Educative Video Game Based Android System for Learning Early Reading for Children with Hearing Impairment

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Abstract This aim of this research is to describe how to use video game as an educative media based on android system that used to increase early reading ability for children with hearing impairment in Special Kindergarten. The backgrounds of this research are from the language ability of children with hearing impairment as we know because of they can not hear anything, their language is limited. Children with hearing impairment use the visual stimulus more than audio stimulus for reading, early reading exactly. Early reading for children with hearing impairment started with identifying word by picture and after that, we start to read the sentences. This research use research and development (R&D) method, and use ADDIE models to make an educative video game. The steps are analyse, development, design, implementation, and evaluation. Based on the other research before, we know that children with hearing impairment have to reading, writing, and speaking with integration learning and do it in early children. Therefore, it is necessary to developed video games education for media to help children with hearing impairment to learn the early reading that can be used anywhere and anytime in a smartphone. By using this media, children with hearing impairment is easier to learn early reading that can increase the process of language acquisition. Media uses it should be under contiguous by parents or adults.

Keywords: children with hearing impairment, educative video game, android system

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1. Introduction

Reading is complicated activities involving a lot of activity limbs, as visual, auditory, motoric, and cognitive. Because of that, reading is difficult to do. Reading has important function in our life, like to obtain information, participate in social life, and culture. Accordingly, reading is basic competence that everyone must be owned to learn and also hold our life.

Reading has steps to reach whole reading competence. One of step is early reading. Early reading is the first step that people must have in order that they can read. But early reading is not easy to have. People must have phoneme awareness and know the mean of the word.

Children, include children with hearing impairment must have early reading skill. This skill linked to a whole reading skill. But, children with hearing impairment have trouble in early reading because they are not hear.

Trouble in their hearing skill makes children with hearing impairment difficult to master early reading skill. To master early reading skill, children with hearing impairment have to memorize the word and its concrete sample. For example is word “book”, children with hearing impairment have to memorize the word, the letter, and look the book.

Because of children with hearing impairment have the language destitution, they have trouble to understand the meaning of the word, and know letter by letter of the word. Learning media roles is so needed. Visual learning media easier to use for children with hearing impairment.

The fact is until now learning media like educative video game to help children with hearing impairment to learning their early reading is not available. So that, they can not optimal to learn.

From the above description, learning media like educative video game is needed and urged to develop to improve the early reading skill of children with hearing impairment. It is hoped the educative video game could be increased the result study of children with hearing impairment. According to background has been told, so the formulation of this research is:

1) How early reading skill of children with hearing impairment in SLB-B in DKJ Jakarta?
2) How learning process early reading skill children with hearing impairment in SLB-B in DKJ Jakarta?
3) What learning media used to learning early reading for children with hearing impairment in SLB-B in DKJ Jakarta.
2. Theoretical Background

2.1. Definition of Hearing Impairment

Allen stated that hearing impairment divided into two namely, hearing loss and deaf. Deaf is hearing loss heavy that someone can not process verbal language even they use hearing aids. While hearing loss is lower than deaf, but it still have an influence on social, cognitive, and individual development. In her statement, Allen said that no matter how obstacles that occurs in hearing, fixed it constrained the development of someone with hearing impairment. [1]

Similar statement also expressed by Moores, hearing impairment divided two specifications, they are hearing and deaf. Less hearing is someone who has problems in hearing but their communication development still increased by hearing aids. They can understand the conversation and their communication and language development are balance. In less hearing, these individuals can still use their remnants hearing, but they still need practice to use it. The other specification is deaf. Deaf is someone who have heavy problems in hearing and cannot understand speech oral.

Classification of Hearing Impairment

Prelingual Deafness

Prelingual deafness is obstacles hearing that happens before language and speech developing. So that, language and oral skill someone has not been established but input function of language reduced. Prelingual deafness children’s vocabulary is too few. They usually learn vocabulary by the real picture.

Post Lingual Deafness

Post lingual deafness is hearing obstacles that had occured a few years after speech and language skill develop. So that these individuals have known language and have listened language. So they have a language although a little and they keep have to practice to addition their vocabulary.

Characteristic of Hearing Impairment

Children with hearing impairment having characteristics that often random speaking or unmatch word. For example like “rumahsakit” they said “sakit rumah”. Because of their impairment in their ear, they difficult to learn intonation and verbal communication. When they communicate with common people, they usually use their visual power to see their partner lip motion. Children with hearing impairment usually have problem in their vocabulary, beside vocabulary, they have problem in syntax and morphology.

In cognitive skill, children with hearing impairment usually under than common children because their hearing impairment. Most children with hearing impairment have problem in any subject in academic skill, reading and math especially (ASHA). Problem in academic skill is not caused low in intelligence, but it caused their hearing impairment.

Children with hearing impairment sometimes feel isolated, they have no friends, not happy in their school and feel lonely. That is all because they can not hear anything. The other effect of their disability is they have high impulsive and egocentric in their surroundings.

2.2. Definition of Media

Media is from Latin “Medium” means mediator and refers to communication tools. Smaldino said that media refers to everything that bring about the information from source into receiver. So media is between the source and receiver. [2]

Similar definition revealed by Association for Educational Communication and Technology reveal that media is everything that used to distribute the information. This statement told that every tools that facilitate to distribute information from source to receiver is media. [3] Media not only needed in communication, but also in learning, learning media used to student make easier knowing the subject.

Audio visual media or video has important role in learning process. Video can motivate the students to learn and make easier to remembering the subject. Audio visual media has picture and sound as output, so we can look and listen like film, and television. Video is media that display the movement, including DVD, video record, computer animation, and so on. Video game that which sounds and images produces are good media for student with hearing impairment. This media used to learn speaking and reading lip movement process for student with hearing impairment. Beside that, this media can increase student’s vocabulary deposite, specially verb. The benefits of video as a media is:

1) Movement

Movement picture (animation) has clearly than not movement picture. To explain the concept, animation is very important in learning. Picture that used in video game is animation picture that make student interested to play.

2) Process

Movement consecutive served in video games it is movement in pronuncing verb. So, student with hearing impairment can see how pronouncing the word.

3) Skill Learning

To be expert on physical skill, requires exercise over and over. Through a video, we can see feedback and improvement. Physical skill refers to how student with hearing impairment try and try pronouncing the word.

4) Affective Learning

Video has big effect to influence emotions of student. Video has beneficial in form student attitude and social.

5) Cognitive Learning

Video must based on empiric and factual knowledge.

2.3. Definition of Educative Games

Games educative an outgrowth from video game. Video games develops rapidly that made him as an interactive media and developed by many companies game design. Many educators think to teach based game. So the game that made for learning called educative game or education game. Educative game according to Hurd and Jennings is game designed to teach the user about knowledge, developing the concept, understanding, guide them to train their competence, and motivate them to play. [4]
Educative game has to designed by interest design in order to give motivate for student to play. In addition to give
the motivation, educative game made to stimulate children
to get and concentration, so they encourage to win the
game. Word video game that made to increase the early
reading skill for student with hearing impairment made
with rules. The rules for making educative games is
(a) right on the target, (b) multifunction, (c) according to
the purpose, (d) train basic concept, (e) creativity stimulus.

2.4. Definition of Android

Android is software in mobile phone that currently used
by a lot of people in the world because it practic and modern.
According to Gargenta, android is a comprehensive open
source platform that was designed for a mobile device. [5]
Comprehensive platform is a complete software pile that
used in mobile device. So, android is specially made for
mobile phone.

According to Darcey and Conder, android is the first
complete mobile platform, open source, and graphics
software developed by comprehensive and complete
Software Development Kit (SDK) to develop the
powerfull aplication. In his opinion, Conder and Darcey
stated that android software is contained in most complete
mobile phone until now. [6]

Strength of android:
1) Multitasking. Android can working a lot of
programs in the same time without you close the
other programs.
2) Notification. Android always display the notification
on their home screen like SMS, Email, or newest
articles from RSS reader.
3) Accessable. From app store in android, the user can
download everything they want, and free.
4) A lot of varian smartphone
5) Rom can modified
6) Widget to make easier and faster setting
7) Google app has integrated with email

Weekness of android:
1) Internet connection always running
2) A lot of advertisement in aplication

2.5. Definition of Early Reading

Reading is the complex activity that involve visual
activity, thinking, psikolinguistic, and metacognitive. As a
visual process, reading is translate letters into verbal. Then,
thinking include word identification, literal comprehension,
interpretation, critical reading, and creativity comprehension.
Based on it, reading is complex activity involve many
activities that coordinated each other.

Reading is a vital activity to know about everything,
especially for student with hearing impairment that have
visual skill more than audio skill. According Learner that
copied by Mulyono said that reading is basic to master the
various field of study. If a child at the beginning of the
school not immediately have reading skill, they will
difficult to learn more. So reading is complex processing
activity involve the physic and mental activity that very
important to developing the academic skill of children.

Early reading skill is very important for academic
progress. There are three reasons according to Choate in
an effort to increase entanglement letters and early reading,
there is (a) that literate received with the sound of the proper
letters and knowledge about what the word, (b) early reading
is basic skill to reading comprehension, (c) early reading
skill very needed in academic learning in the school. [7]

According to Stahl that quoted by Santrock, early reading
helps students to identifying the words automatically,
text comprehension, and motivated to read and reading
operations. [8] Early reading skill is the first step to reach
whole reading competence. Early reading skill is the first
competence in school age that children must have,
because if student can not read, they have problem to
master the advance knowledge. Early reading skill means
identifying letter, word, and meaning of the word. There
were 6 steps in early reading. According Chard and Osborn,
the steps is (1) letter concept awareness, (2) sounds language,
(3) phemene awareness, (4) phoneme, (5) vocabulary, and
(6) read and the comprehension. [9]

3. Methods

This research use R&D (Research and Development)
method. Borg and Gall stated to preliminary study as the
needs analysis use descriptive method, and to development
video game use ADDIE (analysis, development, design,
implementation, and evaluation) method. This research
done in SLB (Sekolah Luar Biasa) Pangudi Luhur for student
with hearing impairment, in West Jakarta. Object of this
research is student with hearing impairment in Kindergarten.

Data analysis result of this research use qualitative
approach and use data triangulation technique based on
the result of observation, interview, and analysis data files.
Media development carried out with this steps : (1) an
analysis of the needs of early reading skill of children with
hearing impairment in special kindergarten, (2) Media
development were carried out based on the result of the
analysis of needed, need special media that is designed to
improve the early reading skill of children with hearing
impairment in special kindergarten, (3) Make design
learning media video game that appropriate with the
characteristic of children with hearing impairment in special
kindergarten, (4) the next step is validation.
Validation carried out by 3 experts, they were from media
expert, hearing impairment expert, and the expert of
technology. After validation, we testing to student with
hearing impairment in special kindergarten with the limited
sample, and then repaired media in line with the testing
until created the final product to suit the needs of in the
field, (5) Evaluation was the last step before products
disseminated, assessment the result of the implementation
of product that has tested. Is it an accordance with
children with hearing impairment needs, and is it effective
to use, or need some repairs.

4. Results

The result of this research to analysis what student needed
in early reading learning and the result of this research is:
1) Early reading skill of children with hearing
impairment in special kindergarten carried out by
conversation and use Maternal Reflective Method
2) Early reading skill children with hearing impairment started from identifying the word to syllable. For example, for the word “meja” you read “meja” and yo divided to “me” and “ja”.

3) Media that used in early reading learning is word card that filled the topic picture and under the picture, ther is a name of picture written as cursive.

4) Teacher of special kindergarten not use information technology when they taught, so learning situation is so monitone.

5) Learning media development to increase early reading skill is needed to teach children with hearing impairment in special kindergarten more variative, happier and get optimal scores.

Based on result of the research, analysis necessary in the field is learning media development is needed, early reading media exactly. Then researcher bargain early reading media learning, that is video game educative based android system use ADDIE models, and the steps is : 1) Need analysis to early reading skill for children with hearing impairment, 2) Media learning development designed by the analysis of need to increase early reading skill children with hearing impairment in special kindergarten, 3) Design of educative video game is according to characteristic children with hearing impairment in special kindergarten, 4) Implementation. Next step is validation. Validation carried out by 3 experts, they were from media expert, hearing impairment expert, and the expert of technology. After validation, we testing to student with hearingimpairment in special kindergarten with the limited sample, and then repaired media in line with the testing until created the final product to suit the needs of in the field, 5) Evaluation was the last step before products disseminated, assessment the result of the implementation of product that has tested known that educative video game will be effective work if there were teacher, parents, or the adult on children side.

5. Discussion

To overcome children with hearing impairment needs in learning early reading skill the researcher gives descriptions about early reading skill ability for children with hearing impairment in special kindergarten. Based on the result of this research need to develop learning media in learning early reading, this research set out to answer four questions 1. How early reading skill of children with hearing impairment in SLB-B DKI Jakarta? 2. How learning early reading skill of children with hearing impairment process in SLB-B DKI Jakarta? 3. What media use for the learning early reading skill of children with hearing impairment in SLB-B DKI Jakarta? 4. How to develop learning media video games educative based on android to increase children with hearing impairment needs early reading skill in SLB-B DKI Jakarta?

5.1. Children with Hearing Impairment Early Reading Skill.

The result of this research found that early reading skill in children with hearing impairment still on indentification vocabulary and pictures. Early reading skill ability is a first step that the children had to comprehend within to reading learning, including the children with hearing impairment. This identification is a first step in the process of early reading skill.

Vocabulary identification process is doing by matching the letters with the pictures, after that the children should be say that letters when the letters appear in their daily life children can read and know the meaning of the letters. In this identification process, commonly when the children can identifying vocabulary or picture so the children can say that.

Based on the result of this research found that process of identification vocabulary is doing by memories a type of word. Teachers should be true wrote a vocabulary because when the shape of the word is wrong, students with hearing impairment can not understand the meaning of the word.

Early reading children of hearing impairment in SLB B Pangudi Luhur Jakarta teach since Early Intervention. In this research showed the process and ability owned by children with hear impairment level Early Intervention in SLB B DKI Jakarta. First day in class Early Intervention commonly the children with hear impairment have not competention to reading and identifying vocabulary. Early reading learning start with conversation in school.

Conversation started when students say something spontaneously, then it will be topic for the conversation. And then teacher give directions the conversation in order to be a specific theme. So what be used as a conversation is what the student spontaneously said and other students can interested with the topic. Commonly the topic in Early Intervasion is about something around the students.

Topic in these conversation afterwards can be used by the teacher to develop conversation. Preparation conducted by dramaticalisation a vocabulary of, say a new vocabulary, and read together. Dramaticalisation a conversation by practically new vocabulary ( verb or event) and touch concrete things. After that, children were asked to say and teachers wrote on the board and ask children with hear impairment to read again or practices the new vocabulary. As a result of this as long as children can understand how to read words in a card, so that words belonging to them.

5.2. Learning Process Early Reading in Children with Hear Impairment

Based on the result of the research uses Maternal Reflektive Method children in kindergarten started learning to read by says something spontaneously and than teacher figure it out. Learning process to read in children with hear impairment according to Maternal Reflektive Method is; conversation in school, preparation conversation, read speech, and reflective learning. Conversation activity in school started by stimulation from teacher in order to make children one by one to say a new vocabulary, after that teacher write down the new vocabulary with pictures. All of the student with hear impairment have to participate in every conversation process. It is meant that students had a experiences.

The next level in early reading learning is word processing. Word processing could do with reading guidance and dramatize conversation substance. Word
Children with hear impairment uses identification card to learr early reading skill. Identification card obtained from newest vocabulary in everyday conversation. There is a picture and a word in identification card. Pictures is the most important thing that children with hear impairment used to learning early reading because they relying on the sense of visual third than the others sense that still function properly. Therefor, when learning early reading children with hear impairment always showed many different pictures in every vocabulary, for example: bag, there are many kind pictures of bag. The aim of this measure is children can get a lot of vocabulary that can belong to them. This could make more easier to learr early reading skill.

5.4. Product Development (Product Specification)

This product named Game Educative For Early Reading Learner. This games measuring about 43 Mb and designed in the android studio, photoshop software for the graphic and only can used in android operating system. This games designed for early reading learner specially for children with hear impairment. Content in this games is a words, pictures, sentences, and also compose a sentence. This games also contained sentences with hyphen that are characterize of children with hear impairment. A picture on this game they were followed by a syllable , so easy to understand. And in every word were followed by a sound for example in word car so they are voices car appears to.

On a menu composing sentence there is a pictures that can guide children to composing sentences properly. This is games there is more over 120 words from various category and 42 sentences practice which is devide into 7 categories. A category in sentence options is "my school, my environment, my self, colours, activity, fruits, and animals. This game is very simple to play, parent need to accompany so that early reading learning can do well. The following is step to play:

1)  Download and install from Playstore.
2)  Open games application.
3)  Choose "Word" menu for starts learning reading starting from words and syllable.
4)  Choose button to continue, use button to repeat voice in every word, and button to go back to display previously.
5)  Be sure to read all a word that is available until can be understood by the children.
6)  If the word menu has understood, next choosing menu and then select centences menu then choose category desired.
7)  Arrange sentence in a order of the picture on the coloums and than choose word that available.

5.3. Video Game Educative Uses For Early Reading Learning Process

Media is the important thing in learning process, according to Kemp and Dayton learning process requires an connections between a stimulus and the response. Stimulus is the message that contained early reading learning process material who will be transfer to children. To make it easy for delivering early reading learning process material we need a media.
1) Early reading children with hearing impairment in special kindergarten through the conversation with maternal reflective method.

2) Early reading skill children with hearing impairment started from identifying word to syllable. For the example we divided /meja/ to /me/ + /ja/.

3) Media that used in early reading learning is flash card that there were a picture and under the picture there is a letter of that picture. The letter use cursive.

4) Early reading learning in special kindergarten have not use information technology media learning, so the learning activity might be monotone and not enough variation.

5) Media learning development for children with hearing impairment use ADDIE model with the step: 1) Need analysis to early reading skill for children with hearing impairment, 2) Media learning development designed by the analysis of need to increase early reading skill children with hearing impairment in special kindergarten, 3) Design of educative video game is according to characteristic children with hearing impairment in special kindergarten, 4) Implementation. Next step is validation. Validation carried out by 3 experts, they were from media expert, hearing impairment expert, and the expert of technology. After validation, we testing to student with hearing impairment in special kindergarten with the limited sample, and then repaired media in line with the testing until created the final product to suit the needs of in the field, 5) Evaluation was the last step before products disseminated, assessment the result of the implementation of product that has tested known that educative video game will be effective work if there were teacher, parents, or the adult on children side.

Based the conclusion that have explained, advices from the researcher for teacher in special kindergarten is use educative video game to support learning process early reading children with hearing impairment, make a whole reading easier for children with hearing impairment. Beside that, teacher hoped be more creative to use learning media, so that students more enthusiast to learn early reading.

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