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Knowledge Sharing In E-Learning: A Study at Mangalore University and Selected Colleges in Mangalore, Karnataka, India

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ABSTRACT

The COVID-19 pandemic has significantly impacted education in India, leading many colleges and universities to adopt electronic learning methods. This study used a Google Form online survey questionnaire to gather research data and aims to provide insights that will empower educationalists to design more effective online courses and help students overcome the challenges of knowledge sharing in the digital realm. The research on 471 students from six colleges analysed their demographic characteristics, satisfaction levels, and perceptions based on gender and residential area. The reliability assessments demonstrated internal solid consistency for constructs related to technical features, advantages, and disadvantages. The findings revealed no significant gender-based differences in satisfaction with technical features or overall advantages. However, males rated certain benefits higher, and females reported more critical concerns about the loss of tradition. Differences based on the residential area were noted, with semi-urban students generally perceiving more tremendous advantages. Correlation analysis showed a significant positive relationship between perceived benefits and satisfaction with technical features. The study underscores the importance of addressing gender-specific and regional perceptions to enhance e-learning experiences. The results of this research, with their potential to guide educators and policymakers in developing interventions and practical strategies, will facilitate a smooth transition to the electronic learning environment and foster hope for improving knowledge sharing in future and present educational environments.

Keywords: E-Learning, Knowledge sharing, COVID-19 pandemic impact, Remote Learning experiences, Online learning challenges, Student's perceptions on knowledge sharing in e-learning. Technical features of e-learning, Online education, Online Learning experiences, Online Learning Impact. Digital education.

1. INTRODUCTION

The COVID-19 pandemic has obstructed education, affecting many universities and colleges in the electronic learning environment. While this change has permitted students to stay in their studies despite the pandemic, it has also modelled numerous encounters, mainly regarding knowledge sharing. In face-to-face (direct) learning environments, students can communicate simply by discussing concepts, asking questions, and collaborating on group projects. The electronic learning environment plan presents some limits, such as slower communication and limited visual cues, which can make knowledge sharing more complex.

2. REVIEW OF LITERATURE

During the COVID-19 pandemic, numerous studies have explored the factors that influence knowledge-sharing among students engaged in online education. According to Zhang and Zhou (2021), intrinsic, extrinsic, social, and cognitive motivation are the four main factors driving knowledge-sharing

behaviour in electronic learning environments. Research by Masri, Al-Shihi, and Al-Mudhafar (2021) has shown that knowledge-sharing behaviour positively impacts student performance in online learning settings. Several factors affect knowledge-sharing behaviour, including motivation, perceived usefulness, social norms within the electronic learning community, and perceived risks associated with sharing knowledge, as highlighted by Nguyen and Vo (2021). Panwar and Garg (2021) emphasise the role of the perceived risk of knowledge-sharing and the technological capabilities of the online learning platform in influencing this behaviour. During the pandemic, Ramamurthy and Kannan (2021) and Sinha and Gopalakrishnan (2021) identified motivation, knowledge-sharing's usefulness, social norms, and perceived risk as the most critical factors. Lastly, Wan and Wang (2021) discovered that knowledge-sharing behaviour positively affects performance in electronic learning environments, with motivation and self-regulated learning serving as mediating factors.

3. OBJECTIVES OF THE STUDY

- To investigate students' attitudes towards knowledge sharing through an electronic learning environment.
- To identify students' knowledge-sharing challenges through an electronic learning environment.
- To determine the factors that motivate students to share knowledge through an electronic learning environment.
- To suggest ways educators can promote knowledge sharing through an electronic learning environment.

4. HYPOTHESES FOR THE STUDY

- H0: There is no significant relationship between students' perceptions of technical features of e-learning platforms and their overall satisfaction with e-learning.
- H1: Students' satisfaction with e-learning is significantly influenced by the perceived advantages of e-learning platforms, such as accessibility and flexibility.
- H0: No significant difference exists in the satisfaction with e-learning platforms between students from different genders.
- H1: There is a significant difference in the satisfaction with e-learning platforms between students from urban and rural areas.

5. SCOPE AND LIMITATION OF THE STUDY

In this research, confinement in Mangalore University and specific colleges is examined. The study collected 471 student responses to gain insight into their perspectives on the electronic learning environment for knowledge sharing. It is important to note that the research only pertains to these educational institutions.

6. RESEARCH METHODOLOGY

An online questionnaire will be used to collect data for this study, which will be created using Google Forms. Participants can access the questionnaire from 11-2-2020 to 12-12-2020. The questionnaire has been shared with student groups to ensure sufficient responses. The study investigator has contacted the college principals and lecturers requesting their help in encouraging students to participate and complete the questionnaire. This collaborative effort aims to gather diverse and comprehensive data to contribute to the study's objectives. By involving multiple educational institutions, the study results are expected to have broader applicability and relevance for Mangalore University and selected colleges and academic and research institutions.

6.1 SAMPLING METHOD USED

The sampling method employed for this study was random sampling. This method is advantageous in achieving a robust and statistically significant sample that accurately reflects the broader population.

6.2 SAMPLE SIZE CALCULATION

Before collecting data, a pilot study was conducted with 20 participants. The analysis of this data revealed a maximum standard deviation of 0.554 across the components of Technical Features, Advantages, and Disadvantages of E-Learning.

To determine the required sample size, the following formula was used:

$$n = \left(\frac{Z \times \sigma}{E}\right)^2$$

Where:

Z = 1.96 (for a 95% confidence level)
E = 0.05 (margin of error)
σ = 0.5534 (observed standard deviation from the pilot study)
Substituting the values:

$$n = \left(\frac{1.96 \times 0.5534}{0.05}\right)^2 = 471$$

Thus, the required sample size for the study is approximately 471.

6.3 MEASURE

The study employed a well-structured Google Forms online questionnaire to gather primary data on the chosen constructs. Likert scale measured the students' experiences with knowledge sharing in e-learning: a study at Mangalore University and selected colleges in Mangalore, Karnataka, India.

6.4 VALIDITY AND RELIABILITY

This is one of the data collection methods; it produces systematic, error-free, and valid information. Several attempts were made to ensure the validity of the scale constructed for this study, such as analysing several books and articles on self-directed learning to empower faculty and library professionals to deepen understanding, informal discussions with teachers and experts, and informal meetings with library and information science professionals.

6.5 DATA SCREENING

Data screening covers a critical process where the collected data are thoroughly scrutinised and validated to ensure their usefulness for further analysis. Data screening was done before applying statistical tools and techniques. During the process, errors appeared in the dataset and were identified and fixed.

6.6 EXPERT REVIEW

The expert review ensures that questionnaire items accurately measure study constructs. Experts assess relevance, clarity, and comprehensiveness to validate the questionnaire's alignment with research objectives.

6.7 QUESTIONNAIRE DESIGN

While creating the questionnaire, investigators gathered insights from various sources, such as research papers, journals, and studies. The design process included incorporating and merging ideas from these sources to ensure the questionnaire was thorough and efficient in capturing pertinent data. Combining theoretical knowledge and subject matter expertise, the questionnaire was carefully designed to capture the data required for the study.

6.8 POPULATION OF THE STUDY

The study includes students from various institutions in Mangaluru, such as St Aloysius College (Autonomous), St Aloysius Institute of Management and IT, Mangalore University, SDM College of Business Management, University College Mangalore, and P.A. College of Engineering. There are 471

students in the sample, representing diverse demographics across different colleges and academic departments. The study encompasses students from various disciplines, including MCom, MBA, BCom, and other engineering fields. This broad representation aims to comprehensively understand student experiences and perceptions across educational and geographic backgrounds.

6.9 DIVERSE ARRAY OF DEPARTMENTS

The study includes students from various academic departments covering multiple educational backgrounds. Participants consist of MCom students (17.83%), MBA students (52.02%), BCom students (2.76%), and students from different engineering disciplines such as Mechanical Engineering (12.95%), Computer Science and Engineering (6.16%), Electrical and Electronics Engineering (1.06%), and Civil Engineering (7.22%). This diverse representation of departments provides a comprehensive perspective for the study, incorporating views from management and engineering fields to ensure a well-rounded analysis.

6.10 STATISTICAL TOOLS USED

The study utilised various statistical tools to analyse the data and interpret the results effectively. Descriptive statistics summarised the sample's demographic characteristics, including frequency distributions and percentage calculations. Cronbach's alpha was used to assess the internal consistency of constructs related to technical characteristics, advantages, and disadvantages of e-learning. Inferential statistics such as t-tests and ANOVA were utilised to examine differences in satisfaction and perception based on gender and area of residence. A correlation analysis was employed to understand the relationships between the perceived benefits of e-learning and overall satisfaction with technology features. These statistical methods provided a comprehensive understanding of the factors affecting students' e-learning experiences. Furthermore, Structural Equation Modeling (SEM) was used to investigate the complex relationships among various factors influencing students' e-learning experiences, enabling a detailed analysis of direct and indirect effects. These statistical methods provided an in-depth understanding of the factors affecting students' satisfaction with e-learning.

7.DATA ANALYSIS AND INTERPRETATION

7.1 Selected Institutes for the Study

Table 1 Selected institutes for the study

S.No	Name of the College	Frequency	%
1.	St Aloysius College (Autonomous), Mangalore	150	31.8
2.	P.A. College of Engineering, Mangalore	129	27.4
3.	Mangalore University, Mangalore	104	22.1
4.	SDM College of Business Management Mangalore	44	9.3
5.	University College Mangalore	38	8.1
6.	St Aloysius Institute of Management and IT, Mangalore	6	1.3
Total		**471**	**100**

Table 1 indicates that among the 471 respondents, St. Aloysius College (Autonomous), Mangalore has the highest representation, with 150 participants accounting for 31.8% of the total responses. Following closely is P.A. College of Engineering, Mangalore, with 129 participants (27.4%), and Mangalore University, Mangalore, 104 participants (22.1%). These three institutions contribute more than 80% of the total responses. SDM College of Business Management, Mangalore, and University College, Mangalore, have moderate representation, with 44 respondents (9.3%) and 38 respondents (8.1%), respectively. In contrast, St. Aloysius Institute of Management and IT, Mangalore, has minimal participation, with only six respondents (1.3%). This distribution highlights the significant interest from St. Aloysius College, P.A. College, and Mangalore University, while other institutions represent a smaller proportion of the total responses.

7.2 Reliability Assessment.

Table 2 Reliability assessment

S.No	Construct	N of Items	Cronbach's Alpha	Internal consistency
1.	Technical Features	7	0.904	Excellent
2.	Advantages	8	0.785	Acceptable
3.	Disadvantages	8	0.873	Good

Table 2 reliability assessment evaluates three constructs. Technical Features, with seven items, show excellent reliability with a Cronbach's Alpha of 0.904, indicating high consistency. The Advantages construct, consisting of 8 items, has a Cronbach's Alpha of 0.785, reflecting acceptable reliability. Disadvantages with eight items exhibit good internal consistency, with a Cronbach's Alpha of 0.873.

7.3 Profile of the Sample.

Table 3 Profile of the sample

S.No	Characteristics		N	% age
1.	College Name	St Aloysius College (Autonomous), Mangaluru	150	31.85
		St Aloysius Institute of Management and IT, Mangaluru	6	1.27
		Mangalore University, Mangalore	104	22.08
		SDM College of Business Management Mangaluru	44	9.34
		University College Mangalore	38	8.07
		P.A. College of Engineering, Mangalore	129	27.39
2.	Department wise Distribution	MCOM	84	17.83
		MBA	245	52.02
		BCOM	13	2.76
		Department of Mechanical Engineering	61	12.95
		Department of Computer Science and Engineering	29	6.16
		Department of Electrical and Electronics Engineering	5	1.06
		Department of Civil Engineering	34	7.22
3.	Gender	Male	259	54.99
		Female	212	45.01
4.	Residential Area	Rural	172	36.52
		Urban	155	32.91
		Semi-urban	144	30.57
Total			**471**	**100**

Table 3 provides a detailed breakdown of 471 respondents, showcasing their demographic and academic characteristics such as college, departmental distribution, gender, and residential location. The most significant proportion of respondents is affiliated with St Aloysius College (31.85%), followed by P.A. College of Engineering (27.39%) and Mangalore University (22.08%). Most respondents are from the MBA department (52.02%), followed by MCOM (17.83%), with more miniature representation from fields such as Mechanical Engineering, Civil Engineering, and others. The gender distribution shows a slight male majority (54.99%), while most respondents reside in rural areas (36.52%), with significant representation from urban and semi-urban areas. The data presents a comprehensive overview of the respondents' backgrounds.

7.4 Variation of Satisfaction of Students on Technical Features of E-Learning.

Table 4 Variation of satisfaction on technical features of e-learning by gender of students

S.No	Technical Features	Male		Female		t	Sig.
		Mean	S.D.	Mean	S.D.		
1.	Audio Quality	3.62	1.33	3.53	1.23	0.744	0.457
2.	Video Quality	3.68	1.21	3.56	1.16	1.037	0.300
3.	Mobile access	3.63	1.19	3.40	1.17	2.136	0.033
4.	Live streaming	3.50	1.37	3.53	1.22	-0.218	0.827
5.	Time Limit of Software	3.66	1.14	3.52	1.13	1.299	0.195
6.	Overall Features	3.69	1.35	3.67	1.30	0.142	0.887
7.	Network Connectivity	3.63	1.21	3.58	1.17	0.410	0.682
Overall Satisfaction Score		**3.63**	**1.00**	**3.54**	**0.95**	**0.956**	**0.339**

Table 4 compares the satisfaction levels of male and female students with the technical features of e-learning. The average scores for various technical features, such as audio quality, video quality, mobile access, live streaming, time limit of software, overall features, and network connectivity, are similar between male and female students. Based on the t-values and significance levels, there are no significant differences between male and female students' satisfaction with these features, except for mobile access ($p = 0.033$). The overall satisfaction score also does not show a significant difference ($t = 0.956$, $p = 0.339$), indicating that gender does not substantially impact satisfaction with e-learning technical features.

7.5 Variation of Satisfaction on Technical Features of E-Learning by Residential Area of Students.

Table 5 Variation of satisfaction on technical features of e-learning by residential area.

S.No	Technical Features	Rural		Urban		Semi-Urban		F	Sig.
		Mean	S.D.	Mean	S.D.	Mean	S.D.		
1.	Audio Quality	3.62	1.23	3.65	1.25	3.47	1.38	0.773	0.462
2.	Video Quality	3.60	1.13	3.65	1.18	3.63	1.27	0.066	0.936
3.	Mobile access	3.51	1.15	3.55	1.21	3.51	1.21	0.077	0.926
4.	Live streaming	3.48	1.28	3.63	1.23	3.44	1.40	0.887	0.413
5.	Time Limit of Software	3.57	1.09	3.60	1.17	3.63	1.16	0.117	0.890
6.	Overall Features	3.73	1.35	3.79	1.20	3.50	1.42	1.975	0.140
7.	Network Connectivity	3.66	1.14	3.62	1.19	3.52	1.26	0.572	0.565
Overall Satisfaction Score		**3.60**	**0.91**	**3.64**	**0.98**	**3.53**	**1.06**	**0.479**	**0.620**

Table 5 compares mean satisfaction scores and standard deviations for technical features among rural, urban, and semi-urban groups. It includes F-test values and significance levels to evaluate the differences between these groups. For technical features such as audio quality, video quality, mobile access, live streaming, software time limits, overall features, and network connectivity, the mean satisfaction scores are generally similar across all groups, with slight variations. The F-test values and significance levels for each feature are above the threshold of 0.05, indicating no statistically significant differences among the rural, urban, and semi-urban groups for any of the features analysed. This consistency in scores suggests that users' perceptions of these technical features are aligned across different geographic locations, reflecting uniform satisfaction levels. The overall satisfaction score shows no significant difference among the groups ($F = 0.479$, Sig. $= 0.620$), confirming that satisfaction with these technical features does not significantly vary by geographic area.

7.6 Variation in the Perception of the Advantages of E-Learning Based on Students' Gender.

Table 6 Variation in the perception of the advantages of e-learning based on students' gender

S.No	Advantages of E-Learning	Male		Female		t	Sig.
		Mean	S.D.	Mean	S.D.		
1.	Learning from own home	3.40	0.71	3.22	0.48	3.079	0.002
2.	Everything is in the same place	3.86	0.57	3.98	0.22	-2.801	0.005
3.	Easy access to information	3.77	0.84	3.65	0.79	1.544	0.123
4.	There are no fixed terms for learning	3.69	0.87	3.66	0.81	0.394	0.694
5.	Freedom in choosing teaching materials	3.71	0.83	3.61	0.74	1.444	0.149
6.	Possibility of repetition, if necessary	3.64	0.86	3.62	0.78	0.353	0.725
7.	Lower cost of studying	3.41	0.97	3.45	0.89	-0.546	0.586
8.	Favorable for people with restricted mobility	3.71	1.14	3.99	0.90	-2.914	0.004
Overall Advantage Score		**3.65**	**0.57**	**3.65**	**0.43**	**0.034**	**0.973**

Table 6 shows how male and female students perceive the advantages of e-learning differently. Most mean scores for the advantages are similar between genders, with a few notable differences. Males gave a higher rating (mean = 3.40) for "Learning from own home" compared to females (mean = 3.22), with a significant t-value ($t = 3.079$, $p = 0.002$). On the other hand, females rated "Everything in the same place" (mean = 3.98) and "Favorable for people with restricted mobility" (mean = 3.99) higher than males, with significant t-values ($p = 0.005$ and $p = 0.004$, respectively). Meanwhile, other advantages like "Easy access to information," "No fixed terms of learning," and "Lower cost of studying" did not show significant differences. The overall advantage score ($t = 0.034$, $p = 0.973$) indicates no significant variation between genders, suggesting that both male and female students perceive the overall advantages of e-learning similarly.

7.7 Variation in the Perception of the Advantages of E-Learning Based on Residential Area.

Table 7 Variation in the perception of the advantages of e-learning based on a residential area

S.No	Advantages of E-Learning	Rural		Urban		Semi-Urban		F	Sig.
		Mean	S.D.	Mean	S.D.	Mean	S.D.		
1.	Learning from own home	3.31	0.66	3.26	0.59	3.38	0.60	1.336	0.264
2.	Everything is in the same place	3.91	0.51	3.90	0.44	3.94	0.39	0.380	0.684
3.	Easy access to information	3.66	0.85	3.65	0.79	3.85	0.81	2.975	0.052
4.	There are no fixed terms for learning	3.61	0.88	3.61	0.84	3.83	0.78	3.287	0.038
5.	Freedom in choosing teaching materials	3.68	0.76	3.55	0.79	3.77	0.82	2.839	0.059
6.	Possibility of repetition, if necessary	3.62	0.84	3.59	0.82	3.69	0.80	0.658	0.518
7.	Lower cost of studying	3.31	0.96	3.31	0.88	3.69	0.92	8.269	0.000
8.	Favorable for people with restricted mobility	3.81	1.09	3.90	1.09	3.80	0.94	0.472	0.624
Overall Advantage Score		**3.61**	**0.56**	**3.60**	**0.50**	**3.74**	**0.45**	**3.726**	**0.025**

Table 7 displays the differences in students' perceptions of the benefits of e-learning based on their residential area (rural, urban, and semi-urban). The overall advantage score indicates a significant difference ($F = 3.726$, $p = 0.025$), with semi-urban students showing the highest mean score (3.74). Specific advantages such as "No fixed terms of learning" ($p = 0.038$) and "Lower cost of studying" ($p = 0.000$) also exhibit significant differences, with semi-urban students rating them higher compared to rural and urban students. The perception of "Easy access to information" almost reaches significance ($p = 0.052$), but no other advantages show substantial variation based on residential area. In conclusion, the table suggests that semi-urban students generally perceive more significant e-learning advantages than their rural and urban counterparts.

7.8 Correlation between the Perception of the Advantages of E-Learning with Overall Satisfaction with the Technical Features of E-Learning.

Table 8 Correlation between the perception of the advantages of e-learning with overall satisfaction with the technical features of e-learning.

S.No	Advantages of E-Learning	Pearson Correlation	Sig.
1.	Learning from own home	0.026	0.577
2.	Everything is in the same place	-0.003	0.940
3.	Easy access to information	0.076	0.098
4.	There are no fixed terms for learning	0.094	0.042
5.	Freedom in choosing to teach materials	0.127	0.006
6.	Possibility of repetition, if necessary	0.100	0.030
7.	Lower cost of studying	0.099	0.031
8.	Favourable for people with restricted mobility	0.250	0.000
Overall Advantage Score		**0.169**	**0.000**

Table 8 illustrates the correlation between students' perceptions of the benefits of e-learning and their overall satisfaction with the technical aspects of e-learning. The Pearson correlation coefficient for the overall advantage score is 0.169, with a significance level less than 0.05 (p = 0.000). This indicates a significant positive correlation between students' perception of e-learning advantages and their satisfaction with the technical features. Specific advantages such as "Favorable for people with restricted mobility" (r = 0.250, p = 0.000), "Freedom in choosing teaching materials" (r = 0.127, p = 0.006), "No fixed terms of learning" (r = 0.094, p = 0.042), and "Possibility of repetition if necessary" (r = 0.100, p = 0.030) also exhibit significant positive correlations. This suggests that as students perceive more advantages in e-learning, their satisfaction with the technical features increases. However, features like "Everything in the same place" (r = -0.003, p = 0.940) do not correlate significantly. Overall, the findings emphasise a meaningful connection between the perceived benefits of e-learning and technical satisfaction.

7.9 Variation in the Perception of the Disadvantages of E-Learning Based on Students' Gender.

Table 9 Variation in the perception of the disadvantages of e-learning based on students' gender

S.No	Disadvantages of E-Learning	Male		Female		t	Sig.
		Mean	S.D.	Mean	S.D.		
1.	No direct communication with teachers	2.37	1.04	2.16	0.89	2.373	0.018
2.	No direct communication among students	2.31	1.06	2.16	0.94	1.551	0.122
3.	No interaction	2.37	1.07	2.29	0.94	0.831	0.406
4.	Loneliness, depression	2.31	1.03	2.17	0.87	1.516	0.130
5.	Costs of Internet	2.37	1.09	2.24	0.91	1.400	0.162
6.	No compulsion to learn	2.30	1.24	2.36	1.11	-0.601	0.548
7.	Working long hours on the screen can be harmful	2.42	1.05	2.34	1.04	0.749	0.454
8.	Loss of tradition	2.50	1.31	2.76	1.27	-2.224	0.027
Overall Advantage Score		**2.37**	**0.83**	**2.31**	**0.71**	**0.770**	**0.441**

Table 9 shows the analysis of perceptions regarding the disadvantages of e-learning based on students' gender, revealing significant differences in specific areas. Males perceive the lack of direct communication with teachers as a disadvantage to females, while females view the loss of tradition as a more significant issue than males. However, there are no significant differences between genders regarding other disadvantages such as the lack of direct communication among students, interaction, loneliness, costs of internet, lack of compulsion for learning, harm from prolonged screen time, or the overall advantage score. These findings highlight areas where gender-specific concerns may be addressed to improve e-learning experiences.

7.10 Variation in the Perception of the Disadvantages of E-Learning Based on Residential Area.

Table 10 Variation in the perception of the disadvantages of e-learning and residential area

S.No	Disadvantages of E-Learning	Rural		Urban		Semi-Urban		F	Sig.
		Mean	S.D.	Mean	S.D.	Mean	S.D.		
1.	No direct communication with teachers	2.33	0.97	2.20	1.03	2.31	0.93	0.751	0.472
2.	No direct communication among students	2.38	1.07	2.16	1.02	2.16	0.90	2.554	0.079
3.	No interaction	2.40	0.99	2.35	1.04	2.24	1.02	0.923	0.398
4.	Loneliness, depression	2.24	0.97	2.26	1.02	2.23	0.90	0.055	0.947
5.	Costs of Internet	2.37	1.01	2.35	1.04	2.19	0.97	1.495	0.225
6.	No compulsion to learn	2.23	1.19	2.34	1.12	2.42	1.24	1.041	0.354
7.	Working long hours on the screen can be harmful	2.40	1.06	2.45	1.14	2.31	0.92	0.677	0.508
8.	Loss of tradition	2.53	1.21	2.61	1.33	2.73	1.36	0.887	0.413
Overall Advantage Score		**2.36**	**0.77**	**2.34**	**0.81**	**2.32**	**0.75**	**0.085**	**0.919**

Table 10 shows the analysis of perceptions regarding the drawbacks of e-learning based on students' residential areas (rural, urban, and semi-urban) indicates no significant differences across the different regions. The mean scores and standard deviations for various disadvantages such as "No direct communication with teachers," "No direct communication among students," "Lack of interaction," "Feelings of loneliness and depression," "Internet costs," "Lack of motivation for learning," "Extended screen time," and "Loss of traditional learning methods" do not show any significant variation based on the residential area. Similarly, the overall advantage score does not differ significantly among rural, urban, and semi-urban students. This suggests that students' perceptions of e-learning disadvantages are relatively consistent regardless of their residential area.

7.11 Correlation between the Perception of the Disadvantages of E-Learning with Overall Satisfaction with the Technical Features of E-Learning.

Table 11 Correlation between the perception of the disadvantages of e-learning with overall satisfaction with the technical features of e-learning.

S.No	Disadvantages of E-Learning	Pearson Correlation	Sig.
1.	No direct communication with teachers	-0.221	0.000
2.	No direct communication among students	-0.239	0.000
3.	No interaction	-0.261	0.000
4.	Loneliness, depression	-0.241	0.000
5.	Costs of Internet	-0.234	0.000
6.	No compulsion to learn	-0.237	0.000
7.	Working long hours on the screen can be harmful	-0.223	0.000
8.	Loss of tradition	-0.763	0.000
Overall Advantage Score		**-0.433**	**0.000**

Table 11 shows that the correlation analysis indicates a strong negative relationship between the perception of various disadvantages of e-learning and overall satisfaction with the technical features of e-learning. Each identified disadvantage, such as "No direct communication with teachers" (-0.221), "No direct communication among students" (-0.239), "No interaction" (-0.261), "Loneliness and depression" (-0.241), "Costs of internet" (-0.234), "No compulsion for learning" (-0.237), "Working long hours on the screen" (-0.223), and "Loss of tradition" (-0.763), demonstrates a substantial negative correlation with satisfaction levels. Furthermore, the overall disadvantage score exhibits a significant negative correlation of -0.433 with satisfaction. This suggests that as students' perceptions of these disadvantages grow, their satisfaction with the technical features of e-learning tends to diminish.

7.12 Impact of E-Learning's Technical Quality on Students' Perceptions of its Advantages and Disadvantages.

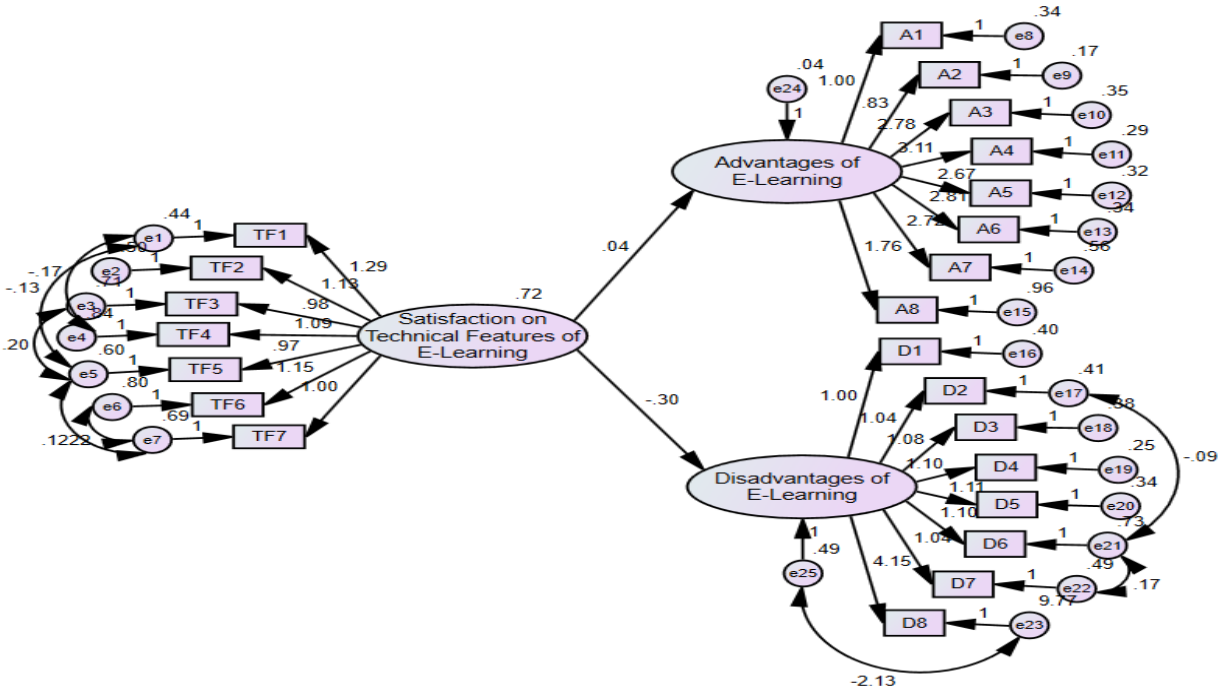

Figure 1 Structural equation modeling

Table 12 Structural equation modelling components

Technical Features	TF1	Audio Quality
	TF2	Video Quality
	TF3	Mobile access
	TF4	Live streaming
	TF5	Time Limit of Software
	TF6	Overall Features
	TF7	Network Connectivity
Advantages	A1	Learning from own home
	A2	Everything is in the same place.
	A3	Easy access to information
	A4	There are no fixed terms for learning.
	A5	Freedom in choosing teaching materials
	A6	Possibility of repetition, if necessary
	A7	Lower cost of studying
	A8	Favorable for people with restricted mobility
Disadvantages	D1	No direct communication with teachers
	D2	No direct communication among students
	D3	No interaction
	D4	Loneliness, depression
	D5	Costs of Internet
	D6	No compulsion to learn
	D7	Working long hours on the screen can be harmful.
	D8	Loss of tradition

The Figure 1 and Table 12 analysis of e-learning using structural equation modelling (SEM) shows that technical features such as audio and video quality, mobile access, live streaming, and network connectivity significantly impact overall satisfaction. Improving these aspects is likely to enhance the user experience. The benefits of e-learning, such as the ability to learn from home, easy access to information, and the flexibility to choose learning materials, positively influence satisfaction, indicating that they contribute to creating a flexible and accessible learning environment. On the other hand, drawbacks such as the lack of direct communication, feelings of loneliness, and the loss of traditional learning methods strongly influence satisfaction. By addressing these critical technical and experiential factors, overall satisfaction with e-learning can be improved by enhancing positive aspects and mitigating the negative ones.

7.13 Model Fit.

Table 13 Model fit

RMSEA	NFI	IF	CFI
0.074	0.947	0.960	0.951

Table 13 shows the Model fit. The analysis of the e-learning SEM model indicates that it has a good fit, with an RMSEA value of 0.074, below the threshold of 0.08. Furthermore, the fit indices NFI (0.947), IFI (0.960), and CFI (0.951) are all above the recommended threshold of 0.90, suggesting a solid fit. These findings imply that the model accurately represents the connections between technical features, advantages, and disadvantages of e-learning and their impact on overall satisfaction.

7.14 Structural Equation Modelling Results.

Table 14 Structural equation modelling results

			Estimate	S.E.	C.R.	P
TF1	<---	Technical Features	1.294	0.073	17.670	0.000
TF2	<---	Technical Features	1.126	0.067	16.856	0.000
TF3	<---	Technical Features	0.977	0.067	14.673	0.000
TF4	<---	Technical Features	1.094	0.075	14.650	0.000
TF5	<---	Technical Features	0.967	0.058	16.547	0.000
TF6	<---	Technical Features	1.150	0.062	18.506	0.000
TF7	<---	Technical Features	1.000			
A1	<---	Advantages	1.000			
A2	<---	Advantages	0.825	0.156	5.277	0.000
A3	<---	Advantages	2.776	0.425	6.529	0.000
A4	<---	Advantages	3.115	0.469	6.645	0.000
A5	<---	Advantages	2.665	0.408	6.525	0.000
A6	<---	Advantages	2.809	0.429	6.546	0.000
A7	<---	Advantages	2.719	0.432	6.291	0.000
A8	<---	Advantages	1.763	0.348	5.062	0.000
D1	<---	Disadvantages	1.000			
D2	<---	Disadvantages	1.043	0.060	17.316	0.000
D3	<---	Disadvantages	1.078	0.060	17.887	0.000
D4	<---	Disadvantages	1.103	0.056	19.532	0.000
D5	<---	Disadvantages	1.107	0.060	18.554	0.000
D6	<---	Disadvantages	1.097	0.072	15.167	0.000
D7	<---	Disadvantages	1.043	0.063	16.574	0.000
D8	<---	Disadvantages	4.154	0.636	6.532	0.000
Advantages	<---	Technical Features	0.043	0.014	3.055	0.002
Disadvantages	<---	Technical Features	-0.300	0.046	-6.588	0.000

Table 14 shows the SEM results. It provides detailed estimates, standard errors, critical ratios, and p-values for the structural equation modelling of e-learning components. It indicates that all technical features (TF1 to TF7) significantly contribute to the Technical Features construct, with high estimates and critical ratios indicating strong positive loadings. Similarly, each advantage (A1 to A8) and disadvantage (D1 to D8) significantly contribute to their respective constructs, with notable significance in "Loss of Tradition" (D8). The model also shows a positive relationship between technical features and perceived advantages (estimate = 0.043, p = 0.002) and a negative relationship with perceived disadvantages (estimate = -0.300, p < 0.001). This suggests that better technical features are associated with more excellent perceived benefits and fewer drawbacks in e-learning. Students ranked audio quality as the most crucial aspect of E-Learning's technical features (1.294), followed by overall features (1.150) and video quality (1.126). The least significant factor was the software's time limits (0.967). For E-Learning advantages, students considered the flexibility of learning without fixed terms as the top benefit (3.115), followed by the ability to repeat content as needed (2.809) and easy access to information (2.776). The lowest-ranked advantage was having everything in one place (0.825). Regarding E-Learning disadvantages, students identified the loss of tradition as the most significant drawback (4.154), followed by internet costs (1.107) and feelings of loneliness and depression (1.103). The least concerning issue was the lack of direct teacher communication (1.000). The quality of technical features has a positive effect (0.043) on students' perceptions of E-Learning advantages, meaning that as the quality improves, students' views of its benefits also improve. Conversely, the quality of technical features negatively affects (-0.300) students' perceptions of E-Learning's disadvantages, indicating that their perception of its drawbacks decreases as technical quality improves. The impact of technical feature quality in reducing negative perceptions is nearly seven times greater (0.300/0.043 = 6.98) than its influence on increasing positive perceptions.

8.FINDINGS OF THE STUDY

The study provides valuable insights into students' experiences with e-learning. The sample consists of 471 students from selected colleges. The reliability assessments indicate high internal consistency in constructs related to technical features, advantages, and disadvantages of e-learning. Satisfaction levels with technical features show no significant gender or residential area-based differences. However, male students rate "Learning from own home" higher, while female students rate "Everything in the same place" and "Favorable for people with restricted mobility" more favourably. Perceptions of e-learning advantages vary by residential area, with semi-urban students generally expressing more positive views. Correlations between perceived advantages and satisfaction with technical features are significant, reflecting a link between the benefits students perceive and their technical satisfaction. Gender-based differences in perceived disadvantages reveal that males are more concerned about the lack of direct communication with teachers, while females are more concerned about losing tradition. Overall, there are no substantial differences in disadvantage perceptions based on residential areas.

9.FURTHER RESEARCH

This study examines student perspectives on e-learning during the COVID-19 pandemic in Mangalore, Karnataka, highlighting the need for further research to gain deeper insights. Future studies could investigate how levels of satisfaction and technical preferences evolve, assess regional differences in access to resources, and explore socioeconomic factors that affect both resource availability and satisfaction, research focusing on gender-specific perceptions, technical challenges, and the impact of various teaching methods on student engagement could inform targeted support strategies.

10. DISCUSSION

The study's findings offer a detailed understanding of students' experiences with e-learning. The data suggests that students generally have consistent opinions about the technical features, benefits, and drawbacks of e-learning, indicating that the measured concepts are reliable and coherent. Notably, satisfaction with technical features is generally consistent across genders and residential areas, with a few exceptions. Male students are more satisfied with learning from home, while female students express greater satisfaction with features related to accessibility for people with restricted mobility and centralised

resources. These differences may reflect varying personal priorities or learning preferences. The residential area significantly influences perceptions of e-learning benefits, with semi-urban students generally expressing more positive views than their urban and rural counterparts. This variation could be attributed to differences in the accessibility and quality of e-learning infrastructure in different areas and varying levels of digital literacy. The significant correlation between perceived benefits and satisfaction with technical features underscores the importance of improving the technical aspects of e-learning to enhance overall student satisfaction. Gender differences in perceived drawbacks reveal that males are more concerned about the lack of direct communication with teachers. At the same time, females are more focused on the loss of traditional learning experiences. This suggests that addressing these concerns could lead to more balanced and practical e-learning experiences. For instance, incorporating more interactive elements and traditional pedagogical practices into e-learning platforms may help mitigate these drawbacks.

11. CONCLUSION

The study concludes that students generally have a positive attitude towards e-learning platforms. These platforms are highly reliable regarding technical features, advantages, and disadvantages. While overall satisfaction levels are relatively consistent, there are noticeable differences in how male and female students and those from different residential areas perceive e-learning platforms. These findings suggest that e-learning systems should be customised to address various student groups' concerns and preferences. This could involve improving direct communication features and integrating traditional learning methods. Furthermore, enhancing technical infrastructure and implementing digital literacy programs in various residential areas could help to narrow the gap in perceptions of the benefits of e-learning. By addressing these diverse needs and concerns, e-learning platforms can become more effective and inclusive, ultimately enhancing the educational experience for all students.

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CONTRIBUTOR

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APPENDIX
QUESTIONNAIRE**

1.Demographic Details 1.1College ___1.2 Course/Department ____1.3 Gender ____1.4 Residential area___

2. Satisfaction with Technical Features of E-Learning.

S No	Technical Features of E-Learning	Very Satisfied	Satisfied	Neutral	Dissatisfied	Very Dissatisfied	Not Applicable
1.	Audio Quality						
2.	Video Quality						
3.	Mobile access						
4.	Live streaming						
5.	Time Limit of Software						
6.	Overall Features						
7.	Network Connectivity						

3. Advantages of E-Learning.

S No	Advantages of E-Learning	Very Satisfied	Somewhat Satisfied	Neither Satisfied nor Dissatisfied	Somewhat Dissatisfied	Very Dissatisfied
1.	Learning from own home					
2.	Everything is in the same place.					
3.	Easy access to information					
4.	There are no fixed terms for learning.					
5.	Freedom in choosing to teach materials					
6.	Possibility of repetition, if necessary					
7.	Lower cost of studying					
8.	Favorable for people with restricted mobility					

4. Disadvantages of E-Learning.

S No	Disadvantages of E-Learning	Very Satisfied	Somewhat Satisfied	Neither Satisfied nor Dissatisfied	Somewhat Dissatisfied	Very Dissatisfied
1.	No direct communication with teachers					
2.	No direct communication among students					
3.	No interaction					
4.	Loneliness, depression					
5.	Costs of Internet					
6.	No compulsion to learn					
7.	Working long hours on the screen can be harmful.					
8.	Loss of tradition					

Date: **Place:** **Signature with Name**

**The Word document questionnaire has been converted into a Google Form and shared with the student groups.