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A Literature Review and Exploratory Study of Existing Educational Mobile Applications in Turkey and Northern Cyprus

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Abstract:

Mobile devices play an important role in daily lives of majority of people. Number of smart phone users in Turkey and Northern Cyprus is estimated to reach 35.2 million by the end of 2016. There is a growing demand for educational mobile applications among the youth of the country. These applications serve the purpose of teaching in a simplified and user friendly manner.

This research paper focuses on the comparative study to explore different Educational Smartphone Applications built in Turkey and Northern Cyprus and compare them on the basis of context, content, rendering output and ease of use.

An empirical study has been conducted by involving real time users and gathering their view point in the form of surveys, questionnaires and interviews to find out the problems they faced while using the applications.

The purpose of this research is to conduct an extensive literature review about existing mobile applications in the context of education in Turkey and Northern Cyprus and detect the design issues in its relation.

In this research paper, new features and improvements have been introduced for each category of applications that can lead to the better usage in return helping the students to gain knowledge and stakeholders to increase the expected monetary value.

Keywords:

User friendly, Usability, Context driven Smart phone Applications

1. Introduction:

Education is an important part of a civilized society.It is necessary for student learning, employment opportunities and economic wellness. For example, research in Turkey has found that increasing the compulsory education requirement from the scale of five years to eight years increased the number of women having eight years of school by 11 percentage points, and had various positive social consequences.[1]

Mobile devices have gained much popularity and strength in the digital world. They are a powerful tool that allow students to connect, communicate, collaborate and create knowledge.One of the greatest benefits of mobile technology is the contribution to economic growth. According to the World Economic Forum, no social-economic factor is a better assessor of a country's economical success than its investment in education and mobile learning. It offers vast opportunities to redefine the way that individuals and communities can contribute towards their society.[1]

Young minds of the generation are enthusiastic, open and adaptive to the changing trends in technology. Young people are accustomed to seek the information in a personalised manner with the advent of Web 3.0 and Internet. They gather information of their particular interest without any time constraint. Mobile applications developed specifically for educational purposes provide a customized environment for students to learn the subject in more fun, engaging and positive environment.

Generally, a class consists of students with different capabilitiies, backgrounds and learning style. It is not possible for the teacher to accommodate everyone's pace of learning. Teenagers are hesistant to ask questions in the class due to behavioural issues or peer pressure. Mobile applications build for the purpose of education can proove to be helpful in this regard. They can serve as a tool to provide a platform where students can learn and practice in a playful manner.

Mobile applications are certainly not a substitute for Classroom Teaching Learning pedagogy but an additional tool to enhance the knowledge learnt in the classroom.These applications are adaptive in such a way that they tune in and adjust according to the student's learning speed. It accommodates user needs.Content of the application must be ubiquitous and customized so that students can follow their learning passions and score high marks.

With the help of mobile apps, Learning is no longer a mundane task. Rather it is easy, playful and cost effective.Google's play store is an inventory for many free of charge mobile applications specifically created for the purpose of education. With the help of internet, they can be accessed in any remote geographical area. Students have the liberty to study from their homes. It has increased the horizon along with flexibility. There are few applications that are community based forums where students can share their knowledge with teach other. Even teachers can participate and contribute their knowledge to the same. Students develop a sense of responsibility with these kind of models.

In this research paper, we conduct a comparison of 6 mobile applications developed for helping students in academics.We test them with real time users and compare them on the basis of their usability and interest and suggest changes so as to improve the existing features.

2. Literature review

Kim et al found in their research that students in the rural areas, seriously lacking educational resources and technology exposure may have gained more from mobile technologies than urban school students.They argued that mobile devices in rural areas helped students as it gave them access to information that their peer-groups belonging to higher socioeconomic status already had.[3]

In regions where women's mobility is strictly regulated, mobile applications have turned out to be beneficial by providing the necessary information for their overall development. Women have become more visible and are better able to negotiate the public sphere.[4]

In the education area, an innovative program called "Snowdrops" which is developed by Turkcell and the Association in Support of Contemporary Living has provided thousands of women with new opportunities in terms of grants and funds to complete their higher studies.[4]

A study of 175 females who received training in computer literacy adapted more easily to digital applications and expressed more positive reactions towards computers. These types of training sessions reduced the digital division and brought more people into the electronic era.[5]

It plays an important role of empowering the people with special needs such as physically disabled or intellectual disability.

The company Turkcell Academy had provided training for nearly 50,000 employees (male and female). It includes sessions in leadership, technical innovation, and customer relationships. Courses consist of topics related with marketing and sales, mobile technology and management training. This helps them improve their skills and gain high-level positions. [6] Some of these classes are online through the Coursera digital learning platform. Students can take a wide range of educational offerings in Turkish or English. Others are "massive open online courses" (MOOCs) through the Massachusetts Institute of Technology. They cover topics like business and entrepreneurship, science, and financial studies. [7]

Turkcell Academy has developed its mobile application that provides lectures for different courses in audio/video format. Mobile learning offers convenience, flexibility, and positive interaction, all factors attractive to students.

Study shows that there is a gap between students owning mobile devices and actually using them for academic purposes.Most frequent academic apps used by students were information apps (Google, Safari), reference apps (Dictionary), school apps (UCF Mobile, Mobile Learn), and resource management apps (Dropbox,word processing).It has been suggested that teaching institutions need to introduce these apps to the instructors and incorporate them in the relevant coursework. [8]

There is much applied stress at teaching English in Turkish public schools that Government increased the years of learning , shifted from fourth grade to first grade in the year 2013.Turkey has launched a program to supply around 15 million students with tablets and replace all printed textbooks with digital content example: e books online courses).[9]There is a rise of electronic apps for language learning preferably English in Turkey.

Development of mobile apps by Leinen et al shows that reflection through the medium of audio and video recording can increase the learning potential of students. Apps are useful for Project based learning or collaborative learning. @ apps were the consequence of the research 1) ***ReFlex***, for individual reflection, and (2) ***TeamUp***, for group work reflection [10]

Scientist built *Sketch2Go* app which encourages different ways in which the sketch drawn by the user changes. (Physical temporal phenomena) [11]

Graph2Go, a special purpose graphing calculator that operates for given sets of functions. Its unique feature is enabling the dynamic transformation of functions. [11]

Math4Mobile, a dynamic mobile application for learning mathematics was developed by understanding student's experiences in relation with mathematical tasks. (Lai et al., 2007).[11]

3. Research Methodology

There were many Turkish applications in the play store related with education. It was beyond the scope of this research paper to study all of them. So Six were selected on the basis of usage,ranking and purpose and they were analysed.

There were few applications created and owned by universities such as AÖF Çıkmış Sorular, Denemeler created by Anadolu Üniversitesi . Such applications were created specifically for faculty members, students or parents. They were password protected so we could not include them in our research. We filtered out common applications based on English language learning, multiple language learning, preparation for competitive exams, high school preparation, personal development.

Application	Publisher	Usage Rank in Education in Turkey , Source:similarweb[12]
Test Coz	Edu-Apps	31
Turkcell Akademi	Turktell Bilisim Servisleri A.S	483
Brainly-Get Homework Help	Brainly, Inc	17
Memrise	Memrise	35
Learn English by Conversation	SCD Group	120
Duolingo	Duolingo	10

Table 3.1

The target sample size is about 25 users from which the observations are taken during the exploratory research. Observations are taken under account using questionnaire as primary data for study. It consists of open ended questions in English and Turkish language. Majority of the users were master students in the school of computing and technology, Eastern Mediterranean University with the age group of 25-38. 10% of the users were female students. 80% of the users were international students (Turkey, Iran, Nigeria, Jordan) and 20% were Cypriots.

Survey form :

SURVEY FOR RESEARCH PURPOSE/**ARAŞTIRMA AMAÇLI ANKET**

NAME/**İSİM:**

GENDER/**CİNSİYET:**

AGE/**YAŞ:**

OCCUPATION/**MESLEK:**

Q1 Do you have a smart phone? /**Cep telefonunuz var mı?**

Q2 Do you use mobile applications for educational purpose? If yes, which one?/ **Mobil telefon uygulamalarını eğitim amaçlı kullır mısınız? Cevabınız evet ise hangisini kullanırsınız?**

Q3 what are the drawbacks or faults in educational mobile applications?/**Eğitimde mobil uygulamalarda hatalar nelerdir?**

Q4 Are mobile applications useful for learning purpose?/ **Eğitim amaçlı mobil uygulamalar yararlı mı?**

Q5 Do you want to share any other suggestion?/ **Konu ile ilgili başka öneriniz var mı?**

Mobile Applications to be compared: in terms of user design, total number of downloads, popularity, quality of content, performance / **Karşılaştırmalı mobil uygulamalar: Toplam indirim sayısı, popularitesi, içerik kalitesi, performans,**

- **Test Çöz**/ Solve test
- **Turkcell Akademi**/ Tukkcell academy
- **Brainly**
- **Memrise**
- **Learn English By Conversation**/ Konuşarak İngilizce öğren
- **Duolingo**

Students were instructed to install each application and test them on the basis of ease of use, simple design, usefulness, speed, interesting factor, consistency and errors in the application.

A preliminary session was conducted with the students to explain them the meaning and overall importance of usability factors such as speed,consistency,flexibility, rate of errors and ease of use. Real- life examples of live websites were shared to teach them the relevance of each factor. It was emphasized that an application should provide fun filled positive user experience.

Speed:It determines the speed of an individual task in an application. Users were encouraged to test the application thoroughly in order to find out events that makes an application to slow down.

Consistency:It means that every module in an application should be similar in terms of design . Identical terminology is preferred in prompt, menus, help screens.It refers to similar interface styles for each module of an application. (web and mobile). If they are too different then user will get confused and leave. It also refers to consistent sequence of actions

Flexibility:Application should be flexible and adapt itself to different mobile platforms. Navigation should be easy without breaking the link.

Rate of errors: Number of bugs, dead links should be minimum in an application. Errors should be handled in advance and briefly explained in simple language with the help of notification.

Ease of Use: An application must be easy to use and user friendly. It should be simple with easy steps and accommodate general level of intelligence of all the users.

Interesting: It means it should engage the user for a long period of time in a fun filled environment.

Usefulness: It should be useful and provide knowledge to the user. It should increase their learning ability.

On the basis of majority of students response, an average was calculated and this table was generated

All the points were rounded off to next closest integer.

Application	Speed	Consistency	Flexibility	Rate of Errors	Ease of Use	Interesting	Usefulness	Total
	5	**5**	**5**	**5**	**10**	**10**	**10**	**50**
TestCoz	3	4	2	1	8	5	7	30
Turkcell Akademi	3	2	5	4	5	5	8	32
Brainly	4	3	3	2	6	7	8	33
Memrise	5	4	3	3	7	9	7	38
LearnEnglish	1	2	5	2	5	7	9	31
Duolingo	5	4	5	2	8	9	10	43

Table 3.2

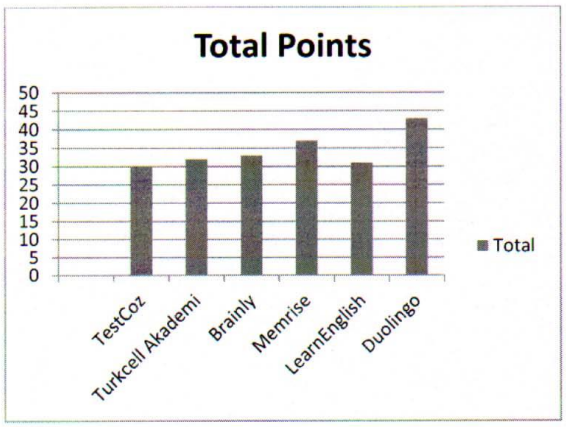

Figure 3.1

Table 3.2 and Figure 3.1 clearly shows that Duolingo scored highest among all the applications. It scored full marks for speed, flexibility and usefulness meaning that majority of the users found it faster, light and useful for the purpose of learning a new language. Second best application according to the survey is Memrise application which is again a language learning tool. It shows that majority of students in Turkey and Northern Cyprus use language applications to learn English or other language. In an informal interview, few students mentioned that after their graduation, they are plannning to continue their higher studies in other parts of Europe and therefore they use the application to learn foreign language such as German, French and Spanish after learning English. Few international students use the tool to learn Turkish language as well.

According to the results mentioned above, there is not much difference in the overall score of TestCoz,Turkcell Akademi,Brainly and Learn English. They are more or less equally used by the user. These apps scored less in terms of consistency due to different interface styles for each module. These applications were not flexible as they do not have versions other than android platform. The developers designed it specifically for android and didnot focus on

I phone and windows phone users due to which it substantially lost a percentage of its clients.

Turkcell Akademi reported to have higher number of errors as compared to other applications. It should be noted that it is a huge application and therefore vulnerability increases. More than errors, it was observed that system feedback and information about a specific error, help manuals were missing.

Brainly is reported to be fastest among all applications. It is a light weight application and ranks at third position according to the results.

TestCoz is the most user friendly application with a simple and easy to understand interface. Students found it easy to use because of less tasks involved in it.

Memrise reported to be most intersting application due to fun filled interface.

According to the user survey and results, each application is explained below along with their features, advantages, disadvantages and suggestions.

TestCoz

Features:It is a mobile app that conducts exams and tests the knowledge of the students in various subjects It has different levels, from easy to advanced. It consists of wide range of subjects ranging from biology to mathematics.There are sub topics for each subject.For eg: in Mathematics, one can choose to give exam for algebra. Exam is taken in the form of multiple choice questions.

Advantages: It has relatively simple and easy interface. It is easy to understand. It is consistent having similar style and terminology.No errors were found during the study.

Drawbacks: There is no learning/teaching pedagogy involved in this application. Students can only evaluate themselves by giving exams. They are not given knowledge of the subject. Marks are given to students but it is not clear how the application calculates the marks. Marks for each question is not mentioned.Each question in an exam is time based which can be a disadvantage for less prepared student. It is not flexible. It is not compatible with ios or windows phone.

Suggestions: Application should involve teaching learning pedagogy to increase the usage and popularity. For example: if student wants to give exam for algebra, app must provide the notes for the subject before taking an exam.

Turkcell Akademi

Features: It comprises of different categories.There are third party videos for each category that user can watch about every topic such as Technology,English learning, preparation for an exam, personal development,khan academy. It is very vast and powerful application.

Advantages: It is very informative and useful application.

Drawbacks: The design interface is too complex. It has too much content in relation to the mobile size. It is confusing with too many user clicks with too many user actions and tasks. It is time consuming.

Suggestions: Application should reduce its content and keep only the relevant or the most popular items/categories. There must be limited number of videos so as to avoid confusion for the user.It should be simplified in design and content so more users can be motivated to use it. Design team needs to add some interesting feature to engage the user.

Brainly

Features: It is a mobile application where user can ask a question about any topic, give an answer to existing questions of different topics and create his profile.

Advantages: Questions can be asked by typing or posting a picture in the form of snapshot, from student's notebook. Real time classroom homework questions are posted by the users. It is a platform of collaborative study where another user can challenge the existing answer and give the better solution. İt is like a discussion forum where study in groups is encouraged.

Drawbacks: There is no assurance that the answer provided is correct. App does not hold any responsibility for the correctness of the solution. There are no predefined solutions.Sometimes questions are posted for days and weeks with no one answering.

Suggestions: If the application could include an agent that could automatically answer an untouched question for more than 4 days then its ranking would definitely shoot high.

Memrise

Features: It is a language learning app with daily goals and reminders. One can choose from more than 100 languages but can learn only 1 language at a time. There are other topics such as memory training, arts and literature, natural world supported by the application.

Advantages: It is a vast application with wide pool of information organised in a tidy manner thus increasing the usability.

Drawbacks: Since it is huge, there are many activities that user could do which increases the number of user clicks that results into a bad design principle.

Suggestions: Keep it simple by reducing the number of user clicks for each activity.

Learn English

Features: It is an application to learn English. It is widely used in Turkey. There is a log in section that requires user's credentials. It is consistent with clear distinction between beginner, intermediate and advance level.

Advantages: It offers a dynamic interface that adapts according to the user's capabilities.

Drawbacks: It is relatively slow as compared to other apps. At some tasks there is audio / text mismatch which increases the rate of errors. It requires an internet connection even after the installation.

Suggestions: Errors should be handled and provided with a help menu in case user gets stuck at any step of the task.

Duolingo

Features: It offers learning a particular language with different stages. It is a graphical application with different images and sound. User can set their daily goals. It also provides them a graph of their progress

Advantages: It is a very popular application. It has a simple interface and many people collaborate and compare their progress. It is integrated with different social media websites such as facebook. It is compatible with iphone and windows phone as well

Drawbacks: There is a sequential order of passing the stages. Sometimes user wants to skip certain stage and try out a new stage. There is no feature to support it.

Suggestions: It should be flexible enough that gives user a chance to jump to a next level before passing the previous level.

Conclusion

In this research paper, an attempt was made to compare different turkish mobile applications in context of education on the basis of design principles such as speed,consistency,flexibility,ease of use, usefulness and system feedback.Quantitative study shows that Duolingo application is better in terms of all the design principles mentioned above in comparison with other applications. Memrise is found to be second best application used in the regions of Turkey and Northern Cyprus. Both of these applications are language learning tool which suggests that majority of the youth in these regions are preparing to learn foreign languages for their higher studies in abroad. Applications related to acadmics such as Brainy, TestCoz andTurkcell Akademi scored closely to each other and majorly used by students to enhance their academic knowledge and personal development.Learn English app didnot score as expected probably because many of its clients switched to Duolingo and Memrise app for learning the language. It is reported to be the second worse application according to the results.User surveys cannot be taken as accurate results and therefore there is a goal to increase the sample size and research in an exhaustive way using statistical analysis in future.

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