

Measuring Usability of the Mobile Learning App for the Children



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Introduction



Child-Computer Interaction is very important area that needs to be explored further. Many mobile Apps for children have been developed under various categories, e.g., games, learning apps, etc.

Evaluating usability of these mobile Apps is crucial for the success of these Apps.

Related Work

Arain et al. have recently evaluated the usability of mobile learning App. Data was collected through formal experiment and System Usability Scale. Results revealed that App is very effective, efficient and user friendly [1].

Read et al. have measured fun through Fun Toolkit containing Smileyometer, a Fun-Sorter and an Again-Again Table with kids having age between 5 and 10 years. They additionally examined relationship amongst fun and usability in three dimensions: Endurability, Engagement, and Expectations. They measured these three dimensions of fun in detail. They concluded that these three measures of fun are useful [2].

Read & MacFarlane have provided the guidelines for researchers that how to use Fun Toolkit and other survey methods related with child studies [3].

Two summative evaluation methods have been assessed by [4]: Smileyometer and This or That. Researchers measured reliability and validity of each method with 113 youngsters having age from 3 to 8 years.

Related Work

Researchers have designed a fun loving interactive Tablet-PC App for playful reading and storytelling for the children. The App was evaluated by 18 children of primary school. Fun Toolkit was used to measure the kids' experience of fun. They concluded that the children enjoyed reading from the App [5].

Fun Toolkit has been used to evaluate the children's user experience having age 11-13 years for the prototypes of iPad based game [6].

Smileyometer and Fun-Sorter have been used to evaluate children's experience of fun for the educational software; the children's age was 7-8 years. The authors recommend Fun-Sorter for assessing various products with children [7].

Usability and fun and the relationship between them have been investigated for kids between 7 and 8 years for the educational software [8].

Motivation

Many learning Apps for children have been developed but not a single App has been developed for children speaking Sindhi language to learn English.

Sindhi language is commonly spoken in Sindh and Balochistan provinces of Pakistan as well as in northern parts of India.

We have developed a mobile learning App for the children who are native speakers of Sindhi language to foster their English through the App.

Usability test has been conducted for this learning App along with Fun Toolkit and its results are presented here.

“Learn English-Sindhi” App

Nowadays children are very accustomed with mobile phones and Tablet-PCs in early age. This provides the chance to teachers and researchers to teach children through interactive mobile learning Apps. By keeping this fact in mind, we have developed an Android based mobile learning App called “Learn English-Sindhi” for Sindhi speaking children in Pakistan to teach them English through their native language Sindhi. The main objective of the mobile learning App is to provide a dedicated Sindhi Application to Sindhi speaking children so that they themselves can learn English through their native language. There is no such kind of App available yet in the Android market.

The mobile App covers the basic activities that the children use to learn in the early level of the education. These entire activities are presented through the images, text and voice in both languages: English and Sindhi. The target of the App is the children aged between 4 and 9 years.

“Learn English-Sindhi” App (Screenshots, Fig. 1)



Figure 1. (a) Main Menu

(b) Alphabets

(c) Name of days

Methodology

Demographic questionnaire was used to collect the demographic data of the children.

The usability study was conducted with 100 children. As our target audience was children, so Fun Toolkit was used to measure the children's experience of fun after the usability tasks were performed by them.

Methodology

Each child was asked to perform three simple tasks, the tasks were to find out an alphabet, a fruit and a body part from the App.

For each child, task completion time and task completion rate was recorded.

Smileyometer, Again-Again Table and Fun-Sorter from the Fun Toolkit were immediately administered after the children performed the usability tasks to give their opinion about the App.

Results

Demographic Data

According to the results, 58% participating children were baby boys and 42% were baby girls; having age between 4-9 years.

50% children were from Class-KG and 50% were from Class-I.

All the participating children had experience of using smartphone or Tablet-PC and were using different mobile Apps.

The participating children's usage of smartphone or Tablet-PC was: 59% children spent one hour daily, 30% children spent two hours daily, and 11% children spent three hours daily or above.

Usability Results

There were three tasks to be performed by the participating children during the usability test.

The task completion rate was 100%; this shows that the App was easy and effective as every child completed all the three tasks.

Usability Results

Efficiency was measured through task completion time; Fig. 2 shows the average task completion time of the children in seconds.

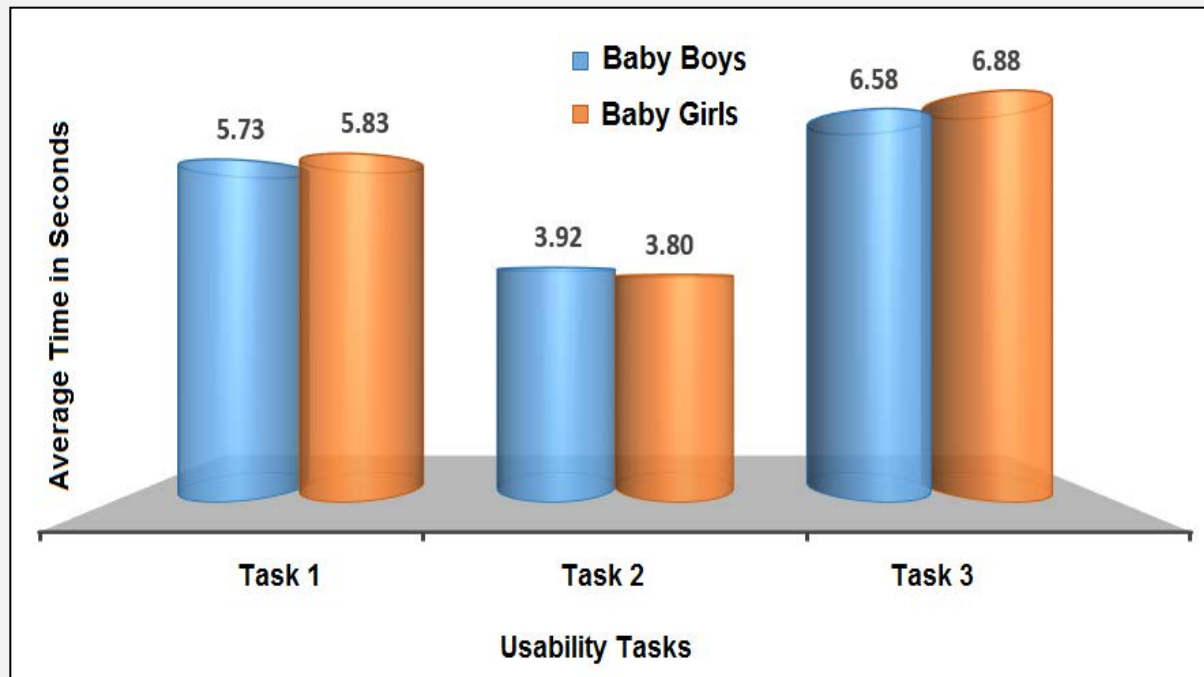


Figure 2 shows the average task completion time of the participants

Statistically Analysis

Table 1 shows descriptive statistics of all three tasks in terms of the task completion time in seconds for all the participants.

S#	Tasks	Mean	Std. Deviation
1	Find out the Letter D (D for Doll) “ گڈي ”	5.7730	2.8774
2	Find out the Eyes “ اكيون ”	3.8738	1.7472
3	Find out the Mango “ انب ”	6.7067	2.3088

Table 1. Descriptive statistics

Statistically Analysis

Table 2 shows group differences of the participants in categories of gender, education level and smartphone or Tablet-PC usage groups with mean and standard deviation for the task completion time in seconds.

Group	Category	Mean	Std. Deviation
Gender	Baby Boys	5.4114	1.6337
	Baby Girls	5.5061	1.9579
Education Level	Class-KG	5.4448	1.7386
	Class-I	5.4575	1.8149
Smartphone or Tablet-PC Usage	1 hour daily	5.5126	1.7184
	2 hours daily	5.7438	1.9962
	3 hours daily or above	4.3236	0.7684

Table 2. Group differences

Statistically Analysis

Table 3 shows regarding the participating children that there is no statistically significant difference between gender, education level and smartphone usage groups in terms of the task completion time.

The results show that the App is equally efficient for all the participating children regardless of their gender, education level or daily usage time of smartphone or Tablet-PC.

Test type	Testing variable	Value	Probability
Independent Samples t-test	Gender	$t(98) = -0.263$	$P = 0.793$
Independent Samples t-test	Education Level	$t(98) = -0.036$	$P = 0.971$
One-way ANOVA	Smartphone or Tablet-PC Usage	$F(2,97) = 2.779$	$P = 0.067$

Table 3. Independent samples t-test and one-way ANOVA

Fun Toolkit

Fun Toolkit has been used to measure the participating children's experience of fun after completing the tasks.

Three tools of Fun Toolkit have been used:

1. Smileyometer
2. Again-Again Table
3. Fun-Sorter

Smileyometer

Smileyometer from Fun Toolkit has been used to measure the children's experience of fun that how much fun it was to use the various activities of the App. Fig. 3 shows a five-point scale (Awful, Not very good, Good, Really good, Brilliant) which has been used to record the response from the participating children for the Tasks (e.g. Task 3) as well as about the overall App.

3. Find out the Mango "انب".

How much fun was it to use this activity?



<p>Mango</p>  <p>انب</p>	 <p>Awful Not very good Good Really good Brilliant</p>
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Figure 3. Smileyometer

Smileyometer (Results)

How much fun was it to use the App?

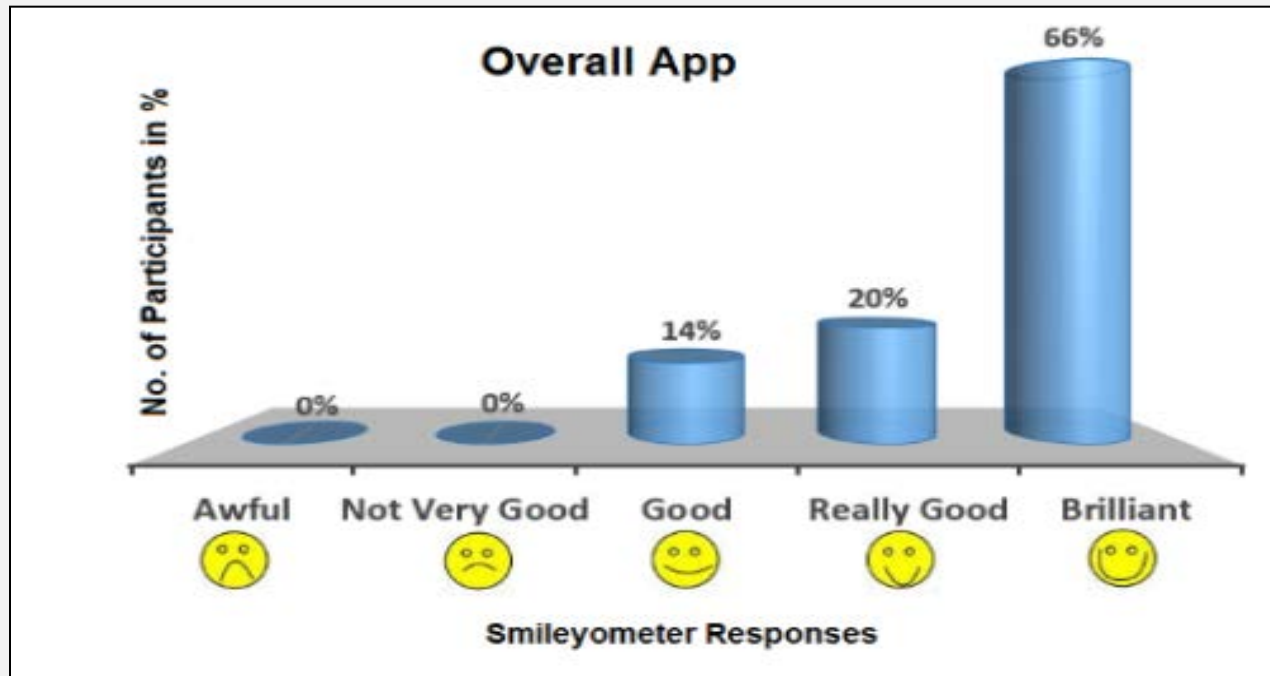


Figure 4. shows Smileyometer's Response of the participating children

Again-Again Table

Again-Again Table has been used to ask the opinion of the children whether they want to use the App or to do the activity (task) again or not, for capturing an idea of engagement, as illustrated in Fig. 5.

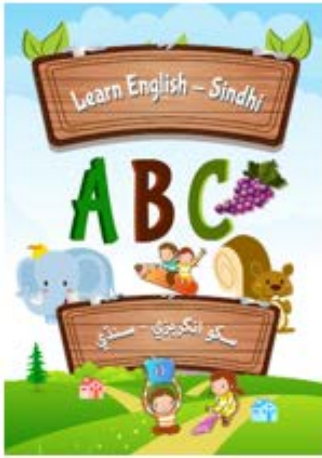
Would you like to use “Learn English - Sindhi” App again?			
	Yes	May be	No
			

Figure 5. Again-Again Table

Again-Again Table (Results)

Would you like to use the App again?

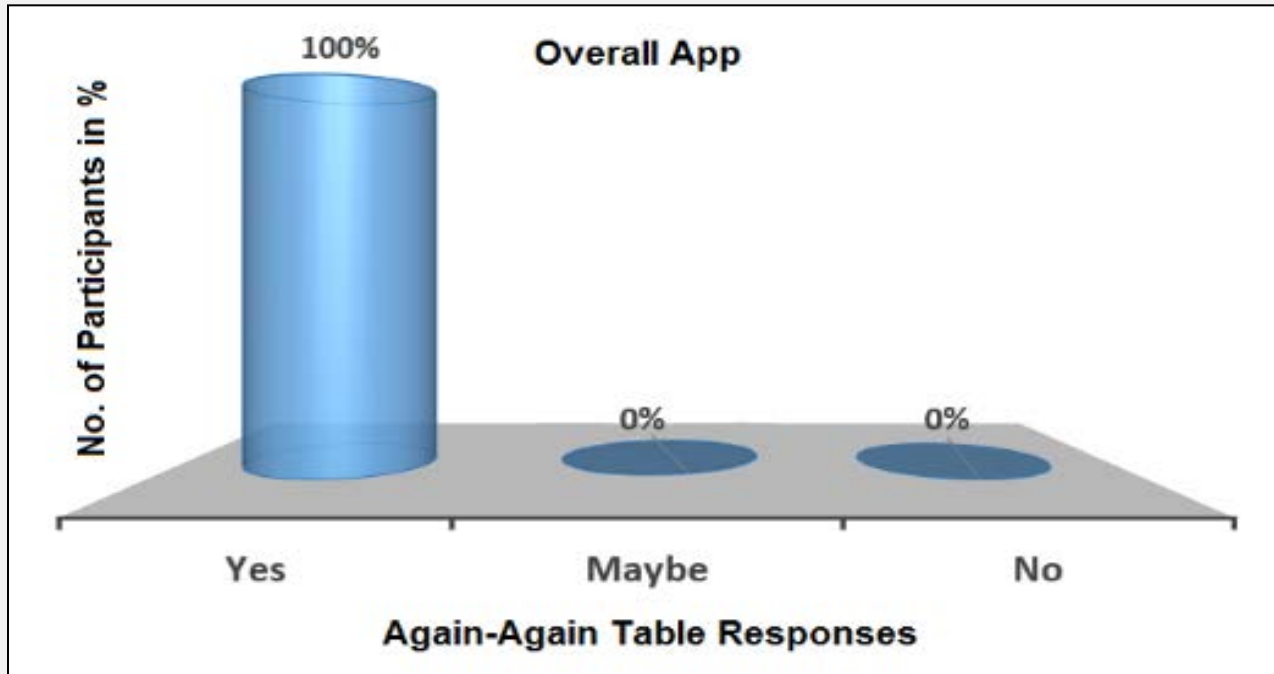


Figure 6. shows Again-Again Table's Response of the Participating children

Fun-Sorter

Fun-Sorter has been used to sort the tasks in terms of easiest to do and most fun. According to the children’s reported opinion in Fig. 7, Task 1 (Task A) was the easiest task to do. The children found Task 2 (Task B) as the most enjoyable activity as compared to two other activities.

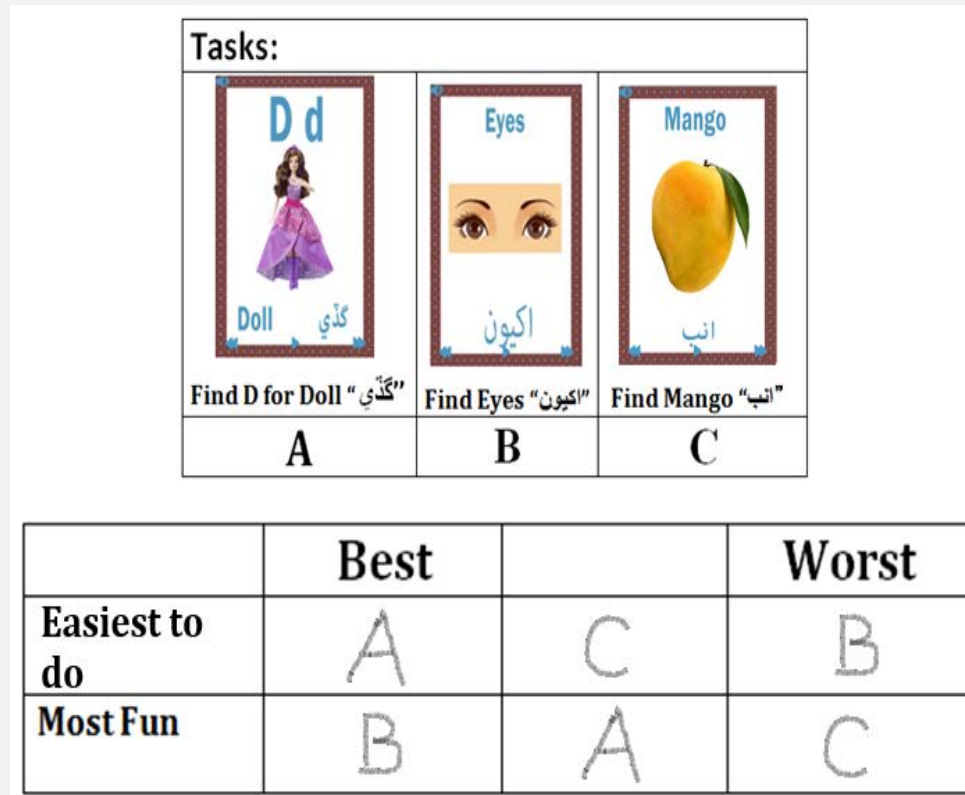


Figure 7 shows the Fun-Sorter response of the participating children

Conclusions

Results from the usability study show that the App was very easy and effective for the children as task completion rate was hundred percent.

There was no statistically significant difference among children under various categories: gender, education level and smartphone usage groups, in terms of task completion time which shows that the App was equally efficient for all the children regardless of their gender, education level or daily usage time of smartphone or Tablet-PC.

According to the results, the participating children enjoyed the App and all the children wanted to use this App again.

Future work would include the observation of the children while using the App and comparing the observational data with the children's reported experience of fun.

For analyzing the impact of the App, an experiment will also be conducted to measure the learning outcomes of the children.

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Thanks