Development of an Android-based Learning Media Application for Visually Impaired Students

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Abstract:

This research aims to develop the English for Disability (EFORD) application, on Android-based learning english media for Visually Impaired students and determine its based this on assessment of matter expert, media expert, special needs teacher and students. The research method adopted in this research is Research and Development (R&D). The development of this application through five phases: (1) Analysis of problems, through observation and interviews. (2) Collecting information as product planning / analysis of the needs of the media as required of blind children. (3) The design phase of products such as the manufacture of flow and storyboard navigation map.(4) Design validation phase form of an expert assessment of the media are developed. (5) testing products phase, such as assessment of the application by blind students. The results of this research is EFORD application which is feasible to be used as english learning media for visual impairment application based on assessment: 1)Media expert its obtained a percentage scored 95%, include for very worthy category, 2)Subject matter, expert its obtained percentage scored 75% include for worthy category and 3) Special needs teacher its obtained a percentage scored 83% include for very worthy category. Upon demonstration, students indicated positive response of ≥ 70% in each indicator. Therefore English learning media with Android based application English for Disability (EFORD) is very feasible to be used as a English learning media especially grammar and speaking english content for students of visual impairment for a number of reasons.

Keywords: Learning Media, Mobile Application, Android, Visual Impairment

Introduction

Education is the foundation in the process of forming the next generation of the nation. In Indonesia, education is given special attention as it is described in Law Number 20 Year 2003 regarding National Education System that provides full guarantee to children with special needs to obtain quality education services. Placement of students with special needs in the realm of general education and special education which is now known as inclusive education. In the aspect of teaching, most students are taught a curriculum that is equivalent to non-disabled students. Inclusiveness is influenced by many factors, ranging from student special characteristics, preparation and teaching skills, to the amount of administrative support available (Causton & Theoharis, 2013).

There are more than 13 special characteristics of students that affect teaching and learning activities, one of the special characteristics of students are students with visual impairment or visual impairment. Impaired vision is a limitation with regard to the inability or limited ability to receive information through the sense of sight.

Based on the observations at SMP-LB YKAB Surakarta, the researcher found that the mastery of the students' learning material for the blind of class VII is not optimal, one of them is grammar and speaking english or English pronunciation. According to Based on interviews with grade VII students, most complained about the difficulty of distinguishing between vowels and consonants in English. Especially with the vocabulary of their vocabulary. This implies the process of writing / writing English. The use of media in the learning process is one of the efforts to create more meaningful and quality learning. In the SMPLB YKAB Surakarta school the braille reading book and listening teacher speak as the main learning source of English.

In recent decades, the ownership of mobile devices (mobile devices) with Android operating system is increasing. The Android operating system is open source and has multitasking capabilities to run multiple applications at once (Reski Rantepedang: 2012). Mobile app development is not just destined for normal individuals however, for individuals with special needs. The developed mobile app is complemented by features devoted to individuality. For people with visual impairments voice is one of the most important indicators that must be in every mobile application. With the voice indicator of the visually impaired easier to access the application on Android, students use the sense of hearing to use and access information on Smartphones. Smartphones have many features, one of which is a talkback feature that allows easy access for children with visual limitations.

The growing number of people who own and use mobile devices opens the opportunity for the use of mobile devices in education. The use of mobile devices (mobile devices) in the learning process is known, as mobile learning (m-learning) (Gorgiev, 2004). Mobile learning is a learning that allows the learner (learner) does not stay in one place. The existence of m-learning is shown as a supporter of learning that can provide an opportunity for students to study material that is controlled anytime anywhere.

Based on the above presentation of the need for innovative learning media for students with visual impairment then, making Android mobile application "English for Disability" based on Android is expected to facilitate students in learning grammar and improve students' verbal skills to be used to listen to conversation using English and can apply in the surrounding environment. This research was conducted under abovementioned circumstances. The purpose of this study is to develop learning media and know the feasibility of English-based English for Disability learning media for visually impaired students.

Research Method

Research Approach

This research uses a kind of research and development method to produce English English for Disability based on Android for students with visual impairment.

Place and time of research

The research was conducted at SLB / A- YKAB Surakarta which addressed the road of HOS Cokroaminoto No.43, Surakarta. The research time is done in stages starting from May 2016 until June 2016.

Research procedure

This research procedure of media development adapted from step written by Sugiyono. These research procedures include finding potential and problems, needs analysis, product design, design validation and product testing. Limits for this study are only up to the product trial stage.
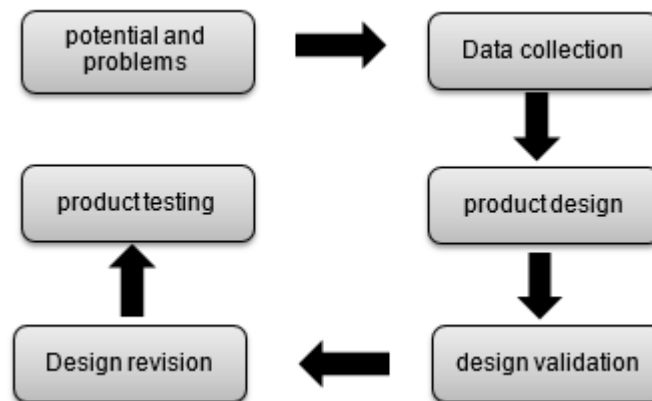

Figure 1. Research Procedure

Data collection technique

Relevant and accurate data is necessary to conduct this research, it is necessary to collect data. Data collection techniques were conducted in several ways, namely (1) litertur study (2) assessment sheet (3) interview (4) observation.

Data analysis technique

The data type of this research is qualitative data and quantitative data. Qualitative data include comments and suggestions for improvement from materials experts, media experts and learning practitioners. Quantitative data is obtained from scoring scores from experts and learning practitioners. Data analysis technique used in this research is descriptive analysis technique by altering the average score result data score interval.

Criteria for media assessment based on criteria of score interpretation according to Riduwan (2012: 15) with further changes, which can be seen in Table 1.

Table 1. Guidelines for Media Assessment Criteria

Percentage	Assesment Criteria
0% - 20%	Very Unfeasible
21% - 40%	Less Feasible
41% - 60%	Qiute Decent
61% - 80%	Feasible
81% - 100%	Very Feasible

Research Result and Discussion

Stage Analysis (Analysis)

The analysis phase consists of two stages: content analysis and needs analysis. The content analysis phase is conducted to identify the material based on core competency and core competency (KIKD) of VII class of English in the even semester of academic year 2015/2016. The subjects taken are materials on grammar / grammar and speaking english.

Need analysis consists of two stages: functional requirement analysis and non functional requirement analysis. The functional requirements analysis is (1) the application is equipped with voice accessing media indicator (2) the application provides the material presented with audio (3) the application provides

multiple choice exercises to help students practice the problem analysis skills. (4) The application provides additional material on the subject matter such as vocabulary / vocabulary designed with spelling models or English spelling so students can identify letters of the alphabet in English by sound. (5) This application provides material reinforcement to students anywhere and anytime without having to connect to the internet.

Non-functional needs analysis aims to develop the learning media in accordance with its function. Software specifications (software) for the manufacture of applications are (1) App Inventor 2 (2) MIT AI2 Companion.

Data Collection Stage

Materials Information for product planning is collected from literature studies, specialist media specialist interviews and observations to SLB schools on the analysis of media needs suitable for blind children.

Stage Design (Design)

The design stage was conducted by making the navigation map and storyboard. The purpose of the navigation map is to provide an explanation on each section or sub-section of the navigation or button on the application. The goal of the storyboard is to provide an explanation of the narrative path in the application.

Figure 2. Main Menu Display of the English for Disability application

Design Validation Phase

Media that has been made, then subsequently performing media validation stage by material experts, media experts, and learning practitioners. Validation of material experts aims to determine the feasibility of the application with the assessment results in terms of two aspects of learning aspects and aspects of the material.

Table 2. Validation Results by Material Experts

N.	Aspect of Assesment	Percentage	Category
1	Learning	75%	Feasible
2	Material	75%	Feasible
Total		**75%**	**Feasible**

Based on Table 2 validation results by material experts, obtained the percentage of the learning aspect that is equal to 75%, while the percentage of material aspect is 75%.

Based on the results of the percentage, it can be seen that the criteria of assessment of aspects of learning include decent categories and aspects of the material including viable categories.

Validation of media experts aims to determine the feasibility of the application with the assessment results in terms of two aspects of aspects of display and aspects of the device.

Table 3. Validation Results by Media Experts

N.	Aspect of Assesment	Percentage	Category
1	Display	95%	Very Feasible
2	Technical	100%	Very Feasible
3	Beneficiary	100%	Very Feasible
4	Accessibillity	83%	Very Feasible
Total		**95%**	**Very Feasible**

Based on Table 3, the results of validation by the media expert, obtained the percentage results from the aspect of display that is equal to 95%, the percentage of the technical aspects obtained a percentage of 100%, the percentage of beneficiary aspects obtained a percentage of 100% and the percentage of accessibility aspect netra 83 %.

Based on the percentage results, it can be seen that the assessment criteria aspects of the display, technical, usefulness and accessibility of children with visual impairment are categorized as very feasible.

Validation of learning practitioners aims to determine the feasibility of the application with the assessment results in terms of material aspects and aspects of learning.

Table 4. Validation Results by Practitioners of Learning

N.	Aspect of Assesment	Percentage	Category
1	Learning	81%	Very Feasible
2	Material	85%	Very Feasible
Total		**83%**	**Very Feasible**

Based on Table 4 validation results by learning practitioners, the material obtained result percentage of aspect that is equal to 81%, while the result of percentage of learning aspect that is equal to 83%. Based on the results of these percentages, it can be seen that the criteria of assessment of the aspects of the material including the category is very feasible and the aspects of learning including the category is very reasonable. Based on validation by experts and learning practitioners then produce a decent product used for visually impaired children.

Based on Table 4 validation results by learning practitioners, the material obtained result percentage of aspect that is equal to 81%, while the result of percentage of learning aspect that is equal to 83%.

Based on the results of these percentages, it can be seen that the criteria of assessment of the aspects of the material including the category is very feasible and the aspects of learning including the category is very reasonable.

Based on validation by experts and learning practitioners then produce a decent product used for blind children.

Stage of Trial

Media design has been validated by the expert will enter at the trial stage The media is tested to the students of class VII SPMLB YKAB. Learners are given the opportunity to use the English for Disability (EFORD) applicationn obtained the percentage as in figure 3
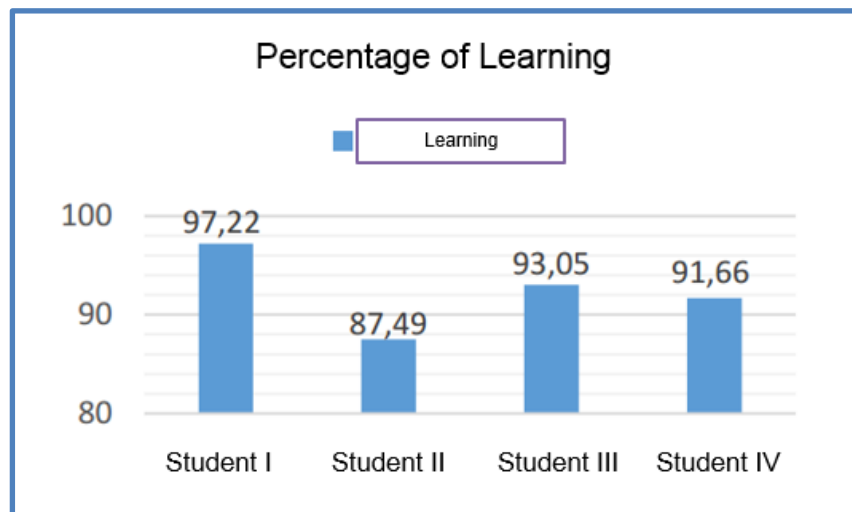
Percentage of Learning

Learning

100	97,22		93,05	91,66
90		87,49		
80				

Student I   Student II   Student III   Student IV

Figure 3. Percentage of Student Trial

According to the learners' responses the use of learning media is very beneficial for children with disabilities, because access to learning becomes easier and explanation of grammar content is very easy to understand. According to one of the seventh grade blind students, he is very enthusiastic about the English for Disbility (EFORD) media because, the EFORD application is the first Android-based learning media innovation he tried and very user friendly for visually impaired students. The response is supported by the statement of one student who provided feedback to be able to disseminate this application that can be used not only for Android but can be on all operating systems like Symbian.

Conclusions and Suggestions

Conclusion

Based on the results of research and discussion, it can be concluded that is (1) Development of Android-based "English for Disability" application in English subjects for class VII SMPLB YKAB Surakarta students with basic grammar / grammar competence and English pronunciation. For blind children has been successfully developed through 5 stages: first phase, problem analysis, through observation and interview. The second stage, gathering information as material product planning / media needs analysis according to the needs of children with visual impairment. The third stage, the stage of product design in the form Map navigation and storyboard plot. The fourth stage is the design validation in the form of an expert assessment of the developed medium. The fifth stage of product testing is the assessment of application by blind students. (2) the feasibility of adobe flash based applications has 75% judgment of qualified material experts, 95% of highly qualified media experts, and 83% of highly qualified learning practitioners.

Suggestion

Based on the weakness of the product on the final product review, the suggestions that can be given for the next step of development and research are as follows: (1) the need to develop the material widely in addition to the English grammar and pronunciation materials in English VII class SMPLB YKAB Surakarta (2) should the speed of sound on the material slowed (3) page or button designing adapted to the needs of students with visual impairment.

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