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The Effectiveness of E-Learning Apps in Higher Education

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ABSTRACT: The survey conducted to assess the impact and effectiveness of e-learning applications in higher education. As technology continues to evolve, e-learning platforms have emerged as transformative tools, offering flexible, personalized, and interactive learning experiences. In the Indian context, where traditional classroom education was dominant until a decade ago, the integration of ICT has significantly reshaped the educational landscape. The survey explores how e-learning apps support student engagement through self-paced learning, real-time feedback, and collaborative tools. It also examines how educators benefit from data-driven insights that allow for customized instruction and timely interventions. The study highlights the exponential growth of the Indian e-learning market and identifies challenges such as digital inequality, faculty preparedness, and limitations in self-directed learning. The findings emphasize the need for continuous improvement in content design and delivery methods to maximize learning outcomes in higher education.

KEYWORDS: Digital education tools, Learning analytics, Customized instruction

I. INTRODUCTION

As technology rapidly evolves, e-learning apps are becoming increasingly prevalent in higher education, offering a flexible and interactive approach to learning that can potentially enhance student engagement and learning outcomes. By leveraging digital platforms, universities can provide students with access to diverse learning materials, personalized learning paths, and collaborative tools, thus transforming the traditional classroom experience. A decade back in India brick and mortar classrooms were the only mode of education system followed in higher education institutions. After the development of the internet technologies across the world has made a drastically changes in the Indian higher education. Of late in India the practice of using technology to deliver the semester courses for the higher education students to gain momentum. ICT has created opportunity for the students to learn not only in the traditional classroom but also off the classroom as and when the student feels to learn.

ICT has integrated both the internet-based learning as well as the traditional brick and mortar classroom. The e-Learning market in India was worth 247 million US dollars, covering around 1.6 million users in year 2016. It is expected witness an 8X growth to reach USD1.96 billion and the current user base will grow at 44 percent CAGR to 9.6 million users by 2021. Just as technology has become an intrinsic part of our lives, it has penetrated all areas of teaching and learning at the HE level. From radio, films and television, we have entered the computer and the internet age. Computers and their varied and ever-changing applications are becoming part of the educational scene today. Computers and internet have brought in an astonishing change in the lives of most people across the world.

Online learning method is more cost effective than traditional classroom learning but there are many issues arising within the context of self-study independent study programs from the end user's perspective. There is a need to observe and analyze these situations to discover areas of improvement in the design delivery methods employed.

II. STATEMENT OF PROBLEM

E-learning applications have become a powerful force in higher education, reshaping traditional learning methods. They offer key benefits such as greater accessibility, flexible schedules, and personalized learning experiences. These advantages help create a more inclusive and adaptable educational environment for diverse learners. However, the effectiveness of these tools in improving educational outcomes remains under active study. Challenges such as limited

technological infrastructure and unequal digital access hinder their potential. Additionally, these platforms often struggle to provide hands-on, experiential learning opportunities. This research explores how e-learning enhances access by supporting self-paced, flexible learning styles. It also investigates the barriers limiting their impact, including the digital divide and lack of practical engagement.

III. OBJECTIVE

1. To know how e-learning apps improve accessibility, flexibility, and personalized learning experiences for higher education students.
2. To identify the challenges, such as technological barriers and lack of hands-on experience, and their impact on the overall effectiveness of these apps.

IV. RESEARCH METHODOLOGY

RESEARCH DESIGN

The research design for this study will employ a descriptive research approach, aimed at exploring the awareness, usage, and challenges faced by families in Coimbatore regarding online investment applications.

RESEARCH AREA

The research is conducted in Coimbatore.

RESEARCH PERIOD

The research is conducted over a period of 4 months from December 2024 to March 2025.

V. DATA COLLECTION TECHNIQUES

PRIMARY DATA

The primary data collection type is used to collect the data from the respondents

METHOD OF DATA COLLECTION

Questionnaire method of data collection is used to collect the data from the respondents.

VI. SAMPLING DESIGN

SAMPLING TECHNIQUE

Within each simple random sampling can be applied to select participants. This ensures that every individual in the sample has an equal chance of being selected, minimizing bias and increasing the reliability of the results.

NUMBER OF SAMPLES

Sample size taken for the study is 127.

RESEARCH TOOLS

For this study, Standard deviation and co-efficient of variance are used.

Standard Deviation (σ or SD)

For a population:

$$\sigma = \sqrt{\frac{\sum (X_i - \mu)^2}{N}}$$

For a sample:

$$S = \sqrt{\frac{\sum (X_i - \bar{X})^2}{n-1}}$$

Coefficient of Variation (CV)

$$CV = \frac{\sigma}{\mu} \times 100$$

VII. REVIEW OF LITERATURE

1. **Anderson, T. (2008)** – The Theory and Practice of Online Learning Anderson explores online learning in higher education, focusing on the application of various learning theories in virtual environments. The book emphasizes the importance of understanding both the
2. **Ally, M. (2004)** – **Foundations of Educational Theory for Online Learning** Ally's work focuses on the educational theories that support online learning, providing a strong foundation for designing e-learning experiences. It discusses various learning theories such as constructivism and behaviorism. The book also explores how these theories can be adapted for digital environments. Ally highlights the significance of learner-centered design in e-learning applications. It is a valuable resource for educators and instructional designers in higher education
3. **Kirkwood, A., & Price, L. (2014)** – **Technology-Enhanced Learning and Teaching in Higher Education: A Critical Review** Kirkwood and Price highlight that technology in higher education must align with sound pedagogy to be effective. They discuss the benefits of e-learning but also note challenges like the digital divide and tech complexity. The review emphasizes that technology should support, not replace, traditional teaching methods. It also stresses the need for faculty training to use digital tools effectively.
4. **Koper, R. (2005)** – **E-learning: Design and Delivery of Flexible Learning** Koper's work focuses on designing flexible, student-centered e-learning environments through effective instructional design. It emphasizes interactivity, adaptability to diverse learning styles, and the importance of assessment and feedback in online learning.
5. **Moore and Kearsley (2011)** **Distance Education: A Systems View Online Learning** provide a systems approach to distance education, emphasizing interaction among students, instructors, and technology. They highlight the importance of clear objectives, communication, and explore both synchronous and asynchronous e-learning models. The book serves as a key resource for understanding the structure and effectiveness of online education.

VIII. DATA ANALYSIS AND INTERPRETATION

TABLE1 OFTEN DO YOU USE E-LEARNING APPS FOR YOUR STUDIES

S.NO	E-Learning apps	Total no. of respondents	Percentage
1	Daily	33	26%
2	Weekly	61	48%
3	Occasionally	26	20.5%
4	Never	7	5.5%
5	TOTAL	127	100%
6	\bar{x}	1.88	
7	σ	0.83	
8	CV	44.1	

Source: Primary data

INTERPRETATION:

The table illustrates the majority of respondents use e-learning apps on a weekly basis (48%), followed by daily users at 26%. A smaller proportion (20.5%) use the apps occasionally, while only 5.5% never use them. The mean score of 2.05 and the coefficient of variation of 40.49 indicate a moderate variation in the frequency of app usage among respondents.

INFERENCE:

The data suggests that most respondents are weekly use E-learning apps for studies. However, a notable proportion remains Daily, and small segments in Never. This indicates that digital learning platforms are increasingly important for education.

TABLE 2 THE E-LEARNING APPS THAT ARE USED THE MOST

S.no	E-learning apps are used most	Total no. of respondents	Percentage
1	Coursera	19	15%
2	edX	14	11%
3	Udemy	33	26%
4	Khan Academy	14	11%
5	Other	47	37%
6	TOTAL	127	100%
7	\bar{x}	3.44	
8	Σ	1.45	
9	CV	42.2	

Source: Primary data

INTERPRETATION:

The table provides data the most commonly used e-learning app is "Other" (37%), followed by Udemy (26%), with Coursera and edX each accounting for 15% and 11%, respectively. The mean score of 3.44 suggests that there is a preference for apps outside of the main well-known platforms. The high coefficient of variation (42.2%) indicates considerable diversity in the choice of e-learning apps among respondents.

INFERENCE:

A significant portion 37% of respondent are others indicating a wide variety of preferences in e-learning tools. The relatively lower usage of edX and Khan Academy suggests that respondents may prefer platforms with more diverse or specialized content.

TABLE 3 PROGRESS TRACKING AND FEEDBACK HELPFUL

S.NO	TRACKING AND FEEDBACK HELPFUL	TOTAL NO OF RESPONDENT	PERCENTAGE
1	Very helpful	61	48%
2	Somewhat helpful	56	44.1%
3	Not helpful	10	7.9%
4	TOTAL	127	1005
5	\bar{x}	1.40	
6	Σ	0.63	
7	CV	45.0	

Source: Primary data

INTERPRETATION:

The data results indicate that 48% of respondents (61 individuals) find the tracking and feedback to be very helpful, while 44.1% (56 respondents) consider it somewhat helpful, and 7.9% (10 respondents) find it not helpful. The mean (X) score of 1.40, with a standard deviation (σ) of 0.63 and a coefficient of variation (CV) of 45.0%, suggests that while most respondents perceive the tracking and feedback as helpful, there is moderate variability in how it is viewed across users.

INFERENCE:

The majority of respondents (48%) find the tracking and feedback provided to be very helpful, while 44.1% consider it somewhat helpful. The coefficient of variation (45.0%) indicates moderate variability in responses, suggesting that while most users appreciate the feature, some still feel it could be improved.

TABLE 4 THE ACCESSIBILITY OF THE APP ON ALL DEVICES

S.NO	ACCESSIBILITY OF APP	TOTAL NO OF RESPONDENT	PERCENTAGE
1	Yes	98	77.2%
2	No	29	22.8%
3	TOTAL	127	100%
4	\bar{x}	0.772	
5	σ	0.419	
6	CV	54.3	

Source: Primary data

INTERPRETATION:

The table shows the majority of respondents (77.2%) have access to the app, indicating strong availability for most users. A smaller proportion (22.8%) do not have access, which may suggest some barriers to entry. The mean score of 0.772 reflects that most respondents have positive access to the app. The high coefficient of variation (54.3%) indicates considerable variability in the responses, suggesting differences in access experiences among users.

INFERENCE:

The data suggests that the majority of respondents have no issues accessing the app on all their devices, reflecting strong compatibility. However, a significant portion, nearly **23%**, faces accessibility challenges, indicating room for improvement in the app's cross-device functionality.

TABLE 5 SELF MOTIVATED WITH SELF-PACED LEARNING ON THE APP

S.NO	SELF-PACED LEARNING ON APP	TOTAL NO OF RESPONDENT	PERCENTAGE
1	Yes, always	30	23.6%
2	Sometimes	62	48.8%
3	Rarely	29	22.8%
4	Never	6	4.7%
5	TOTAL	127	
6	\bar{x}	1.91	
7	σ	0.81	
8	CV	42.4	

Source: Primary data

INTERPRETATION:

The table shows that 48.8% of respondents use self-paced learning sometimes, while 23.6% use it always. A smaller proportion, 22.8%, use it rarely, and only 4.7% reported never using self-paced learning. The mean (\bar{X}) score of 1.91, with a standard deviation (σ) of 0.81 and a coefficient of variation (CV) of 42.4%, suggests moderate variability in the frequency of self-paced learning experiences across respondents.

INFERENCE:

Most respondents engage in self-paced learning either sometimes or always, with 48.8% and 23.6% respectively. However, the moderate variability (CV of 42.4%) indicates differing levels of engagement among users.

SUGGESTIONS

- Google Classroom fosters effective communication between students and instructors by providing a centralized platform for announcements, discussions, and feedback.
- It enables collaboration through tools like Google Docs, Slides, and Forms, promoting active participation in projects, quizzes, and assignments.

IX. CONCLUSION

E-learning apps have significantly transformed higher education by offering flexible, personalized, and interactive learning experiences. They empower students with self-paced learning and immediate feedback while enabling educators to make data-informed decisions. This dual benefit enhances both teaching efficiency and learning outcomes. Despite their advantages, challenges like digital access and faculty readiness must be addressed. Overall, e-learning apps hold great potential to complement and enrich traditional higher education systems.

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