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Potential for use of Educational App for young children

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Abstract: Technology has impacted each aspect of our lives, including education. Education is no more confined to the classroom; students are now learning in an anytime anywhere framework. The COVID 19 pandemic has furthered this trend. Through this exploratory research, the researchers have surveyed 144 Parents and relatives of children, in the age group two to twelve years, to understand the potential for using an educational application to make learning fun for children. Results indicate that Parents and relatives of young children are inclined towards using educational apps for children and opined that children would be able to learn better by using educational apps. Findings suggest that the educational app should have more of video and games, making the experience engaging with modules having screen time not exceeding 3 hours per day. These findings are of particular use to organizations involved in developing online education learning apps for children.

Keywords: App based learning, anytime anywhere learning, Mobile learning, Online Learning, educational app

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I. Introduction

With the advent of technology, availability of cheaper mobile phones and other digital devices like tablets, laptops and with better networks, the education sector is now undergoing a paradigm shift from traditional classroom teaching to anytime, anywhere teaching (Vinu et al., 2011). While Undergraduate and Postgraduate students may have had some prior exposure to online teaching, for young school going children it is a total shift from Classroom teaching to online teaching. Research suggests that young children, especially those in the age group two to twelve years do adapt to online learning rather well (Lynch & Redpath, 2014) and can independently handle devices like the tablets and smart phones. Research also suggests that students learn better by using technology rather than when they learn in the traditional classroom method (Klimova, 2019). Educational apps enable children to learn at their own pace and in an environment that they are comfortable in (Tamhane et al., 2015). Studies also indicate that Mobile applications are ideal to include work and play culture while educating young children (Hussain et al., 2020). Some of the advantages of using an educational app listed by researchers include providing the anytime anywhere facility, user friendly, rich multimedia content, interactive, personalised to the needs of the students, providing feedback, allowing repetitions and iterations, recording of the students learning history and facility to re-learn concepts (Yusop & razak, 2014)(Lall et al., 2021). In spite of the above research, there are several factors, that will decide the potential for use of educational applications. These include the perception of Parents regarding use of education application for young children, allowable screen time for their children, and ability of children to pay attention, as well as to sit in one place to access the app. This is an exploratory research to find the potential for using an educational app to make learning fun, for children between the age group of two to twelve years.

II. Review of Literature:

Advances in technology have ushered in anytime anywhere learning making it a feasible alternative to traditional classroom teaching. Students are known to learn better when they learn using technology (Jayaprakash & Chandar, 2015). In this literature review, we will look at available literature with respect to various aspects pertaining to learning through educational apps for children in the age group two to twelve years. The literature was reviewed in the context of the following questions.

Can children in the age group 2 years to 12 years use digital devices and navigate educational apps independently? – Whether mobile phones, tablets or laptops, digital devices today are an integral part of a

child's growing up days (Papadakis & Kalogiannakis, 2017). It has been found that children are more receptive to learning in the digital format rather than through the traditional classroom lecturing method (Teodorescu, 2015). Research suggests that children, even those as young as 2 years old, are able to use digital devices independently and navigate through the educational apps on their own. (Beschoner & Hutchison, 2013).

Combine learning and fun – Another aspect of using an educational app to make learning fun, that needs to be explored, is whether it is possible to combine learning and fun. (Pechenkina et al., n.d.) found that use of gamified mobile applications, led to an increase in the students engagement, increase in the retention of the concepts that were taught and better academic performance. Math and storytelling apps were found to increase the cognitive learning of the children (Camilleri & Camilleri, 2019). Educational apps with problem solving based learning activities make learning engaging and enable students to find solutions on their own rather than being spoon fed by teachers. This was found to be true for Math and Language learning (Karabatzaki et al., 2018)

Attention Span and ability to sit in one place to learn - While teaching young children by means of an educational app, one major concern has been, to get the child to pay attention and retain that attention and to make the child sit in one place. (Moyer et al. 1954) say that it is very difficult for children up to the age of 7 years to sit in one place without moving and pay attention for more than 15 minutes. Educational apps that make use of engaging videos, music and animation are able to capture the attention of young children for a larger span of time (Pal et al., 2017)

Permissible screen time - Parents are generally wary of giving the mobile or digital devices to their children, due to the bad effects of excessive screen time. However, a study by (Hirsh-Pasek et al., 2015) finds that screen time used for educational purposes like learning Math, English is very useful and has resulted in increased learner motivation.

Preferred device for learning - When learning through online educational apps, Children use desktops, laptops, tablets or smart-phones. Studies in this area have found that young children learn in ways which come to them naturally. Touching, zooming, learning through trial and error are ways which enable learning. While children up to the age of 7 years are quite comfortable using the smart phone or touch screen tablet, they find it very difficult to use the mouse. (Papadakis & Kalogiannakis, 2017).

Effectiveness of education app based learning - Whether the children learn through Online mode or offline mode, what is important is how effectively the learning happens. Studies find that lengthy teaching period using the traditional classroom lecture delivery method results in students losing interest and not paying attention. (Lamba, 2014). Research experiments have also found that Students who were exposed to high volume of technology in learning performed better than those who were not (Jayaprakash & Chandar, 2015). Students are also found to be more receptive to learning material in digital format as compared to text books and notebooks (Teodorescu, 2015). Research also suggests that mobile educational apps are useful as they can help in customizing the content and enable student paced learning (Pahade et al., 2008). It was found that mobile education apps in the form of video games, storytelling and simulation enabled better learning (Kolås et al., 2016), (Camilleri & Camilleri, 2019)

Research Questions: Based on the literature review, the following research questions were framed.

RQ1. Are small children (age 2 to 12 years) able to use mobile applications for educational purposes?

RQ2. Is it good to combine learning with fun?

RQ3. Is it a challenge to make children sit in one place and learn?

RQ4. Which is the preferred device for online/app based learning?

RQ6. What is the maximum screen time for children between ages two to twelve years?

RQ7. What do children prefer to watch online?

RQ8. Will Parents' be willing to subscribe to an educational app or will they prefer it free (with Advertisements)?

Based on the above research questions, the following objectives of the study were decided.

Objectives of the study

1. To find out the ability of children in the age group two to twelve years, to independently use the educational app on a digital device
2. To explore the possibility of using an educational app to make learning fun for young children
3. To study the perception of Parents regarding the maximum permissible screen time for young children
4. To examine the most preferred device for using an educational app for young
5. To investigate the effectiveness of app based learning

III. Research Methodology

This study is an exploratory study to find out the possibility of using an educational app to make learning fun for young children in the age group two to twelve years. Data of 144 respondents was collected using a structured questionnaire.

Sample

The Sampling method used for this study was non probability convenience sampling. The sample comprised of 144 Parents and relatives of young children in the age group two to twelve years.

Data collection

A structured questionnaire was constructed to collect the responses using Google Forms. A pilot study of 15 respondents was conducted to test the questionnaire. The questionnaire was then modified and circulated on email and through other electronic media to collect responses.

Data Analysis, Findings and discussion of results

The data collected was analyzed. The analysis was carried out using Microsoft Excel. The source of all illustrations presented in this section is a result of the authors' data analysis.

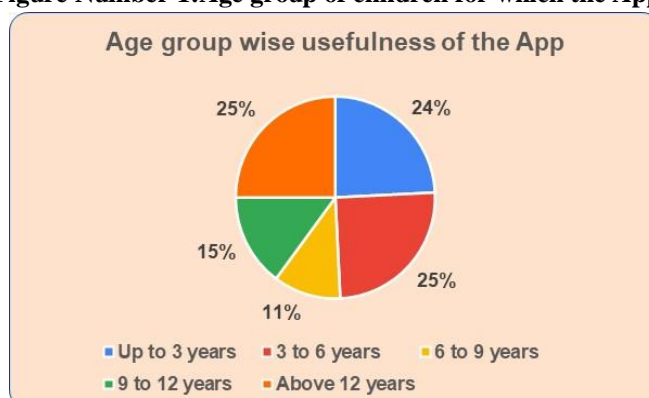
Demographic Characteristics of the respondents -The demographic characteristics of the 144 respondents are presented in **Table 1** below. Barring two respondents, all others were from various states of India. Most of them were from Chhattisgarh, Gujarat, Maharashtra, and West Bengal.

Table 1. Location wise distribution of respondents

State/Country	Responses
Chandigarh	1
Chhattisgarh	21
Goa	2
Gujarat	23
Jharkhand	2
Karnataka	3
Maharashtra	39
New Delhi	4
Odisha	3
Rajasthan	1
Tamil Nadu	2
West Bengal	41
South Australia	1
Utah, USA	1
Total	144

Age group of children for whom the App will be useful - The respondents were regarding the age of the child for whom they perceived the App will be useful. The results of their responses are presented in **Figure 1**.

Figure Number 1: Age group of children for which the App will be useful



The responses indicate that the App could be useful for all ages of children up to 12 years and even above. The results also show that the App could be useful even for very young children, i.e., below three years of age (24 per cent responses). These results are in line with earlier research which suggests that children as young as two years old are also able to use digital devices and use educational apps(Lynch & Redpath, 2014).

Ability of a child to use mobile app - The respondents were asked if it is possible for a child to use a mobile App. The results are presented in **Table 2**

Table 2. Ability of a child to use mobile App for Education

Response item	Count	%
It could be possible	26	18%
It is certainly possible	22	15%
It is possible if the App is user friendly	79	55%
It is impossible and not advisable	17	12%
Total	144	100%

The results indicate that majority (88 per cent) of the respondents believed that Children have the ability to use a mobile App. This finding corroborates earlier research findings which suggest that young children can navigate mobile apps on their own and are able to tap, drag, drop, slide, pinch, and flick on a touch screen device(Azah et al., 2014), (Beschoner & Hutchison, 2013)

Combine Learning with Fun - Respondents were asked regarding the possibility of combining learning with fun. Results are presented in **Table 3**.

Table 3. Could learning be combined with fun

Response item	Count	%
Fun could be introduced in some subjects	12	8%
It is possible to introduce fun in all subjects	17	12%
It will be great if knowledge could be imparted with fun	115	80%
Total	144	100%

All respondents opined that learning could be combined with fun. Around 8per cent respondents were of the opinion that fun could be introduced in some subjects only. Past research studies have highlighted that use of educational apps is especially useful in teaching math and English to young children(Karabatzaki et al., 2018),(Teodorescu, 2015).

Challenges faced by Parent's to make children sit and learn -Since making a young child sit and learn could be a challenge, a question was asked what challenges parents face in this task and what strategies do they employ in ensuring learning for a child. The results are presented in **Table 4**.

Table 4. Challenges faced by parents to make their child sit and learn

Response item	Count	%
Do not know how to make the child sit and read by himself/herself	9	6%
Have never faced this problem	17	12%
I have my own way to make my child learn	36	25%
I somehow manage to make the child learn but I wish he/she could develop self interest	68	47%
No need to make the child sit and read at this early age	12	10%
Total	144	100%

It may be observed that 12 per cent parents did not face any challenges in making their child sit and study, while 10 per cent believed that it is not desirable to make the child sit and study. Remaining majority of 78 per cent parents are faced with this challenge and are looking for some solution. Earlier studies suggest that children, especially those in the age group two years to seven years find it extremely difficult to sit in one place and concentrate. (Moyer et al. 1954). Hence the educational apps have to be interesting and interactive to ensure that students are engaged in the learning process(Pal et al., 2017)

Utility of Online Education for Children and Effectiveness of educational app for children - While use of electronic media and online applications are gaining increasing popularity in secondary and higher education, especially after Covid-19, opinion of the respondents was obtained about their utility and effectiveness for children's education. The results are presented in **Table 5** and **Table 6**.

Table 5. Utility of Online education for children

Effectiveness of online learning	Count	%
Highly effective	11	8%
It is the need of the hour	26	18%
Moderately effective, but instructor assisted learning is better	87	60%
Not very effective. There is no substitute for in-person training	20	12%
Total	144	100%

Table 6. Effectiveness of Online education for Children

Utility of online learning	Count	%
If there is no option, then virtual study is OK	34	24%
Some portion of virtual study is OK	53	37%
The world is changing, online education is the future even for kids	46	32%
There is no need for virtual classes	11	8%
Total	144	100%

It may be seen that 92 per cent of respondents are in favour of using App based or Online education for their children, though 24 per cent of them are rather reluctantly willing to adopt online education if there is no other choice. Prior studies indicate that Parents have a positive perception towards using educational apps for young children, as it helps in creating an interest in children(Venter et al., 2016)

Type of device suitable for use by children - The respondents were also asked about the type of device that could be suitable for use by the children and how much screen time is advisable according to them. The data is presented in **Table 7**.

Table 7 – Type of devices suitable for use by Children

Type of device	Count	%
Desktop computer	28	19%
Laptop	55	38%
Smart Phone	25	17%
Tablet	36	25%
Total	144	100%

It may be seen that most respondents preferred Desktops and Laptops (57per cent) due to the larger screen size, however, they were not averse to the use of other devices like smart phones and tablet PCs. Previous research indicates that the popularity of smart mobile devices is mainly due to large screens, light weight, and user friendly nature of the device.(Papadakis & Kalogiannakis, 2017).Similarly Children can better use smart

mobile phones because of the tap, drag, pinch, flick etc functionality, which is not available in a desktop or laptop (Azah et al., 2014)

Screen time that should be allowed for children – Respondents were also asked about maximum permissible screen time for children. The results are presented in **Table 8**

Table 8. The screen time that should be allowed for children

Screen time	Count	%
1 to 2 hours	108	75%
2 to 3 hours	31	22%
3 to 4 hours	3	2%
4 to 5 hours	2	1%
Total	144	100%

Majority (97%) of the respondents were of the opinion that the screen time should not exceed 3 hours. This will help the service providers in developing the learning modules. Researchers (Hirsh-Pasek et al., 2015), opine that screen time utilised for learning is good screen time and should be encouraged.

Self-learning ability of the child – Respondents were asked about the ability of Children to independently handle the digital devices and learn on their own. The results are presented in **Table 9** below. It was observed by 75% of the respondents that children would be able to learn on their own or with some help from parents. This indicates good potential for the implementation of online education for young children. This is corroborating evidence for earlier research studies that have found self-learning ability of young children (Beschoner & Hutchison, 2013)

Table 9. Self-learning ability of the child

Response item	Count	%
He will be able to manage on his/her own	20	12%
He/She will be able to manage on his/her own	19	13%
He/she will need full time accompaniment	35	24%
Parent will need to help him/her for some time intermittently	70	49%
Total	124	100%

Content that would be interesting for a child - While developing a mobile App or online content it is important to know the kind of activity that would interest the child. **Table 10** shows that games and videos would interest most children (76%). Several research articles mention that use of gaming, problem solving exercises, simulation and animated videos make for better learning and are able to capture the child's attention (Kolås et al., 2016), (Pechenkina et al., n.d.), (Camilleri & Camilleri, 2019)

Table 10. Content that would be interesting for the child

Content	Count	%
Activities/Crafts	25	17%
Educational content	10	7%
Games	47	33%
Videos	62	43%
Total	144	100%

referred mode of acquisition of the education app - The respondents were also asked about the preferred mode of acquisition for the mobile App. Responses are presented in **Table 11**.

Table 11 – Preferred mode of acquisition of the educational app

Response item	Count	%
I am willing to pay for a premium account, but there should not be any disturbance of advertisements	17	12%
I would prefer subscription based service (no disturbance of advertisements)	83	58%
This App should be free even though there could be disturbance of intermittent advertisements	38	26%
No preference	6	4%
Total	144	100%

70% of the respondents showed preparedness for acquiring the App at a price if it offers uninterrupted learning for their children. This again indicates a good potential for developing such an application.

Suggestion and comments made by Respondents: Some of the suggestions and comments made by the respondents are summarized below.

The app should not be just videos or educational activities or games; it must also have some modules that help children to develop their basic skills and manners e.g. Some kind of moral stories.

The app must have login and parental control to avoid any misuse; eliminating the necessity for watching the children full time while they are studying.

There should be provision for Parents to interact with Teachers and receive feedback and areas for improvement for kids.

Offer various premium options from low pricing to high pricing offering more personalized scales which will allow parents of slow learners to have more time with teacher.

The App should have a combination of games, videos, activities and craft with an undertone of learning.

The App should be user friendly, not needing too much adult help.

Application once opened should close after pre-defined time to avoid undue usage.

Usefulness of the study: The following aspects of the study are particularly useful to organizations that are into developing online educational apps for young children. The study indicates that Parents and relatives of young children are open to using online educational apps. Another finding is that the apps should have more of videos and game content which is engaging for the students and modules should be designed so that overall screen time should not exceed 3 hours. Since, students may use the app on multiple devices; the design should be compatible with Desktops, laptops, tablets, and smartphones.

IV. Conclusion

The educational sector has seen tremendous transformation in the last one year in term of use of technology for imparting online education during Covid-19 lockdown. The present study has explored the potential for use of mobile educational application or online learning for young children. The results show that 92% of the respondents are willing to adopt online learning for the children. The respondents are open for use of any device by the children, however, they are of the opinion that the screen time should not exceed 3 hours. The learning content should be developed in the form of games or videos which are the most engaging forms for children. 75% respondents feel that the children will be able to use the mobile/online App on their own, or with a little help from their parents. Thus, the results of the study strongly indicate that there is a potential for use of mobile/online educational tools for young children, if appropriate content could be developed and presented in a user-friendly way.

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