Assessing The Impact of Mobile Learning Applications on Higher Education Outcomes in Rural India: A Case Study Approach

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Abstract. During the COVID period there is a sudden surge in the EdTech industry with new learning applications especially in the higher education. Penetration of the mobile technology in India strengthened usage of mobile learning applications in the higher education setting. In this regard this research study aims to investigate the impact of mobile learning applications on higher education outcomes in rural India. The study is focused on integration of mobile learning applications in higher education, usage and challenges. The study will address the disparities in the higher education outcomes in rural India. Case study approach is adopted to study the impact and integration of the mobile learning applications. The findings from the study will contribute in addressing the problems of technological advancements and overcoming the challenges in the integration process of mobile learning applications.

Keywords: EdTech, Mobile Learning Applications, Higher Education & Rural India.

1   Introduction:

Rapid growth of mobile technologies boosted the growth in the development of mobile based learning applications, and vice versa, the edtech industry is growing as the IT infrastructure is rooted in remote areas. The development of the mobile technologies changing the way student is learning in higher education. This change in the nature of learning boosted the service providers to develop rich digital content and started distributing it through mobile technologies helping the learner attain higher education outcomes. Engaging the learners using the technology is new training method and developing rapidly compared to conventional usage of e-learning technologies. Mobile technologies also facilitating the instructors and learners to learn anything at anytime within the institution or outside of the institution. Enhanced learning experience boosted the usage of the mobile learning applications.

According to E-Learning Market Report 2022-2027[1] India's e-learning market was valued at Rs.108.79 billion in 2021 and projected to touch at Rs.299.18 billion by 2027. After COVID the acceptance of mobile device for learning purpose is gaining acceptance among the learners as well as higher education institutions. According to Kantar ICUBE 2020[2] report the number of active internet users among the urban and rural is steadily growing. Out of the total population nearly 67 percent active internet users are from urban and 31 percent active internet users   are from rural population. 91.11 percent students of computer science make use of internet followed by 50.47 percent of business and commerce students, 37.17 percent of general science students and 32.99 percent of social sciences and humanities students respectively.

2   Review of Literature:

[7] examined that mobile learning has significant positive effect on the learner achievement, behavior and positive attitude towards the mobile based learning in the under graduate students. Mobile learning projects to be integrated with the curriculum which will increase the engagement of the learner. The successes of the mobile learning applications depend on the learner's access to the content, device of the learner and usage of the technology (3). (2) in their research compared the mobile learning environment with e learning environment. The study found that learners with android based mobile learning applications shown more interest as the device will be with learner, able to download all the materials and also user interface is very high.(4) investigated m-learning's effect and found the components like knowledge, belief, personalized learning, more enthusiastic in writing in mobile device, flexible learning, learning through mobile app, gamification and visually pleased videos were significantly higher than the students who are not using mlearning and also advised that instructors should consider the content, learning style, assessing outcome in designing the mobile learning environment. (6) identified the mobile learning app features like profile page, live chat, live interaction with instructor, community, sharing the content and self check learning

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The original version of the chapter has been revised. Chapter 7 processed with chapter 3 contents has been updated with correct chapter 7 contents. A correction to this chapter can be found at https://doi.org/10.2991/978-94-6463-433-4_48

helped the students to use mobile learning app.As mobile penetration is growing rapidly students are using social media as medium to contact their peer learners for feedback and support.   Especially this behavior is observed in the language learners through mobile learning using their social media. Learners are showing more interest in networking and platform program. Through the social media the learners are updating themselves with new updates in their study field (10).[8] studied the impact of effectiveness of mobile learning app and found that learner's satis faction increased in the factors like ease of use, navigation and ability to retrieve the information from the app. Service quality has been considered as minor issue when it comes to app learning. Understanding the information, content reliability and relevance of the information developed the critical thinking abilities of the learner. The study also found that learner's satisfaction is very high in the case of reuse.[9]in their empirical study identified that behavioral intention is negatively influenced by Perceived Risk. This suggests the importance of keeping female students informed about the potential risks associated with using mobile apps for their studies. Additionally, the findings reveal that Perceived Value has an insignificant impact on Behavioral Intention, likely due to the predominant feedback from younger female students who may not be fully cognizant of cost- related issues. Learning through mobile app makes it a valuable tool to encourage motivation among rural Indian female students to incorporate mobile apps into their school studies.

From the above review of literature, it is found that effectiveness, improvement in the aca- demic performance is there by using the mobile learning applications and perceived risk is also high especially in the rural areas. As there is less research has been done on the effectiveness of mobile learning applications on learners, a modest attempt made to study the impact of mobile learning applications.

3   Research Objectives:

- To study the impact of mobile learning applications the following objectives framed
- To study the usage patterns of the learners
- To identify the factors influencing the accessibility of mobile learning applications
- To understand the effectiveness of mobile learning applications
- To study the impact on academic performance of the learners

4   Research Methodology:

Table 1.

Type of Research	Empirical Research
Type of Study	Survey Based
Data Collection	Primary & Secondary
Total Population	3198
Total Sample	343
Sample Location	Adoni
Sampling Technique	Convenience Sampling Technique
Research Instrument-	Questionnaire
Statistical Tools	Chi Square Test & Frequency Analysis.
Statistical Analysis	SPSS.

5 Discussion and Analysis:

From the above table it is clearly evident that majority of the samples are studying the under- graduate courses like degree and engineering courses. As there is only one distance education Centre is available and few working employees are studying in distance mode. Majority of the learners own smart phones and few students also own laptop especially the students from engineering discipline. Learners opined that majority of the times they use smart phone for learning needs and requirements. Simultaneously they are using lab in their respective college hours. Out of 343 students nearly 197 students are using mobile device every day for their learning and 67 students are using smart phone during the college hours. The usage patterns of smart phones in the for learning purpose is very high.

Table 2. showing the usage patterns of the learners

Usage Patterns	Particulars	Value	Total
Course you are studying	MBA	56	
	BTECH	99	343
	Degree	112	
	Diploma	76	
Are studying in regular mode	Yes	329	343
	No	14	
From the following select the digital devices that you have	Smart Phone	292	
	Laptop	24	343
	Desktop	12	
	Tablet	15	
Which digital device you use for learning	Smart Phone	292	343
	Laptop	24	
	Desktop	12	
	Tablet	15	
How frequently you use the digital device for learning	Everyday	197	343
	Once in a Week	24	
	After college hours	43	
	During College Hours	67	
	Occasionally	12	

6   HYPOTHESIS

To test the usage patterns the following hypothesis has been framed.

Ho: There is no significant association between the usage of device and frequency of usage of device in mobile learning applications

H$_1$: There is significant association between the usage of device and frequency usage of device in mobile learning applications.

Since the calculated value of X^2 is 415.44 is greater than the table value of X^2 is 5.226 at 0.05 level of significance for 12 degrees of freedom and hence null hypothesis is rejected.

Chi-Square Tests			
	Value	df	Asymp. Sig. (2-sided)
Pearson Chi-Square	415.447[a]	12	.000
Likelihood Ratio	253.527	12	.000
Linear-by-Linear Association	147.637	1	.000
N of Valid Cases	343		

Table 3. 12 cells (60.0%) have expected count less than 5. The minimum expected count is .91.

6.1   Table showing factors influencing the accessibility of internet and mobile learning application

From the above table 4 it is clearly evident that 148 respondents use their existing data plan to access the mobile learning app. Few students they have the access in the home also through the broadband. In the remote villages nearby Adoni students are accessing the internet connectivity through AP Fibernet (Subsidized broadband provided by AP State Government).   In the free hours students are using LAN (Local Area Network) connectivity in the college to access the mobile learning app. 186 students faced problems in the internet connectivity due   to power cut and network issues at the time of usage of learning application. Low bandwidth   is another problem identified through the study in accessing the mobile learning app as most   of the learning apps required high bandwidth to access the high-quality video content. Though the students have not received any training on how to access the mobile learning app. Only few instructors have given demonstration on using the mobile learning application. Few learners are learning through tutorials of the app.   As the usage of ICT based teaching is increased in   the current education system even instructors are also encouraging to use mobile devices for better understanding of concepts. 246 respondents opined that they have been permitted to use mobile phones during the class hours. Awareness among the parents also increased, 245 learners opined that their parents agree to use mobile phones for learning.

6.2 Table showing effectiveness of mobile learning applications Source: Primary Data

Table 4.

Variable	Particular	Value	Total
Access to Internet	Fiber Net	45	343
	Broadband	31	
	WIFI in Home	36	
	WIFI in College	39	
	Lan Connectivity in the college	44	
	My Plan	148	
Have you faced any problems in access to internet connectivity	Yes	186	343
	No	157	
What kind of problems faced in access to internet connectivity	Low Bandwidth	45	343
	Data Limit	189	
	Router Problem	4	
	Technical issues	9	
	Service Provider	38	
	Power cut	43	
	Network Coverage	15	
Is your digital device is supported for Learning	Yes	343	343
	No	0	
Have you received any training for accessing learning through Internet	Yes	98	343
	No	245	
If yes please mention	Instructor	247	343
	Demo	0	
	Video Tutorials	29	
	Through friends	0	
	Self-Try	67	
In which language you access the learning	English	321	343
	Regional Language	22	
	National Language	0	
Your instructor permits to use mobile for learning in the class	Yes	198	343
	No	145	
How frequently you use the digital device for learning in the class	Frequently	246	343
	Sometimes	0	
	As per the instructor	97	
Your parents accepts the usage of mobile for learning	Yes	245	343
	No	98	

Table 5.

Variable	Particular	Value	Total
Did you find the content is relevant	Yes	228	343
	No	98	
	Somewhat	17	
Whether the learning content is aligned with your syllabus	Yes	46	343
	No	287	
The level of engagement in your mobile learning	Very High	63	343
	High	213	
	Moderate	67	
	Low	0	
	Very Low	0	
Any facilitator, support desk in your mobile learning	Yes	45	343
	No	298	
Flexibility of accessing materials	Very High	19	343
	High	312	
	Moderate	6	
	Low	6	
	Very Low	0	
User friendly	Very High	273	343
	High	58	
	Moderate	6	
	Low	6	
	Very Low	0	
Availability of assessment	Yes	244	343
	No	99	
Is student forum or online community is there	Yes	272	343
	No	71	
Do you interact with peer learnersN	Yes	29	343
	No	314	
Learning helped in your academic performance	Very High	84	343
	High	207	

	Moderate	46	
	Low	6	
	Very Low	0	

From the above table 5 it is clearly evident that the factors like relevance of the content, engagement of the learner, user friendly, accessibility to support materials, assessment, presence of the online community and forums for peer learning and better academic performance helped the learners to use mobile based learning applications. Majority of the students expressed in mobile learning applications support from the instructor and support desk from the service provider is not available.

Table 6. showing the usage of mobile learning application and its impact on academic performance

Variable	Particular	Value	Total
Usage of learning through mobiles helped in your subject matter	strongly agree	91	343
	agree	218	
	Neither Agree nor Disagree	34	
	disagree	0	
	Strongly disagree	0	
Improved scores	strongly agree	125	343
	agree	218	
	Neither Agree nor Disagree	0	
	disagree	0	
	Strongly disagree	0	
Performed better in my class	strongly agree	124	343
	agree	219	
	Neither Agree nor Disagree	0	
	disagree	0	
	Strongly disagree	0	
Additional materials helped me to understand the concepts	strongly agree	90	343
	agree	241	
	Neither Agree nor Disagree	0	
	disagree	12	

	strongly disagree	0	
Able to submit my assignments in time	strongly agree	41	343
	agree	232	
	Neither Agree nor Disagree	70	
	disagree	0	
	Strongly disagree	0	
Able to complete the course	strongly agree	243	343
	agree	69	
	Neither Agree nor Disagree	28	
	disagree	3	
	Strongly disagree	0	
Tips and tricks and other inputs from peer community	strongly agree	69	343
	agree	274	
	Neither Agree nor Disagree	0	
	disagree	0	
	Strongly disagree	0	
Feedback helped me to correct myself	strongly agree	127	343
	agree	107	
	Neither Agree nor Disagree	109	
	disagree	0	
	Strongly disagree	0	
Overall academic performance improved	strongly agree	42	343
	agree	212	
	Neither Agree nor Disagree	89	
	disagree	0	
	Strongly disagree	0	

Source: Primary Data

From the above table 6 it is evident that nearly 309 students agreed that mobile learning app's helped to increase the understanding of the subject matter. All the population selected for sample responded that there is an improvement in the scores and performed better in the class after using the mobile learning app. While learning through mobile app the service provider's support material for completing course helped the learners to complete the course easily. Access to forum community helped the learners to receive the tips and tricks in completing the course and also helped in improving their conceptual knowledge and able to submit the assignments   in time. Overall the students opined that mobile learning has improved their academic performance.

7   Conclusion:

The impact of the penetration of the mobile technology and telecommunications   infrastructure rapidly growing in the remote areas which boosted the edtech industry to develop mobile based learning applications. The usage of the ICT based teaching after COVID period is also drastically increased as the learners are habituated in learning through mobile devices. The studies found that majority of the undergraduates are using the mobile based learning applications. The study identified various factors like user interface, online forum, feedback mechanism, assessment, medium of language and content made the learners to learn from the mobile applications. By using the mobile learning applications learners improved their subject knowledge performed well in the class and improved their scores and grades. Mobile learning applications has positive impact on the learners in improving their academic performance even in the rural area due to the rapid development and penetration of telecommunications industry. However, the study found that in the rural area awareness is required among the parents as learners opined that their parents not agreed to use mobile for learning purpose. Another major challenge identified is the relevance of the content as majority of the learners opined that content in the learning application is not aligned with their subject's curriculum.

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