743), the "Social and Emotive" component underlines even more its essential importance in deciding the success of e-learning projects. Comparably, the "Impact of Game" exhibits a high link with "Student Satisfaction (.863) and "Overall Outcome (.748), suggesting that gamified aspects and interactive features in e-learning considerably increase student involvement and the general success of the educational experience. Emphasising that parental support and involvement are main drivers of a good e-learning experience, the "Effect of Parental Involvement" shows

a noteworthy association with "Student Satisfaction (.773". Its quite modest association with "Overall Outcome" (.561) indicates, however, that even if parental engagement is crucial, it has to be balanced by other elements like good teaching strategies and interesting materials. Last but not least, "Student Satisfaction" turns out to be a key factor with substantial connections with "Overall Outcome" (.754), "Impact of Game" (.863), and "Effect in Learning" (.750). This emphasises the need of establishing a rich and interesting learning environment as it shows how both a driver and a result of good e-learning methods are student happiness.

Table 3: Chi-square 1

H1: The role and impact of e-learning practices in Indian education is positive and transformativ

	Overall Outcome					
Role and Impact	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Total
Significantly Decreased	14	0	0	0	0	14
Decreased	6	7	0	0	0	13
No Change	0	0	4	12	16	32
Increased	0	0	12	8	28	48
Significantly Increased	0	0	8	16	24	48
Total	20	7	24	36	68	155
Chi-Square Tests	Value	df	p value			
Pearson Chi-Square	220.536a	16	0.00			
Likelihood Ratio	162.458	16	0.00			

On the other hand, those who said e-learning had "No Change" were more equally spaced throughout the satisfaction scales. Of this group, some were "Satisfied" (12) or "Very Satisfied" (16), while a noteworthy fraction stayed "Neutral" (4). This implies that people who do not see notable changes in the function of e-learning might be less likely to show great happiness or discontent, thereby adopting a middle-ground position. Fascinatingly, the group that said e-learning was "Decreased" or "Significantly Decreased" had poor satisfaction ratings; majority of the respondents fell into the "Very Dissatisfied" or "Dissatisfied" categories. Among those who felt a "Significantly Decreased" role, all 14 respondents were "Very Dissatisfied." For those in the "Decreased" category, a small number (6) were "Very Dissatisfied," and 7 were "Dissatisfied." These results support the idea that a perceived decline in the role and impact of e-learning is highly associated with dissatisfaction regarding overall outcomes.

Results of the chi-square test confirm these findings even further. With a p-value of 0.00, the Pearson Chi-Square value of 220.536 shows a rather strong link between the general results and the influence of e-learning. This implies that these factors have a statistically significant correlation and that the observed response distribution is improbable to have happened by accident. With a similar p-value of 0.00, the likelihood ratio likewise validates the strength of this link. These results provide strong proof to back up

the theory that e-learning methods have a beneficial and transforming influence on the nature of Indian education. The results show that participants' satisfaction with general educational outcomes increases in line with their view of an increase in the function and influence of e-learning. This emphasises the crucial need of improving and supporting the function of e-learning in Indian education as it directly relates to good impressions and satisfaction among involved parties. Simultaneously, resolving the issues raised by individuals who believe the e-learning function is declining or not changing would help to guarantee fair and inclusive advantages from its use.

Table 4: Chi-square 2

HO: e-learning practices are not important as they do not lead to educational transformatory outcomes in Indian primary/ elementary education

	Overall Outcome					
E-Learning Practices	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Total
Very Difficult	4	7	0	0	0	11
Difficult	12	0	0	0	0	12
Neutral	4	0	4	0	4	12
Easy	0	0	4	8	16	28
Very Easy	0	0	16	28	48	92
Total	20	7	24	36	68	155
Chi-Square Tests	Value	df	p value			
Pearson Chi-Square	216.011a	16	0.00			
Likelihood Ratio	152.623	16	0.00			

The way the answers fall across satisfaction levels exposes obvious themes. With regard to the general results, participants who rated e-learning activities "Very Easy" most often expressed being "Satisfied" (28) or "Very Satisfied" (48). Similarly, those who found e-learning practices "Easy" showed a strong inclination towards higher satisfaction levels, with 8 respondents "Satisfied" and 16 "Very Satisfied." These results show that when e-learning platforms and tools are user-friendly and accessible, they greatly help to produce good educational experiences and transforming results. Participants who assessed e-learning methods as "Neutral" or "Difficult," on the other hand, showed less pleasure with the learning results. Of those who identified as "Neutral," the results were equally divided; four respondents in the "Neural" and "Very Satisfied" categories each. The varying degrees of satisfaction of this group imply that inconsistent good results can follow from uncertain usability of e-learning technologies. Moreover, those who thought e-learning methods "Difficult" or "Very Difficult" most definitely expressed discontent. Among those who assessed e-learning as "Very Difficult," for example, most were either "Very Dissatisfied" (4) or "Dissatisfied" (7), whereas all those who ranked e-learning as "Difficult" were "Very Dissatisfied" (12). These results draw attention on how negatively difficult e-learning technologies affect outcomes and satisfaction.

The statistical findings confirm these observations even more. With a p-value of 0.00, the Pearson Chi-Square value of 216.011 shows a very strong link between the general results and the degree of e-learning

activities. This implies that the interaction among these factors is not likely to have happened by accident. With a p-value of 0.00 that is also quite significant, the probability ratio supports the strength of this link. These statistical findings clearly reject the null hypothesis and highlight the crucial need of e-learning methods in obtaining transforming educational achievements. These results imply that educational experiences in Indian main and elementary school are significantly shaped by the design and accessibility of e-learning systems. Higher satisfaction and transforming results follow from e-learning products seen as simple and easy to use. On the other hand, technologies seen as challenging or time-consuming compromise good experiences and happiness, which emphasises the requirement of user-centric design and suitable training for teachers and students both. Emphasising the need of enhancing their usability and accessibility for more general effect, the data supports the idea that e-learning practices are actually important and help to bring about educational revolution.

Table 5: Chi-square 3

H1: The role of access and experience in e-learning towards transformative education in primary/ elementary education is very positive and encouraging

	Overall Outcome					
Access and Experience	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Total
Not Supportive at All	16	0	0	0	4	20
Not Supportive	0	7	0	0	0	7
Neutral	4	0	4	0	36	44
Supportive	0	0	4	20	24	48
Very Supportive	0	0	16	16	4	36
Total	20	7	24	36	68	155
Chi-Square Tests	Value	df	p value			
Pearson Chi-Square	316.271a	16	0.00			
Likelihood Ratio	201.5	16	0.00			

The chi-square study investigates the theory that, for primary and elementary school pupils, access and experience in e-learning play a beneficial and motivating part in attaining transforming education. Given the statistically strong correlation between access and experience in e-learning and the general educational outcomes, the data provide convincing proof to support this theory. With a p-value of 0.00 and a Pearson Chi-Square value of 316.271, the strong link that is rather improbable to have developed by accident is indicated. This result emphasises the crucial need of making sure that e-learning tools have supported access and of encouraging good experiences to get transforming educational results. Positive educational results and good access and experience in e-learning show a clear association according the facts. Of the participants who said e-learning "Very Supportive," most said they had good results; 16 respondents expressed pleasure and another 4 said they were really satisfied. Likewise, those who said their access and experience was "Supportive" had a clear tendency towards good results; twenty people were pleased and twenty-four extremely happy. These results imply that students who feel their e-learning environment is helpful are far more likely to undergo educational transformation and satisfaction.

Conversely, bad e-learning experiences and limited availability greatly compromise favourable results. Participants who claimed access and experience as "Not Supportive at All," for example, mostly expressed unhappiness—16 respondents expressed great unhappiness. Only a tiny percentage (4 participants) in this group indicated extremely high satisfaction, suggesting that, under insufficient e-learning infrastructure and experience, transformational results are unusual. Likewise, those who categorised their experience as "Not Supportive" consistently expressed discontent; seven of them mentioned it. This tendency emphasises how bad restricted access and poor experiences are for students' capacity to gain from e-learning. Fascinatingly, those who saw access and experience as "Neutral" showed a conflicting behaviour. Although four respondents said they had no results, a stunning thirty-six people said they were very satisfied. This suggests that other factors including external resources, intrinsic drive, or support from parents and teachers may compensate even in circumstances where access and experience are not actively seen as encouraging, hence producing favourable results.

The relevance of the likelihood ratio (201.5) and its matching p-value of 0.00 supports the conclusions even more. These findings underline how important access and experience are for forming students's impressions and learning results in e-learning settings. While poor access or unpleasant experiences are major obstacles, supportive access and good experiences create an atmosphere that enables transforming education. The results show generally the important part access and experience play in e-learning as main forces for educational revolution. These findings highlight for legislators, teachers, and institutions the need of funding dependable e-learning infrastructure and encouraging user-friendly experiences to improve learning results. By closing access barriers and raising the calibre of e-learning tools, one may help to empower students to accomplish significant educational change.

Table 6: Chi-square 4

HO: There is no effect of e- learning in primary/ elementary education on teaching learning practices

	Overall Outcome					
Effect in Learning	Very Dissatisfied	Dissatisfied	Neutral	Satisfied	Very Satisfied	Total
Significantly Declined	12	0	0	0	0	12
Declined	8	7	0	0	0	15
No Change	0	0	8	4	12	24
Agree	0	0	8	12	12	32
Significantly Improved	0	0	8	20	44	72
Total	20	7	24	36	68	155
Chi-Square Tests	Value	df	p value			
Pearson Chi-Square	210.669a	16	0.00			
Likelihood Ratio	163.71	16	0.00			

Examining the null hypothesis—that e-learning in elementary and primary school has no appreciable impact on teaching and learning strategies—the chi-square study Strong data showing that e-learning significantly influences teaching-learning approaches helps to strongly refute this theory. With a p-value of 0.00, the Pearson Chi-Square value of 210.669 shows a statistically significant correlation between the general results and the perceived impact of e-learning on learning. Analogously, this conclusion is supported by the likelihood ratio of 163.71, again with a p-value of 0.00. These results expose the quantifiable and transforming impact of e-learning on dynamics of teaching-learning. The way replies are distributed offers understanding of how e-learning influences learning results. With 20 people pleased and 44 extremely happy, a significant fraction of those who said that e-learning "Significantly Improved" learning outcomes showed great degrees of pleasure. This implies that e-learning produces overwhelmingly good impressions and results when it successfully improves teaching-learning approaches. Representing the bulk of the sample, this group emphasises the transforming power of well used e-learning strategies in primary education.

Though to a much lower degree, those who only "Agree" that e-learning enhanced learning outcomes also reported good findings. Of this group, twelve were pleased and another twelve were quite satisfied. This suggests that good educational results may arise from even little changes in teaching-learning methods implemented via e-learning. The results for these two groups highlight in general the important part e-learning performs in improving the teaching-learning process when used properly. On the other hand, individuals who said that e-learning "Declined" or "Significantly Declined" the efficacy of learning mostly voiced discontent. Out of the "Declined" group, seven were unhappy and eight were rather dissatisfied. In the "Significantly Declined" group, too, all twelve members expressed great discontent. These results draw attention to the negative effects of poorly developed or implemented e-learning systems, which could cause annoyance, discontent, and a lack of apparent value in the teaching-learning process.

Fascinatingly, the "No Change" group responded in a mixed-pattern. Out of this group, eight were indifferent, four were content, and twelve were rather happy. This diversity implies that e-learning platforms may still provide extra advantages that help to produce favourable results, including flexibility, accessibility, or more resources, even if some students may not notice considerable changes in teaching-learning approaches. The general results show the dual character of e-learning's influence: when properly combined, it may greatly raise satisfaction levels among elementary and primary students and greatly boost teaching-learning practices. But improperly executed it might lead to discontent and less results. Policymakers, teachers, and organisations as a whole will find great ramifications from these findings. Investing in excellent material, guaranteeing user-friendly interfaces, and giving teachers and students enough training will help to maximise the advantages of e-learning. Furthermore, systems of constant observation and feedback should be set up to handle difficulties and maximise the way e-learning is included into the educational framework.

Table 7: ANOVA 1

H1: There is social and emotive impact of e-learning in primary/ elementary education among students and teachers

Social and Emotive	Sum of Squares	df	Mean Square	F	p value
Between Groups	152.981	4	38.245	72.164	0.00
Within Groups	79.497	150	0.53		

Total	232.477	154			

Compelling data from the analysis of variance (ANOVA) supports the theory that e-learning significantly influences instructors and students in primary and elementary education on social and emotional level. With a very significant F-value of 72.164 and a p-value of 0.00 the statistical findings show a substantial link between the group classifications and the social-emotive effects. The p-value being less than the conventional threshold of 0.05 indicates that the variations among the groups reflect a significant influence of e-learning on social and emotional characteristics in the educational environment rather than result from random fluctuation. With regard to the variance explained by variations across the groups, the "Between Groups" sum of squares comes out to be 152.981. Given the overall sum of squares (232.477), this high number shows that the effect of the independent variable—in this example, the exposure to e-learning practices—can be mostly responsible for the variation in social-emotive outcomes. With a matching mean square value of 38.245 for "Between Groups," e-learning's significant influence on variances in social and emotional experiences among instructors and students is underlined.

By means of a mean square value of 0.53, the "Within Groups" sum of squares—which considers variation within particular groups—is quite low at 79.497. This implies that, while there is some variation within every group, it is somewhat little in comparison to the variances between them. The reduced "Within Groups" variance emphasises the constancy of social-emotive effects within certain categories, therefore underlining the clear variations resulting from e-learning among groups. These results highlight how e-learning's social and emotional influence is dual. One may argue that by motivating cooperation, involvement, and support among instructors and students, it promotes good emotional and social connections. Conversely, differences in access, experience, or implementation quality might produce different social-emotive results—as the between-group variation suggests. This duality emphasises the need of precisely planning and implementing e-learning initiatives to maximise their positive influence on social-emotive aspects. For teachers, legislators, and other participants in the educational field, these findings have major ramifications. Understanding that e-learning affects social and emotional components of learning lays a basis for creating plans to maximise its advantages. Incorporating activities that foster social skills, teaching instructors to control the emotional well-being of their pupils in an online environment, and building platforms that support peer-to-peer and teacher-student contacts might all help to address this. Furthermore helping to reduce the dangers of negative social-emotive results is addressing any obstacles such technology constraints or access inequalities. By concentrating on these areas, e-learning may be used as a transforming tool not just for cognitive learning but also for creating a supporting and emotionally rich learning environment.

Table 8: ANOVA 2

HO: There is no impact of game/play/video oriented e-learning systems in Indian primary/ elementary school educational system and practices

Impact of game	Sum of Squares	df	Mean Square	F	p value
Between Groups	171.83	4	42.958	136.624	0.00
Within Groups	47.163	150	0.314		
Total	218.994	154			

The findings of the analysis of variance (ANOVA) provide strong proof to refute the null hypothesis, which holds that game-, play-, or video-oriented e-learning systems have no effect on instructional practices in Indian elementary and secondary schools. The data shows a very significant F-value of 136.624 and a p-value of 0.00, thereby suggesting that the observed variations across groups in terms of the influence of game-oriented e-learning systems are not resulting from accident. The p-value being less than 0.05 firmly indicates that game- and video-oriented e-learning systems significantly affect educational practices. With a "Between Groups" sum of squares of 171.83, the variations in the effect described by the group differences reflect the variability in this regard. This explains a great majority of the overall sum of squares (218.994), emphasising that group membership is a crucial element in determining variances in how game-oriented e-learning systems are viewed and experienced in the educational environment. Reflecting the great degree to which the inclusion of game-oriented e-learning affects group results differentially, the mean square value for the "Between Groups" variation is 42.958. With a mean square value of 0.314, the "Within Groups" total of squares at 47.163 is much less. This underlines the uniformity in replies within every group as it shows the least of difference across individual groups. The sharp differences between the "Between Groups" and "Within Groups" imply that the effects of game-oriented e-learning systems are evidently defined between several categories or groups, such those based on access, frequency of use, or the quality of implementation of such systems. The strength of the link between the dependent variable (reported influence on educational practices) and the independent variable (usage of game- or video-oriented e-learning systems) shows in the high F-value of 136.624. This suggests that including these systems into main and elementary education has transforming power and will greatly change the way teaching and learning are done. This metamorphosis can show itself as higher engagement, better recall of ideas, and a more engaged and fun classroom for younger kids.

These results highlight the need of including game- and video-based e-learning aids into curricula of education in order to maximize their advantages. These technologies may help to solve problems like keeping student interest and promoting creativity by making learning more interactive and fun. Moreover, they provide chances for adaptive and interactive learning—where students may interact with materials at their own speed and get feedback right away. The findings also underline the importance of fair application tactics as they imply that variations in the efficacy of these systems might be connected to variations in access, teacher training, or technical infrastructure. Finally, the ANOVA study amply illustrates how significantly and favourably game- and video-oriented e-learning systems influence instructional policies in Indian elementary and secondary schools. These instruments are essential for establishing a contemporary and interesting classroom; they are not just extras. Stakeholders who want to fully realise their potential should concentrate on lowering access obstacles, guaranteeing sufficient teacher preparation, and matching these instruments with curricular objectives to assist overall educational growth.

Table 9: ANOVA 3

H1: The effects of parental involvement in e- learning practices in primary/ elementary education are crucial, determined and encouraging

Effect of parental involvement	Sum of Squares	df	Mean Square	F	p value
Between Groups	177.758	4	44.439	97.184	0.00
Within Groups	68.591	150	0.457		

Total	246.348	154			

In this regard, the ANOVA test findings show a noteworthy correlation between parental participation in e-learning activities in primary or elementary school and the consequences of such engagement. Usually stating that there is no difference in the means of the groups, the null hypothesis (H0) would be replaced with the alternative hypothesis (H1), which claims that parental participation has a vital, determinational, and motivating influence on e-learning practices. Under these circumstances, the quite high F-statistic of 97.184 indicates that the variance between the groups is much more than the variation inside the groups. This high F value suggests the rejection of the null hypothesis, therefore verifying the major effect of parental participation on e-learning results. Another important consideration is the p-value of 0.00, which shows rather low chances of obtaining such a big F-statistic by accident. Given that the p-value is much less than the 0.05 standard significance threshold, it implies that parental participation has a statistically significant observable impact. Stated differently, the data offers enough evidence to support the theory that the success of e-learning initiatives in primary school is mostly dependent on parental participation.
Moreover, the mean square across groups is 44.439 and the Sum of Squares between groups is 177.758, indicating that the variations in parental participation degree account for a significant degree of data variability. Conversely, the Sum of Squares within groups comes out to be 68.591 and the matching mean square is 0. 457. This lesser degree of within-group variance supports even more the notion that the variations among the groups are statistically significant and not resulting from random chance. Taken together, these findings unequivocally support the alternative hypothesis (H1), which holds in the framework of primary/elementary education parental engagement in e-learning activities is vital, determinational, and motivating. This emphasises how crucial it is to include parents in the e-learning experiences of their children in order to improve the educational results.

Table 10: ANOVA 4

HO: There is no involvement & student satisfaction towards e-learning in primary\ elementary education

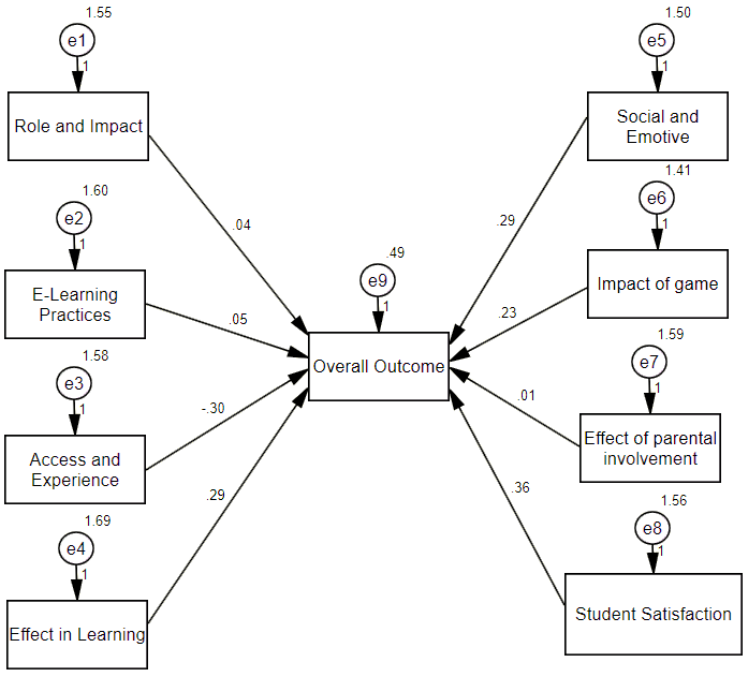
Student Satisfaction	Sum of Squares	df	Mean Square	F	p value
Between Groups	194.364	4	48.591	153.216	0.00
Within Groups	47.571	150	0.317		
Total	241.935	154			

The ANOVA test findings for this study point to a noteworthy correlation between student happiness and the degree of participation of stakeholders in e-learning initiatives in elementary or secondary school. The null hypothesis (HO) holds that student happiness has no effect on degree of e-learning participation. With a somewhat high F-statistic calculated—153.216—the variance between the groups—that of students with varying degrees of e-learning—is clearly considerably more than the variation within the groups. This significant F value strongly indicates that the null hypothesis should be disproved, therefore suggesting that student happiness varies meaningfully depending on degree of e-learning participation. Given that the p-value of 0.00 is well below the usual significance level of 0.05, this conclusion is even more supported by This low p-value indicates that the likelihood of finding such a significant F-statistic by chance is almost nil, therefore offering strong proof that the variations in student satisfaction are not the result of random fluctuation but rather of the varying degrees of e-learning participation. According to the statistics,

participation has a statistically significant influence on student satisfaction; so, the greater the student satisfaction levels the more engaged the participants are in the e-learning process.

Examining the Sum of Squares, we see that the within-group variance is much less at 47.571 while the variation between the groups is 194.364. This significant variance in the sums of squares supports the conclusion that variations in engagement rather than random fluctuations explain the variations in student satisfaction. With a mean square for across groups of 48.591, the mean square within groups (0.317) is quite less. This emphasises even more how mostly the participation of stakeholders in the e-learning process determines the variations in satisfaction levels rather than any inherent conflicts within every group. All things considered, the findings of this ANOVA test unequivocally show that the null hypothesis should be rejected as the data strongly suggests that student happiness and degree of e-learning engagement have a noteworthy correlation. This result emphasises the need of active engagement of many stakeholders, including teachers, parents, and students themselves, in improving the e-learning experience and finally raising student happiness in primary and elementary education.

Structural Equation Modeling



The structural equation model (SEM) shown in the graphic offers a comprehensive picture of the interactions among the many elements affecting the general results of e-learning in primary or elementary education. The study aims to grasp the many effects of these factors on the efficacy of e-learning and clarifies how different components either support or impede its performance. The model detects multiple hidden variables, each of which in this context reflects a vital characteristic of e-learning. Each of these variables is related to the central latent construct labelled "Overall Outcome," which is the dependent variable reflecting the combined effect of these elements on e-learning outcomes. These comprise "Role and Impact," "E-Learning Practices," "Access and Experience," "Effect in Learning," "Social and Emotive," "Impact of Game," "Effect of Parental Involvement," and "Student Satisfaction." The route coefficients in the graphic show the direction and degree of the interactions between the general result and the independent latent variables. Among them, "Access and Experience" seems to have a particularly

negative path coefficient (-0.30), indicating that problems with accessibility and user experience in e-learning can reduce the general results. This suggests that the efficacy of e-learning in elementary school is much hampered by issues such poor infrastructure, technological problems, or restricted user-friendliness.

On the other hand, "Effect in Learning" shows a quite significant positive link with the general result (path coefficient = 0.29). This suggests that e-learning systems greatly help to provide favourable results when they efficiently enable the learning process. Emphasising the need of making sure students find the e-learning experience interesting and satisfying, "Student Satisfaction" also shows a really good impact (path coefficient = 0.36). With path coefficients of 0.05 and 0.04 respectively, the variables "E-Learning Practices" and "Social and Emotive" reveal somewhat modest positive effects on the general result. These findings underline the need of good e-learning plans and the inclusion of social and emotional components into digital learning systems in order to provide a more complete and motivating learning environment. Fascinatingly, "Impact of Game" exhibits a somewhat positive link with the general outcome—path coefficient = 0.23. This implies that including gamification components in e-learning might increase primary-level students' interest and engagement, hence improving the learning results. With a path coefficient of 0.01, the "Effect of Parental Involvement" demonstrates a low effect showing that, while parental engagement may play a part in e-learning, its direct contribution to outcomes is somewhat small compared to other elements. Reflecting the limits of the model in capturing all contributing elements, the error terms (e1 to e9) linked with each latent variable and the overall result show the degree of unexplained variation. For instance, the error term for the overall result (e9 = 0.49) emphasises the complexity of e-learning dynamics in elementary school by implying that over half of the variation in the overall outcome stays unresolved.

Dependent variable	Independent variables	Estimate	S.E.	C.R.	p value
Overall	Role and Impact	0.042	0.045	0.937	0.35
Overall	E-Learning Practices	0.047	0.044	1.052	0.29
Overall	Access and Experience	-0.303	0.045	-6.772	0.00
Overall	Effect in Learning	0.286	0.043	6.619	0.00
Overall	Social and Emotive	0.293	0.046	6.398	0.00
Overall	Impact of game	0.233	0.047	4.94	0.00
Overall	Effect of parental involvement	0.01	0.045	0.22	0.83
Overall	Student Satisfaction	0.36	0.045	8.015	0.00

With a standard error of 0.045 and an estimate of 0.042, "Role and Impact," the first independent variable, stands. With a p-value of 0.35 and a critical ratio (C.R.), of 0.937, The p-value is higher than the traditional 0.05 criterion, hence "Role and Impact" does not clearly affect the general dependent variable. Stated differently, in this study "Role and Impact" had no statistically significant impact on the result. Comparably, the variable "E-Learning Practices" boasts a C.R., a standard error of 0.044, and an estimate of 0.047. 1.052, with a 0.29 p-value. Once again, the p-value is higher than 0.05, indicating that in this model "E-Learning Practices" has no statistically significant influence on the general dependent variable. Conversely, given its estimate of -0.302, with a C.R., the variable "Access and Experience" shows a notable negative connection with the dependent variable. for -6.772. The p-value of 0.00 emphasises even

more the relevance of this variable as it indicates that a drop in the dependent variable corresponds with a better access and experience, therefore with statistical significance.

With a C.R., the variable "Effect in Learning" estimates positively at 0.286. With a p-value of 0.00 and a 6.619 value, the dependent variable shows a rather significant positive correlation. This implies that good changes in the general dependent variable are somewhat correlated with enhancements in learning effects. With an estimate of 0.293, a C.R., the "Social and Emotive" variable also demonstrates a significant positive influence. With a p-value of 0.00 and a 6.398 value. This suggests that the result determined by the dependent variable is favourably influenced by social and emotional elements in major part. With a C.R., the "Impact of Game" variable projects 0.233. with a p-value of 0.00 and 4.94. This implies that include games has a major positive effect on the dependent variable, therefore validating the theory that gamified features may help to produce the intended result. With a C.R., the "Effect of Parental Involvement" presents a quite meagre estimate of 0.01. With a p-value of 0.83 and 0.22. The high p-value indicates that the general dependent variable is not much influenced by parental participation, thereby suggesting that in this model parental involvement has either little to no influence on the result.

At last, "Student Satisfaction" has a quite strong positive estimate of 0.36, a C.R. of 8.015 with a 0.00 p-value. This suggests that greater degrees of student satisfaction are connected to better results in the dependent variable as it reveals that student satisfaction is very substantial and favourably correlated with the general dependent variable. Overall, the study shows that while "Role and Impact," "E-Learning Practices," and "Effect of Parental Involvement" have not statistically significant effects in this model, variables including "Access and Experience," "Effect in Learning," "Social and Emotive," "Impact of Game," and "Student Satisfaction" greatly influence the dependent variable. These findings underline the relevance of elements connected to student involvement and learning outcomes as well as imply areas where additional study might be required to grasp the functions of certain variables.

Discussion:

The primary aim of this study was to determine the impact of social and emotional factors, parental involvement, games/play, and student satisfaction on e-learning in primary/elementary education. The findings indicate that dependent variables such as social and emotional factors, the impact of games, and student satisfaction significantly influence e-learning. However, parental involvement did not demonstrate a significant effect on primary/elementary students.

In this study, social and emotional aspects are affected in two ways. The transition to e-learning has considerably disrupted the daily lives of students, negatively impacting their overall well-being. This disruption highlights how e-learning interrupts the essential role of social interaction in the learning process. Prolonged e-learning can lead to children becoming detached from real-world social situations, preventing them from forming genuine friendships. As a result, children may miss out on critical experiences related to struggle, purpose, and teamwork, which can affect their overall development. The importance of social interaction in e-learning is also tied to teacher feedback and student communication. E-learning becomes a challenge for effectiveness, which can impact children's emotions. Negative experiences, such as anxiety and frustration, have become prevalent among students. Teachers play a crucial role in fostering positive emotions in students by imparting knowledge and skills.

The study highlights that game- and video-based e-learning systems have a significant positive impact on elementary and secondary schools in India. These methods enhance the transfer of information and educators' ideas into effective education. They have also aided in the development of knowledge and

improved decision-making, cooperation, and communication skills. Additionally, game- and video-based e-learning serves as a supplementary tool to make learning enjoyable and interactive. Elements of gameplay, such as points, levels, badges, leaderboards, and rewards, are utilized in e-learning, which helps motivate students, engage them in their studies, maximize learning, and shift attitudes positively.

Another key dependent variable in this study is student satisfaction, which plays a significant role in e-learning. It greatly affects children in primary/elementary education in India. Factors related to students, teachers, and technology contribute to student satisfaction. Children who have a positive attitude toward new technology tend to have higher satisfaction levels. Furthermore, peer interactions among students and between students and teachers significantly impact student satisfaction. Conversely, the teaching methods employed in e-learning can deliver a high quantity and quality of content to students, which in turn increases student satisfaction.

Based on our study, parental involvement in children's e-learning does not appear to significantly impact outcomes. Typically, parental engagement is considered essential. E-learning can create a communication gap between parents and schools. Parental involvement ensures that children receive support as they navigate the learning process. The roles of parents and the framework of e-learning both play crucial roles in shaping student performance. Nevertheless, there are still challenges to address in supporting children and ensuring they have adequate learning facilities at home.

Conclusion

E-learning cannot be deliberated as an alteration in technology. It has been a role of reconsidering the development of transferring information and standards to the coming generation and expertise to the instructors. The purpose of e-learning will continue to progress in the future as instructors and students can read and gain billions of knowledge. E-learning reports intensified the capability to study and also employ teachers and pupils. E-learning inspires teachers to engage in lifelong learning. With quick developments in technology and progressing educational practices, teachers must frequently apprise their talents and knowledge. Generally, e-learning converts the role of teachers by offering influential tools, sources, and prospects for proficient growth. It permits them to be more effective, innovative and student-centered in their teaching performance, which might lead to developed learning consequences for pupils. E-learning influences the upcoming education and the significance of refining assured pedagogical tactics like self-directed and enduring learning. Therefore, this study will assist in understanding how social and emotional factors, gaming elements, parental involvement, and student satisfaction influence primary/elementary students through the integration of e-learning.

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