

# Designing an Android based Interactive Learning Application for the Kids

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**Abstract**—The effect of innovation on children is said to be exceptionally pivotal in this era, so each and every issue are expected to mull over on planning an intuitive format of outline for kids. This exploration concentrates on understanding the outline required for child applications as far as discernment, memory, typical representation and critical thinking. Getting requirements from small age student is tough because of memory, reading ability and handling ability of every child is different. This paper proposes an android based interactive learning application to improve kids learning using math counting, alphabets and fruit names.

**Keywords**—Child Computer Interaction (CCI); Android based learning; Human Computer Interaction (HCI); Kids learning

## I. INTRODUCTION

In few studies, kids come closer to contribute views and plans for future. Samples containing the overviews to evoke insight for the perceptual prototypes that kids have [1] and their utilization to assemble necessities for interfaces [2]. Generally, reviews are utilized as a part of assessment study, where children are asked to remark on the look and feel and effectiveness of a product [3].

Understanding the requirements required for designing children applications is critical to guarantee that the applications composed are truly suitable to be utilized by kids. The attributes of children from various classes, for example, psychological, physical, and social/enthusiastic advancement should have been found as kids act distinctively contrasted and grown-ups [4].

In recent years, the information and communication technology is becoming more valuable for children. Kids now grow up deeply in innovation to a level that continues astonishing prior eras. Research of children enlightenment from new technologies using computer is now a very active, renowned and an area of educational analysis. Computer is presumably a standout amongst the most energizing developments in the information age for kids [5].

Over the last decade, the fast growth of technologies has brought basic changes to education, computer and entertainment. Computer technologies have the power to create best learning environments. We can facilitate and provide our kids an effective learning by using multimedia technology. By the use of CCI techniques we can increase learning of children to maximum level [6].

Getting requirement from the small age students is tough because of memory, thinking abilities and reading ability of every child is different. Children have a limited concentration span of 30 – 45 minutes maximum.

We are motivated to design an android based interactive learning system for the children with highly friendly user interface for different children for different mind levels to enhance their learning.

This paper is related to the domain of CCI. The studies in the field of CCI shows how kids use interactive products. As compare to HCI, CCI is a discipline focused on assessment, design of interactive computing applications for kid's use [6].

## II. BRIEF SOLUTION

When the child will start the application, then a message will be prompted Welcome to Kids Learning as shown in Fig 1. After this, three options will be shown to the children which are alphabets, fruit and math counting learning. The child will tap or click on any of them, then subsequently, a main menu screen will be displayed in which options like Play, load game, settings and quit will be shown to kids as shown in Fig 2. The load game option will be active when the game will be paused otherwise it will be inactive for New game. When the child will click on the Play or tap than an android based learning application will begin; in which the kids will first of all have to learn the alphabets like A, B till Z stage by stage. When the kid will tap 'A' alphabet, then a sound will come A for Apple as shown in Fig 4. The children will learn alphabets from A to Z, fruit names and also math counting.

At every stage the child will learn an alphabet, a fruit name and also counting. After complete learning of alphabets a quiz will be taken to get to know what a child has learned so far as shown in Fig. 5. Similarly, the quiz of fruit names and math counting will be taken. In a quiz, there will be five total questions and questions will be shown one at a time so that child may not get puzzled.

There will also be a reward system for the kids on the basis of quiz performance. The criteria of reward system is as follows

TABLE 1: Criteria for Reward System

Obtain Marks	Total Marks	Award
5	5	Gold Medal
4	5	Silver Medal
3	5	Bronze Medal
2	5	Well try
1 or 0	5	Try again/ Play again

Clapping sound or music will be played for the appreciation of the children in getting either Gold, Silver or Bronze medal as shown in Fig 6. There will also be a super student award as shown in Fig. 7 which will be awarded to a child, which has won the Gold Medal of alphabets, fruits and math counting learning.



Fig. 1: Welcome Screen

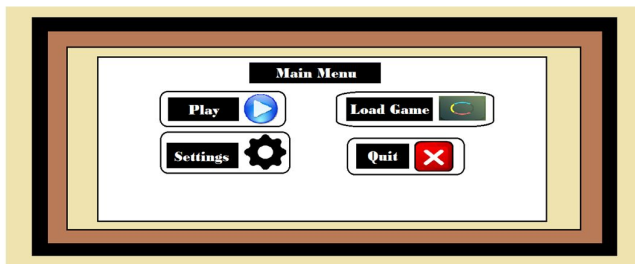


Fig. 2: Main Menu Screen

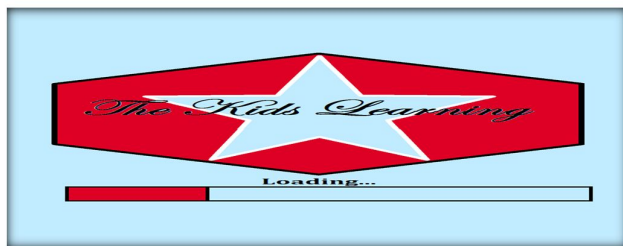


Fig. 3: Game Loading

The paper structure is as follows: related work is defined in the next section, our proposed model of android based interactive learning application is given in section IV, the results are defined in section V, conclusion is defined in section VI, the future research directions are defined in section VII and references are given in section VIII respectively.

### III. RELATED WORK

Scientists have specified all sorts of attributes of kids and their capacities to interpret. This demonstrates extraordinary prerequisites for building up an application for kids are definitely needed. This exploration concentrates on three gatherings of individuals which are the children, the designers, and the general population. There are a lot of components to be considered about while outlining an application as the designers don't generally know which the most suitable one for kids is, particularly for kids at 2 to 7 years old [8].

The testing procedure is done to kids from age of 2-7 as needs be and that diverse times of children have distinctive

developing advancement. This testing process chooses, maybe a couple current programming applications which are accessible in the market now as opposed to making another application. From this testing process, couple of perspectives is to be centered around, for example, the text style, size, shading differentiate, the navigation links, symbols, icons, sounds and character. Children's reactions on these couple of viewpoints are vital to demonstrate what might be the most suitable to be connected to the application's design [8], [9].

The paper by Roussou, Oliver and Slater portrays the exploratory utilization of Activity Theory as an instrument for the examination of behavior of children collaborating with an impressive Virtual environment. The general point of the exploration venture, of which the study reported is a section, was to think about the associations between intelligence, learning and applied change. This is a fascinating and novel utilization of Activity Theory to break down subjective information. A little number of kids were watched and recorded. The paper portrays in point of interest how the Activity Theory was utilized to furnish the originators with a comprehension of the children association conduct amid their endeavors to develop virtual sections from segment parts [10].

Existing solutions have been created in a more enabling and functional perspective, centered on the individual himself. Examples of possible applications are: the wonder glasses, Zap-Zap math; Crazy cursive letters.

Cam Quest is one of the application which is used to change the common attitudes for kid's in-order to make use of tablets in preschools. The benefits of using the tablet empower the children to find out two-dimensional geometrical shapes by discovering and taking photos of the encompassing environment by using the tablet camera simultaneously with kindred preschoolers [11].

An instance of a new large project is Blocks, which consists of enlarged alphabet blocks with a screen and auditory feedback. A quiz of spell words demonstrated by a voice is taken. This learning instrument is projected to foster the mental and social improvement of 6-7 years old child. This tool combines novelty and perceptible view-points that gather positive effects in terms of learning [11].

#### a. Limitations and gaps

Scientists and engineers of interactive items are normally not professionals in analysis of design and hence many questions arises from this. In several surveys, the questions are asked like, to the point that the answers are continually the ones the review designers wanted to listen [10]. Because of inalienable problems with survey procedures and the survey designer's insufficiency for children these techniques are discouraged in CCI. These techniques of survey methods are not valid, but these techniques connect researchers and designers with children [10].

Keeping in view the abilities of the kids in spoken language a survey regarding this composed language was conducted [12]. During the survey, certain words found which should be

avoided and are not clear. These words should be avoided at the time when multi decisions, reactions are to be utilized. Precautions should be adopted so that the good responses may be developed for children [13].

All of these applications and games works for single target, i.e. Zap-Zap math names application works only on mathematical questions while crazy cursive letters named application works on just English letters. There is no any application which consists of all these target features in the same single view.

#### IV. OUR PROPOSED METHODOLOGY

When the child will tap or click on Alphabets learning (shown in Fig. 1) then the given below screen (shown in Fig. 4) will be shown to the user. The arrow towards alphabet 'A' shows that the system is waiting for the user to tap or click on 'A'. After tapping 'A' Jerry will dance and a sound will come A for Apple. Similarly, using this proposed prototype child will learn alphabets from B to Z using different cartoons.

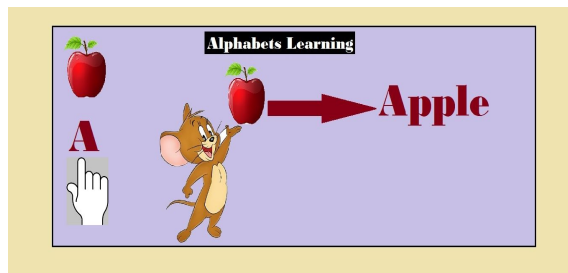


Fig. 4: Prototype of Alphabets Learning

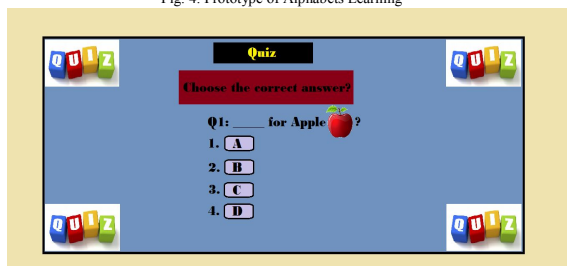


Fig. 5: Prototype of Quiz



Fig. 6: Prototype of Gold, Silver and Bronze Award



Fig. 7: Prototype of Super Student Award

#### a. Best features

The following are the best features of the system shown in Fig 4 & 5.

- User Friendly Interface (UFI)
- Ease to Recognize Alphabets (ERA) e.g. A, B, C...
- Ease to Recognize Fruit Names (ERFN) e.g. Apple etc.
- Color Scheme Attraction (CSA)
- Ease to Recognize Counting (ERC) e.g. 1, 2, 3...

#### b. Evaluation Method

For better and interactive learning of alphabets it is divided into stages. After five stages a quiz will be taken of child in order to find what the child has learned so far. In a quiz, there will be five questions and child has to answer questions out of four available options as shown in Fig 5. On correct answer a sound will be played for correct response and in case of incorrect answer a sound will be played for incorrect responses.

#### c. Applications areas

CCI has applications in various fields; some of them are explained below:

TABLE 2: Application areas of CCI

Application	Description
Jigsaw Puzzle	Children interact with different puzzle games and it teaches them names of vegetables, alphabets, different drawings, and colours names.
Talking Tom	Children can learn in an interactive way by repetition of words or sentences as Tom speaks.
Zoo Train	A zoo train in which child enjoys and learns different animals' names as they appear in the train.
Word Search	A game in which child guesses different words like tools, instruments, favourite things etc.

#### V. RESULTS AND ANALYSIS

TABLE 3: Satisfaction Results

Users	UFI	ERA	ERFN	CSA	ERC
1	4.3	2.4	3.5	4.5	4
2	2.4	4.4	1.8	2.8	2.9
3	2	2	3	5	4
4	2	2	2	4	4
5	2	2	3	5	4
6	2.4	4.4	1.8	2.8	2.9
7	2	2	2	4	4

8	4.3	4.4	3	4.5	4
9	4.3	2	4.3	2	1.8
10	2.4	2.5	2	4.3	2
11	5	5	5	5	5
12	4.5	4.5	4.5	4.5	4.5
13	5	3	5	4	5
14	4	5	2	5	5
15	5	3	4.5	3	3.5
16	2.4	4.4	1.8	2.8	2.9
17	2	2	2	4	4
18	4.3	4.4	3	4.5	4
19	4.3	2	4.3	2	1.8
20	2.4	2.5	2	4.3	2

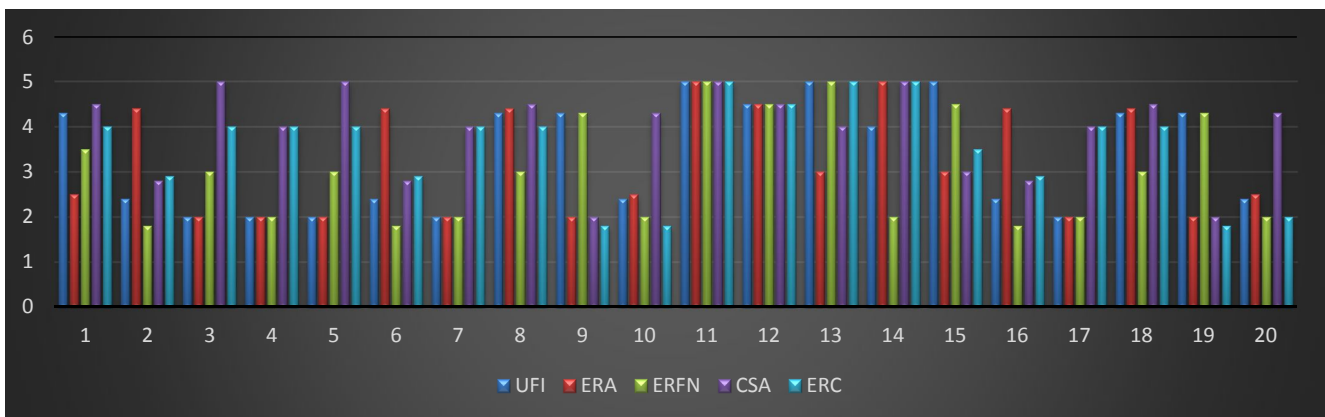
child has learned so far. We will also evaluate kids using quizzes which will tell us the learning of kids.

## VII. FUTURE WORK

Teacher dashboard will be created where a teacher can add different questions to the student portal or he/she can view the student report. The child's progress report will be sent to the parents via a message or email.

When the application will run, front camera will automatically start working and it will focus on the face of the child. By using the images captured by camera, we will check the mood of the child, whether the child is showing interest in this application or not.

The application will be available in multi-languages like Urdu and Arabic.



GRAPH 1: Analysis of proposed application

According to the user views, this analysis shows the interaction of users and kids learning app with different requirement or demands. Above table shows the satisfaction value of some selected users. The range of satisfaction is from 0 to 5.

## VI. CONCLUSION

We can conclude that with the use of CCI techniques we can increase learning of children to maximum level. An android based interactive learning application for the children with highly friendly user interface for different children for different mind levels can enhance their learning. At every stage the child will learn an alphabet, a fruit name and also counting. After five stages a quiz will be taken of the child in order to find what the

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