

# **Using Smart Device: The Roles of Mobile Application Usage on Toddlers and Pre-Schoolers**

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## Abstract

Technology has found its way into the hands of young children propelling various researchers to carry out a series of research on the impact which the usage is having on the young children. In the available studies concerning the young children on the effect of technology and mobile application, most researchers have focused either attention on the advantages or the disadvantages.

This research work is not focusing on the advantages and disadvantages but instead looking through the two research questions, which are 1. What role do the use of smart devices and mobile apps play in the lives of toddlers and preschoolers? 2. Should toddlers and preschoolers be allowed to use a smart device? to address the role of mobile technology and its' application on young children.

The research methodology used in this work is the qualitative research methods implemented by carrying out a survey. The survey is used to carry out data collection from 20 parents in-order to create a framework for the basis of the result driven.

The findings made confirms that smart device and the usage of mobile apps is playing a big role on the young children, but parents are obligated to provide protection and control to mitigate the negative effects could bring on the users.

Mobile application for young children has come to stay and will continue to grow; parents should take note on how their kids use the device and for what purpose it used. Likewise, app developers should develop a more suitable app for young children. Also, regulatory bodies in charge of applications developed for young children should regulate what sort of advert pops-up in applications developed for young children.

### *Keywords*

Children, technology, application usability, parents and technology, mobile apps for children, app developers, app content, apps impact and effect (children and developers),

### *Supervisor*

Professor, Marianne Kinnula.

## Foreword

It is of great pleasure to be writing this part of the thesis work. The journey towards the successful completion of this thesis has not gone as planned but to the support of many people who have been of great help the work has been put to a successful completion. A lot of reasons went into picking up the thesis topic and the primary reason was my daughter was just two years old at the start of the thesis work. I felt like this was a good time to study on a trending topic such as the role mobile application plays in the life of young children and if it was right to let them have it at an early age or not

Through the years working on the thesis have seen my daughter advance in the use of mobile application and how well she operates the mobile device. Though she has been around all the while but none of her engagement with the mobile device and the use of the application have had any impact or influence in the thesis work.

The completion of the thesis will not be achieved if not for the support of some individuals that played a big role to make it happen. First, I will like to send my appreciation to all the parents who took their time to fill out the questionnaire that form the bases of my data collection if not for the generosity to partake in the survey the thesis will not be completed yet. I really appreciate all your effort and time.

To a strong lady Laura Narkiniemi who had stood by me through the years and continuously encourage me to beat myself out of my busy schedule to put this work to a completion. I want to appreciate all your effort and time sacrificed to take care of things while I work on the thesis.

The completion of this thesis is my way of saying thank you to a brother like father who have stood by me through the thick and thorn of my journey as a student in Finland. Dr. Franklin Nakpodia, I appreciate all your effort towards me in making this happen and I dedicate the successful completion of this thesis to you.

Sometimes questions spike the push we need to achieve the success that we crave for. I want to thank my mother, Mrs. Angelina Thompson for the constant question of “when do you plan to finish your master’s degree my son?” Every time the question comes even though I defend it with my busy life and schedule, it pushes me to get something done with the thesis work. This question has been on for years and am glad it’s been put to an end.

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# 1. Introduction

The Present day home provides children from an early age the possibility to have access to an internet-connected device given to them (toddlers and pre-schooler) the opportunity and access to play and operate the internet connected devices. These devices include Tablets, iPads, Smartphones, television etc.

The much availability of these devices is to the credit of the advancement in technology that has made it possible for every parent to afford the devices to enhances their (parents) daily activities and increase their literacy level. This availability to parents has created the opportunity for young children as early as being a toddler the access to these devices.

Going by a report published by the American Academy of Pediatrics (2013) emphatically stated that children under the age of two years should not be allowed to have any screen (all media device) time. The above statement underlines that children under the age of two years could face the threat of technology disadvantages in the long run.

During the age as a toddler and preschooler, what they see and observe through the media devices, including the television, could have an impact on their body and brain development. That observation could impact either positive or negative as their body and brain develop into an adolescent, teenage and young adult.

Children from being a toddler up to the adolescent age, are ignorant of everything and entrusting them with such devices without proper parental guidance could lead to a long-term technology threat such as ‘Sociocultural, Cognitive and Wellbeing’ as stated by Plowman, Stevenson, McPake, and Stephen, (2010).

In the effect of technology threats to young children, lots of research has been carried out to estimate the number of hours a preschooler should spend over a media device (screen time). Nevertheless, it’s also a necessity to provide research that gives the importance of the role of the family in providing the young children with the support they needed while coming in contact with technology at home (Plowman, Stevenson, Stephen, McPake, & Adey, 2011).

There is no doubt in knowledge and literacy enhancement that technology has brought to human from the availability of media device of various specifications and types with the possibility to access the internet far more comfortable than what it was years back. This positive aspect could be faced with negativities as well as if the user sees the use of technology as the opportunity to explore the world from within without having the proper guidance on what to do, how it should be done, for what purposes, and limits on how far to go while exploring what technology device could offer.

The term technology in this research work will be addressing various kinds of technology media devices such as Television, iPad, Tablets, Smartphones, and all devices that display visuals for entertaining and educating. The research work will then go through the impact of technology from the mobile application perspective on the children between the age of 0-6 and how the developers of this application have been affected; positively or otherwise.

Mobile applications (mobile apps) have become an integral part of technology, enabling mobile devices to perform several functions. Users of these mobile apps benefit from using apps in various areas such as; health, sport, gaming, education, social interaction,

news, entertainment, etc. including many others. Forasmuch as mobile apps could be of great benefit, so also it could be detrimental in various ways to users notably in health-related issues emulating from an early age as reported by researchers.

Given toddlers and preschoolers mobile apps should not avail into a topic of concern but that is not the case anymore. Parents now find an app that could keep their child calm and focus while they perform other necessary things. In a report by Linn, Almon, and Levin (2012), they pointed out that “in 2011 there were three million downloads just for the Fisher-Price apps for infant and toddlers” (p. 5). This statement debugs the fact that toddlers and preschoolers may not be aware of what they are doing or keep track of what impact the mobile device with its application entrusted to them by their parents is having on them. The fact remains that their senses are shaping towards what they can visualise, which will ultimately have an impact on them as they grow older.

Through lots of reviews from various literature relating to the research area, there are observations on advantages and disadvantages of mobile apps with emphasis pointing towards parental guidance to avoid what could turn out to be long-term disadvantages on children. Parents are responsible for their children and to make sure, they are not exposed to the harmful content (Wartella & Jennings, 2000).

The most prominent advantage of mobile apps within the age range of the research is educational. The educational apps have been developed to enable users to learn new things, develop new skills while having fun simultaneously. Meanwhile, the disadvantage can trail on health, social negligence, etc. In contrast to the research, suitable apps for toddlers and preschoolers varies with much differences giving that, a toddler’s interaction with a mobile device user interface is not as cognitive as that of the preschooler but, the interference within the age group create the possibility to combine both.

From the look of things, health matters are fervent within the research age range among previous researchers and have created concern because the foundation of what the child will grow and develop into is based on how the child grows from being a toddler and preschooler. Health-related issues have been affiliated with too much of screen time, causing lots of concern among researchers.

A study on the impact of screen time on children’s health carried out by Martin (2011) explain that a child who spends too much time with the media screen increase the possibility of the child experiencing; loneliness, depression, and social segregation. Many other health issues have been associated with screentime, such as Obesity, sadness, aggression, etc.

Linn et al. (2012) given their concern about children’s health and growth in a world taken over by technology, put a question through stating that, “How best to support children’s growth, development and learning in a world radically changed by technology?” (p. 3).

Children now have whole lots of fun playing with technology and all that technology has got to offer. Things that kids can now do on a media device are endless from gaming to learning using their fingers to pinch, swipe drag and drop and whole lots more through various applications developed for that purpose. What children derive from this technology engagement is the fun and excitement that comes with it. Shuler, Levine, and Ree (2012) indicate that a large percentage of paid apps for children that are available at the Apple store falls in the education category. All these apps are primarily to enhance

children's knowledge and literacy, but it deprives them the natural development which nature only could provide (Linn et al., 2012).

Addressing the negative impact of this research topic is mostly common among previous researchers pointing the limitations towards the research work, but this will not affect the validity of this research in any form. The focus will not point at any direction either advantages or disadvantages rather, will base its arguments on various views derived from previous related literature that affect the research subjects to arrive at a conclusion that genuinely presents the purpose and importance of the work.

In every scientific research, it's a mandate to have a research question to give direction on the exact area of the research work is out to address. This study will address two research questions, which are;

- What role do the use of smart devices and mobile apps play in the lives of toddlers and preschoolers?
- Should toddlers and preschoolers be allowed to use a smart device?

This research will go through six chapters having the introduction as chapter one. Chapter two of the research will look through various related works to know what other researchers have been saying. This chapter will allow the possibility to direct the research within the framework intended by the researcher to ascertain the validity of the work.

Chapter three will focus on the research methodology. This chapter will cover two sub-headings, which are qualitative research and data collection. Chapter four will focus on data analysis were results would be presented. Chapter five will be the discussion part, while chapter six will be the concluding chapter of the research work.

## 2. Related Research

When it comes to children and technology device, there is not much engagement from children with technology device rather than do what they imagine or what their parents have thought them. The target age of the research work interacts with mobile device technology in anticipation for a response which creates excitement using their fingers across the device to perform the needed action.

The purpose of this section is to create an understanding of what previous scholars have observed concerning mobile technology, pre-schoolers, toddlers, mobile technology at home among parents and children; providing a ground to justify the basis of this research work. Various studies have been done to combat threats of technology among pre-schoolers, toddlers and infants likewise.

Lots of research has directed attention to the need for children to engage in technology at an early age. A common ground among researchers from this field of study has been parental guidance. Every researcher in the study framework has emphasised the importance of parental guidance on the use of technology among young children.

Research work pointing directly towards technology and children between the age of 2-6 is not so vast, and this could be seen as a limitation in finding enormous relevant data from the selected database. The primary database used to search for related works on the thesis topic includes; ResearchGate, ScienceDirect, IEEE, ACM, Google Scholar, University of Oulu library and the university online library database using the term “Technology, and children” as the primary key search words.

There was no year filtering during the search because, though there are huge differences with technology and its usage by young children from many years back compared to the situation today, findings have shown that the purpose of the researchers remains the same and the result presented, either way, could be used for all similar purposes.

At the end of this section, the thoughts and understanding of the previous work done will enable in building a conceptual framework that goes through the research methodology to present an actual result.

### 2.1 Children and technology

About 20 – 30 years ago, children are the architect of imaginary games, creating an atmosphere whereby they could share and relate with other kids causing a form of interaction, ideas sharing and engagement in various things. Doing all these activities enhances the child’s mobility, increasing their ability and their sensory organs towards the environment and nature (Burke & Marsh, 2013).

The family is a key factor in children’s life and time spent together as a family is very important to the development of every child. Family life before the inflow of technology is such that bring everyone around the table to dine together, discuss and sharing the highs and lows of the day, allowing the children to feel the sense of belonging which in turn increase their social senses within and among their mates (Garcia, Welford, & Smith, 2016).

Technology today has taken over most of the role of the family in the life of children. The impact of technology on children has been debated by many researchers elaborating on



its advantages and disadvantages with emphasis on parental guidance. It commonly discussed how the continuous use of such gadgets influences and affect the child negatively nevertheless, appropriately chosen and constrained use of the technology can have a lasting beneficial effect (Livingstone, 2013).

Looking at a statement made by McManis and Gunnewig (2012) they stated that “the research on newer technologies and applications has yet to catch up with their availability to children, but there are promising indications” (P. 15). This statement indicates that there is still a lot of research to be done about the usage and interaction of technology and its various devices and applications among young children (McManis & Gunnewig, 2012).

Technology has become an important part of human life and children are not exempted from the use of it. Right from the pre-school age, children should be allowed to operate a technology device that has pre-installed software that is appropriate for their age (Haugland, 2000).

Quoting Haugland (2000) on the benefit of technology on young children she explained that “Research has shown that 3-4-year-old children who use computers with supporting activities that reinforce the major objectives of the programs have significantly greater developmental gains when compared to children without computer experiences in similar classrooms--gains in intelligence, nonverbal skills, structural knowledge, long-term memory, manual dexterity, verbal skills, problem solving, abstraction, and conceptual skills.” (P. 1)

Among other benefits of trusting pre-schoolers with technology from the parent’s perspectives is the availability of various applications for all age groups across the devices when compared to the regular toys. One reason is that there are relatively few toys that "grow" together with the toddlers (Burke & Marsh, 2013).

In 1998, executive director Cheryl Lemke of the Milken Exchange on Education technology and Edward Coughlin conducted a study, in which they mentioned significant issues that should be acknowledged and address if the use of technology is to be important for the kids at school. These issues are:

- “
- Setting high standards reflective of today’s Technology age.
  - Driving a national research agenda to inform practices.
  - Building the capacity of local schools and districts to implement the conditions for such learning environments.
  - Documenting and reporting results. ” (P. 14).

Alongside with the learning of the workforce alignment, innovation in the technology enables kids to learn in a radically new manner. Kids can see the activity of the Solar System, can view the human body at three-dimensional models, and learn new and interesting things.

Cornelia Brunner, Research Scientist at the Centre for Kids and Media, has been a dynamic member in ventures that convey instructive innovation in technology to kids. In ‘venture Ready to Learn’ for instance, Brunner attempted to create instructive recordings and educational modules of videos for youngsters between the ages of two and eight. She

found that young children effectively used technology and appeared to work with it normally (Brunner, 1992).

Young children may not have the full knowledge of what they are using the mobile devices for, but it is gathered that they loved to learn through technology with a great deal and it didn't prevent them from being similarly as keen as playing with sand and water, dolls house or a fast auto car. (Wideman, Owston, Brown, Kushniruk, Ho, & Pitts, 2007).

Technology enhances the learning power of children and encourages them to participate in different discussions, creativity, flexible thinking, risk-taking and problem-solving. It provides different opportunities through which they can groom themselves. Providing different perspectives and equipped user-friendly screens to take them into an imaginary world where they learn things more practically and efficiently (Burke & Marsh, 2013).

Kids who abuse the use of technology devices report relentless body impressions such as; “shaking, expanded breathing, heart rate, and a general condition of unease” as mention in a blog post posted by Technology World (2019). Youthful kids who are presented to savagery through TV and computer games are in a high condition of adrenaline and worry, as the body does not realise that what they are watching isn't genuine (Waithaka, 1992).

It's critical to meet up as guardians, educators, and specialists to enable society to wake up and see the large impacts innovation is having not just on the youngster's physical, mental and behavioural wellbeing yet also on their capacity to learn and maintain individual and family connections (MacNeill, 2015).

While innovation is a prep that will constantly push ahead, it is of importance for parents to learn about its inconvenient impacts and make the move toward adjusting the utilisation of innovation with basic variables for improvement in the direction of maintaining our kids (O'Hara & Pritchard, 2014).

While nobody can contend with the advantages of cutting-edge innovation currently associated with these gadgets, it has also brought about a detachment from what society should esteem most, family. Instead of embracing, playing, roughhousing, and bantering with youngsters, parents and guardians are progressively depending on furnishing their kids with more TV, computer games, and the most recent iPads and PDA gadgets, making a profound and irreversible gap amongst parent and the kids (Aziz, 2013).

The vast extension of innovation in kids' lives has empowered many open doors for their instructional improvement but, if not utilised viably or properly, innovation can likewise be a headwind for youngsters. While auditing proof and practice around, the inquiry isn't whether kids should utilise innovation for their learning or maybe, the imperative inquiries regarding innovation rotate around what, where, when, and how they utilise it (Wideman et al., 2007).

Besides, maintaining a strategic distance from the use of technology devices among children a prior hour of sleep time will be useful for rest cleanliness. It is additionally sensible to have clear guidelines and limits when the use of technology devices occurs amid the school week. Without a doubt, during school term, there might be no gaming amid the school week; instead, parents and guardians may permit some gaming at the end of the week (Druin, 2002).

## 2.2 Apps for children

The smartphone media advance revolution is changing the lives of youngsters and many kids of different ages. It is currently simpler to circulate informative educational content. Though in the past just vast scale reading material could circulate educational content and other related assets to wide crowds now educators, guardians, and specialists can develop new educational content and let it distribute in the electronic world.

There are such a significant number of instructive educational applications specially designed for the pre-schoolers that it can be a bit difficult to decide what app is the best for the use. These sets of queries according to a web post posted by Apple Computers (2014) will provide you with some starting edge:

- Is this a perfect choice for a toddler?
- Is the app giving the set of different challenges that will help the kid to increase the brain exercise?
- Is the app catalogue being there for the specific age group?
- Is the navigation of the app being easy for the kid?
- Does the application offer the guidelines so that kid can understand the complete functionality of the app?

Several different applications are there but before choosing a certain one it should be kept in mind that the app choose should enhance the creativity of the child or children with a total increment in the core skills (Apple Computers, 2014).

Not all kids have broad chances to be imaginative and creative with tablets or electronic gadgets at home if they are limited to the specific applications that are not designed according to their interest and age or applications that are not intuitive and provides the best user experience. Consequently, it is considerably more vital that applications selected for the early years create the manners by which the kids can utilise the technology imaginatively and effectively (Pew Research Center 2015).

Taking the review of concern made by Radesky, Schumache, and Zuckerman (2014) about their thought on limited research on the issues of the mobile device and its applications, they point out the followings:

- “At what age and what content can young children start learning from interactive media compared to the real world?
- What tablet device facilitates the most learning at a different development stage?
- Do children from low-literacy families benefit more from apps that engage caregivers in the child’s learning experience?
- Do children with self-regulation problems, whose parents might use media more to calm them down have a better or worse outcome as a result?” (P. 2)

The fact is clearly stated with no doubt that a lot of research on the topic relating to children and how they use the mobile device and its application still needs to be done to ascertain a concrete proof of the impact on the young children. Nevertheless, parents are still the best group of first-hand researchers to prove the impact the device will have on their children (Radesky et.al, 2014).

## 2.3 Technology Impact

Technology has become so rich in content and values in today's world that schools and parents find it easy for their children to learn from it. It is becoming a great tool to enhance child learning through the development stage (Skiada, Soroniati, Gardeli, & Zissis, 2014). A study done by Skiada et al, (2014) mentioned that "technology environment is now being developed to improve the rate of children learning in school and at home through the use of mobile apps and mobile devices" (P. 219) while researching on the issue dyslexia (dyslexia is as a symptom that causes learning disability in children and propagating less efficiency in reading and writing).

In today's world, technology has created the avenue for us to get away from the consistent connection with one and another and jumping out into the unknown, or what is view as the outside scenery. Technology has become an integral part of everyone's life which has taken people into the giant room in which everybody remains inside to reach to their neighbours. Every individual in this this room are always jabbing each other and afterwards making inquiries or informing them about their whole day details (William, 2010).

According to William (2010) "We experience daily reality, such that everybody is deeply contacted by every other person constantly. We're not actually in a room that is floated far from the Earth, however, we are definitely in another place and its innovation that has brought us here into a new place with different explorations". (P. 1)

Children nowadays are learning from educational games allowing them to spend time alone. Though they are learning nevertheless, the reality is also that the learning process is creating a world of loneliness in their imagination. This is playing a major role in building personalities and their approach to understanding the importance of communication with others (Schaper & Pervan, 2005).

Gaming has progressed significantly over the previous decade and has equally had an impact. Early recreative games were played on a devoted video gadget; today, technology has taken it from PCs to little handheld gadgets providing the users with a user-friendly experience, using technology devices such as; Personal Data Assistants (PDAs), mobile phones, and Tablets (Mitchell, 1985).

This expanded openness has made a tremendous blast in gaming, prompting numerous youthful and breath-taking enjoyable games that encourage the children to spend lots of time in interactive play which makes learning fun and interesting. Different games and amusements can be utilized with the positive outcomes that help to gain valuable knowledge, but there should be some limitation (Mitchell, 1985).

Every game app developed are developed to impact the users positively without any exceptions. As a toddler or pre-schooler, every game apps are meant for them to learn different things and digest the most critical part with great ease. This provides a promising atmosphere to learn the new innovation in technology and other critical concepts. Puzzles and logical games are designed to enhance learning capabilities (Mitchell, 1985).

An area whereby the technology is having a great impact is the Assistive Technology. Assistive innovation motivation is to "enlarge capacities and abilities sidestep or adjust for an inability" according to Lewis and Sommers (2003) (P. 67). PCs have been particularly valuable, for they enable us to control things, for example, make the students able to solve the different problem more accurately. Furthermore, particular gadgets have

been built to help students with particular incapacities and disabilities (Lewis & Sommers, 2003).

DynaMyte for example, is a convenient specialized device that encourages students with open incapacities to talk and chat with others through a console made out of images. With these sorts of developments, it has been evaluated that roughly 95% of kids with incapacities between the ages of six and eleven can get their training in consistent classrooms (Lewis & Sommers, 2003).

While mechanical advances will not hurl a wide range of inquiries regarding instructive practices and the development of the learning condition the part of qualities in training gets far less consideration. This appears to be peculiar given that building up a fundamental arrangement of qualities has dependably been a foundation of an understudies' training (Berg, 2001).

Despite the fact that the world of technology and its impact have changed from what it used to be decades back the qualities and standards that understudies need to create have not changed. It is the appropriate use of the technology that has affected the qualities which have caused changed. Meanwhile, homes and schools are the best places to utilize this technology to further increase the quality and standards (Berg, 2001).

Interaction with modern technology has helped the kids in developing their social skills. They learn the different turns of the dynamic society and also help in their intellectual and emotional development. Utilizing modern innovation in the technology is not simply restricted to the use of mobiles, workstations, tablets and so forth. There are home learning units that use the latest term of technology adequately to enable the children to grow mentally (Frauenberger, Good, & Alcorn, 2012).

There are many useful programs like English learning programs that use the reading pen to promotes comprehension and enhances the fluency in the language. Technology can be accustomed to getting new abilities particularly regarding the language even before they are educated at school. That is one of the greatest preferences of utilizing technology (Frauenberger et al, 2012).

It is was initially comprehend that innovation can never supplant or recreate the advantages of unstructured imaginative play. Kids require genuine chances to envision, make, and investigate. They likewise require the strong warmth that originates from up close and personal communications with cherishing grownups. Then again, innovation isn't leaving, and it can offer instructive esteem when utilized properly (Frauenberger et al, 2012).

Pre-schoolers are normally attracted to innovation. In any case before they start learning with innovation, they should take the nuts and bolts. Enable your tyke to investigate economical cell phones put away in rough edges. Show how to swipe and touch the screen. Afterwards your youngster can figure out how to utilize a mouse or console (Bate, 2013).

Inquiry recordings about points that intrigue your kids for example, the worldwide space station, wilderness, cold creatures, or cooking. Utilize an adjusted way to deal with innovation and instruction offering it as one feature of a rich learning condition. Be aware of how much time your tyke goes through with innovation and don't enable it to supplant

different exercises for example, perusing unstructured play, or open-air play time (Bate, 2013).

When your kid is in grade school, he's most likely knowledgeable in innovation. At this age most youngsters can utilize a mouse, open and close applications, and even pursuit the web. It's a great opportunity to converse with the children about web security. Set clear rules about what kinds of media are worthy of view and utilize (Bate, 2013).

Advise your youngster to never share name, address, or individual data on the web or via web-based networking media. Chat with your tyke about what to do on the off chance that he or she runs over unseemly substance (close the screen and alarm you), and ensure you have a great web channel and security framework set up (Bate, 2013).

This section has presented the impact of technology giving a clear view of positive impact on the toddlers and pre-schoolers. Having said that, if proper care is not taking by the parents and guardians, the impact can be detrimental.

### 2.3.1 The interaction between the children, apps, and devices

Touchscreen gadgets, for example, cell phones and tablets are presently pervasive in the lives of many youngsters. These devices allow youngsters to perform an intelligent act in a natural form with the activities as basic as touching, swiping and scrolling. It is of no argument that the role of these devices affects the child's life in many different ways which are mostly on learning and developing the different aspects of their surroundings.

According to a study that was carried out by Aziz (2013) on children's Interaction with Tablet Applications. The study was on children from the age of 2 years to 12 years but considering the age group this thesis is focusing on the writer will only focus on the age group 2 to 6 years. Explaining how these age groups interact with apps on tablet devices differently Aziz (2013) presented the findings as follows;

Children age two have there on way of communicating with the devices. The study shows that they were able to slide and flick on the touch screen. It was also gathered that they enjoy tapping and touching anything on the screen as it pleases them. Some finding that was also made shows that children at the age of two sometime have problems doing the pinch gesture using two fingers and also, they were on able to drag and drop. Children at this age have not much concern about what is happening on the interface they just want to interact with the devices (Aziz, 2013).

Children aged three years have some similarities with the age two children but better with how they interact with the device. At the age of three, the children studied were able to tap, slide and flick on the touch screen. Just at it was for the age two children the three years old kids likewise could not do a drag and drop gesture but with few practices they were able to do the drag and drop. They were also having problems to complete a pinch and spread gesture, but they were not really bother or concern about the gesture on the device interface. At this age of three, every action the children perform on the device at first were not successful but with consistence try most actions a done after 3 to 4 attempts (Aziz, 2013).

The four years old children have grown to understand and perform more actions that the youngsters one. At the age of four they can tap, slide, flick and pinch to zoom in and out. At the start of the session the children were encouraged to do the drag and drop gesture which they performed quite well after a difficult start. At this age the children learn how

to use the device and gain new experiences at every interaction they have with the device (Aziz, 2013).

Children aged five years have gotten lots of ideas and how to do what using the mobile devices. They can perform all kinds of gestures without any problem. Drag and drop gesture could be a huddle sometimes with these age group but it does not take a while before they can perform the required task. Children at this age now have the interest to know what is happening on the interface as compare to the age group two to three years old kids (Aziz, 2013).

The final group that thesis will be dealing with from the study made by Aziz (2013) will be on the children aged six years. In that study these three points were pointed out:

- “were able to use all the gestures
- will be successful after keep trying if they encounter problems using any gesture
- have no problem dealing with 2D or 3D objects on the touch screen • have no problem using a lot of gesture on one interface” (P. 449).

Looking at the findings from the study, it is clear that children age 2 and 3 years have some similarities why children age 5 and 6 years equally have similarities. The age 4 is view in this contest as the transition age whereby children interaction gets more intense.

As shown in the Figure 1, mobile applications are what mobile device users are most using in the current technology world and young children are becoming a greater part of the users. As depicted in the figure only the messaging and social apps are not in use by the young children. Every other section has an application for the ages (Mihaela, 2018).

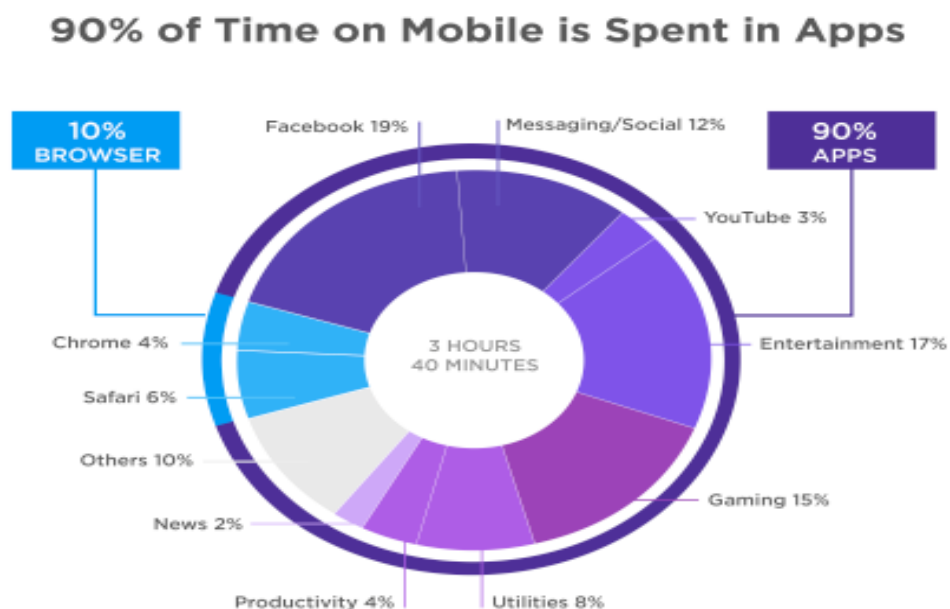


Figure 1 Time spent on Mobile Phone (Mihaela, 2018)

Using the latest technology, the kids can experience the excitements without any hurdle than they can do in the past. Touch screens now allow the kids to see themselves in a story enable the parents to record the story or to depict photographs in a family collection and so on. Parents and children interaction allows the children to learn a lot using the devices and also it enables the parents the awareness of what the child or children are

using the devices for and how they use it (Hiniker, Sobel, Hong, Suh, Irish, Kim, and Kientz, 2015).

The interaction between the children and the mobile devices is an event that has come to stay, and children will continue to use it to get the most out of it. Hiniker et al, (2015) explained that “Seventy-five per cent of American families with a child under 8 have direct access to a touchscreen device, and iPad ownership in families with young children saw a five-fold increase (to more than 40% of households) between 2011 and 2013”. (P 109).

As mobile devices availability and usage continue grow within the households likewise the access to the device by the toddlers and preschoolers grows. Children between the age of 2-to-4 years old now spend quite an amount of time daily on smart devices. This statement confirms that the availability of the devices to the parents gives the children the opportunity to use the devices for the purpose to play and interact. (Hiniker et al, 2015).

To effectively interact with the devices using the applications suitable and appropriate for their age group, the device and apps must be user-friendly and easy to use. There are common 7 gestures performed by the users to interact with the devices and their apps. These gestures include; tap, drag-and-drop, slide, pinch, spread and rotate. All these gestures enable interaction (Aziz, 2013).

Interaction with the different applications helps kids learn a lot of things as it provides different learning opportunities. It also provides a sophisticated environment where the children can learn the potential creative ideas. The most reliable aspect of interaction that engages the mind and attention of young children while in contact with the devices is gaming. Gaming enhances learning and also brings satisfaction.

Research shows that there are different kinds of discovering and learning that kids can gather during interaction with gaming apps. These incorporate the implicit learning of the games and how it functions getting into the core of different tasks (e.g., coordinating, counting). Referring to an article posted on the web by TeachThought Staff (2017) on the topic of 6 basic benefits on game-based learning, the following points were listed

“Increases A Child’s Memory Capacity

Computer & Simulation Fluency

Helps with Fast Strategic Thinking & Problem-Solving

Develops Hand-Eye Coordination

Beneficial Specifically for Children with Attention Disorders

Skill-Building”

Games often revolve around the utilization of memorization. This does not only relate to games whereby children must remember aspects in order to solve the game, memorize critical sequences, or track narrative elements. This is something which is very important because we live in a world which is dominated by technology. Playing on games via the internet allows children the license to get used to how a computer works and thus it becomes second nature to them. There are websites, such as Cartoon Network games, which provide young children with fun and exciting games which also teach them



to utilize the mouse and keyboard properly, not to mention browsing, username and passwords, and general internet navigation (TeachThought Staff, 2017).

Most games require children to think quickly. Moreover, they have to utilize their logic in order to in order to solve problems and complete levels. This is great because it is something which helps children in later life as they develop their logic, their accuracy and their ability to think on their feet and outside of the box. Games that require children to use a gamepad or a keyboard and the mouse to operate the games can help develop hand-eye coordination. Not only does this get them more tuned to how a computer works but it also helps to develop hand-eye coordination because children have to look at the action on the screen whilst using their hands to control what is happening at the same time (TeachThought Staff, 2017).

Research has revealed that online games can help children who experience attention disorders. This was concluded by a professor at Nottingham University and is a notion which has been repeated by many in related studies. A lot of games contain certain aspects which help children with specific skills. For example, a lot of mystery and adventure games contain maps which children will have to read. This obviously helps their map reading skills and practical thinking. Moreover, there are games, such as football management games, which introduce children to managing finances and general project management (TeachThought Staff, 2017).

It is of a certain that mobile app gaming is not detrimental to the kid's development or something that should not be encouraged. Thus, education and gaming are definitely not in any way harmful to the kids using them rather, they could be of great benefit if used appropriately (TeachThought Staff, 2017).

Making Apps give an arrangement of different tools for drawing and building. A high interest depends on youngsters' enthusiasm for doing things in a compact way with unlimited potential outcomes and results. Furthermore, the kid's experience is portrayed by learning, by doing, expanding on their current attitudes and being roused by their own particular advantages (Bowen & Pistilli, 2012).

Children Interaction with technology guided with proper guidance provides the best possibilities for learning and grooming. It also provides the analytical level for kids' learning to absorb different things. Touch screen innovation offers a method of intuitive experience that mirrors the child characteristic and constructive natural learning (Bowen and Pistilli, 2012).

Though gaming is one form of interaction among young children with mobile devices there are lots of other function they can do using the devices. In the Figure 2, just as presented in the Figure 1, the rate of mobile app usage is exponentially increasing and these device in which these applications are downloaded have found its way into the hands of the young children enabling them to use the applications for the purpose it was developed (Rachmiconsagous. 2018).

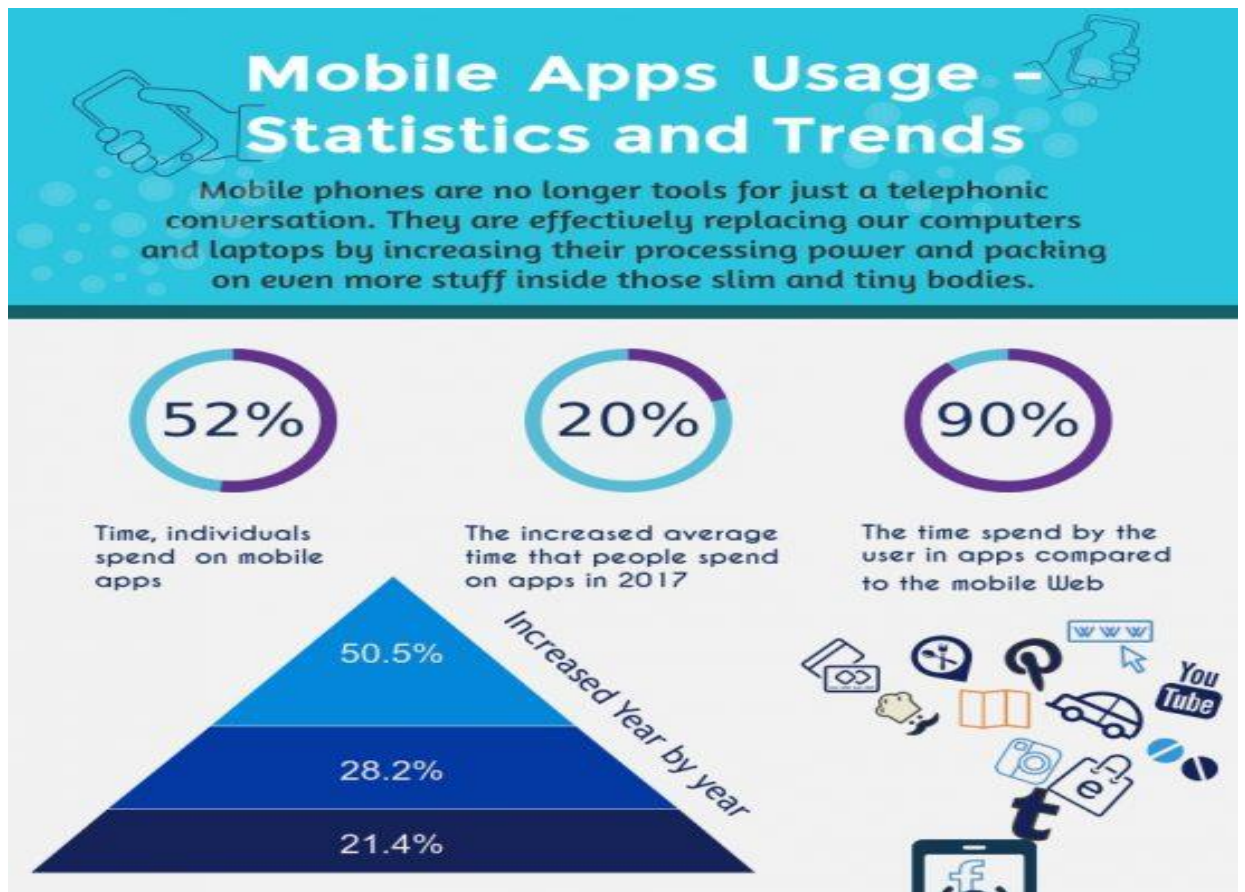


Figure 2 Mobile Apps Usage (Rachmiconsagous. 2018).

The current education system is designed in such a way that kids use the touch screen to experience the digital world and understand the core knowledge of the available electronic data. This also provides the basic structure to keenly observe the different things in the available applications (Bekele, 2010).

While a few specialists have stressed that innovation and mobile devices abbreviate kids' capacity to focus, others propose that the present media may fortify youngsters to think and learn in new and positive ways.

### 2.3.2 Parents, device, and learning

Digital technology has become an important part of everyone's life and almost every household is in contact with a large number of digital technology devices and tools. Parents are now device oriented and that situation prompting the children to engage and interact with the devices likewise. Genc (2014) conducted a study regarding the parents of pre-school age on how they apply mobile technology. In the study Genc (2014) propose the following research questions:

- “• For what purposes do preschool-aged children utilize their parents' smartphones?
- How frequently and for how long do preschool-aged children use their parents' smartphones?
- Which applications do parents install on their smartphones for their children?
- How do parents feel about their children's smartphone habits?” (P. 56).

Going by the questions stated above it evident that parents have the role of controlling and commanding how, when and for what purpose the child or children is using the devices.

Parents believed that the digital world has so many positive effects on the children, but it is challenging at the same time. One side of the coin shows that learning through the digital world helps them to understand the core steps of the parenting but sometimes it is the most dangerous thing for young brains as excessive use of the technology is really problematic that needs to be carefully observed and controlled (Livingstone, 2003).

Having being obvious that the children learn a whole lots at home with assistance from parents and guardians using the devices and technology it's of a great importance that parents should have an eye on what the children do while they make use of the devices and also, parents should be on hand to help when the need arises (Plowman et al, 2011).

In the Figure 3, Plowman et al, give a summary of the study on parenting, technology usage and learning. This figure was present to show the importance of family and parents using the mobile device together with the kids. In a statement made by Plowman et al, (2011) concerning learning with technologies they explain that “our analysis of support for learning at home is grounded in an ecocultural approach that recognizes that a child's learning cannot be separated from the environment in which it takes place and that these factors interact with people and the technological resources at hand”. (P. 366).

Name of research project	Already at a disadvantage? ICT in the home and children's preparation for primary school	Entering e-Society: young children's development of e-literacy	Young children learning with toys and technology at home
Funder	Becta	ESRC	ESRC
Dates of study	2003–2004	2005–2007	2008–2011
Duration	9 months	18 months	36 months
Characteristics of case-study families	16 families (eight 'more' and eight 'less' advantaged in terms of household income; eight target boys, eight target girls)	24 families (13 'more' and 11 'less' advantaged in terms of household income; 11 target girls, 13 target boys)	14 families (SES distribution roughly in line with national average; seven target girls, seven target boys)
Methods used to inform case studies	Based on interviews and observations during two visits to families	Based on interviews and observations during five visits to families	Based on interviews and observations during nine visits to families, plus three rounds of mobile phone diaries from 11 families
Additional forms of data collection	Survey of 400 families from eight pre-schools (50% response rate); interviews with primary school teachers from four schools on expectations of children's ICT competences on entry to school	Survey of 800 families from four local authorities (45% response rate); expert forum of key policymakers and practitioners	Case studies of specific technological toys based on further visits and videos by subset of four families

Figure 3 A Summary of Three Research Project (Plowman et al, 2011). (P. 346).

Various Online activities help the kids to simulate the creativity, fantasy and imagination. Growing up in the rich media smart world kids are interacting with different ranges of digital tools. The main benefit is that they can easily acquire operational skills (O'Hara and Pritchard, 2014).

In Figure 4, we can see a family using technology together with the children. This figure present what the modern-day family life looks like and it is encouraged to be so because the young children can learn a lot from their parents while they use the devices together and be safe from bumping into harmful content (Plowman et al, 2011).



Figure 4 Family using technology (PennState News, 2017).

Parents set a certain limitation to limit their kids' access to the digital world. Setting the time limitations and keep their access to certain information appropriate for the age can help to bring positive changes. Time limits with proper monitoring can increase the overall productivity of the kids. Parents of the pre-schooler help the kids in several different ways like downloading the educational app can increase the efficiency and performance in the academic years (Ofcom, 2014).

Kids primarily utilize advanced innovation in the world of technology to have a fabulous time. Their most loved and basic exercises are sitting in front of the TV, watching video cuts on YouTube and playing advanced diversions. Youngsters now utilize tablets, iPads or mobile phones to play out these exercises. These devices are mostly owned by parents (O'Hara and Pritchard, 2014).

Energetic youngsters additionally adore YouTube. They can discover and watch recordings on this and even a portion of the most youthful ones can become the most famous icon on YouTube. Of the kids they could watch them utilizing tablets, iPads or cell phones, the greater part of them could choose films from the side menu, despite the fact that not every one of them could type in words in the search bar (Fielden and Malcolm, 2008).

In a statement made by Genc (2014) the statement reads "However, as these children exist in technologically rich environments, high total screen media time is an inevitable result." (P. 58). This statement affirms that use of technology by young kids cannot be eradicated, restricted or reframe from the kids but rather, the parent has to be sure that the impact of using such devices on the kids is a positive impact and not negative.

## 2.4 App Developers

App developers have gotten their role to play on what is appropriate and what is not appropriate for the toddlers and pre-schoolers. The purpose of this is to deal with some of the aspect the app developers are facing in developing a suitable application for the research age group.

Day by day advancement in the world of technology is playing an important role in the life of children. A Hundred and millions of applications are available performing different role in the different part of life. Some are for entertainment while some are for the education purpose. No matter the purpose of any application, users should engage in it for all the positive motives (Anand, 2010).

App Developers are continuously working to observe the different manners of life with every positive and negative perspective so that they can provide the best results that increase the productivity to its maximum level. Different application modules are developed by the best developer that are targeting the different audience of the different age groups (Anuj, 2009).

Educational apps, healthy related apps and apps for the toddlers and young adults are developed by the professionals with some objective on the backend. A large number of factors are there that are encouraging the developers to produce the best results. When the developers made a certain application, a whole brief research is conducted to analyse the various factors with the main objective is to provide the ease to the general public (Anand, 2010).

Different applications are created to increase the information for the toddlers. In the initial year of learning these types of application helps them to absorb the critical data. Different methods and techniques are used to create an engagement between the user and application. Interactive front-end is also a challenging job for the developer to meet all the expectation of the user (Apple Computers, 2014).

### 2.4.1 Children apps: Impact on developers

The invention of the touch technology introduces the concept of applications that are developed by the highly expert developer that keep the view of different aspects. Different entertainment applications are being developed as well as educational applications.

Children applications are a bit challenging for the developer as they have to create them in such a way that can easily be understood by the different ages of kids and increase their productivity level as well. As with any other electronic products, the tablet computing industry soon saw a rapid increase demand for child-friendly content, especially for preschool-aged children as parents look for novel and appropriate ways to occupy their youngsters throughout the day (Goodwin and Highfield, 2012).

Within an issue of a few years after the introduction of Apple's popular iPad tablet, smart mobile tablet software, commonly referred to as "apps," has vastly grown in popularity and has become a most concerned issue in the training and child development stages.

App developers target the age of the kids' groups and streamline all the requirements in the panel and choose a certain topic where they have seen less productivity or problematic area for them. In a very affordable budget, the children can learn new things very efficiently. Developer hit the most sensitive part of them and put their effort very keenly to help the kids to attain their goals (Anand, 2010).

The application developer designs the applications in such a way that increase the thinking power of the children that enhance the engagement between the learning and the fun. Level based games enhance the creativity and change the way of education. The use of the Internet utilizes has enhanced the advancement of Internet development, quick development, and improvement in the previous 40years and still, will keep on developing successively (InternetSociety.org, 2012).

### 2.4.2 Advantages and disadvantages of developing children apps

Technology plays a very important role for today's children. It helped them to engage with the different activities and learn different things more efficiently and effectively.

Through the smart gadget applications, the kids can absorb the different things more effectively (Plowman et al, 2011).

There are several advantages for developer to derive from developing the children applications some of which are: adding value to education, it creates entertainment, easy to use for the kids

This is one of the best advantages as it increases the literacy rate among children. Toddlers who use the smart world applications can learn more as compared to the children who don't interact with such gadgets. Using smart applications can help them in different ways. Entertainment and education all together can give the best outcome (Graeme, 2008).

Different skills can be gathered through using the smartphone applications. As interacting with the virtual world this enhances the thinking power of the kids. It provides the different platform to them where they can explore the different things according to their area of interest (Burke and Marsj, 2013).

It's a great source of entertainment for the kids. After the long hectic day, kids can spend a couple of minutes to seek some pleasure moments. A positive attitude towards the technology can bring a very positive change (Jenny et al, 2019).

Using the online applications that are specially designed for the kids can help them to understand the critical aspects of their daily life. Even some applications are developed that help them to be a master of something. The step by step encourages them to learn more and digest more (MacNeill, 2015).

Having discussed briefly about the advantages there is some disadvantages to the use of the applications developed for the kids. App developers are aware of these disadvantages and they are working with schools, homes, guardians to mitigate the disadvantages as much as they can. Some of the disadvantages includes lack of communication skills and negative effect on health-related issues. Spending a lot of time in the virtual world decreases interaction with the common audience. As it limits their real-world activities (The centre of technology, 2014).

Loud colours, continuous image motion and flashing light affect the eyesight of the little kids. This also gives the mood swings to the kids and give them a little hard time to interact with the other personal activities (Richards, McGee, William, Welch, and Hancox, 2010).

Long sittings in front of a computer affect the physical health of the kids. Getting addicted to electronic gadgets. Long sittings and eating also increasing obesity. Heavy load on the eyes can also cause different eyes problems (Cinthia, Margaret, Brain, and Katherine, 2012).

### 3. Research Methodology

This section will introduce the research method used in the research work. In every scientific paper research is a key part of the work. It illustrates the basis of the research work and provides an answer to the research question which the research work was primarily designed to answer. A statement made by Rajasekar, Philominathan, & Chinnathambi, (2013) regarding research explained that “is a search for knowledge, that is, a discovery of hidden truths. Here knowledge means information about matters. The information might be collected from different sources like experience, human beings, books, journals, nature, etc.” (P. 3).

Another twist to the definition giving above is that research is the action performed by a researcher to gather up-to-date information and study for an existing project or study to better improve the study. Have cleared what research is now, what is; research methodology?

Rajasekar et al, (2013) described a research method as “a systematic way to solve a problem. It is a science of studying how research is to be carried out”. (P. 5). Having confirmed the importance of a research methodology in scientific writing it is clear to say that this research work will not be accepted without a research methodology. The research methodology that has been chosen for this study is qualitative research.

#### 3.1 Qualitative research

Getting the views and opinions of a certain group of people either by interview or questionnaire or both to ascertain a situation on a particular subject matter is what qualitative research is out to address. This method has been chosen to provide answers to the underlining matter of this research work (Yin, 2012).

Qualitative research could be classified into two major types; these are “participant feedback (survey) and in-depth interviewing. Participant feedback allows data to be gathered in a natural and convenient environment of the participants by answering certain questions related to the said topic. However, in-depth interviewing is a different type of qualitative research, this research type allows engagement with the interviewee in an open-ended question to derive as much information as possible (Yin, 2012). This research work will focus on the participant feedback type of qualitative research by answering 14 questions available in the questionnaire.

#### 3.2 Data collection

Collection of the data and information is the key step in the qualitative research method. This serves as the foundation of the research study. In the collection of the data, one must be sure that the collected data are authentic. Data collection is not streamlined to a certain pattern or ways, it can be collected from various life events, experiences, observations, the examination of the different situations in a formatted way. One can receive the information through surveys, interviews, actions, gestures and observing the real environments.

Collection of data was done through a survey that includes 14 questions prepared using the google form. These forms were sent to the participant via email. Every participant has been contacted before the email containing the questionnaires were sent to agree on issues

such as privacy and what the data collected will be used and for what purposes. All participants in this survey are family with a child or children.

A total of twenty families participated in the survey; three of the families have four children each between the age of 0 to 7 years; five of the families have three children each with their age ranging between 2 to 7 years old; six families have two children with the age ranging between 2 and 5 years; while the other six families have one child each between the age of 1 to 3 years old. From the 20 parents that participated in the survey, four were single parents; one of the single parents have two children while the other three single parents have one child each. All the participants reside in Finland and from the same city. The Participant had two weeks to complete the survey meanwhile, the last response to the survey was received the third day after the email was sent.



## 4. Data Analysis

In any given research work, data holds a great part in the authenticity of the work and the accuracy of the data is something of great importance that should not be tampered with. Also, every privacy in regard to the data gathered should be respected and kept as agreed. All these have been considered by the researcher in accordance with the privacy policy while the data is being analysed.

Data analysis is a process used to underline the facts of any given data in a research study. The data are gathered in various ways depending on the type of methodology that is implemented in the research work. Considering that the implemented research method for this research work is the qualitative method; survey using questionnaire is a tool used to gather the needed data.

The analysis of the data gathered will be based on the research question;

- What role do the use of smart devices and mobile apps play in the lives of toddlers and preschoolers?
- Should toddlers and preschoolers be allowed to use a smart device?

to test the research argument and provide a basis for a concrete conclusion towards the research question.

The analysis of data gathered from the questionnaires of 14 questions sent to the 20 families can be viewed below. All the data presented in this section are genuine and nothing has been tampered with. The questionnaire was made using Google form and the analysis was automatically created and gathered from the Google form responses. All responses in regard to the questionnaire that was sent to the families can be accessed in the data analysis section under the questions and answers.

### Family mode

20 responses

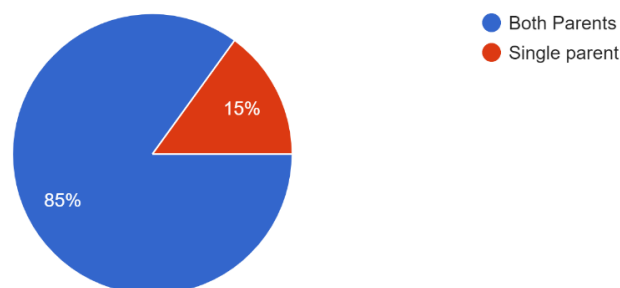


Figure 5 Family mode

### Parent's age

20 responses

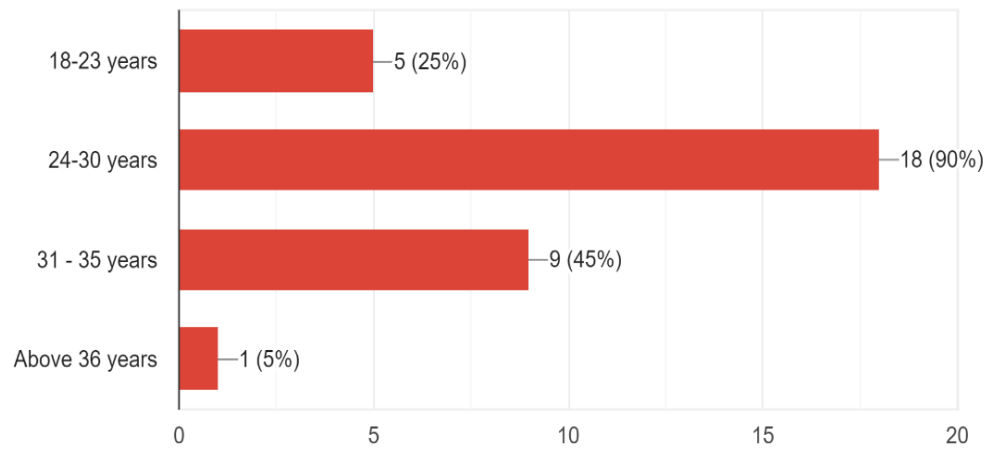


Figure 6 Parents age range

### How many child or children do you have?

20 responses

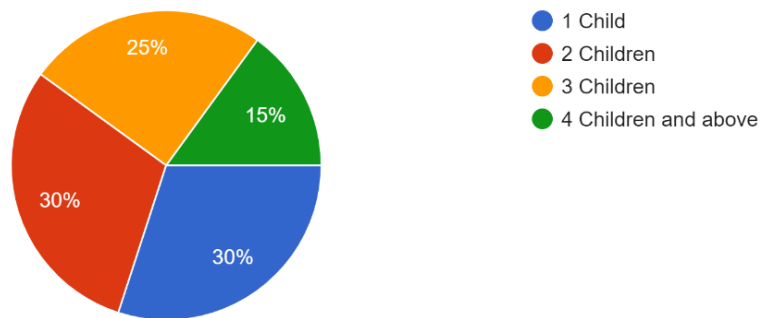


Figure 7 Number of Children

### What age range is your child or children?

20 responses

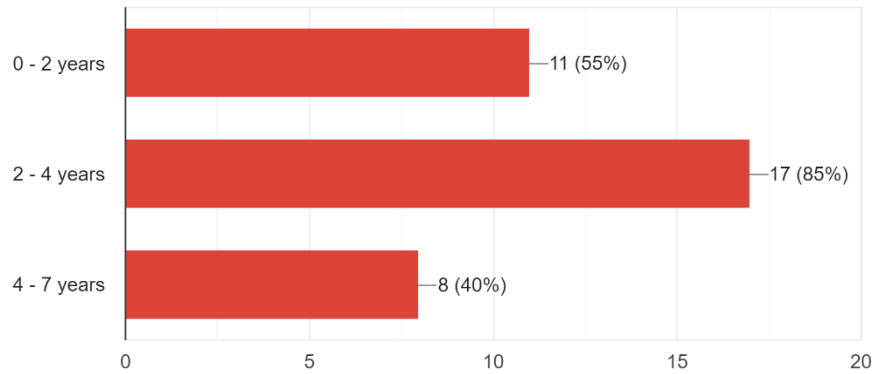


Figure 8 Child or children age range

### Do you allow your child or children use smart devices?

20 responses

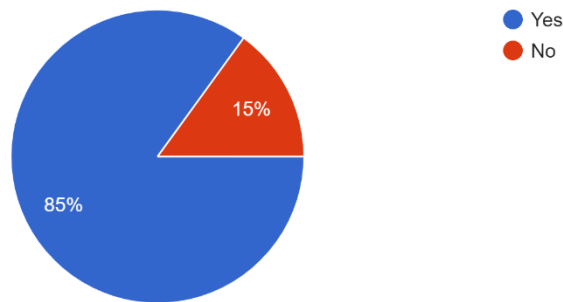


Figure 9 Usage of smart device

### If yes, for what purpose are they meant to use the device?

20 responses

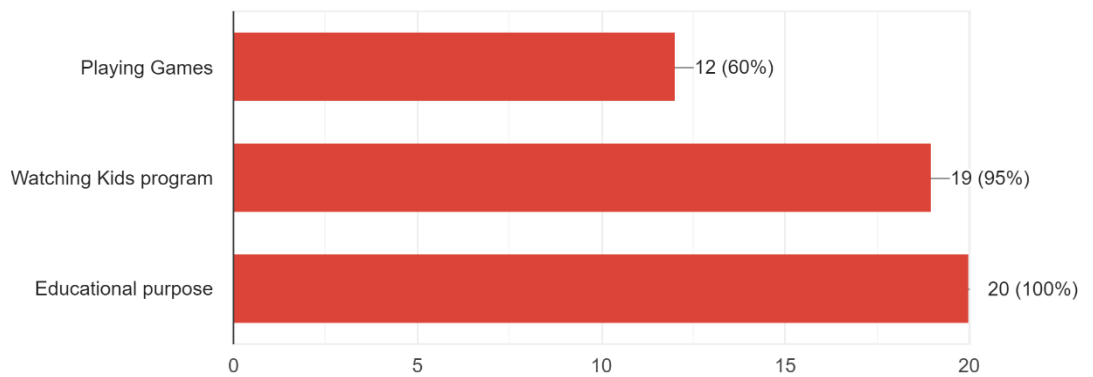


Figure 10 Purpose of smart device usage

## As a parent, how do you control what content your child or children view on the smart device?

20 responses

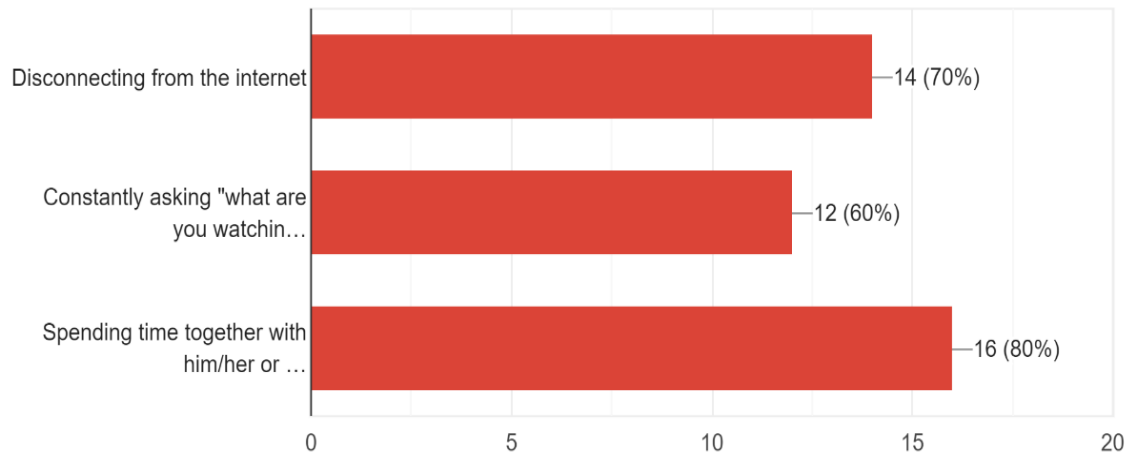


Figure 11 Parent control using a smart device

## As a parent, will you prefer your child or children to live without a smart device?

20 responses

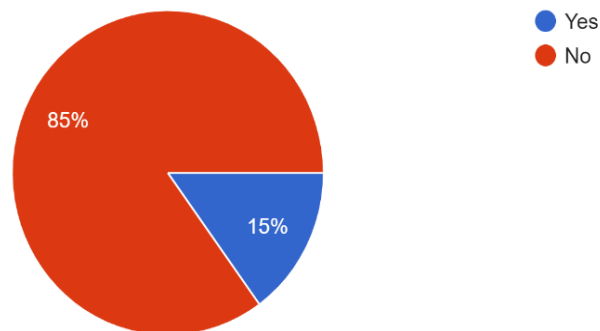


Figure 12 Living without a smart device

On an average per day, how many hours does your child or children spend on smart device?

20 responses

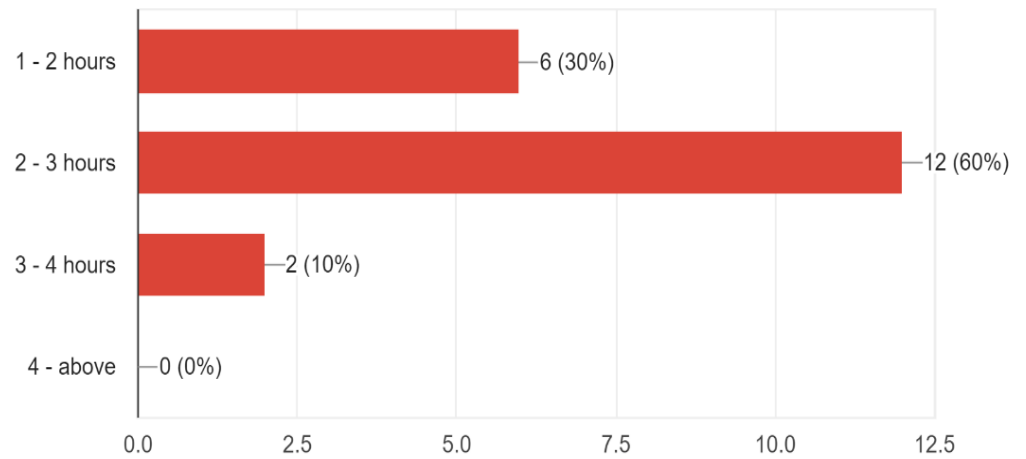


Figure 13 Average hour per day using a smart device

As a parent, if you are meant to choose between spending time in the nature with your child or children and...mart devices; which would you choose?

20 responses

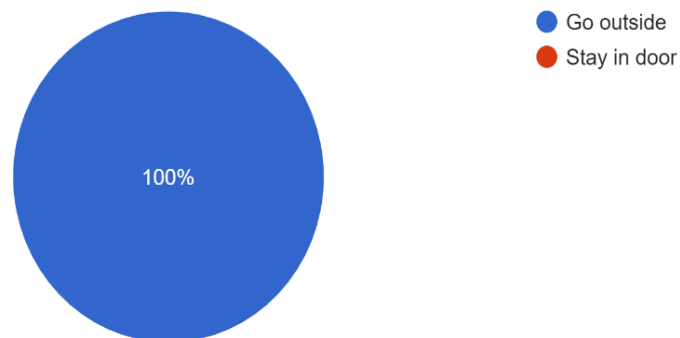


Figure 14 Outdoor or indoor

### Are there total free days from smart device for your child or children?

20 responses

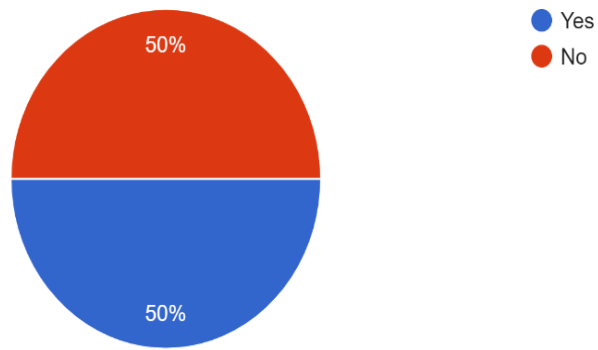


Figure 15 Total free days from a smart device

### If yes, how many days per week?

10 responses

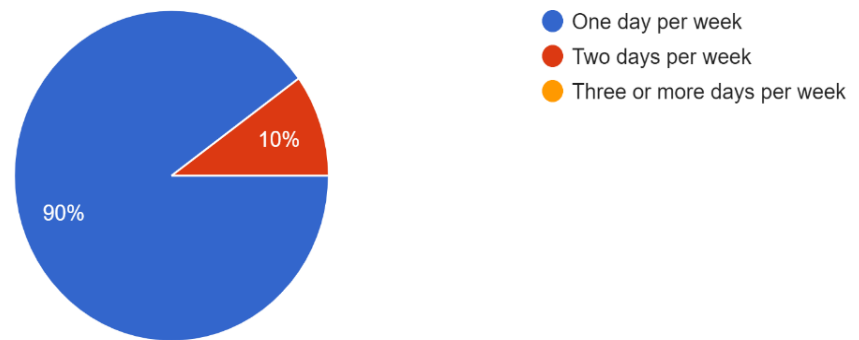


Figure 16 How many free days per week

## If no, can you tell us in one sentence; why not?

10 responses

It keeps them occupied
Kids are so used to it this days that it is possible for them to do without it
It is part of the day's activities
It is not just possible
We the parents are very device oriented
It is not just positive to have them at home without the device
We cannot figure out how that could be possible
It make no difference
They need to have it everyday
The time the child spend on the device is my own free time.

Figure 17 Why no free days per week

From a general perspective of your child or children's development using a smart device, what is your opinion as ...pact and 10 = highly negative impact)

20 responses

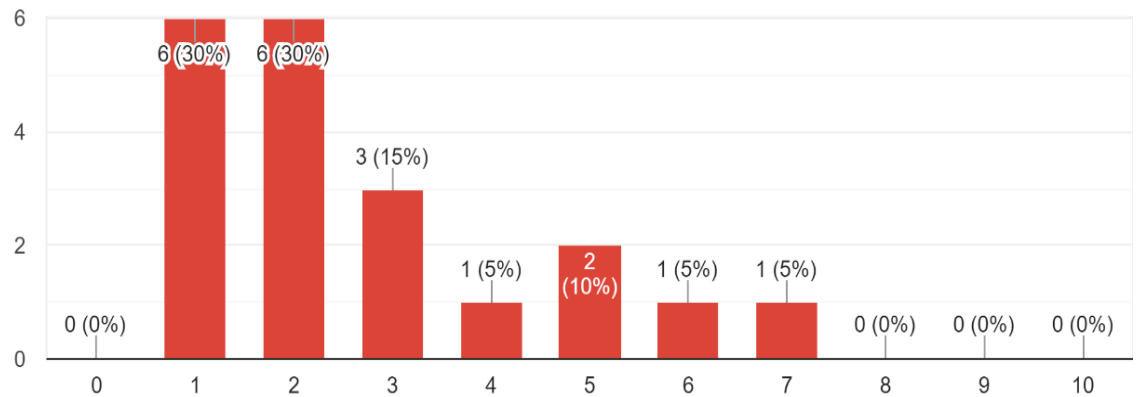


Figure 18 Impact of using a smart device

## 4.1 Results

Having carried out the survey through the process of the questionnaire, collecting data and analyzing the data, is what will give a solid ground to the research and provide answers to the research questions. All the data gathered are formatted in the proper manner and used for the proposed purposes. To present a valid result, the result generated through research methodology should be organized appropriately so that conclusions can be generated to provide solid information (Yin, 2010).

Looking at the data analysis, it is clear that parents have a lot to do to control the impact of engaging with the smart device by a child or children. Some parents claimed that it has a negative impact on the kids as they spend most of the time in front of the internet and surfing through the one application to another. They waste a lot of their time while some parents see it as a way to keep the kids calm while they are doing some other things and the child or children learn simultaneously.

One question from the questionnaire that got a 100% is the question ‘As a parent if you are meant to choose between spending time in nature with your child or children or staying indoor while they spend time on smart devices; which would you choose?’ To this question, every parent will rather spend time outdoors rather than staying indoors and let the child or children spend time on a smart device. This shows that even though technology has come to stay and cannot be totally taken off from young children, there is still a whole lot of disadvantages that come with it.

Another point from the data analysis is that all of the participants in the survey encourages their child or children above the age of two years old to use the devices. The most interesting question that got the attention of the research is the question “Are there total free days from the smart device for your child or children?”. The answers were quite fascinating considering that the responses were 50-50%. For the 50% that answers No free days, their reasons were very personal to themselves (the parents).

Going through and studying the data, the obvious observation is that, smart devices have found its way into the hands of young children and developers are leveraging on the education platform to get them (young children) have the right to use it because every parent now have the notion that ‘children can learn great things while they play at the same time using a smart device.

### 4.1.1 Questions and Answers

In this session I will be going through the fourteen questions that were asked during the and their answers giving by the parents. Though there are graphical presentation of the responses to the questions in the data analysis session nevertheless, the author has found a need to go through the questions and answers one by one for the readers to have good knowledge on how the responses have been interpreted.

The first four questions focus on the family mode while the remaining ten questions are about the use of mobile applications. The questions are as follows:

1. Family Mode (Both or Single Parent living in the same household).



- a. Seventeen families answered both parents living in the same household with the children while three families answered single parents (all mothers) living in the same household with the children.
  - i. This gives us a total number of 37 individuals (17 both parents plus 3 single parents).
- 2. The second question was about the Parent's Age.
  - a. From the 37 individuals as parents, 33 responded to the Age question and their responses are as follows:
    - i. 5 are between 18-23 years.
    - ii. 18 are between 24-30 years.
    - iii. 9 are between 31-35 years.
    - iv. 1 is above 36 years.

While analysing this response I observe that 3 of 5 between the age of 18-23 are living as single parents with one child each and these parents have their child use the devices mainly because it provides them free time.

- 3. How many child or children do you have?
  - a. This question presented a total number of 45 Children from the 20 families.
    - i. 6 families answered 1 child each.
    - ii. 6 families answered 2 children each.
    - iii. 5 families answered 3 children each.
    - iv. 3 families answered 4 children and above.
- 4. What age range is your child or children?
  - a. From a total of 45 children from the 20 families that are involved in this research work, the total age group is 36 with the highest number coming from the 2-4 years old group.
    - i. 11 children fall between the age of 0-2years.
    - ii. 17 children are between the age of 2-4 years.
    - iii. 8 children are between the age of 4-7 years.
- 5. Do you allow your child or children to use smart devices?
  - a. This question provides understand on the perception of the parents with the use of the smart device by their children
    - i. 17 of the 20 parents answered yes to this question
    - ii. 3 parents answered no. These parents have a child under the age of 2 years each. This confirms that parents are aware of the danger associated with the usage of the smart device by a child under the age of 2 years.
- 6. If yes, for what purpose are they meant to use the device for?
  - a. In response to question 5, it is important to know for what purpose are they meant to use the devices.
    - i. 12 families selected for playing games.
    - ii. 19 families selected for watching kid's program.
    - iii. All 20 families selected for educational purpose. This confirmed that educational purpose is what the children should be using the devices for at that age and this confirms why there are more education apps than any other apps for children under the age of 7 years.

7. As a parent, how do you control what content your child or children view on the smart device?
  - a. The purpose of this question is to have the view of the parents on how they practice parental control.
    - i. 14 parents selected the option of disconnecting the device from the internet.
    - ii. 12 parents opted for constantly asking what you are watching.
    - iii. 16 parents describe the best parental control is spending time together with him/her or them on the device.
8. As a parent, will you prefer your child or children to live without a smart device?
  - a. This question is designed to know from the parent's perspectives, what are their thoughts about the smart devices and applications for children.
    - i. 17 parents answered no while only 3 parents answered yes. With no doubt and no matter how much risk of being exposed to inappropriate content, smart devices will be entrusted to kids by the parents.
9. On an average per day, how many hours does your child or children spend on a smart device?
  - a. From the responses gather it clear to say that parents are really keen on time spent on the devices by their child and children. Even though they want them to have it but there are time restrictions which are very good based on studies on how long should kid spend on screen time.
    - i. 6 parents answered 1-2 hours per day.
    - ii. 2-3 hours per day by 12 parents.
    - iii. 3-4 hours per day by 2 parents

Having the option of 4 hours and above was to see if any parents will have their child or children have the device for that long period per day but as expected, none of the parents selected that option. The 2 parents that selected 3-4 hours per day explained that the kids do a lot of painting and drawing using an application and they think it's good for them.

10. As a parent, if you are meant to choose between spending time in nature with your child or children and staying indoor while they spend time on smart devices; which would you choose?
  - a. Smart device and the great mobile applications developed to help kids learn, recreate and have fun are great time but could they replace the real nature?
    - i. All 20 parents answered to go outside into nature with the kids rather than stay indoors. This answered assured that nature is still the best way for kid's development.
11. Are there total free days from the smart device for your child or children?
  - a. Aside from time restrictions on a daily basis this question was designed to know if parents can control the use of mobile device effective among the young kids.
    - i. Parent answered equally to this question. 10 parents said yes while 10 parents said no. The 10 parents that answered yes explain the importance of having a free day as to let the children be creative on their own.

12. If yes, how many days per week?

- i. 9 parents answered a day per week and just a parent responded with 2 days per week.

13. If no, can you tell us in one sentence; why not?

- a. In response to question 11, if the parent has answered no, why?
  - i. It keeps them occupied.
  - ii. Kids are so used to it these days that it is impossible for them to do without it.
  - iii. It is part of the day's activities.
  - iv. It is not just possible.
  - v. We the parents are very device oriented.
  - vi. It is not just possible to have them at home without the device.
  - vii. We cannot figure out how that could be possible.
  - viii. It makes no difference.
  - ix. They need to have it every day.
  - x. The time the child spends on the device is my own free time.

14. From a general perspective of your child or children's development using a smart device, what is your opinion as a parent regarding the impact on the kids? (0 = Highly positive impact and 10 = highly negative impact)

- a. What is the parent's opinion on the impact of smart devices on their child or children?
  - i. More than half of the total number of parents are convinced that the impact of mobile applications and smart devices on the child and children is highly positive.

There are few parents who do not completely accept the highly positive impact but none of the parents is of the opinion that the mobile applications and smart device have a great negative impact.

## 5. Discussion

Children from being a toddler up to the adolescent age, are ignorant of everything and entrusting them with such devices without proper parental guidance could lead to a long-term technology threat such as ‘Sociocultural, Cognitive and Wellbeing’ as stated by Plowman, Stevenson, McPake, and Stephen, (2010). This statement effectively addresses the two key points from the two-research question proposed in this work which is; The role of Mobile Application and if it is allowed to them use it at a very young age. The statement agrees that there are benefits and so also can be detrimental.

Technology is no doubt the trend of today’s world and everyone including the toddlers are finding there a way to make the best use of it. Parents nowadays cannot view the use of mobile technology as a threat to the life of the young children and also, researchers are now finding a balance to present research that does not stop or prevent the use of mobile technology by young children but rather encourage them to use it with proper guidance and time limitations.

These researchers Haugland, Burke, and Marsh pointed that technology device is not detrimental to the life of young children rather it will help them to develop in an environment that is rapidly growing into a tech world. Meanwhile, the American Psychological Association and Waithaka, to mention a few have a different opinion on the impact of mobile technology usage among the toddlers and preschoolers.

Parents have also played a big role in the use of mobile technology devices. No toddler or preschooler can own a mobile device they can only have access to these devices through their parents and because of the amount of attention the devices derive from the users (toddlers and preschoolers), parents are now using the devices to keep the children busy with the motive and affirmation that the users a learning new things and skills using the devices while they (the parents) do other things.

From the viewpoint of various researchers that were studied, the research questions which are: 1. What role do the use of smart devices and mobile apps play in the lives of toddlers and preschoolers? 2. Should toddlers and preschoolers be allowed to use a smart device? can be discussed as a situation that will be relevant for a long time because agreeing to one-side of the argument either been of advantage or disadvantage will continue to be an issue to resolve.

The most common use of the devices by the focus group is for learning. Every activity performs during the use of the device are designed to enhance some sort of learning. The developers are constantly working on the different poses of the kid's betterment so that positive changes bring the smooth learning environment and productivity can be increased in an accurate flow.

Having mentioned in the introduction part that this work is not out to address the advantages or disadvantages of the use of mobile technology on the toddlers and preschoolers but rather to find a balance, the condition remains and parents are found to be the designer of what the impact will be on the child and children that use the mobile device. From the responses gathered from the questionnaire sent out to parents, it was clear that most parents have the same opinion about the use of technology devices by their child or children of the same age.

Considering the first research question based on the responses gathered from the parents, it is obvious that most parents are of the opinion that the role of mobile application on toddlers and preschoolers is positive rather than negative. This does not come as a surprise because seeing how innovation through technology has grown and the amount of application developed for young children, parents will always find something for their children. Going by this sentence; it is considerably more vital that applications selected for the early years create the manners by which the kids can utilize the technology imaginatively and effectively. Parents are prone to provide the best application to the child or children (Pew Research Center, 2015).

The second research question (Should toddlers and preschoolers be allowed to use a smart device?). Through the responses from the parents, every parent has got a way in which they control how the devices are been used and for what purposes and for this reason, it will be clear to say that toddlers and preschoolers should be allowed to use the smart devices.

The one major finding of this research work is that technology has come to stay, and children will definitely use it. It is no solution to restrict the use of mobile devices from young children rather encourage them to use it. Using mobile devices from an early age will help them a lot as they grow older and get involved in more advanced technology. The world is rapidly becoming a technology world and advancement is growing at a fast rate. Schools are now adopting the mobile use in class, hospitals are going deep into technology, the financial sector is moving in the same direction and people around the world today spend hours daily on a technology-oriented device. With all of this about technology and its usage by young children, it is important that parents let their child or children have the basic concept of how the devices work, what are their functions and how it can be used to a maximum effect.

There are few limitations to address in this work and these limitations are based on the geographical and cultural differences. The survey carried out was done among 20 families all from the same country and culture. This might say a lot about the said country which is rich in knowledge and advancement in technology but not about many other countries such as countries from Africa which have different culture, limited knowledge about the importance of technology. With this limitation, similar study if carried out in those regions with limited knowledge about technology can provide result far different from the result that this work has provided.

For future research on the impact of mobile application usage on children, I will suggest that research should be done on the continent of Africa. There are still millions of people living in the continent of Africa that has not come across mobile phone, there are many who see a mobile phone as a treasure and will not allow their older children to touch let alone a toddler or preschooler. All this research will definitely bring a new result, and this can improve the authenticity of future works on the said topic.

Another suggestion for future research will focus on the two main characters of the researcher work; 'the children and the mobile application'. These two characters will continue to exist without any doubt and children will get even closer to the use of mobile application while developers will develop more applications for the children to use. So, some suggestions for future research relating to the said topic will be to focus on; 1. Application Content, 2. Adequate Regulations of Application for Children, 3. In-App Advertisement (Should In-App adverts be taking off applications developed for children under the age of 7?).

## 6. Conclusions

The technology through the use of mobile devices and its application has brought a huge change in human daily lifestyle including the young children and putting the devices away from the young children doesn't present itself as an option of mitigating the risk of inappropriate exposure or negative impact anymore. There is a lot of positive impacts that users especially the young children, in this case, can derive from the use of these technologies.

Mobile applications are the main part of the online world and that are helping the kids in several different ways. This thesis provides detailed research about how the applications are affecting child life and their positive, negative effects on their life. The mobile application world is working like a fore and developers are working for the betterment to see the bright future.

Different methodologies are used to produce the appropriate results and proper drafting is described through which the developers can make the appropriate application that can increase the productivity of the user especially among the kids. They are designing different applications according to the specific age of the kids. Kid finds this as an attractive way to learn new things with great efficiency.

Through the survey, that comprises of 14 questions to 20 parents as participants, data was gathered and data for the bases of the results in this thesis work. This thesis is a contribution to how smart devices and mobile applications are being used by kids from 0-7 years and to provide the best opportunity to learn things with deep understanding.

On the other hand, misuse of these applications is destroying the kid's life badly. But if they are properly used positive exponential outcomes can be achieved. Users of these mobile apps through various kinds of smart devices benefit from using the apps in various areas such as; health, sport, gaming, education, social interaction, news, entertainment, etc. including many others.

Different games are available to help the children of different ages to learn different things and digest the most critical part with great ease. This provides a promising atmosphere to learn new innovations in technology and other critical concepts such as Puzzles and logical games which are mainly designed to enhance learning capabilities.

In conclusion, the technology world among the toddlers and pre-schoolers have advanced a long way and it's of importance for this age group to use this technology only for the right purpose. No current research will depict the fact that the use of the modern-day technology through the mobile apps by the young children cannot be beneficial with great impact rather, the concern will always be around the appropriate use of the devices.

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