Effectiveness Of Mobile Educational Application Among Kids

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Abstract— **Currently, educational applications are widely used especially in children. The use of mobile devices is increasing from time to time causing many requests on applications with learning elements. Children are targeted respondents for this project. According to psychological development for children, the first experience is very important for them to do any activity. This is because of the first experience will be a very powerful memory even more for a child. These kids will use Assessment Scheme Application (AS apps) for their first attempt and after they use AS Apps for the first time, the kids will use the educational application available on google play. This is to test the application, whether it is effective or not for children. Next kids will use AS Apps once again for the analysis part. As a conclusion, each application will be tested for effectiveness in term of education. Therefore, all kids will use their mobile devices in an effective way by using an effective mobile educational application.**

Keywords—As Apps, Educational Application.

I. INTRODUCTION

Every kid has different personality with maturity level, emotional growth and the way they think. Age and personality of children are also one of the factors that influence the way they think and when looking for experience [1]. Therefore, children's activities should be monitored and kids should not experience personality problems when young as they start from their own child's personality. The stage of development is one of the evidences for children to grow up and every child should apply the elements of education within themselves. Nowadays, most of learning process not only in class room but it also can be presented in different places and environments.

There are various ways and styles of learning for every child as every child has its own way of learning. Some of them learn visually, others by touch, taste, and sound [2]. Additionally, children also use learning techniques in different ways and depend on their growth. At the early age of their children they are very eager to learn new things by discovering and exploring [1]. Because of that, when they go through the process, indirectly children will solve problems that occur during play and in daily activities.

Parents are an important role for every child in finding a suitable way to educate the child in terms of stimulating and promoting the physical, intellectual, and social growth of kids.

To know the ability to think according to the age of the child is in terms of their cognitive development. This phase is characterized by conservative, de-egocentricity and inverse when they are 7 to 11 years old. This process is assumed that each child's cognitive structure will evolve from pre-operative image schemes to operating schemes, which are the capabilities of early logical thinking. For those over the age of 11, they tend to think more mature because of the experience and learning process experienced in the past phase. Children in this distinction can think of using abstract logic and therefore they can find solutions to the problem systematically [2].

In times of which everything just on finger tips, one of the best ways to improve the development of children's learning is to use smartphone as a medium for learning process. Therefore, the best way is to have an educational application in their smartphone because of that they can increase the level of thinking of children in addition to building a good personality for a child.

II. ITERATURE REVIEW

A. Ages and Stages Development
i) Personality Development

The development of children from year to year should be noted and taken care of by every parent whether in terms of personalities or education development. Social development and personality are constructed from social, biological, and reproductive influences. This results in significant development results that are important to children, parents and communities. The ability of young adults to engage in social building action such as helping, guarding, sharing with others, to cope with hostile or aggressive impulses, living morally meaningful values, to develop a healthy identity and sense of self, and to develop talent and achieve success. These are some of the developmental results that show social and emotional efficiency. The achievement of this social and personal development comes from the interaction of many social, biological, and reproductive influences. For example, the development of conscience, which is the initial foundation for moral development [3]. Personality changes from another way. Biologically, children are going through a mature phase,

temperamental characteristics appear and change from time to time. When newborns are born, they cannot control themselves, but as a brain-based capacity to advance self-control, climate change becomes more apparent. For example, a new crying baby often does not have an angry personality.

Additionally, in addition to temperament, its personality consists of many other features. Self-developed children's concepts, their motivation to achieve or socialize, their values and goals, their style of response, their sense of responsibility and obedience, and many other features that create personality. This quality is influenced by biological attitudes, but more children experience experiences with others, especially in close relationships, which guided the development of individual traits. In fact, the development of personality begins with the basic principles of biology but becomes increasingly detailed, expanded, and refined from time to time. Newly born babies become mature with a personality of depth and nuance [4].

According to Jacquelynne S. Eccles's study, the years between 6 and 14-mid children and early adolescents-are the periods of important developmental progression that creates a sense of identity of children. For years, children are making progress toward adulthood by becoming competent, independent, self-conscious, and involved in the world beyond their families [5].

ii) Learning Styles

Children's cognitive skills begin at age six. Although cognitive changes that occur in childhood and preschool years are dramatic. All cultures that provide formal schooling for their children begin at age five and seven [6]. Not all children have the opportunity to get an early education. But many do not know that early learning appears to improve the ability of children to learn which can improve their performance. By providing social and cognitive experiences, preschool programs add to the home environment of children. They create close friendships with school institutions and procedures that can help secondary schools later. Evidence that advocates positive impact on special education and grade retention rates is less conclusive than expected. And the lack of information about these results in many studies makes any general inaccurate conclusions. Evidence of positive impact on cognitive development, as measured by academic achievement, achievement of education, or school attendance can be ascertained with less ambiguity [7].

In addition to early childhood education, self-esteem also plays the most important role in the evolution and development of mental and emotional health of children [8]. Many studies have shown that self-esteem is the only strategy that can prevent most emotional or behavioral problems in children. Besides, low self-esteem is not good for an individual because it affects one's personality as well as learning development. Efforts to increase low self-esteem are important to prevent future psychological problems. As children become more sophisticated from a cognitive point of view, they become more coherent, more stable, more realistic [9].

Although the origin of the change is not well understood, there is a broad consensus that children develop key thinking or conceptual skills during this transition period, which is then filtered and consolidated throughout the middle year. Medieval children are characterized by some kind of progress in learning and understanding. During this period, at school and wherever they spend time, children acquire basic skills that are considered important by their culture, such as reading and arithmetic [10]. Gordon J and O Toole L recommends that all education systems take the well-being of children as their central purpose, because there are capacities, ranging from personal qualities to behavioral skills, which are necessary for the development of the personal resources to enable lifelong and life wide learning [11].

Learning style is something that should be emphasized as it will affect the performance of the child. It is also a skill that can make learning more effective. Self-awareness skills also flourished in medieval times. For example, children develop a perception of how people learn, and they find that strategies such as learning and practicing can improve learning and performance. They become more able to retrieve information and use it to solve new problems or to deal with new situations. Through their understanding is increasing the behavior of others and through understand written materials, children take information that builds their knowledge basic and laid out their thinking capacity. Basic mental ability for all This skill is at a very young age, but it is during the middle child that this the ability to be salient and aware [12].

Both of these skills require the ability to reflect on what is being done and what to achieve, and that ability increases dramatically during middle-aged children. Children begin to plan consciously, coordinate actions, evaluate their progress, and change their plans and strategies based on reflection and assessment.

Family is also an important factor in learning style development for every child. This is explained in more detail in the Study, which shows that the family environment offers personal opportunities autonomy and encouraging early teens in family decision-making are linked to positive outcomes, such as self-esteem, self-esteem, satisfaction with school and student-teacher relationships, positive school adjustments, and sophisticated moral thinking [13]. Finally, in addition to their ability to reflect upon themselves, children also develop the ability to take on the perspective of others. They understand that others have different views and different knowledge than they have, and they understand that these differences have consequences for their interaction with others.

Through their understanding of the behavior of others and through their understanding of written materials, children take information that builds their knowledge base and presents their reasoning ability. The basic mental abilities of all these skills occur at a very young age, but in the middle of childhood that this ability is important and conscious [12].

B. Childrem as Active Mobile Phone Users

Mobile technology is increasingly pervasive and has many advantages. The number of children owning their own mobile devices is increasing from time to time. Based on the figures below, it shows starting as early as the 9-year-olds have received

a smartphone. The highest percentage data was when they were 12 and 13 years old. Therefore, children will be exposed to the good and bad impact of mobile devices.
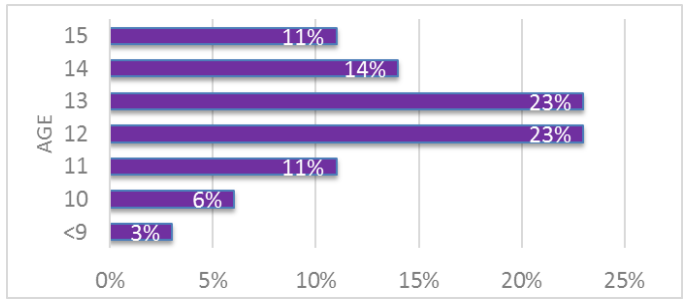

Fig.1.   Age When Given First Cell Phone From 9 to 15 years old

But parents surveyed said they had smartphones and analyzes found ownership of smartphones in households to be high by 77%. More surprisingly, almost 97% of parents said their children were using smartphones in their homes. When children age 4, the study found that three-quarters of children had their own mobile device, and about half of them, using more than one device at the same time. Among other discoveries, according to their parents there are 20% 1-year old children having tablet computers. there are some that are scarier when children use mobile devices without adult watch. Data shows that 28% of 2-year-old children can navigate the mobile device without help. Apart from using mobile devices for communication, gaming, entertainment and others, 28% of parents said they used mobile devices to put their children to bed. This is to ensure the safety of children is always in good condition [13].

C. Mobile Application Development

The mobile application, most commonly called as an apps. Smartphone or tablet computer is the type of hardware devices used for communication, entertainment and more. It is an application software designed by researchers and developers to run on the mobile device [14]. Mobile apps are often used to provide users with similar services to those accessed on the PC. Apps are generally individual software units with limited functionality. Nearly half of parents (52%) found downloading apps on their mobile phones and devices. This analysis shows that half or more of the parent mobile devices from the app has been downloaded for their child's use and is not the parent's use. In addition, education and entertainment is an essential element in an application and can be practiced for children as shown in figure 2.2 below [15].

D. Educational Application

There are many positive effects from the use of mobile devices when studied more closely. Moreover, there are many children's learning ranging from using the latest devices and gadgets. Based on research, many children learn new things

through the mobile educational application that is increasingly contagious in android google play or apple store.

Because of that, a new idea came from researchers on the field of mobile learning in other words m-learning. The use of cell phones in the last decade has exploded, but the potential of using this device to transform teaching and learning has not been fully explored. The increasingly contagious M-learning is now considered as an important medium in the world of mobile computing technology as well as e-learning as it combines individual learning with wherever and wherever they want to learn.

Educational experiences that alter the nature of knowledge formally or unofficially and focus on the user experience can be derived from learning through mobile devices available mobile learning available. It provides a variety of educational and learning materials in a unique way (touchscreen), while giving them the option of choosing from information that will enrich their knowledge and improve their skills. Educational apps for mobile devices motivate children and draw their attention while focusing on solving problems, improving their memory, reading and writing skills [16].

Educational mobile apps not only stimulate children's interest in learning but can also improve - Imagination, Critical Thinking, Intelligence and Emotion development. Therefore, educational mobile applications are an important part of child development.

III. Methodology

This research aims to analyze the effectiveness of an educational application that available in google play and also using AS Apps as a platform to test the application. Overall, the process of this research would be summarized in flowchart form as figure below:
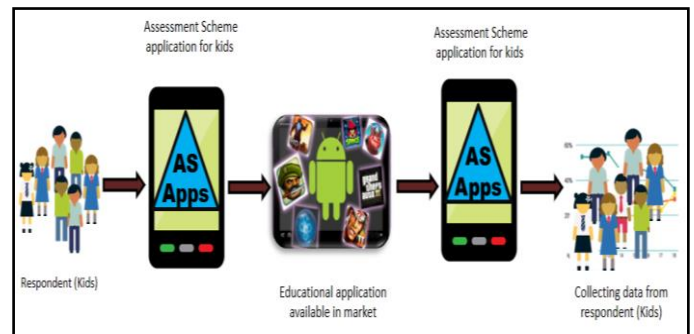

Fig.2.   Flowchart of this research

A. Operation of the Application

Children are targeted respondents for this project. These children will use AS apps first for their first attempt. according to psychological development for children, the first experience is very important for them to do any activity. This is because of the first experience will be a very powerful memory even more for a child. Next, after they use AS Apps for the first time, the kids will use the educational application available on google play. This is to test the application, whether it is effective or not

for children. Furthermore, for the next step of this process is the kids will use AS Apps once again for the analysis part. Objective for this step is to see the changes after using the educational application from the android platform.

B. Designing Application

AS Apps are designed using MIT app inventor as shown in figure 3. App Inventor is an open source application for everyone to become a developer of apps by using it without any charge and it was originally provided by google. AS Apps is designed to be a platform that can show evidence of the effective application of an educational application. AS Apps shows the scores in terms of scores and also the ones taken for the child to complete the questions or games that exist in the application.
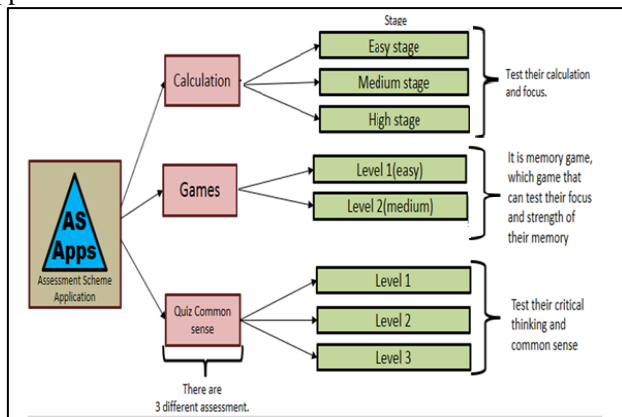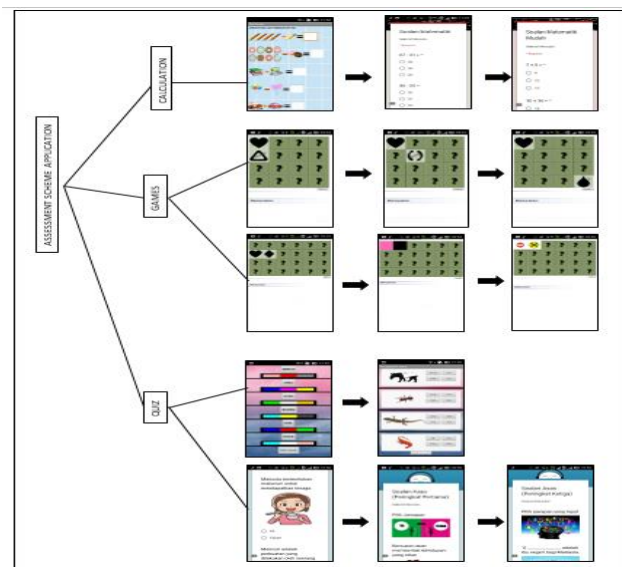

Fig.3. AS application

Fig.4. Design of AS Apps with different assessment and different level

There are three different types of fields (As Apps) each of which has its own unique objectives Tested from children ie calculation, games and quiz as shown in figure 3 and figure 4. Each of these assessments has different levels that are initiated with ease and are followed by a rather difficult one. This will further enhance the motivation and enthusiasm of the child through challenging challenges at every level they play.

C. Data Analysis

Data collection from respondents among children aged 9 to 14 years old. To ensure that the data taken is more accurate and valid, the number of respondents should be large. Therefore, to ensure that the research works smoothly with the primary and secondary schools will be held so the application can be played by students for data collection.

IV. RESULT

a. Respondent

For this project, there are 124 children from 9 to 14 years old who are comprised of primary school and secondary school.
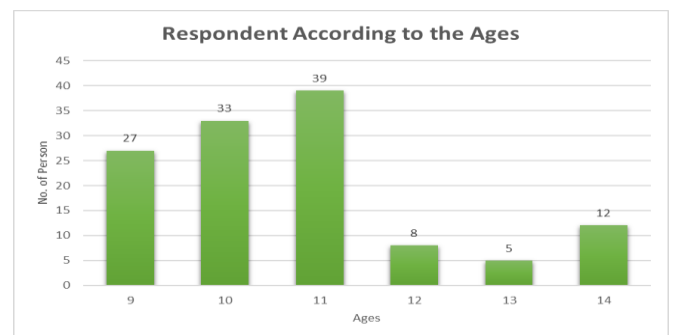

Fig.5. Number of Respondent According to their Ages

The figure above shows the number of respondents for different ages of which 99 respondents from primary schools and 25 respondents from secondary schools. According to studies of each stage of the age will affect the thinking of children especially in making a decision.

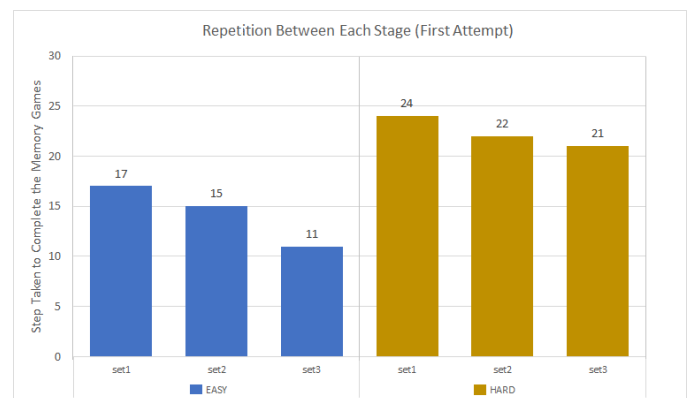### b. Repetition Helps the Memory of Children

Fig.6. Step Taken for the Respondent to Complete the Memory Game for First attempt
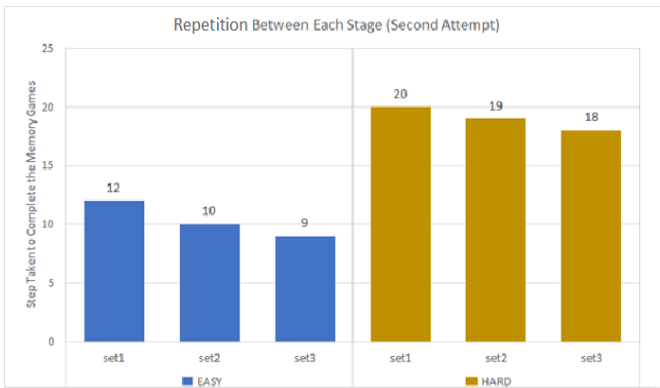
Fig.7. Step Taken for the Respondent to Complete the Memory Game for Second attempt

For memory games there are two levels of easy and hard. Each level has 3 sets of games for them to complete. The results are tested when the few steps they take to complete the game are the best.

Figures 6 and 7 clearly show an increase for each respondent either in the first or second attempt. Improvements apply to each set for each level. This shows the repetition in action or during learning will increase their memory of what they do.

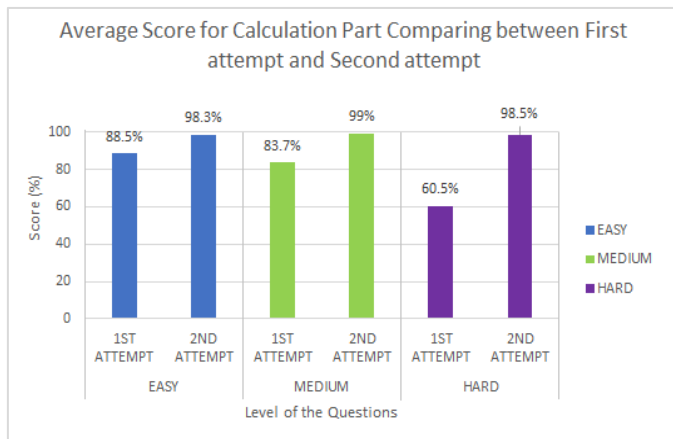### c. The Overall Difference Before and After Using the Game Application from Android

Fig.8. Average Score for Calculation Part by Comparing First and Second attempt

Figure 8 shows the change to the calculation part where they will answer mathematical questions. There are three levels of questions that are easy, medium and high. First attempt means they continue to answer the mathematical questions, while for the second attempt they are using apps on android that can help them think to do the right estimation. The results for second attempt for the overall calculation part are increasing.
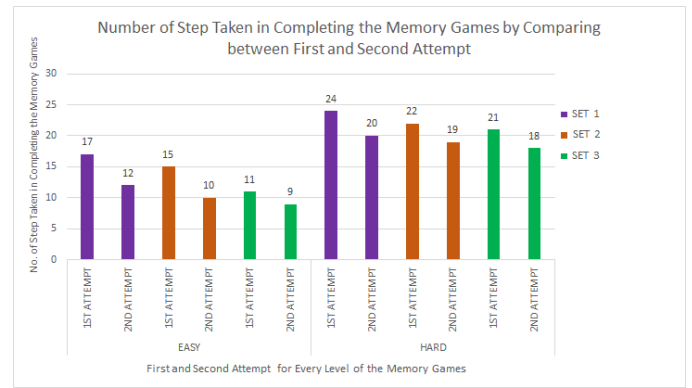

Fig.9. Number of Step Taken in Completing the Memory Games by Comparing First and Second Attempt

The difference between first and second attempts for memory games is quite apparent where the change is uniform for each set. Each set at each level decreases in term of step taking by the respondent to complete the game. It also shows android applications affecting the memory of children. The android application provided is to stimulate their thinking to focus on doing something.
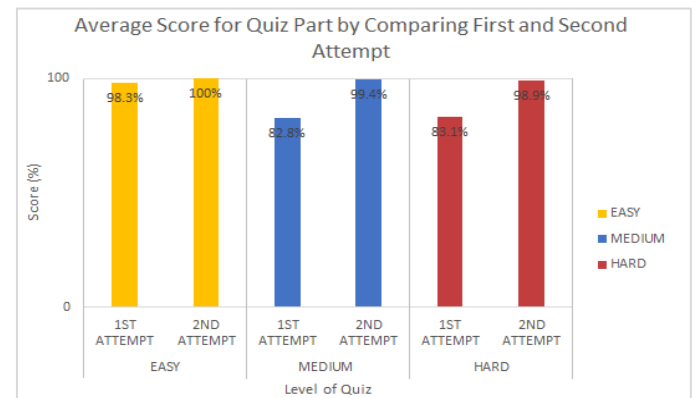

Fig.10. Average Score for Quiz part by Comparing the First and Second Attempt.

The quiz provided in AS Apps is in the form of questions common sense which contains three levels of question that is easy, medium and hard. Most children are weak in the common sense because for those things they are not asked in the exam. But, unconsciously with the common sense will form personal and even form the mindset of the child. Figure 10 shows a good change after they use game apps on android where their quiz results increase.

V. CONCLUSION

In conclusion, this project is well-completed. the main part of this project which is AS Apps which all respondents from 9 to 14 years old use it to obtain analytics data. The whole process of analysis data was taken for two weeks and managed to collect as many as 124 respondents. AS Apps designed also works well as a medium used by them for the first trial. Each application will be tested for effectiveness in term of education. Therefore,

all kids will use their mobile devices in an effective way by using an effective mobile educational application.

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