

Students' Perception and Readiness towards the Adoption of Mobile Learning for Supplemental Education

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DECLARATION

I, Nandita Srivastava, Student of MBA 2016-18 Batch of Delhi School of Management, Delhi Technological University, Bawana Road, Delhi - 42 declare that the dissertation report titled “**Students’ Perception and Readiness towards the Adoption of Mobile Learning for Supplemental Education**” submitted by me in partial fulfilment of the requirement for the award of the Degree of Masters of Business Administration is an original work conducted by me.

The information and data given in the report is authentic to the best of my knowledge.

The report is not being submitted to any other University for the award of any other Degree, Diploma and/or Fellowship.

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CERTIFICATE

This is to certify that the Project Report titled “**Students’ Perception and Readiness towards the Adoption of Mobile Learning for Supplemental Education**” is an original and bonafide work carried out by Ms. Nandita Srivastava of MBA 2016-18 batch and was submitted to Delhi School of Management, Delhi Technological University, Bawana Road, Delhi-110042 in partial fulfilment of the requirement for the award of the Degree of Masters of Business Administration.

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ABSTRACT

Mobile learning is a form of learning in which the learner can access the content anytime, anywhere using a mobile device connected to internet. It is a convenient form of learning as it enables access to educational content irrespective of time and place. It is evolving fast across the globe due to the proliferation of mobile devices such as smartphones, tablets, iPads, e-readers etc. With decrease in cost and improvements in ease of use, mobile devices are being adopted at an ever increasing rate by people.

With increasing exposure to mobile phones, children too have developed an affinity for such devices. However, these devices are not limited to leisure activities only. They can provide an excellent means to engage children through visual and play-way methods of studying. Coupled with traditional methods of teaching, m-learning can make the process of learning enjoyable for them.

This project aims to study the perception and readiness of the students towards adoption of mobile learning solutions for supplemental education.

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CHAPTER 1 - INTRODUCTION

Learning is a process of acquiring knowledge or skills by studying, practising, being taught or experiencing something. Education, a subset of learning, involves receiving or giving systematic instruction in a formal learning environment such as a school or college. However, learning doesn't always have to take place in an institutionalized manner. It can take place informally too. Today most of the learning is associated with the education received by children at school inside the walls of a classroom. This is a widely accepted and globally adopted system. But time and again it has been realized that the education received inside the classroom is not sufficient for the development of the children. The methods of teaching practiced in schools lack personalization and limit the creativity of children. It does not prepare the students for the challenges awaiting them in terms of choosing a career or going for higher education once they finish their schooling.

Formalized system of education also severely limits the opportunities of learning for those who cannot afford schooling. Adoption of technology in learning as in other fields can help overcome some of the limitations of the current education system. Mobile learning particularly can play a pivotal role in bridging the gap between formal and informal education.

1.1 E-Learning

E-learning refers to learning by electronic means. It involves the use of an electronic device such as a computer and a means to transfer content such as the internet or intranet. Common forms are computer-based training and web based lessons or on-line lessons. It can be used in both formal and informal learning environments as teaching can be based both in and outside the classroom. With the proliferation of computers at home and educational institutions and the advent of internet, adoption of e-learning methods has been on a rise.

Previously, e-learning was not adopted widely as it was considered to lack the human element. But with rapid progress in Information and Communication

Technology (ICT) enabling improved e-learning methods, traditional classrooms are being digitised and books are being replaced by laptops, tablets, pen drives etc.

Content too has taken the form of multimedia involving PowerPoint presentations, interactive videos, games etc. The power of web has enabled fast exchange of information over email, discussion forums and internet messaging apps.

Not just at the school level, e-learning is also playing a crucial role in transforming higher education. Distance learning programs by universities and Massive Open Online Courses (MOOCs) have become hugely popular among students.

In the corporate sector too the importance of e-learning is growing. Organizations are opting for online courses along with traditional Learning Management Systems (LMS) to reskill or upskill their employees. Such training programs enable the employees to learn at the comfort of their own pace helping them manage their work and learning together.

E-learning has also proven to be effective for people preparing for various entrance exams worldwide. Students as well as working professionals can reap the benefits of online learning by accessing the study material on their electronic devices without having them to enrol in coaching classes.

E-learning may not be able to completely do away with the need of human involvement for teaching but it can play a significant role in augmenting the impact of education. It has been found in many studies that visual learning is more effective as it is retained for a longer time compared to listening. Thus, effective use of e-learning methodologies can positively transform the way we learn and teach.

1.2 M-Learning

M-Learning or Mobile Learning can be defined as learning by making use of mobile technology and wireless communication. It is a form of e-learning with the devices here being portable and involving mobile technology. Learners can use their personal mobile devices such as smartphones, tablets, phablets and iPads for learning anytime and anywhere. The mobility of such devices makes it very

convenient for learners to access the study content. It is different from e-learning in the aspects of mobility and personalization of the content.

Small size of the device, fast and powerful processor speed, easy to use interface and fast internet connectivity has made the smartphone one of the most ubiquitous devices across the world. It has made the process of learning highly flexible. Multimedia content in the form of audio visuals and games can be accessed from anywhere and anytime. The study content can be personalized to match the pace and comfort of the learner. It also allows bite size learning which helps in retaining the content better. Instant connectivity with fellow learners or instructors can provide the learner the desired help anytime. Learners can use such devices on the go for learning purpose taking the advantage of the mobility. Their learning is not limited to books, notes or classroom lectures.

Mobile devices have the ability to overcome the challenges of the conventional methods of classroom teaching and learning. With features like multimedia content, bite-size learning, personalised study content and fun and engaging applications, it can become a powerful tool for the children to support their classroom learning. Though it cannot completely replace the conventional methods due to the need for human intervention in the learning process, it can still be used to accentuate the impact of learning which is of great need in the current system of education in the country. It can be easily observed that due to improper pupil-teacher ratio, old methods of teaching and complete absence of personalised learning in the classrooms, the student have to look out for external help with their studies. They enroll themselves in coaching classes or take tuitions at home. However, these are expensive and time-consuming in most of the cases. Thus, mobile learning offers a cost-effective and efficient solution to supplement school learning. It is highly convenient for the students. They can learn through recorded videos available online or offered on the educational apps on the mobile phone from the comfort of their homes. They can also receive online tutoring or get real time help with their homework online. Thus, m-learning has helped e-learning take a step forward and facilitated learning from virtually anywhere and anytime.

However, it is important to gauge whether the students are ready and willing to adopt the solutions offered by mobile.

1.3 Current State of Digital Learning in India

1.3.1 Government Initiatives

In his Union Budget 2018 presentation, Finance Minister Arun Jaitley, highlighting the role of technology in education, said that we will gradually move from blackboards to digital boards in classrooms. This shows that the government acknowledges the importance of technology in shaping the education landscape in India in the coming times. The government has taken several initiatives in the past few years in an effort to digitize primary and secondary education and to spread its reach. Following are some of the initiatives:

- ePathshala

It is a joint initiative of Ministry of Human Resource Development (MHRD), Govt. of India and National Council of Educational Research and Training (NCERT). The aim of this initiative is facilitation of learning anytime and anywhere. Online format of all educational resources such as audio, video, periodicals, textbooks and non-print material has been made available all at one place. It can be accessed by anyone including students, parents, educators, researchers etc. Suitable formats for all devices such as mobile phones, tablets, laptops, and desktops are available for easy accessibility and there is no limit on the number of ebooks a user can carry on his or her device.

Educational content along with supplementary material including textbooks, videos, audios of all the classes is accessible by students. The same content along with teaching instructions, source books, policy documents, syllabus and reports is also accessible by teachers, educators and parents. The mobile application of ePathshala is available for Android, iOS and Windows operating systems.

- SWAYAM

This programme has been initiated by the Government of India to facilitate the best learning resources to all, including the most disadvantaged. The aim of this

programme is to provide access to educational resources to those who till now could not afford formal education. The goal of this scheme is to achieve three principles of Educational policy i.e. access, equity and quality.

It is done through an indigenously developed IT platform that is capable of hosting all the courses from class 9 till post-graduation. These can be accessed from anywhere at any time.

These courses have been developed by specially chosen faculty and teachers from across the country. The courses available on SWAYAM are divided into four quadrants:

- i) video lectures
- ii) specially prepared reading material that can be downloaded/printed
- iii) self-assessment tests through tests and quizzes and
- (iv) an online discussion forum for clearing the doubts.

Nine coordinators have been appointed in order to ensure the quality of the content. They are AICTE for self-paced courses, NPTEL for engineering, UGC for post-graduation education, CEC for under-graduate education, NCERT & NIOS for school education, IGNOU for out of the school students and, IIMB for management studies. All the courses are free of cost and certifications can be obtained with a minimal fee. The mobile app of SWAYAM is available for Android, iOS and Windows platforms.

- eBasta

This project has been developed to make school books available in digital form as ebooks. These can be read on tablets and laptops. The project brings the publishers, school and children on one single platform along with providing a framework to manage the resources easily. There is a web application which can be installed on the tablets for using the framework.

Students can identify bastas of their interest and download the same. The teachers can browse the content, pick the content matches their requirements and organize it into bastas. The publishers can upload and manage the content on the portal.

eBasta offers the following advantages:

i) School/Teachers

- ebooks and other resources can be arranged logically into bastas for easy access
- Teachers can manage the content as per their teaching preferences and methods
- Teachers can access variety of content and content formats
- Teachers can comment on and rate the content
- Provides visibility to teachers who contribute or generate more relevant content

ii) Students

- Can access interactive content as per their needs
- Can access the content anytime they want
- Can carry eBasta on their devices anywhere

iii) Publishers

- Can access multiple schools using one portal
- Convenient to register, sell and distribute books online
- Get direct feedback from readers

- National Digital Library of India

This project has been developed by Ministry of Human Resource Development under its National Mission on Education through Information and Communication Technology (NMEICT). It is a framework of virtual repository of learning resources with a single-window search facility. Filtered and federated searching is employed to facilitate focused searching so that learners can find out the right resource with least effort and in minimum time.

It has been designed to support content of any language (more than 70 languages) and provides interface support for leading Indian languages. It is being arranged to provide support for all academic levels (primary to post-graduate) including researchers and life-long learners, all disciplines (Science, Technology, Agriculture, Humanities etc), all popular form of access devices and differently-abled learners. It is being developed to help students to prepare for entrance and competitive

examination, to enable people to learn and prepare from best practices from all over the world and to facilitate researchers to perform inter-linked exploration from multiple sources. It is being developed at Indian Institute of Technology Kharagpur. Mobile app for both Android and iOS is available.

- **Online Labs**

This project aims to help students conduct lab experiments using the internet. It offers an efficient and inexpensive way to learn through experiments. It is especially helpful for students of those schools where there is scarcity of lab equipment as they can still get to experience the lab environment over the internet. The experiments on this portal can be accessed from anywhere at any time, making it convenient for the children to learn. The content of the experiments is mapped to the school syllabus.

Following are the feature of online labs:

- Content in accordance with CBSE and other State boards
- Physics, Chemistry and Biology labs from class 9 to class 12
- English and Math lessons for class 9 and class 10
- Interactive content (animations, videos)

1.3.2 Opportunity for Private Sector

According to a study by KPMG in India and Google titled “Online education in India : 2021”, India’s online education market is expected to grow to USD 1.96 billion in 2021. The current market size is estimated to be USD 247 million. It means it is estimated to grow 8x over next five years. India has currently about 260 million students enrolled in more than 1.5 million schools. With an estimated 280 million students expected to be enrolled in schools by 2021, Primary and secondary supplemental education is set to become the largest category in online education. It is estimated to grow to USD 773 million from USD 73 million currently. This segment has a significant market potential as the top two players currently account for only 2-3% of potential market share.

India's informal education market is one of the largest in the world. It consists of pre-primary, coaching classes, vocational education, and multimedia courses as a supplement or substitute to formal education.

The key motivational factors behind adoption of online channels by students in this segment have been found to be: better concentration at home, convenience and variety of courses. The courses offered currently act as supplement to classroom education and substitutes to tuition classes market. Most of the players in this category are new and are making efforts to establish a sound footing among the customers. Most of these have adopted the 'Freemium' model for revenue generation. According to the study, students in this segment have been found to show a preference for video content. Peer review and feedback have been termed as important criteria by the students in discovery and selection of the content provider. This makes it important for the private players to provide an efficient review and feedback mechanism for their content. The quality of the content has been found to be the top most factor affecting the purchase decision of the students. It is important for the content providers to recognise that the demand for both in-depth content for better understanding as well as summarised content for revision is huge. Increased internet and smartphone penetration in tier 2 cities have been cited to be the most important factors driving the growth in the number of users in this category.

Given the huge market potential, below are some of the organizations in the private sector which offer m-learning products and services in India.

- BYJU's - The Learning App

It was founded in 2011 by Byju Raveendran. It is an educational technology (edtech) company headquartered in Bengaluru. It became the first company from Asia to receive investment from Chan Zuckerberg Initiative. It's most popular product is a smartphone app called BYJU's - The Learning App. It provided educational content to primary and secondary school students. The content is mostly in the video and animation format for better engagement of students. It has overall 15 million users and over 9 lakh paid subscribers on an annual basis. It operates on a freemium business model. Along with serving school students, it also provides help in preparing various entrance exams such as CAT, GRE, GMAT, JEE etc.

- Toppr

It was founded by Zishaan Hayath and Hemanth Goteti in 2013. It provides a personalised learning app for students studying in class 5 to class 12. The app contains video lectures, practice tests, previous papers, performance reports and instant doubt clearing service over chat. It operates on a subscription model offering multiple packages. It also provides assistance in preparation of other entrance exams.

- Veative

Founded in 2016, Veative is a global provider of educational technology for schools and industries. It uses immersive technologies such as 3D, Virtual Reality (VR), Augmented Reality (AR) and Mixed Reality (MR). It offers more than 450 VR modules. It believes that using visualisation and VR heightens the retention and engagement levels of the students. Hence, it aims to transform the learning experience for students using immersive technologies and make it affordable for everyone across the globe. Along with the tools, it also provides training to teachers on how to implement VR technology inside the classrooms. The modules are built into the headset without the need for a mobile phone. The Veative VR Learn content delivery app is employed for delivery of high-quality interactive VR modules. It also enables students and teachers to download VR content from the online store or from a local (offline) content access point.

- Vedantu

Vedantu is an educational technology company which offers personalised learning through live tutoring on mobile devices at even low internet bandwidths. It facilitates interaction between the teacher and student from the comfort of the student's home. The learning sessions are highly personalised and tailored to the need of the students. The recording of the sessions are also available for the student to revise the content. It is said to operate on a marketplace model for teachers, where students can browse, discover and choose to learn from an online tutor of their choice.

1.4 Objectives

Primary Objective

- The primary objective of this project is to study the readiness and perception of students towards mobile learning adoption to supplement their school learning.

Secondary Objectives

- To study the current state of digital learning in the country
- To study the market potential of mobile learning in the future
- To study the current and future technologies in mobile learning
- To study the advantages, disadvantages and challenges associated with mobile learning

CHAPTER 2 - LITERATURE REVIEW

2.1 E-learning

E-learning has been defined as the use of computer network technology, primarily over an intranet or through the internet, to deliver information or instructions to individuals (Welsh et al., 2003). According to the Technology Standard Committee, “e-learning system is a learning technology that uses web browsers as a tool for interaction with learners and other systems”. This implies that the system works as a platform to assist teachers and learners (Ferdousi, 2009). In fact, “e-learning is an information system based on the World Wide Web that provides training and development to learners in a dynamic and flexible manner” (Lee and Lee, 2008). National Program on Technology Enhanced Learning (NPTEL) in India is a virtual education site with online lectures for different courses. Most of the lectures are delivered by educators from the top most institutions of India which helps enrich the knowledge and skills of students and trainees in different organizations.

E-learning has been commonly divided into two categories: synchronous and asynchronous. Synchronous e-learning includes all the e-learning scenarios in which the learning takes place ‘live’ and all the participants need to be present at the same time. Learning over videoconferencing is an example of synchronous e-learning. In asynchronous e-learning, the participants can learn in an offline mode from the previously delivered content or recorded learning sessions. E-learning has made the learning significantly efficient. E-learning offers several benefits such as reduction in delivery time, convenience, improved tracking and cost saving (Welsh et al., 2003). With the revolution in Information and Communication Technology (ICT), e-learning is soon becoming more of a norm than an exception in most parts of the world.

2.2 M-Learning

M-learning can be defined as ‘the acquisition of any knowledge and skills through the use of mobile technology, anywhere, and anytime’ (Geddes, 2004, p. 1). Another definition of mobile learning is given by Mobile Learning Network. It defines m-learning as “the exploitation of ubiquitous handheld technologies, together with wireless and mobile phone networks, to facilitate, support, enhance and extend the reach of teaching and learning” (MoLeNET, 2010). To understand better it can be

said that mobile learning is learning is through mobile-devices like of smartphones, tablets, computers, personal digital assistants (PDAs), MP3s and MP4 devices as well as other portable device (Milošević et al. 2015). Devices like these are handy (convenient for holding in hand and do not require to be installed on a computer), compact (can be taken or carried anywhere easily in a handbag or pockets and have easy battery charging options) and also lightweight (device do not weigh a lot) (Nordin et al., 2010).

Mobile devices are capable of supporting four types of learning approaches:

- i) individualized learning,
- ii) situated learning,
- iii) collaborative learning, and
- iv) informal learning.

According to a Statista report, the number of smartphone users is forecast to grow from 2.1 billion in 2016 to around 2.5 billion in 2019. This in itself is a clear indication of the potential of mobile learning in the near future.

2.3 E-Learning vs. M-Learning

E-learning was a result of the invention of computer and the advent of the internet. It made learning far more efficient than the traditional learning methods. However, with the invention of mobile technology and devices like smartphones and tablets, e-learning leapfrogged to take the form of m-learning. M-learning has been known to have a far more revolutionary impact on education than e-learning.

So, m-learning involves the use of mobile technology while e-learning is based on computer network technology. M-learning is similar to e-learning in a lot of ways but it is unique in terms of flexibility of time and location (Peters, 2007). The three distinguishing characteristics of m-learning are portability, instant connectivity, and context sensitivity (BenMoussa, 2003; Churchill & Churchill, 2008; Klopfer, Squire, & Jenkins, 2002; Sharples, 2000).

2.4 The Current State of Mobile Learning

Currently, cell phones which were at first advertised firmly as communication and entertaining gadgets are now becoming an imperative part in economies and society at large. Cell phones have affected almost each and every task, from managing an account to governmental issues, and are presently being utilized to build profitability in various fields. As these gadgets turn out to be progressively noticeable around the world, mobile learning is also getting lot of attraction. Students and faculties are utilizing this technology for various educational purposes while the government is also being supportive in making policies to promote this innovative method of mobile learning in both formal and informal education setting. Many local educational institutes are also adopting this technology due to its advantages. The specialists in education sector believe that m-learning has now reached to level where its systematic integration with learning both inside and outside of institute's premises is necessary. Choices made today will definitely impact the significance of m-learning in years to come. Some of the latest trends in m-learning are as follows. It includes the innovations in formal and informal education.

2.4.1 Formal Education

The significance of mobiles in formal education systems is increasing. Worldwide, there are two programmes for m-learning which are highly popular. First one being “One-to-One (1:1) Programmes”, under which all the students are provided with their own mobile devices without any cost to the students or their families. The second programme which has got a lot of popularity is “Bring Your Own Device (BYOD)” initiative, in which students carry their own devices to the institutes. Students who have difficulty in affording these devices are supported by institutes which provide them subsidized devices. Generally, the One-to-One model tends to be more prevalent in poorer countries and regions, while the BYOD programme is commonly executed in wealthier communities where possessing a mobile device among youngsters is very common.

- Bring Your Own Device (BYOD)

One suitable way create a One-to-One environment is by using the mobile devices that students already possess. This model, known as Bring Your Own Device

(BYOD), is now causing a big change in higher education and distance learning by enabling more and more students to access the course contents through mobile technology. As mobile devices reach and possession increases, BYOD has a lot to give for students across the globe, though it might appear very different around various regions and countries.

While this programme has been highly popular in regions and communities where mobile devices possession is widespread, students and instructors have also discovered ways to capitalize on less sophisticated student owned technologies. “The Nokia MoMath project in South Africa, for instance, uses the SMS (Short Message Service) features on standard mobile phones to provide students with access to mathematics content and support” (Isaacs, 2012b). While BYOD transfers the hardware costs from the institutes to the students, it puts an extra pressure on bandwidth which is a critical infrastructure requirement for m-learning technology. Institutes or government executing the BYOD programme should also have a strategy in place to supply devices to learners who have difficulty in affording them, either by purchasing the device for them or by providing subsidies to them.

Other issues include security, privacy, adequate professional development for faculties, and a digital gap between learners with latest gadgets and those with less effective gadgets or none at all. Because of such reasons, cases of successful BYOD programmes, specifically in primary and secondary institutes, are quite less. “However, as sophisticated mobile technologies become increasingly accessible and affordable, BYOD may form a central component of mobile learning projects in the future” (Norris and Soloway, 2011).

2.4.2 Informal Education

To a very large extent the m-learning technology has been developed outside the context of formal education and a large amount of m-learning projects have been developed and designed for informal education setting.

- Seamless Learning

“Seamless learning is defined as uninterrupted learning across different environments, including formal and informal settings”. In an ideal example of seamless learning, a learner opportunistically uses various kinds of technologies, capitalizing on the unique affordances of each- the mobility of a smartphones, for example or the superior keyboard on a desktop computer – to maintain continuity of the learning experience across a variety of devices and settings. Historically, there has been a significant divide between the formal learning that happens inside a classroom and the informal learning that occurs at home or in community environments. The role of mobile learning in bridging the gap between formal and informal education is being investigated with great interest by several researchers and experts.

2.5 Educational Technology

Latest advancements in the mobile technology have mostly been around the development of digital content, majorly in the form of digital books or e-books accessed through e-readers. Other thing on which major focus has been is the development of various mobile applications (applications) and software platforms for accessing educational resources through mobile devices.

- **Digital Textbooks and E-Readers**

In formal education setting in the developed world, the transition of books to digital textbooks is one of the most established mobile learning trends. As e-readers and e-reading applications continue to develop and grow, the experience of reading electronically is increasing becoming more pleasurable and conducive to learning. “New approaches to textbook conversion and creation are moving away from mere digital reproductions of printed text to visually rich interfaces that can include multimedia, interactive and collaborative elements” (GSMA, 2011). The coming generations of smartphones and tablets will provide new methods for educating and learning. “For example, e-books could enable a more Interaction form of study, with a group of students collaborating to read, annotate and compare one or more texts on the same topic, each working from their individual mobile device” (Sharples et al., 2012). “Future e-books would utilize the technologies built into mobile devices like voice recorders, cameras, timers, GPS (Global Positioning System) locators,

accelerometers, compasses & tilt sensors, for exploratory learning, navigating the learner through experiments like testing the properties of light using the inbuilt camera of device or sound using the recorder” (Sharples et al., 2012). As smartphone, tablets & e-readers technology enhance in the quality and gets cheaper, this transition towards the digital textbooks could boost the educational opportunities for learners around the globe, particularly for those who presently do not have access to high-quality physical educational materials.

- **Mobile Applications:**

Marketplaces for mobile applications have provided a completely new distribution method for content, stimulating substantial investment in software development for mobile devices. Educational applications are already achieving significant boom in developed nations. These applications provide latest tools for educational tasks like annotation, calculation, composition and content creation. “A recent study found that 270 million applications linked to education were downloaded in 2011 – a more than tenfold increase since 2009” (McKinsey & Company and GSMA, 2012). “While a small number of educational applications are mapped to curriculum targets and designed for use in classroom or homework settings, the majority are intended mainly for informal learning” (GSMA, 2011).

However, as more learners start using mobile devices in formal education settings, applications will be likely become a crucial part of the m-learning technology. Not only are developers now able to sidestep institutes and sell software & apps directly to learners, but students, teachers and schools alike will be able to make small, incremental investments in micro-sized pieces of content. For instance, rather than putting money in the similar textbooks or software for a complete class, institute, city or nation, instructors will be able to opt from various applications that are personalised to every single learner, powering the tailored learning that is expected to characterize formal education in the future. Some of the popular educational applications available on mobile devices are Udemy, Ted, Duolingo, Wikipedia, etc. There are vast number of applications available for different mobile operating systems for preparation of competitive exams like UPSC, IIT-JEE, CAT, etc.

2.6 M-Learning: The Future

According to a report published by McKinsey & Company titled “Transforming learning through mEducation”, the market for mEducation today is worth approximately USD 3.4 billion and is set to reach USD 70 billion by 2020. Currently the global expenditure on education is about USD 4 trillion which is expected to double by 2020. The report identifies three major benefits of m-learning as:

- It helps overcome the limitations of time and location
- It helps educators to customize the content as per the needs of the individual learner
- It helps overcome the challenges of conventional ways of imparting education

It distinguishes the currently available mEducation products and services into seven categories:

- i) Educational e-books and courses
- ii) Learning management systems and authoring tools
- iii) Game or simulation-based learning tools
- iv) Collaboration tools
- v) Adaptive assessment services
- vi) Test preparation support
- vii) Distance tutoring and home support

According to the report, the following five megatrends will shape the role of mEducation in learning in the coming decade:

- i) Evolution of portable device form factors
- ii) Rise of technology generation
- iii) Recognition of importance of mEducation by the governments
- iv) Enormous success of mobile apps as means of learning
- v) Discovery of viable business models in mEducation

It estimates that higher education and K-12 will have a majority share in the mEducation products market across the world. However, there will be differences in different regions of the world in terms of which products or services will play a prominent role. Distance tutoring will be dominant in Asian nations such as India, Japan, and South Korea as these countries have a strong culture of supplementary

education. The findings of the report are a clear indication of the plethora of opportunities the future holds for m-learning as a tool which will shape the future of learning and education across the world.

2.7 Advantages of M-Learning for Supplemental Education

The advantages offered by m-learning can be summed up as follows:

- It facilitates learning on the go by removing the barriers of location and time
- It does not limit the learning content due to high storage capacity, internet connectivity and cloud applications
- It enables bite-sized learning which has been proven to be effective
- It offers multimedia content in the form of educational audio and video files
- It facilitates personalized learning based on the pace of learning of the individual by using advanced technologies
- It can provide real-time assessment
- It reduced the manual effort of instructors and can assist them in teaching and assessment
- It makes learning fun for everyone through gamification using simulation, quizzes, etc.
- Mobile devices are cost-effective and can make education reach to those who do not have access to formal education
- It helps connect the learner and instructor instantly

2.8 Disadvantages of M-Learning

2.8.1 Health hazards due to use of Mobile Phones

- Digital eye strain

Excessive exposure to blue light can cause damage to retina, cataract, sleep disorder (due to excessive levels of melatonin), difficulty in retention (due to sleep disorder).

- Difficulties due to small screen size

It can lead to blurred vision, sore eyes, dry eyes, and headache

- Electromagnetic radiations

Several studies have been conducted to measure the impact of radiation from smartphones on health. However, no concrete evidence has been found. Various

studies have led to inconsistent results. But precautionary measures such as below are advisable by various bodies:

- Keeping the smartphone away from body when sleeping
- Use of hands-free modes
- Smartphone Addiction can lead to decreased physical activity

This can lead to obesity and diabetes.

- Behavioural problems

Excessive use of smartphones can adversely affect behaviour of children in the following ways:

- Increased anxiety
- Violent tendencies due to violent video games
- Blue Whale like games leading to suicides

2.8.2 Other Disadvantages of M-learning

- Distraction by non-educational content on smartphone (games, messaging, internet etc.)
- Too much choice in content (too many players, free content available)
- Lack of authority with respect to credibility of content quality
- Careful handling of devices needed on part of children

2.8.3 Other Challenges

- Lack of awareness about existing m-learning products in the market
- Devices are not personal to most children (need to borrow it from elders at home)
- Lack of local language support in content
- Privacy concerns in app downloads
- Multiple influencers in decision-making while choosing content (parents, peers, teachers, internet)
- Mushrooming of too many offline channels in the vicinity (coaching centres)
- Resistance from parents (they fear that children will misuse the device)
- Resistance from teachers (they consider it a threat to their jobs)

2.9 M-Learning Readiness and Perception

- **M-Learning Readiness**

According to Oxford dictionary, readiness can be defined as the state of being fully prepared for something. Kaur and Abbas (2004) define e-learning readiness as the ability of individuals to utilize e-learning resources and multimedia technologies to improve the quality of learning. M-learning readiness can be defined on the similar lines as the ability of individuals to utilize m-learning products and services to enhance the outcome of their learning.

- **M-Learning Perception**

Perception, as defined in the Oxford dictionary is the way in which something is regarded, understood, or interpreted. Perception towards m-learning can be defined as the way in which an individual interprets m-learning. Perception of an individual towards m-learning can lead to him or her adopt or reject m-learning products and services. It means that perception of individuals towards m-learning can affect its adoption by them.

- **Technology Acceptance Model**

Technology Acceptance Model (TAM) is one of the renowned model related to the acceptance of technologies which was originally proposed by Davis in 1986. "The concept of TAM is to provide a theoretical basis to describe behavioural intentions attitude toward use, external variables impact, internal beliefs and the usage of actual system" (Legris, Ingham, &Collerette, 2003).

"TAM is proposed to be a model of user acceptance of information technology"(Davis, Bagozzi, and Warshaw1989). "TAM hypothesizes that two influencing factors (perceived ease of use and perceived usefulness) are the key factors leading to user acceptance of information technology" (Zhao & Zhu, 2010). "TAM also proposed that external factors affect actual and intention use through mediated effects on perceived ease of use and perceived usefulness" (Davis, 1989). According to TAM, ease of use and perceived usefulness are most important determinants of actual system use.

CHAPTER 3 - RESEARCH METHODOLOGY

This is a preliminary survey study which seeks to explore students' readiness and perception towards m-learning for supplementary school education.

3.1 Research Design

Research design is the arrangement, structure, and methodology of examination imagined in order to get answers to research questions. This research study is descriptive research as it studies the readiness and perception of students towards adoption of mobile learning to support their school studies.

3.2 Research Method

A questionnaire was used to assess the readiness and perception of the students. The questionnaire for the survey comprises of three sections. First section is for collecting the demographic details of the individuals filling the questionnaire. It includes information related to their gender, class of study and if they attend coaching or tuitions after school. The second section contains questions to gauge the readiness of the students towards adoption of mobile learning. As discussed above, m-learning readiness can be defined as the ability of individuals to utilize m-learning products and services to enhance the outcome of their learning. Questions related to accessibility to mobile phones and the internet have been included.

The last section consists of questions related to perception of students towards adoption of mobile learning for supplementary education. It tries to understand the comfort level of students with using a mobile phone along with their willingness to use it for the purpose of studies.

3.3 Source of Data

- Secondary Data

Secondary data acts as a very powerful tool for any researcher as the entire research work is completed on the basis of secondary data. Secondary data is the foundation of any research work. Secondary data is the one which has already been

gathered and analysed by some other researcher. Secondary data has been gathered from the different research papers, white papers, and different websites.

- **Primary Data**

Primary data are those which are newly gathered and which could be unique in character. There are many ways of collecting data, specifically for descriptive research. It includes methods such as observing method, interviewing method and collecting of data through questionnaires. For this research the data has been collected from primary to senior secondary students studying in a school. A questionnaire is an arrangement of questions concentrated on a particular subject or specific field. The questionnaire can be parted into different subsets depending on the subtopics of specialized field. This technique is usually opted by researchers, private and public organizations, as well as government organizations also.

In this technique, generally a questionnaire is sent to a respondent with a request to take the survey and then return back the questionnaire. The respondents are supposed to fill the questions by themselves. Presently, as we are in an age of IT the method of gathering the data by sending the questionnaires via Emails or instant messaging is most commonly utilized in various economic and business surveys. In this survey also, the questionnaire was sent via messaging service on mobile phone to the participants.

3.4 Participants

Participants were selected using convenience sampling. The questionnaire was sent to students studying in different schools using email and instant messaging service on mobile phone. A total of 112 responses were received.

3.5 Scale

In the first and second section, dichotomous questions with options as 'Yes' and 'No' have been included. These are close-ended questions. For questions in the third section which studies perception, a three-point Likert scale with 'Yes', 'No', 'Maybe' as options has been used for the convenience of the students.

CHAPTER 4 - DATA ANALYSIS

This chapter deals with the analysis of the data collected from the students using the questionnaire. First section of the questionnaire collects the demographic details of the individuals filling the questionnaire. It includes information related to their gender, class of study and if they attend coaching classes or tuitions after school. The second section contains questions to gauge the readiness of the students towards adoption of mobile learning. The last section consists of questions related to perception of students towards adoption of mobile learning for supplementary education. It tries to understand the comfort level of students with using a mobile phone along with their willingness to use it for the purpose of studies.

4.1 Demographic Details

- Gender

The segregation of students on the basis of gender is as follows:

Gender	Number of respondents	Percentage
Female	76	67.85%
Male	36	32.14%

- Class of Study

The segregation of the students on the basis of the class they were studying is as follows:

Class 1-5 (Primary)	Class 6-8 (Upper Primary)	Class 9-10 (Secondary)	Class 11-12 (Senior Secondary)
5.3%	34.0%	13.4%	47.3%

- Coaching and Tuitions

Out of the 112 respondents, 60 students (53.6%) take tuitions after school and 51 (45.6%) attend coaching classes.

4.2 Readiness towards adoption of M-Learning

Analysis of the data collected shows that there is readiness among the students to use mobile phone as a tool to supplement their school education.

- Respondents using a personal mobile phone:

The survey found that out of the 112 respondents, 65.2% of them use a personal mobile phone. This indicates that though a majority of the students have a personal mobile phone, a significant number of them do not. The ownership of a personal mobile device is an important factor in readiness for mobile learning. Figure 1 shows the same.

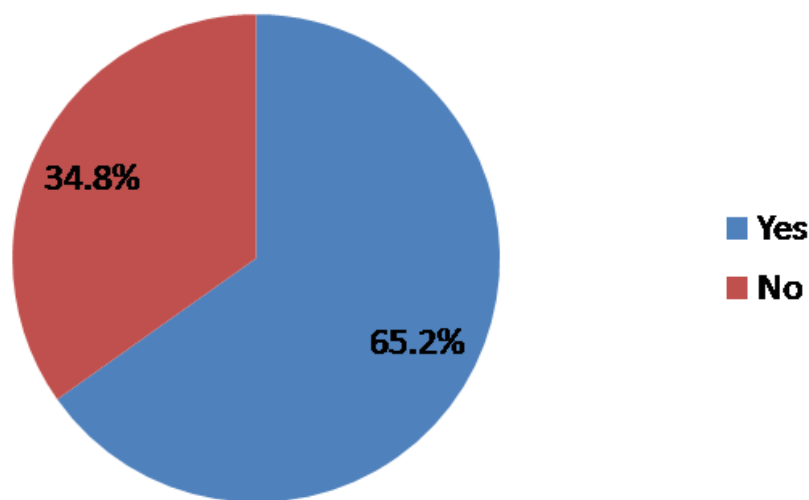


Figure 1 - Respondents using a personal mobile phone

- Respondents' access to mobile phones at home

Out of the 112 respondents, 66.1% of the students use their own mobile phones at home while 25.9% of them use their parent's phone. Thus, a considerable number of students are dependent on their parents for access to a mobile phone. Figure 2 depicts the same.

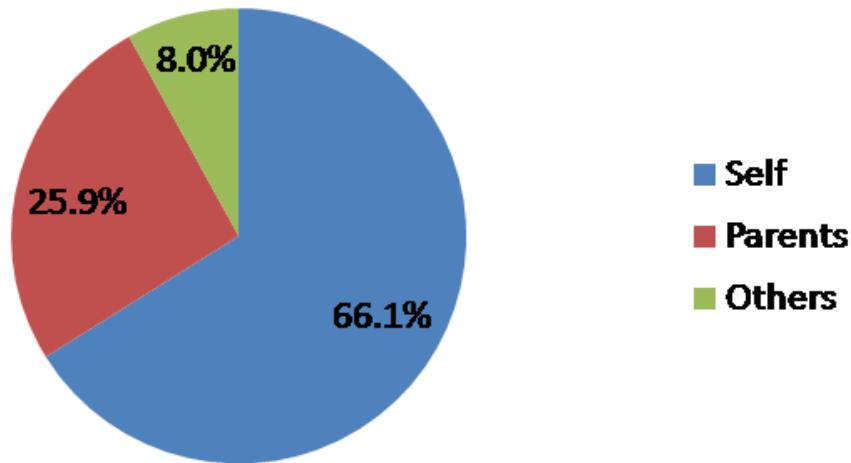


Figure 2 - Respondents' access to mobile phones at home

- Availability of Smartphones at home

Out of the 112 respondents, 58% of the students have more than two smartphones at their home. This indicates that more than half of the students are not dependent on just one smartphone for use. Figure 3 depicts the same.

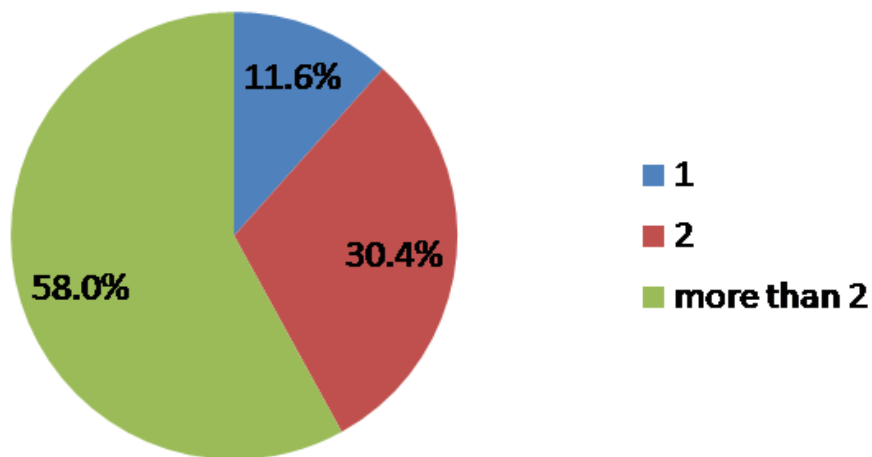


Figure 3 - Availability of Smartphones at home

- Access to 4G internet connection

Out of the 112 respondents, 84.8% of the students have a 4G internet connection in their phone. Accessibility to high speed internet is an important factor to consider while measuring the readiness for mobile learning as most of the content is available

through internet or the mobile applications which require internet to run. Figure 4 represents the same.

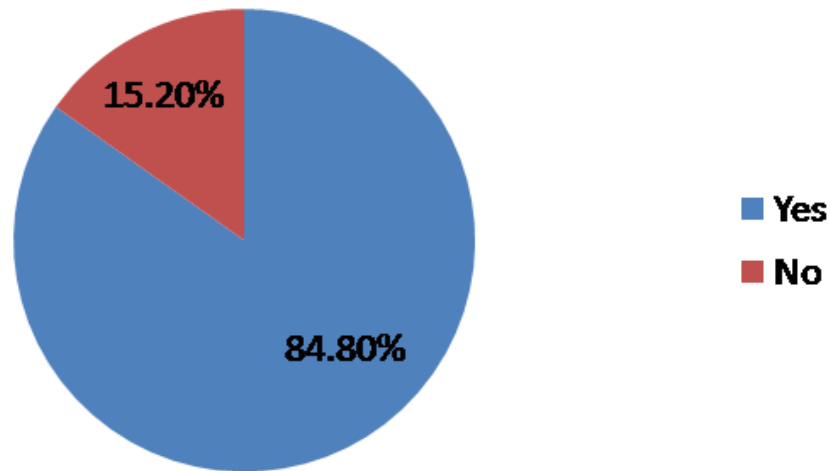


Figure 4 - Access to 4G internet connection

- Purpose of using a mobile phone

Out of the 112 respondents, majority (46.4%) of the students use the mobile phone most often for surfing the internet. 24.1% of them uses it for making phone calls while 16% of them use it for other purposes. This indicates that the students already use the mobile phone for surfing the internet and would easily use it for surfing educational content also. Figure 5 shows the same.

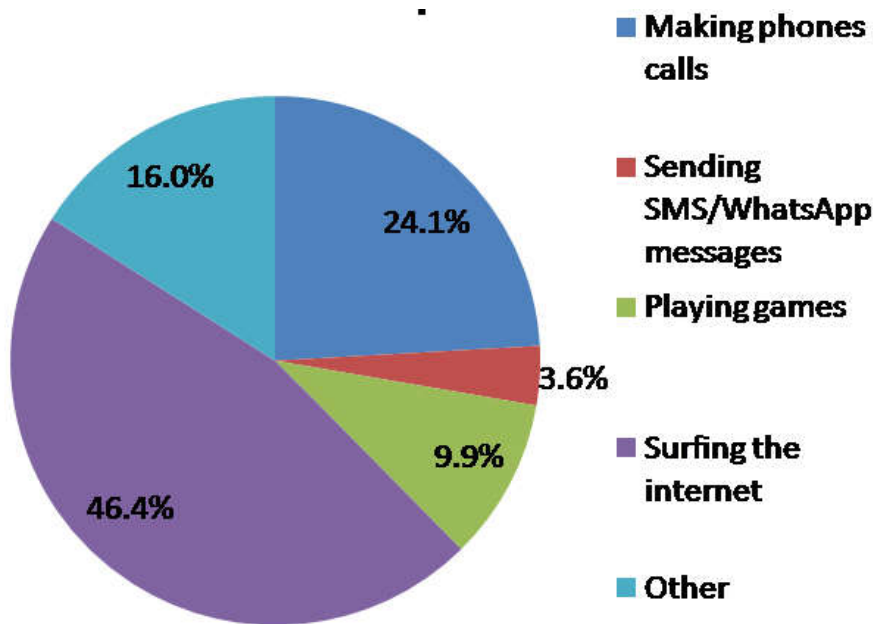


Figure 5 - Purpose of using a mobile phone

- Awareness about mobile learning

Out of the 112 respondents, 87.5% of the students are aware of the use of mobile phone for educational purpose while only 7.1% are not sure about it. This clearly indicates that a large number of students are aware of the fact that a mobile phone can be used for the purpose of learning as well. Figure 6 depicts the same.

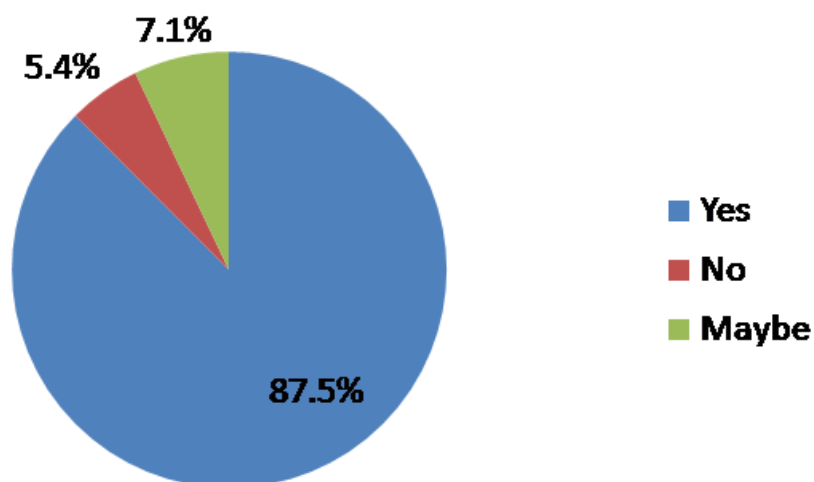


Figure 6 - Awareness about mobile learning

4.3 Perception towards adoption of M-Learning

Perception of students towards adoption of mobile learning is an indicator of their willingness to use it in future. From the data obtained, the respondents responded positively to the use of mobile devices for learning.

- Willingness to use a mobile phone for learning

Out of the 112 respondents, 85.8% of the students showed their willingness to download educational material on their mobile phones. 88.4% were willing to surf the internet to search for information. 59.8% of them wanted to download entertainment material and 71.4% wanted to use the phone to sign in to social media websites or applications. This indicates that the majority of the students are willing to go for mobile learning. Figure 7 shows the same.

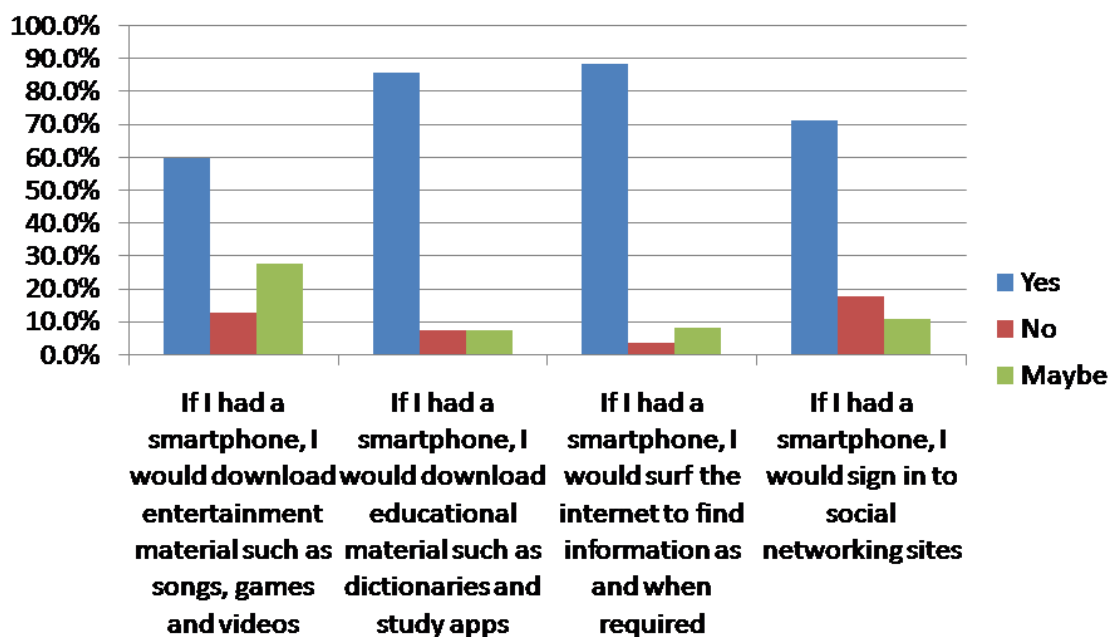


Figure 7 - Willingness to use a mobile phone for learning

- Screen size of the mobile phone

Out of the 112 respondents, 71.4% find the screen size of the mobile phone to be appropriate for learning. 61.4% of them consider it to be too small and 68.8% of them do not care about the screen size of the phone while learning. This indicates that the small screen size of the mobile phones as compared to laptops and tablets should not be a hindrance in using mobile as a tool for learning. Figure 8 depicts the same.

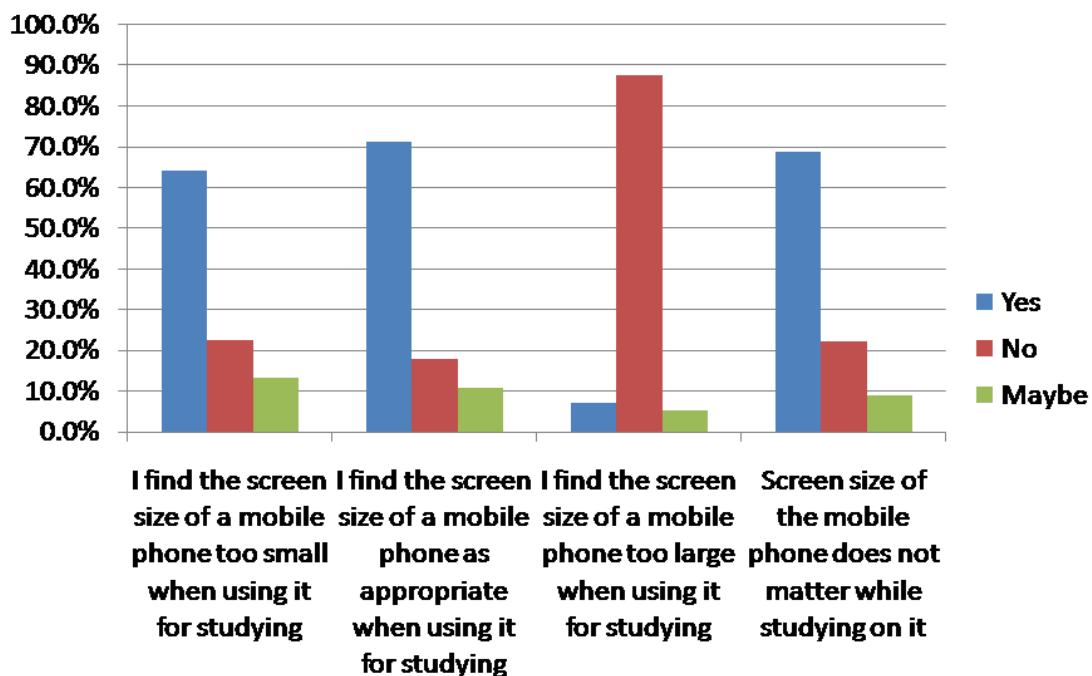


Figure 8 - Screen size of the mobile phone

- Reading text information on mobile screen

Out of the 112 respondents, 75.9% of them feel comfortable in reading text information on their mobile screens. This indicates that the students may be willing to read educational content as well on the mobile screen. Figure 9 shows the same.

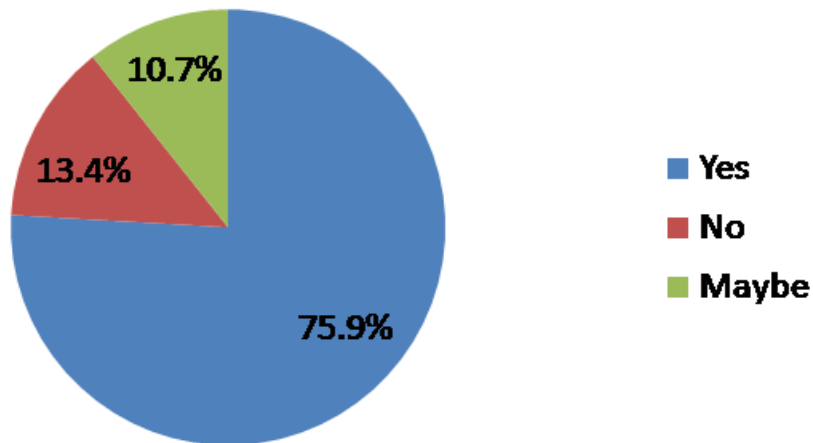


Figure 9 - Reading text information on mobile screen

- Watching informative videos on mobile phone

Out of the 112 respondents, 82.1% of them feel comfortable in watching informative videos on their mobile screens. This indicates that a majority of the students should be willing to use a mobile phone to watch educational content in the form of videos. Figure 10 shows the same.

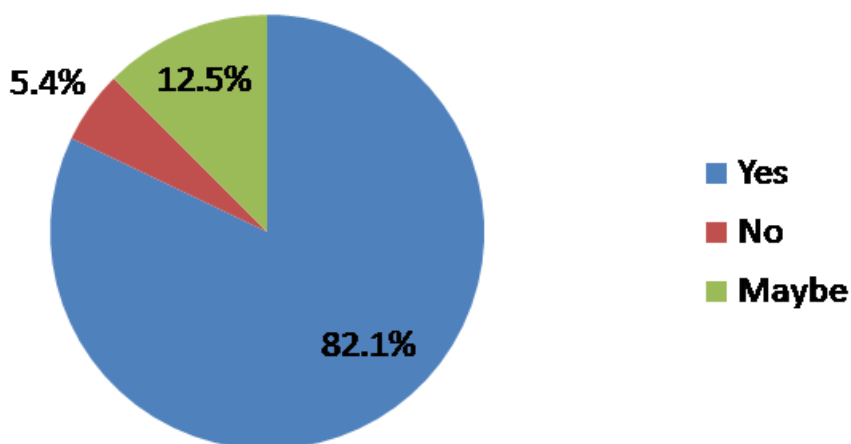


Figure 10 - Watching informative videos on mobile phone

- Connecting with school teachers using a mobile phone

Out of the 112 respondents, 84% of them are comfortable if their teachers are connected with them on their phones through a messaging app while only 7.1% do not find it appropriate. This indicates that students are not hesitant to contact their teachers from their homes to clear doubts or ask queries. Figure 11 shows the same.

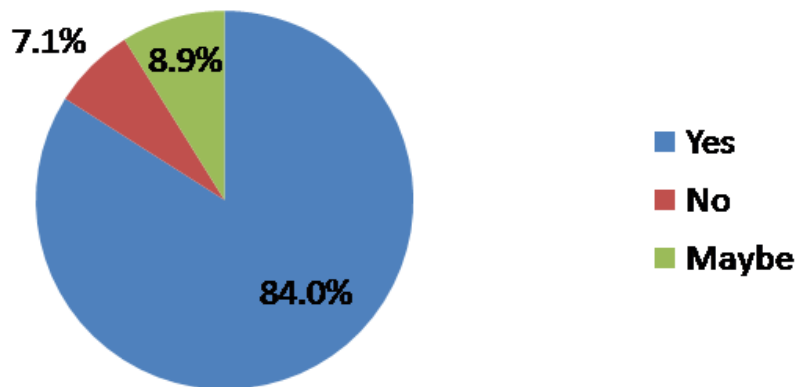


Figure 11 - Connecting with school teachers using a mobile phone

- Academic performance and mobile learning

The survey found that 76.8% of the 112 respondents believe that their scores in tests will be positively affected if they use a mobile application for help with the school studies. This can be a huge motivating factor to use a mobile device for supplemental education. Figure 12 depicts the same.

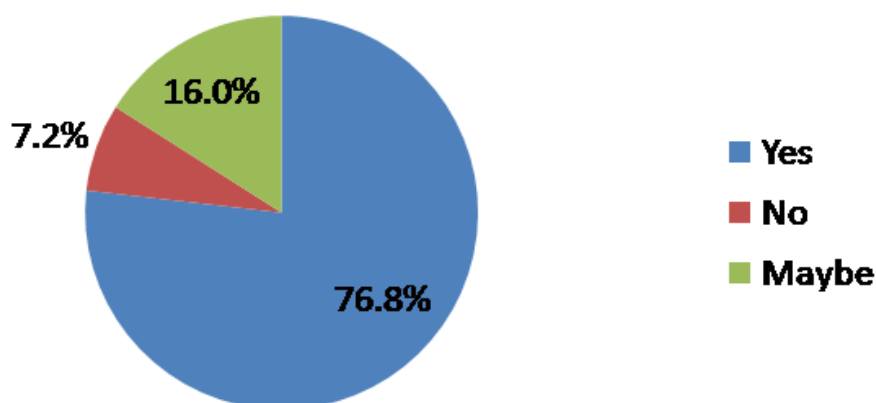


Figure 12 - Academic performance and mobile learning

4.4 Findings and Implications

With respect to the data collected to study the readiness and perception of students towards mobile learning for supplementary learning, following are the findings:

- It was observed that the majority of the students studying in the school own a personal mobile phone.
- It was observed that the majority of the students used their own mobile phones at home. However, a considerable number still used their parent's mobile phone.
- It was observed that more than half the students surveyed had more than two smartphones at their homes.
- It was observed that a large majority of the surveyed students have a 4G internet connection in their mobile phones.
- It was observed that most of the students surveyed were already using their mobile phones to surf the internet.
- It was observed that a large majority of the students are aware that they can use their mobile phone for learning purpose.
- It was observed that a large majority of the surveyed students would be willing to use the mobile phone to download educational material.
- It was observed that the majority of the students found the screen size of the mobile phone appropriate for studying.
- It was observed that the majority of the students were comfortable reading text and watching videos on the mobile phone.
- It was observed that a large majority of the students were comfortable in interacting with their school teachers using their mobile phones.
- It was observed that the majority of the students believe that using mobile phone to supplement their learning at school will help them improve their scores in the tests.

Thus, it can be clearly understood that there is high level of readiness among the students to adopt mobile learning. Easy accessibility to smartphones, availability of high speed internet, comfort with the content consumption on the mobile phone, and no inhibitions to remain connected with their school teacher on their phones all the time are clear indications that the students are willing to make the most of their phones to support the formal education they already receive in their schools. In fact,

they believe that mobile learning will help them improve their performance in the tests in the school.

From the secondary data which was studied, it was found that there is a huge potential for the growth of mobile learning. India's online education market is expected to grow to USD 1.96 billion by 2021 and on a global level, mobile learning market is poised to reach USD 70 billion.

The Indian startup sector is seeing the rise of several edtechstartups such as BYJU's and Toppr. Companies such as Veative and Khan Academy are using advanced technologies such as Virtual Reality and Artificial Intelligence to accentuate the impact of learning on the mobile phone. Platforms such as OpenEd.ai are coming up to develop and promote the use of Artificial Intelligence in education. The government too has taken several steps to digitalise the education in the country. The government, in collaboration with the private players and non-profit organizations, can bring significant transformations in the education sector in the country.

However, there are also several challenges which need to be overcome in order to help mobile learning realize its potential

- Health hazards such as eye strain, addiction, and behavioural problems like anxiety need to be taken care of. Technological solutions need to be devised in order to make the mobile phones safe for consumption for long hours.
- There needs to be a regulating mechanism for validation of the educational content offered by the private players. A basic set of guidelines are needed which every player should adhere to.
- Inclusion of proper parental control methods are needed in the mobile devices as well as the learning applications to prevent the children from consuming inappropriate content and violent games.
- Provisions for protection of user data being used by the edtech companies offering mobile solutions need to be implemented.
- Efforts are needed to educate the parents and guardians of the children on the benefits of mobile learning as they play an influential role in decision making.

This study can be used as a basis for further studies to delve deeper into the factors affecting the mobile adoption among school children which can be of use for the edtech players in planning their outreach as well as creation of learning content for the target audience.

CHAPTER 5 - CONCLUSION

Mobile learning is one of the latest advancements in technology which is gaining popularity day by day. It is gaining so much popularity because of the fact that it uses mobile platform. The accessibility of mobile devices like smartphones, tablets, iPads, personal digital assistants, e-readers etc. has increased drastically which is the main reason for mobile learning's popularity. Along with accessibility, its ease of use and mobility makes it a potential tool for the purpose of learning. This aim of this project was to study the perception and readiness of students towards mobile learning for supplemental education. The observations about the same can be summarized as:

- The prospects of growth in mobile learning market are bright. The global mobile learning market is poised to reach USD 70 billion from USD 3.4 billion currently.
- A number of startups in the field of education-technology are emerging and offering multimedia content along with online tutoring. Advanced technologies like machine learning and virtual reality are set to bring huge transformations in the way students learn.
- The majority of the students surveyed are ready to adopt mobile learning as they have access to personal mobile phones, high speed internet connection, and are willing to use mobile phone for learning.
- The majority of the students surveyed believe that using a mobile phone to supplement their learning will help them improve their score in the exam which can be a strong motivating factor in adoption of mobile learning.
- There are several challenges which need to be overcome in order for mobile learning to realize its full potential:
 - There are some health hazards associated with the usage of mobile phones such as eye strain and screen addiction.
 - There are no parental control mechanisms on mobile devices to prevent misuse of the same by the children.
 - The customers have concerns about data privacy on mobile applications.
 - There are no regulations related to quality of the educational content available through different providers.

5.1 Recommendations

- Technological solutions for health hazards associated with usage of mobile devices need to be devised.
- Proper parental control mechanisms on mobile phones are needed to prevent its misuse by children.
- There needs to be a set of guidelines to regulate the quality of educational content.
- Provisions for protection of user data being used by the companies offering mobile solutions need to be implemented.

5.2 Limitations

Following are the limitations of this study:

- The responses received were 112 which is a small number to make generalizations.
- This is only a preliminary study using descriptive analysis to gauge the readiness and acceptance of the students towards mobile learning. Advanced studies using inferential analysis can be undertaken in order to further study the relationships between readiness and adoption.

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