Virtual Learning: Effectiveness of Mobile Based Learning Applications

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Abstract

Technology advancement is a new paradigm shift in 21st century around the world. The phenomena of technical advancement are spreading in almost all the sectors of economy and society. Education sector is also not remained untouched with this changing scenario. With the growth of innovative technologies, new learners from the millennial and post-millennial generation are challenging the conventional education system. Covid-19 Pandemic has created an indispensable space for E-learning in both Developed and developing countries. In order to capitalize the trend, the education industry is focusing on improving access for education using mobile applications and game based learning.

In this research paper researcher aimed to find out different mobile based learning applications for 10 -20 age group and factors responsible for adoption of mobile based learning. Paper also analyzed effectiveness and health problems of mobile learning applications on children. The researcher conducted exploratory research using qualitative and quantitative data. Convenient sampling method was used to select 20 students using mobile learning applications in Bangalore. Primary data collected using structured questionnaire and SPSS software used for data analysis. Observed results, suggests Byju's as the most popular learning application. Interactive and experimental leaning are major influential factors for usage of learning apps. Results indicate that learning apps helps to recall the concepts and increases clarity of the concepts. Higher usage of learning apps increases psychological and health related problems.

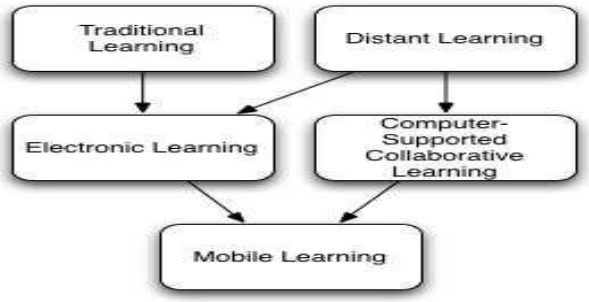
Key words: Virtual Learning, Education Technology, E-learning, Mobile Application based Learning

Introduction

Technology in education widens opportunities for students irrespective of the age and field of study. With the development of high-speed of mobile Internet, smart mobile terminals, such as smartphone, tablet etc. has become integral part of students learning process. Mobile applications, which are software programs running on mobile devices, have become the important carrier of information and services. Mobile learning applications makes it possible for users to study anytime and anywhere via mobile intelligent terminals, which greatly improve the convenience of learning and users' learning enthusiasm (Liu et al., 2018).

Education content is distributed faster to the receiver through digital platform. In Conventional type learning educational resources is distributed through book publishers to the stake holders. Stake holders in educational sector are both givers and receivers, which include academicians, educationist, teachers and learners. Development of technology in education made distribution of digital content easier and faster. To capitalize this trend, education industry is introducing new mediums and patterns for digital learning every day. The introduction of mobile application based learning has made dramatic change in the industry and to each learner's life. Mobile apps have encouraged exciting opportunities for personalized and learner-centered environment with flexible access to learning materials anytime and anywhere.

Chart 1 Illustration of the learning models evolution



Source: Pereira et al., 2013. Survey and analysis of current mobile learning applications and technologies

Mobile app based learning are helping to increase the quality of learning for all age group students from the primary to higher education level. Technology integration in education would help in making high quality education more affordable and reachable to the entire world.

While there are many apps available today, listing down some prominent education apps developed in India and which with their unique characteristic, making an impact in the education sector.

Popular educational apps in India

- Byju**'s**
- Toppr
- Vedantu
- LearnNext
- Khan Academy
- Unacademy
- Meritnation
- Top Rankers

Covid-19 pandemic has changed the life of people around the world towards digital platforms, for their daily needs and work. Education sector shifted from conventional classroom oriented learning to virtual learning, by connecting through different e-learning platforms and exchanging their knowledge. Pandemic has created an indispensable space for E-learning and mobile-based learning in both Developed and developing countries.

Review of Literature

Alqahtani, M., & Mohammad, H. (2015) conducted experimental research on Mobile applications' impact on student performance and satisfaction to find out relationship between behavioral factors and perceived usefulness of using Mobile Learning applications. They concluded that, there is a positive relation between mobile application and the students perceived performance, satisfaction and behavior. They also found that student had high satisfaction and positive attitude towards M-learning applications.

Ansari, M. S., & Tripathi, A. (2017) in their research, An investigation of effectiveness of mobile learning apps in higher education in India, investigated the effectiveness of Mobile Learning Apps in the higher education in India and he found that the role of Mobile Application in higher

education is highly significant and useful. He also found that students were aware and had knowledge about the use of mobile application and internet in their educational environment.

Lopuch, M. (2013) in the research paper, The effects of educational apps on student achievement and engagement, tried to determine whether the app based curricula have impact on student's achievement and engagement. Researcher did experimental research by using e spark App which creates personalized learning curricula using educational Apps and assessment tool via third party. Researcher concluded that educational apps have demonstrated large and positive impact on student's outcome and performance.

Zhang, S. (2016) in the study Mobile English learning: An empirical study on an APP, English fun dubbing, concluded that the learning app users were satisfied with its convenience, flexibility, user friendliness, rich materials and authentic language context. According to the study 90% of the respondent showed a strong enthusiasm for online learning resources

Camilleri, A.C., & Camilleri, M. A. (2019, May) in the research paper titled Mobile learning via educational apps: an interpretative study, explains the rationale behind the usage of mobile learning technologies. They conducted a qualitative study among students to understand their opinions and perceptions toward the use of educational applications (apps). Study indicated that students had different skill-sets as they exhibited different learning abilities.

Thinley, P., Geva, S., & Reye, J. (2014) in their research titled Tablets (iPad) for M-learning in the context of social constructivism to institute an effective learning environment, revealed that effective learning can happen only when teachers and learners are actively participating in the process. Thus research insisted on creation of applications that creates effective learning environment.

Objectives of the Study

The main objectives of the study are:

1. To find out different mobile based learning applications for 10 -20 age group
2. To determine factors influencing the usage of mobile learning applications
3. To analyze effectiveness and health impact of mobile learning applications

Methodology

Exploratory research was used with qualitative and quantitative variables. Convenience sampling method was used to select 20 students of 10-20 age groups from Bangalore. Primary data collected using structured questionnaire. Researcher gave an overview about the research to the

respondents. Questionnaire was administered through scheduling and all questions were asked in the presence of parents as most of the respondents are young students. SPSS software is used to analyse the data. Cronbach's Alpha used to test the reliability. One sample t test used to test the significant effectiveness and KMO and Bartlett's Test used to check applicability of factor test

Scope of study

Scope of this study is limited to awareness of mobile based learning application and factors influencing the usage of Mobile Apps for learning. Paper also analyses effectiveness and health impacts of mobile learning applications on students of the age group of 10 to 20.

Analysis and Interpretations

Table 1 Age group and

		Frequency	Percent
Valid	10-15	12	60.0
	15-20	8	40.0
	Total	20	100.0

Table 2 study level

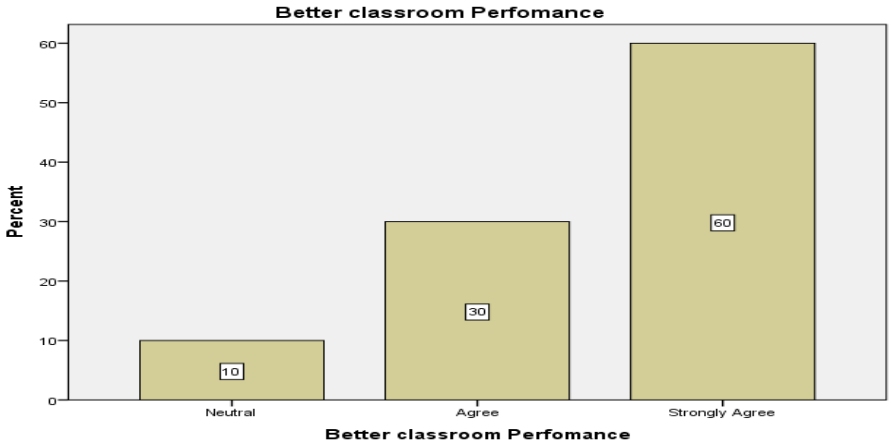
		Frequency	Percent
Valid	5-8	5	25.0
	8-12	15	75.0
	Total	20	100.0

Among the respondents 60% belongs to 10-15 age groups, studying in5^{th} to 12^{th} grade. While collecting the samples, researcher observed that students in grade 8^{th} to 10^{th} are using mobile learning applications more for their studies and all respondents are aware about the mobile learning applications.80% among the respondents are using mobile learning applications for 1 to 2 hours per day for their studies.

Table 3 Better classroom performance

		Frequency	Percent
Valid	Neutral	2	10.0
	Agree	6	30.0
	Strongly Agree	12	60.0
	Total	20	100.0

Fig 2 Better classroom performance

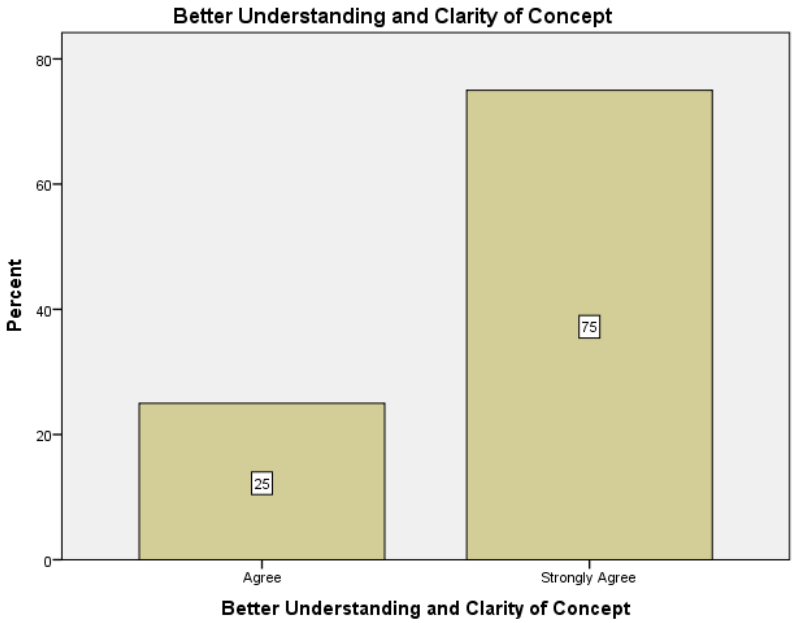


60% of the respondents strongly agree that mobile learning applications helped to improve their class room performances.

Table 4: Better understanding and clarity of concepts

		Frequency	Percent
Valid	Agree	5	25.0
	Strongly Agree	15	75.0
	Total	20	100.0

Fig 3 Better Understanding and Clarity of concept

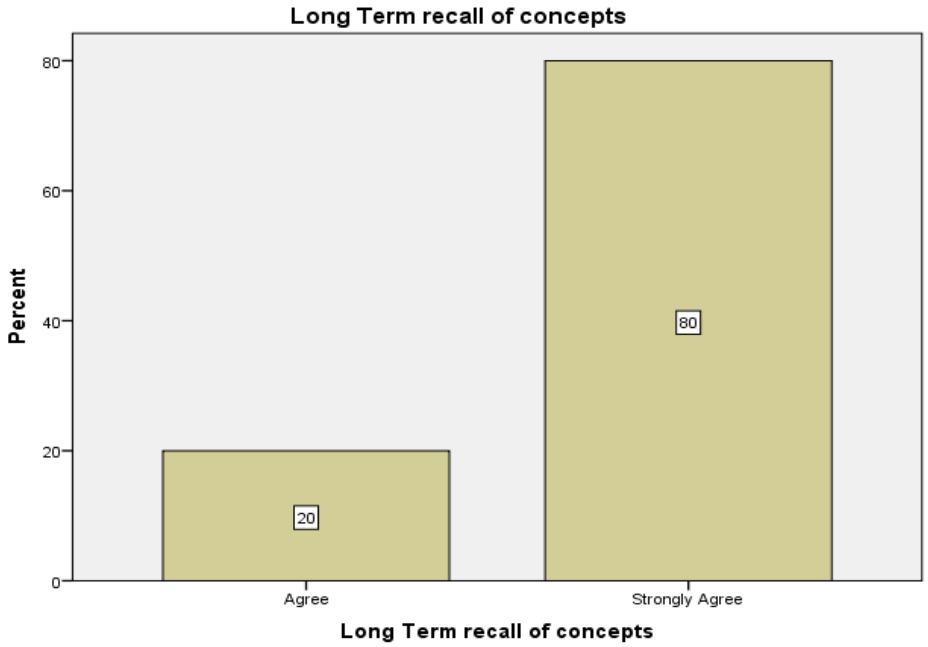


Among the respondents 75% strongly agree that they are able to understand the concepts clearly by using mobile learning applications.

Table 5: Long Term recall of concepts

		Frequency	Percent
Valid	Agree	4	20.0
	Strongly Agree	16	80.0
	Total	20	100.0

Fig: 4 Long term recall of concepts

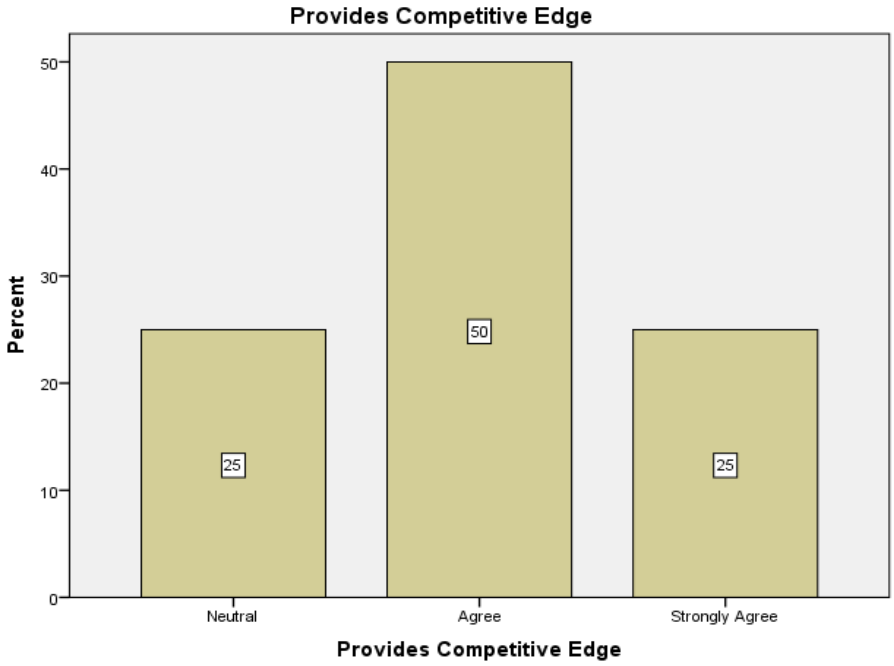


80% of the respondents strongly agree that they are able to recall the concepts learned through learning applications for long term.

Table 6: Provides Competitive Edge

		Frequency	Percent
Valid	Neutral	5	25.0
	Agree	10	50.0
	Strongly Agree	5	25.0
	Total	20	100.0

Fig 5 Provide competitive edge

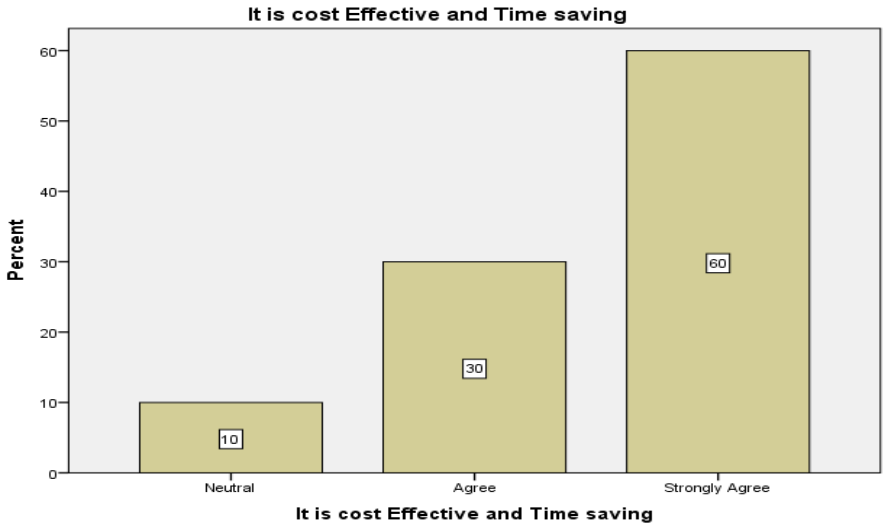


Among the respondents 50% agrees that mobile learning apps provide them better competitiveness. 25% strongly agrees and 25% are neutral.

Table 7: It is cost Effective and Time saving

		Frequency	Percent
Valid	Neutral	2	10.0
	Agree	6	30.0
	Strongly Agree	12	60.0
	Total	20	100.0

Fig 6 Cost effective and time saving

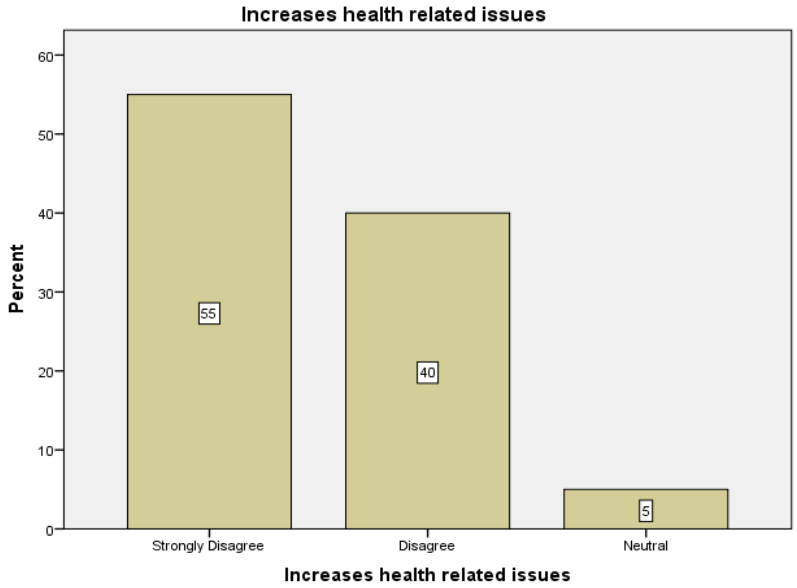


60% of the respondents strongly agree that mobile learning applications are cost effective and time saving.

Table 8: Increases health related issues

		Frequency	Percent
Valid	Strongly Disagree	11	55.0
	Disagree	8	40.0
	Neutral	1	5.0
	Total	20	100.0

Fig 7 Health issues



55% respondents strongly disagree and 40 % disagree that usage of mobile learning apps leads to health issues.

Table 9: Reliability Test

Reliability Statistics

Cronbach's Alpha	Cronbach's Alpha Based on Standardized Items	N of Items
.877	.877	16

Cronbach's Alpha is a measured value for reliability and strength of the consistency and alpha value is .877 which shows the reliability of measuring scale for this research.

Table 10: One Sample Statistics (One Sample t test)

	T	Df	Sig. (2-tailed)	Mean Difference
Mobile Learning Apps are effective	22.465	19	.000	3.300

One sample t test used to test the significant effectiveness and in this research it is significant at 5% level of significance. So Mobile Learning Applications are effective for the school going students for their studies.

Table 13: Rotated Component Matrix[a]

	Component	
	1	2
Mobile Learning Apps giving solution with fun	.827	-.013
Provides experimental and interactive learning	.804	.245
Provides flexible and controlled learning	.779	.371
Mobile Learning Apps are user friendly	.719	.397
Alternative to text book	.131	.910
Provides better competitiveness	.298	.896

Table 11: Factor Analysis

KMO and Bartlett's Test

Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		.597
Bartlett's Test of Sphericity	Approx. Chi-Square	64.551
	Df	15
	Sig.	.000

The approximate of Chi-square is 64.551 with 15 degrees of freedom, which is significant at 0.05 level of significance. The KMO statistic of 0.597 is also large (greater than 0.50). Hence Factor Analysis is considered as an appropriate technique for further analysis of the data.

Table12: Total Variance Explained

Component	Initial Eigenvalues			Extraction Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	3.457	57.614	57.614	3.457	57.614	57.614
2	1.091	18.191	75.804	1.091	18.191	75.804
3	.785	13.085	88.890			
4	.419	6.991	95.881			
5	.144	2.402	98.283			
6	.103	1.717	100.000			

The result indicates that factor test is applicable as the KMO value is more than .5 and Bartlett's Test of Sphericity is significant. There are two components resulting from the analysis explaining75.804% variance in the entire data set. The percentage of variance is explained by first component and second component are respectively 57.614% and 18.191. The First factor can be named as a User Friendly factors which will comprise solution with fun, interactive and experimental learning, flexible and controlled learning and user friendly. The second factor can be named as a Competitive Edge and it comprise alternative to text book and competitiveness.

Findings

- Byju's App is the most commonly used apps by the respondents
- Students of class 8^{th} to 12^{th} are commonly using Byju's for Science and Mathamatics
- The study showed that on average students spend 1 to 2 hours to learn through apps and 60% agreed that it improved their performance.
- Among the respondents 50% agrees that mobile learning apps provide them better competitiveness.
- Fun, interactive and experimental leaning are the major factors influencing use of learning apps

- Mobile learning Apps are flexible and user friendly in nature.
- Study showed that Mobile apps are support system, not an alternative to text books.
- Parents are concerned about the health, psychological and behavioural impact of increased screen time. Student respondents disagreed about the health impact of mobile app based learning.
- Among the respondents 80% strongly agrees that learning apps helps to recall the concepts for long time and clarity of the concepts are better while learning through apps.
- As the number of learners increases, the cost of eLearning business decreases significantly. Therefore, eLearning platforms are focused on large scale of activities to increase profits and profitability.

Suggestions

- Lack of good apps for the entire syllabus makes the students use different apps to learn different subjects and the industry can focus on meeting the needs.
- Government needs to establish clear strategic planning to connect different states, districts, universities, and schools to establish a network for technology based learning.
- Mobile networks can be better utilized for improved provision of education to the entire country.
- Govt. should focus on developing skilled teaching force to provide online and blended instructions
- Public Private Participatory initiatives can be undertaken to improve technology based education.
- Using technology to provide learners with online access to effective teaching and better learning opportunities with options in places where they are not otherwise available

Conclusion

The results of this research have shown that mobile communication technologies can be useful in selected learning settings with certain preconditions. Mobile learning provides a high degree of mobility, flexibility and independence. Individuals can learn at any time and any location according to their personal choice and budget. They can use their idle times productively for learning, and obtaining better learning materials.

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