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Developing a Mobile App for Kids in Dzongkha Learning

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Abstract—The objective of this paper is to study about the interactive systems and designs that will help the development of the new Dzongkha learning app, Interactive Dzongkha Learning App for Kids. The following related systems and apps are reviewed and applied to achieve the objective. The App contains six basic levels: tsawadangpa, tsawanyipa, chacheynatshog, kaelden, soednamdraebu and guetshig which will cover the basic teaching of Dzongkha for the kids and the beginners. The Interactive Dzongkha Learning App for Kids will provide an easy and alternative way in learning Dzongkha besides the regular classroom teaching. The App will also be incorporated with quiz, which it will help learners verify their outcome.

Keywords- Dzongkha app, Dzongkha e-learning, Kids' app, Dzongkha m-learning.

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I. INTRODUCTION

Dzongkha was declared as the national language of Bhutan in 1971[1]. However, Bhutanese in general, especially the youths are having trouble in mastering the language in today's arena.According to the paper The Dzongkha dilemma[2], "Most Bhutanese grew up learning Dzongkha through crude methods, which include memorizing contents of the textbook and sitting through lectures". Which is why additional complementary meansto make Dzongkha learning more interesting and relevant resources are needed. Introducing platforms where kids can learn Dzongkha through interaction with an already comfortable device, like a mobile phone can be one such initiative.Therefore, with the development of interactive Dzongkha learning app young children will have an additionalapproach in learning Dzongkha. The following sections contain our reviews on different interactive systems and how suitable they are for kids. It includes mobile apps such as Bhutanese app Dzongkha for Kids, Government to Citizen (G2C) Services, Royal Government of Bhutan, English for Kids developed by Miracle FunBox, Kids learn Korean developed by Hong Nguyen,Busuu developed by Busuu Limited and Duolingo developed by Duolingo, Inc. We downloaded those apps onto our phone and used them to get better idea about how they attract or interest their users through the use of attractive and interactive interface like sounds, visuals, quizzes, games and assignments. We also studied the software Moodle; about how it aids in Interaction, its availability, accessibility, and System Management Function and System Architecture. Finally, some papers on Interface Designs were reviewed.

II. LITERATURE REVIEW

The literature related to interactive learning Apps designed for kids were reviewed in order to get start with the development of interactive mobile app for learning Dzongkha language. The main aim in doing review was to get a better understanding of features and techniques that worked for kids in learning and which failed. This in turn, helped us in incorporating features and ideas in development of Interactive Dzongkha Learning App for Kids.

A. Self-learning platform

Math Learning Mobile App [3]is a course-learning app that enables children in learning mathematics from the basics of counting numbers to complex geometry. It aimed students aged range from five to seven [3] which helps the children to develop basic skills of mathematics; and abilities of problem solving. The learner can experience self and digital learning in an interactive way through this software.

The app was designed on game-based learning that contains five levels including Perimeter, Area, Surface Area, Volume and Capacity [3]. In each level, there are ten learning programs. The learning outcome is tested in the process of learning by asking questions whereby, children can answer the question according to instructions. The method let children to do self-education or study without the requirement of guidance from teachers. Therefore, incorporation of those methods in Mobile App for kids in Dzongkha Learning can provide self-learning platform to our kids.

B. MALL

Mobile Assisted Language Learning (MALL)[4] is an approach for language learning assisted by mobile phones, MP3 and MP4 players, PDAs and iPads. MALL will let students to access the content and communicate irrespective of time and place with teachers and peers. The learners can maintain linguistic basis, skills, abilities and knowledge through participation in e-language learning [4].
The basic capabilities of 3G smartphones help in language learning due to inclusion of features such as built-in recording function, voice command function, handwriting recognition function, as well as other helpful web-based applications and

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independent applications[4]. However, we will not incorporate those features since it makes an app heavy and difficult to load.

C. Edutainment

The proper use of edutainment (both educational and leisure) media will help cognitive, motoric and sensory developments in kids [5]. Some features of the learning media has ability to draws kids' attention through display.It also motivates, supplements learning and facilitate achievement of goals (understanding and memory)

The *Mobile Technology in Children Education: Analyzing Parents' Attitude Towards Mobile Technology for Children*[5] highlights the importance of need of existing curriculum based content, existing object based design, readable typography, familiar fonts and media assets creation that takes into consideration of environmental and mental conditions of the students. It [5]also points that including of optimistic characters will inspire the kids in following the nature of characters and learn easily. Therefore, taking account of those creativities in Mobile App for kids in Dzongkha Learning app development will give effective and efficient learning experience for the kids making them learn voluntarily.

D. Parents' Attribute

Parents' overall view on the use of Mobile technology for educational purposes in their children is important[6]. Around 61.5% of the parents supported the use of educational technology such as mobile apps for elementary school age children as per the research carried out by the authors in*Mobile Technology in Children Education: Analyzing Parents' Attitude Towards Mobile Technology for Children*[6]. Various considerations need to be taken into account to improve the role of mobile technology in the education of children[6]. Parents' support is necessary; children are found to be more comfortable with touch screen devices such as tablets and smartphones compared to laptops and computers[6]. Most of the time kids use mobile technology for entertainment and e-sports. Therefore, Mobile App for kids in Dzongkha Learning will include entertainment and fun beside main content. Features in app will gain the support of parent for children to go for this app.

E. Game based

Magic Word[7] is a word search based Italian language learning game. The interaction and graphics of the system was designed base on the culture and linguistic of Italian people. For example, Italian cultural items were selected as graphics background[7].

Katakana Star Samurai[8] is a game designed for smartphones and tablets which it supports in learning Japanese language and also provides an environment for students to practice their knowledge (focused on a basic Japanese alphabet called katakana). This game follows edutainment approach by collaborating education with fun which kids learnt by playing. The game was implemented using Unity for Android and is currently available in Brazilian Portuguese, English, Spanish and Japanese languages[8].

The game[8] follows a story format and its design has strong cultural aspects. The game is sectioned into levels so that new contents are gradually introduced. This aims in providing learning pace that most users will be comfortable and follow the levels. The player has to destroy a specific number of katakana per level; there is no determined time for the player to accomplish a level. The goal is determined by destroying all the enemies without losing the life (dying). The number of enemies increases with introduction of every higher level. The design of the game features weredeveloped comprehensively to provide a good learning and interesting gameplay. Therefore, incorporating Language learning based game with our culture items will provide the kids in learning the culture base language with entertainment.
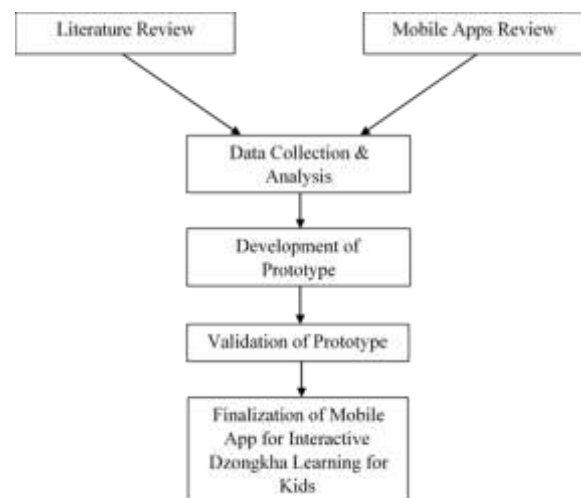
III. METHODOLOGY

Fig 3 Research Methodology

The flow chart as shown in figure 3 shows the research methodology used. It shows the process of prototype development in mobile application. It includes the procedures followed in doing literature review, mobile applications reviews, and collection of data from reviewed literature and analysis.

Literature Review

The review and search of relevant literatures were done to gain extensive knowledge in acquiring required features in mobile application development. The data and features were collected and analyzed while reviewing those literatures by the individual team members. The sources used for literature search were journals, conference papers, technical reports andonline resources.

Mobile Apps Review

The relevant language learning mobile applications were downloaded and installed into mobile devices. Those apps were used and reviewed by the individual team members. In fulfillment of features for Interactive Dzongkha Learning App for Kids, those reviewed mobile apps helped in designing the user interface of appealing, user friendly and entertaining by incorporating relevant photos including audio.

Prototyping

The skeleton of Interactive Dzongkha Learning App for Kids is created based on the features gathered after doing the detail analysis of data collected from the previous processes. The features include:

Self-learning: The app will able to teach the basic learning of Dzongkha language; the app resource kids like tutor. The learning can take place in different dimension of time and place irrespective of zone and locations.

Edutainment: App keeps the track of Dzongkha knowledge and learning in kids through levels of edutainment.The sound and real images incorporated in the app; and rewarding stars for the level or clearance of levels achievement can entertain the kids.

Game-based: The app contains six levels which level one is being enabled by system to the game. After every completion of learning lesson in each level; the quiz is conducted at the end to check their learning outcome. The reward of one yellow star is for scoring 70%; two yellow stars for score above 70% and three stars for 100% score. The dark star remarks the failure in enabling level and cannot go for higher level. The subsequent levels are enabled if their score is 70% and above.

Valid Prototype

The proposed prototype was presented during the Final Year Project Proposal Presentation to the panel members which was conducted in the college. The various feedbacks and the suggestions were reviewed and analyzed. The prototype was also presented to the Project Manager, ICT Officer, Manager and the software developers of Southtech Bhutan Private Limited and it was validated.

IV.   RESULT AND DISCUSSION

A. Result

Fig 4. 1 Prototype

The figure 4.1 is a prototype of the app. The app consists of six levels and further,each level contains several sub-levels. Each sub-level provides a lesson in learning content. The quiz is one of the sub-level at each level to test the content learned. The level one is being unlocked my system; and users need to complete with score above 70% to unlock the preceding or higher level till level five.

Fig 4. 2 Sample Question

The figure 4.2 is a prototype of the quiz. The figure on the left is an example of identifying the correct spelling. In this, either an image or an audio is provided along with a list of spelling. The user can select only one. The figure on right is an example of a quiz to identify the correct audio. Either an image or a word is provided as a question and user needs to select one from the list of audio provided.

Fig 4. 3 Sample of Reward

The figure 4.3 shows the rewarding system of the quiz. The figure on left is an example of a rewarding yellow stars if the user scores above 70% or passes the level or the quiz. The figure on the right is display if the user fails to pass the quiz or level with a dark star. [8]

B. Discussion

Interactive Dzongkha learning app will respond to user's actions and give information in the form of output. It will facilitate the learning of Dzongkha language (the national language of Bhutan), provide a platform in which user can be motivated and improve user experience.   The vigilant evaluation of the existing apps and related literature have made us to conclude the following as important points for the app design; 1) design should be based on existing objects and the typography have to be readable with familiar fonts, 2) Learning environmental and mental conditions of the learners need to be considered in designing the interface, 3) design have to include reward system for motivation of kids in learning; and supplementary programs to add progress in underachieved learners.

English for Kids App has attractive interface which includes amusing pictures as guide to improve vocabulary, listening skills and reading in English. English for Kids App is easy to use, highly responsive, designed with simplicity, memorability and functionality. Hence, App is appropriate for kids. However, Dzongkha for Kids is complex with unattractive interface. It uses audios, visuals, games and quizzes. It also has 20 different categories; 3 different sections: learn, play and quizzes. Kids learn Korean App teaches Korean & English. It has a very limited content beside usage of attractive interface like visuals, audios & fun memory games. It is appropriate for kids but, it has distracting audio usage. Busuu teaches 12 different languages. It is level-based and highly interactive with unique functionality such as speech recognition and hand writing recognition. However, it is not appropriate for kids due to its high complexity and need for prior reading writing skills. Duolingo is made up of modules and the lessons are not taught explicitly. It has a rewards system given in the form of lingots. It has an excellent interface but is not appropriate for kids due to its high complexity and need for prior knowledge.

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CONCLUSION

In conclusion, it was found that the Dzongkha for Kids app is more suited for older kids having knowledge in Dzongkha reading since, all the topics in the first page are written in Dzongkha with no images or other forms of visual or audio aid. Therefore, the first page may seem complicated for the kids. Moreover, this app does not work properly in tablets. On the other hand, English for Kids would be suitable for kids because of its simplicity and attractive interface which is easy to use. Kids learn Korean is also a suitable language-learning app, as it is simple and easy to use. However, it has limited content and advertisements pop up when connected to the Internet which it is distracting. Although,both Busuu and Duolingohave impressive interfaces but, Apps are not appropriate for kids since it is very complex for kids within the age range.

The development of Interactive Dzongkha Learning App for Kids will be more effective and efficient after doing this research. The relevant features found by doing this research will be incorporating in the app and the app will be like exemplar or guide to those who wanted to develop such kind of learning app in the future.

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