

**DEVELOPING DIGITAL GAME-BASED LEARNING MATERIALS TO
ENHANCE VOCABULARY MASTERY OF STUDENTS
WITH MENTAL RETARDATION**

(A Thesis)

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**MASTER IN ENGLISH LANGUAGE TEACHING STUDY PROGRAM
LANGUAGE AND ARTS EDUCATION DEPARTMENT
TEACHER TRAINING AND EDUCATION FACULTY
LAMPUNG UNIVERSITY
BANDAR LAMPUNG
2023**

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A Thesis

**Submitted in a Partial Fulfillment of
the Requirement for S-2 Degree**

in

**Language and Arts Education Department
Teacher Training and Education Faculty**



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ABSTRACT

DEVELOPING DIGITAL GAME-BASED LEARNING MATERIALS TO ENHANCE VOCABULARY MASTERY OF STUDENTS WITH MENTAL RETARDATION

By

Bungsudi

The research aimed to develop digital game-based learning materials to enhance vocabulary mastery of students with mental retardation (SwMR), namely Vocabulary for SwMR. The current research originated from the concept of learning which was closely related to teaching and technological developments. The researcher used ADDIE Model adopted from Branch. The research answered three research questions: 1) to what extent is the development of digital game-based learning materials needed to enhance vocabulary mastery of students with mental retardation; 2) how to develop of digital game-based learning materials to enhance vocabulary mastery of students with mental retardation; and 3) what the students' responses and the teachers' responses of the developed digital game-based learning materials to enhance vocabulary mastery of students with mental retardation are. The research sample was 10 students with mental retardation and an English teacher at SLB Wiyata Dharma Metro. The researcher utilized two data collection tools: questionnaires and interviews. The results of the research showed that students with mental retardation needed digital game-based learning materials to learn vocabulary. The results of media, material, and linguist experts on digital game-based learning materials were highly feasible and able to be applied. Based on the evaluating the use of digital game-based learning materials, it showed positive responses from both teacher and students.

Keywords: students with mental retardation, digital game-based learning materials, vocabulary

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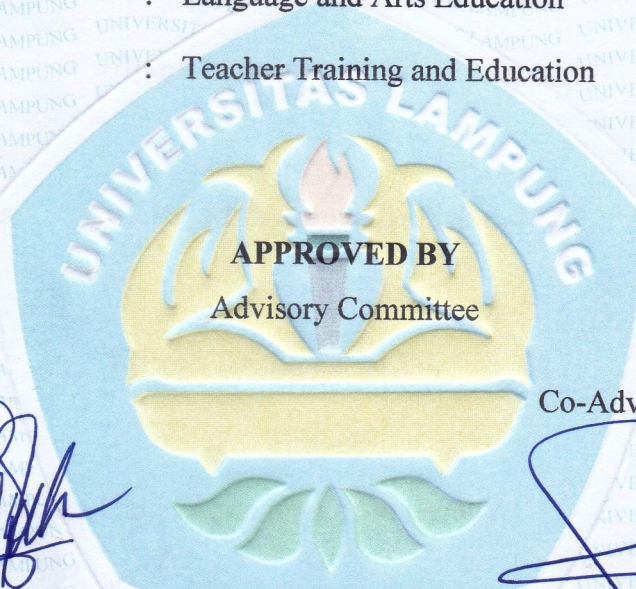
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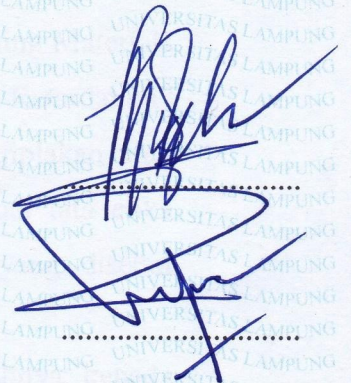
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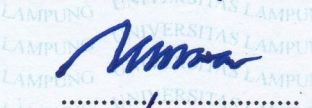
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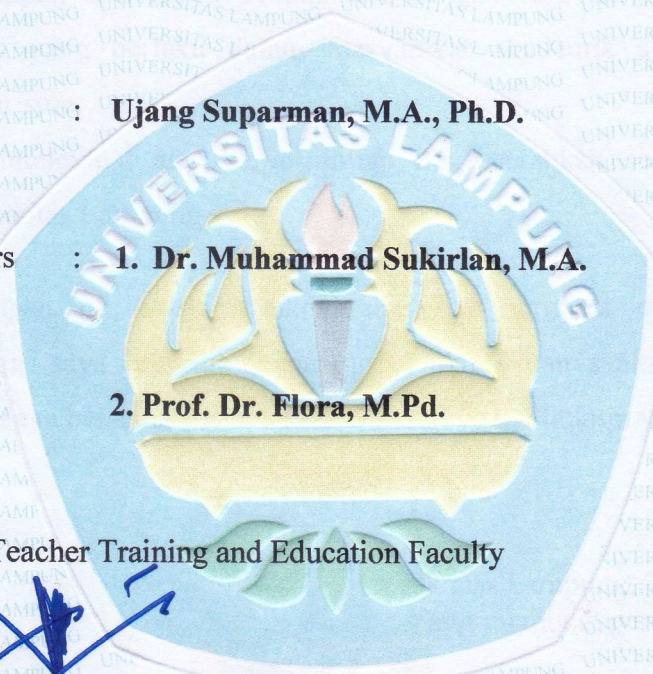
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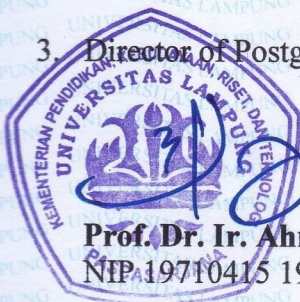


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The researcher is Bungсуди. He was born in Lawang Agung on January 02nd, 1993. He is the fourth child of Subarni and Anama. He has two brothers namely Ujang Supriyadi and Fauzi Malaya, and two sisters namely Listawati and Anisa. He started his study at SD Negeri 01 Lawang Agung. Then, he continued his study at SMP Negeri 02 Muaradua Kisam. And he took his senior high school at SMA Muhammadiyah 01 Muaradua. Next a year, he ran his undergraduate at Universitas Muhammadiyah Metro in 2012. In this university, he took English Educatuon Department and graduated in 2016. After 3 years later to be precise in 2019, he carried on Lampung University. He took Master's Degree in English Language Teaching.

DEDICATION

I would like to dedicate this thesis to:

1. Allah Subhanahu wa Ta'ala as one and only God in the world who has guided me to finish this thesis;
2. My beloved father and mother;
3. My precious brothers and sisters;
4. My big family in Lawang Agung Village;
5. My second family in Metro Town;
6. My advisors of Master in English Language Teaching of Lampung University;
7. My best friends of Master in English Language Teaching of Lampung University.

MOTTO

"Sebaik-baik Manusia Adalah yang Paling Bermanfaat bagi Manusia."

(HR. Ahmad, ath-Thabrani, ad-Daruqutni. Hadits ini dihasankan oleh al-Albani di dalam Shahihul Jami' No:3289)

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I. INTRODUCTION

This chapter discusses some important parts of an introduction section such as problem background, research question, research objectives, research scopes, definition of terms, the expected product specification, and development assumptions and limitations.

1.1. Problem Background

Special students with mental retardation are called students with mental retardation (US; mental retardation, UK; mentally retarded, while in New Zealand; intellectually handicapped and The United Nations (UN); mentally retarded or intellectually disabled.). Students with mental retardation are a classification used to determine individuals with IQs ranging from 50-70 (Hallahan et al., 2020). They have an intelligence below average accompanied by the inability to adapt to the behaviors that arise in the course of development. It is a condition before the age of 18 years characterized by a weak intelligence (usually the IQ score below 70) and difficulty adapting to everyday life. The main characteristic of it is weak intellectual function. In addition to the low intelligence of students with mental retardation is also difficult to adjust and develop. They are regarded as people who cannot master an age-appropriate skill and do not take care of themselves. The learning process for them is aimed at self-development and socialization, developing students' academic ability optimally to be independent in life, preparing learners to have the

basics of intelligence, knowledge, personality, and noble character, providing learners to continue the education level further and preparing learners to socialize in the community.

Mental retardation is incomplete mental development. Mentally retarded persons are the whose normal intellectual growth is arrested at some time before birth, during the birth process, or in the early years of development. Many reasons why a child may have learning difficulties in the research entitled “Mental Illness and Mental Retardation” (Mir et al., 2022). They argued that all slow learning children should be studied by a psychologist who can determine if referral to other specialists is needed. What can seem to be mental retardation might actually be a hearing or speech impairment or a visual problem, the majority of which might be identified and treated by speaking with the right specialist. Emotional disturbances might also cause learning issues. The diagnosticians should be able to distinguish between issues caused by a lack of normal development, a physical handicap, or disrupted mental functioning through an examination of the child's growth and development and the application of highly specialized techniques by the examining team. The slow learner might be mentally challenged.

Enriching the learning resources of students with mental retardation can increase their chances of learning better just as normal individuals do. Providing good education shall expand their horizons, draw respect from others and create an inclusive atmosphere that is free from discrimination. It is confirmed by article 130 Government Regulation No. 17 of 2010 states that: 1) Special education for students with disabilities can be held on all paths and types of education in primary and secondary education, 2) The implementation of special education can be done

through special education, general education, vocational education and/or religious education units, and 3) Further provisions concerning special education programs in special education, general education, vocational education, and/or religious education units as referred to in paragraph (2) shall be regulated by a Ministerial Regulation.

Furthermore, in the research entitled “How to teach students with moderate and severe intellectual disabilities in inclusive and special education settings: Teachers’ perspectives on skills, knowledge and attitudes” appears some key points to teach students with mental retardation (Weiss et al., 2018). The first, key skills for implementing individualized and differentiated teaching include preventing idling by ongoing improvisation, continuously offering learning opportunities so that no student has to wait, and creating diverse and individually adapted learning materials. The second, as cooperation inside and outside the school often leads to conflict and is influenced by divergent opinions, leadership and counselling abilities are required to ensure successful collaboration between different actors by clarifying roles and hierarchies and by negotiating work distribution, expectations and needs. The third, the teacher–student relationship must be based on appreciation, openness and, in particular, a focus on the positive, regardless of the student’s behavior; to achieve that, distance and closeness to students must be balanced. The last, in the longer term, teaching this student population requires one to take care of one’s own mental and physical health.

Becoming the one of basic languages, vocabulary has an important role in learning languages. Unfortunately, many learners feel hard to learn it. It takes some time to learn the different vocabulary of different languages and use them according

to their intended meaning and purpose. Learning English will be as difficult as other native languages without constant practice and actual use and most especially if there are physical, biological/genetic impediments and restrictions beyond the control of medical science. However, environmental exposure may directly influence the speed and accuracy of learning the English language, the support of the family, the community, the media, the educational tools, the support of organizations, and the culture itself.

As one of language components, vocabulary is the basis for a person to be able to speak. Mastering vocabulary is the learner's necessity to understand reading materials, conversation, or articles in the English language (Thornbury, 2002). Without vocabulary, nothing can be conveyed. Therefore, vocabulary is crucial in learning English because by having the vocabulary, students especially learning English as a foreign language can use English easier. When a student has a limited vocabulary, they cannot learn English perfectly because they are stuck to uttering the vocabulary. Vocabulary learning is central to language learning, whether the language is first, second, or foreign recent years specialists now emphasize the need for a systematic and principled approach to vocabulary by both teacher and the learner. Therefore, without mastering enough vocabulary, it would be impossible for people to reach the goal (Thornbury, 2002).

Moreover, students must learn and use thousands of new words in their various subject discipline studies and they are required to perform complex tasks using new vocabulary (Thornbury, 2002). In preparation for the 21st century, the students in Indonesia would have acquired the competence in speaking the English language despite the limited lessons which are given once a week. But because of

exposure to media and various communication platforms like TV, social media, books, journals, and communication networks, vocabulary competence in English shall be manifested among Indonesian citizens despite having varied cultures, ethnicities, beliefs, religions, races, and physical and psychological make-up.

Despite the availability of learning avenues in increasing vocabulary competence, Indonesians feel inferior in speaking the English language though understandably, English is a foreign language to Indonesians. Much support is therefore needed from the stakeholders of the school, family, and community especially those with special needs in learning basic English vocabulary. English vocabulary must be seen at the macro level as a potential factor for increasing communicative competence because the communication barriers had already been reduced by globalization. The increasing demand for the workforce is evident worldwide as communication facilities converge people worldwide despite physical boundaries.

One important and potential workforce in Indonesia is that belong to the group of people that needs special attention and whose world is different from those exposed to regular environments known as mental retardation. The question is, will learning vocabulary make the students that need special attention better? Will English vocabulary empower themselves? Will English vocabulary change their lives? The answers are yes.

In case of correlating the students with mental retardation to vocabulary mastery as one of the language components to learn English as a Foreign Language, they need special methods or media that make them are easy to study. In this

research, the researcher developed digital game-based learning materials to facilitate their learning process being well. The statement is supported by the research of Singh & Agarwal (2013) entitled “Teaching Mathematics to Children with Mental Retardation using Computer Games.” They use an experimental design by involving 18 students with moderate and mild mental retardation who were in the chronological age range of 6 to 16. The result showed that the students taught with the help of computer games produced significantly greater remediation of Mathematics skills as compared to the group taught through the conventional method of teaching. It means that computer games produce a greater gain in Mathematics concepts among children with mental retardation.

Aside from that, the research is also promoted by the research of Rahimi & Donyaie (2016) entitled “Towards a better way to teach and promote mentally retarded EFL learners’ vocabulary learning and retention.” They take 32 students with mental retardation in Sanandaj, Iran as the subjects. The researchers divided them into two groups in which the first group was taught through flashcards on which the pictures of the words are depicted and the second group was taught through translation into their L1 which is Kurdish. After the treatments, which takes about five weeks, the participants take a vocabulary post-test. Two weeks later another vocabulary post-test was administered to the participants to investigate the long-term effect of the vocabulary learning strategies. The results show that there is a significant difference between the effectiveness of the two vocabulary learning strategies. They stated that the group that learns vocabulary via pictures outperformed than the other group in both post-tests.

Digital game-based learning materials are a game containing vocabulary which has 8 categories such as things in the class, animals, fruits, transportation, kitchen tools, vegetables, solar system, and numbers. The vocabularies are designed colorful both in terms of fonts or its pictures. The colorful pictures presented by the teacher can attract students' interest in the class (Afriyanda, 2020). Students can get a lot of new information in the game which brings the learning process becomes more interesting. When students are interested in learning, they find a way or try to know more and master it. Interest takes an important part in the learning process because it can affect students to do something that they are interested (Hadi & Lestari, 2021). Their learning vocabulary is more effective when they are interested.

The digital game-based learning materials are thought to enhance students' learning motivation. Motivation is a complicated aspect of human psychology and behavior that impacts how people choose to spend their time, how much energy they put into any particular task, how they think and feel about the task, and how long they stick with it (Bakar, 2014). Motivation can be influenced by a variety of elements, including student requirements, interests, and enjoyment, as well as the teacher, the teaching technique, and the learning environment (Filgona et al., 2020). Motivation is crucial because it encourages students to think, concentrate, and learn efficiently by stimulating and energizing them. Some elements that must be considered by the teacher while enhancing student motivation are setting a clear aim, demonstrating the necessity for the lesson, stimulating and keeping learners' interest in the lesson, and enhancing the likelihood of success.

In this context, some students with mental retardation at eighth-graders in one of the Outstanding Schools in Metro Town named Sekolah Luar Biasa (SLB)

Wiyata Dharma have difficulty in learning English. They often have difficulty expressing meaning in simple short transactional conversations. They are even reluctant to offer goods or refuse them from their friends in English. It is caused they do not know how to say it in English. The primary question is their lack of vocabulary. Two factors cause their lack of vocabularies such as linguistic factor and non-linguistic factor. Linguistic factor talks about language natural difficulties where the students can not differ their mother tongue language and foreign-language neither its styles nor structures. While non-linguistic factors can be seen through two sub-factors like external and internal factors. In external factors, the weak of students' vocabulary mastery relates to teaching material, method, classroom atmosphere in their school or the weak support from their family and their environment. Deeper on that, the internal factor can be their main trouble such as their IQs which ranges 50-70 often drives them is difficult to catch the core of the learning process they follow. Besides, the lack of motivation, interest, and attention can be part of their difficulty causes to mastering vocabulary.

The statements above are in line with the survey data gained from the school. The English teacher frequently uses limited learning media in teaching learning process. The media are often used are Video and Colorful book. In other hand, the average score for the English report cards of 10 students at SLB Wiyata Dharma in the odd semester of 2022 is 75. The detailed information of score hiring are that there are two students have score 77, one student get score 76, and five students left gain score 74. Consequently, they need more treatments to awaken their willingness to master English. The researcher tries to solve it with digital game-based learning materials as one of the solutions. The researcher did a research

entitled “The Development of Digital game-based learning materials to Enhance Vocabulary Mastery and Learning English Motivation of Students with Mental Retardation.” The research wants to seek whether or not the digital game-based learning materials can enhance vocabulary mastery and learning English motivation of students with mental retardation.

1.2. Research Questions

From the problem background above, the research questions are formulated as follows:

- a. To what extent is the development of digital game-based learning materials needed to enhance vocabulary mastery of students with mental retardation?
- b. How to develop of digital game-based learning materials to enhance vocabulary mastery of students with mental retardation?
- c. What are the students’ responses and teacher’ responses toward developing digital game-based learning materials to enhance vocabulary mastery of students with mental retardation?

1.3. Research Objectives

The researcher determines the research objectives as follows:

- a. To reveal the extent to which the development of digital game-based learning materials is needed to enhance vocabulary mastery of students with mental retardation.

- b. To disclose the developing of digital game-based learning materials to enhance vocabulary mastery of students with mental retardation.
- c. To find out the teachers' responses and experts' responses toward developing digital game-based learning materials to enhance vocabulary mastery of students with mental retardation.

1.4. Research Scopes

The scopes of the research are described to explain some important information about the research. The research is about to focus on the development of the digital game-based learning materials to solve vocabulary learning difficulties among students with mild, moderate, severe, and profound mental retardation in Sekolah Luar Biasa Wiyata Dharma (a special school for students with mental retardation) that is located in Jalan Banteng No.22 A, Metro City, Lampung, Indonesia. The involved students are from the eighth graders of Class C in SLB Wiyata Dharma of 10 students. They are 4 male students and 6 female students. While their age ranges from 15-to 21 years.

1.5. Definition of Terms

The research has several terms that are explained to make a good direction in conducting the research. Here are the definitions of terms that the researcher serves:

- a. Vocabulary is a collection of words or phrases usually alphabetically arranged.

- b. Digital game-based learning materials are a game that contains vocabulary which has 8 categories such as things in the class, animals, fruits, transportation, kitchen tools, vegetables, solar system, and numbers. The vocabularies are designed colourful both in terms of font and its pictures.
- c. Students with mental retardation are students characterized by below-average intelligence or mental ability and a lack of skills necessary for day-to-day living.

1.6. The Expected Product Specification

The product development in the research has the specifications as follow:

- a. The product development in the research is an application of the digital game-based learning materials for students with mental retardation. It is named 'Vocabulary for SwMR' which can be accessed using Android with a minimum system memory requirement of 1 GB RAM.
- b. Digital game-based learning materials discuss English vocabulary learning which displays colorful pictures and words accompanied by the sound of the pronunciation of the letters. Then students were presented with a guessing game or jumbled words. The students were asked to arrange the letters that have been provided to become corrected words that match with the pictures.
- c. The material in the product refers to the core competencies and basic competencies of Sekolah Menengah Pertama Luar Biasa Tunagrahita (Extraordinary Junior High School for Mental Retardation) for English subject, namely:

Core Competencies 3:

“Understanding factual knowledge by observing [hearing, seeing, reading and asking questions based on curiosity about himself, God's creatures and their activities, and the objects he finds at home, at school, and at the playground.”

Basic Competencies

3.1 Identify social functions, text structures and linguistic elements to express numbers according to context.

3.4 Identify text structures and linguistic elements to carry out social functions in stating and asking the number of objects found at home and at school, according to the context of their use.

In addition to the two basic competencies, the game contains several other materials related to students' vocabulary needs.

- d. The Vocabulary for SwMR application development process uses software called Unity which is designed to develop games with simple coding.
- e. The Vocabulary for SwMR application can be accessed offline.
- f. The initial game displays a loading bar display and ‘Play’ button to start the game.
- g. The next screen is a selection menu consisting of 'Belajar' and 'Bermain' to start playing the game.
- h. The Vocabulary for SwMR application presents 8 categories of vocabulary that can provide basic vocabulary knowledge for students such as: things in the class, animals, fruits, transportation, kitchen tools, vegetables, solar system, and numbers.

- i. The Vocabulary for SwMR application also provides a quiz with 10 questions for each category where at the end students can see the number of correct and incorrect answers.

1.7. Development Assumptions and Limitations

It is necessary to state some assumptions and limitations of the development. The assumptions and limitations of the development are as follows:

a. Development Assumptions

There are several assumptions in developing the digital game-based learning materials 'Vocabulary for SwMR', namely:

1. The process of teaching and learning activities to be better and more effective;
2. Students become more active, communicative, and not shy in doing when they want to do something;
3. By applying games in learning activities can help students understand the subject matter;
4. Improve students' abilities in terms of coordination, communication, and cooperation;
5. The game does not internet plan to operate;
6. The students can learn the vocabulary anytime and anywhere.

b. Development Limitation

There are several limitations in developing the digital game-based learning materials 'Vocabulary for SwMR', namely:

1. The application access is limited to Android users with a minimum RAM requirement of 1 GB.
2. Game access can only be run in offline.
3. Games are limited to single player.
4. The game application contains 8 categories of vocabulary as teaching material.
5. The educational game application is not yet available on the play store.

II. LITERATURE REVIEW

This chapter explores some main sub-chapters which are necessary for having this research. Those are the review of related literature and theoretical assumption.

2.1 Review of Related Literature

The researcher presents some theoretical reviews to support the research scientifically. The theory provides researchers with multiple perspectives to investigate complex and social problems and provides a framework for focusing and analyzing various aspects of data (Reeves et al., 2013). Based on that statement, theory consists of a statement, argument, and logical opinion as for the language phenomenon explanation. Here are some concepts that used by the researcher; they are the concept of vocabulary, digital game-based learning materials, and mental retardation.

2.1.1 Vocabulary

As a foreign language for Indonesian, learning English is like constructing a traditional building (Susanto, 2017). English as a second language (ESL) and English as foreign language (EFL) learning vocabulary items plays a vital role in all language skills (i.e., listening, speaking, reading, and writing). It means that all the skills in learning English need the existence of vocabulary as the crucial

foundation in building English mastery. It is like the bridge to send the knowledge in English, so the information is sent and received clearly. For much of the last half-century, therefore, the consideration of vocabulary in the process of language learning, testing, and teaching appears to have been sidelined. Vocabulary is used to express ideas, feeling or thinking, or information to people. In other words, vocabulary is important in doing both spoken and written communication. It represents complex and, often, multiple meanings. Furthermore, these complexes, multiple meanings of words need to be understood in the context of other words.

Vocabulary is one of the components in learning English as a foreign language, especially in Indonesia. Learners cannot express an idea or opinion without knowing it well. Mastering vocabulary is a learner's necessity to understand reading materials, conversations, or articles in English. We can underline that most of the people in Indonesia who learn English as a foreign language believe that vocabulary is part of mastering English which every single student can learn in the formal class such as in school, an informal state such as in English course. It is not irrational; we know that Indonesia consists of 652 local languages (Kemdikbud.go.id, 2018) that spread from the West until the East of Indonesia; precisely 34 provinces exactly. Most of the people use the local language as the mother tongue, Bahasa Indonesia as the second language, and English as the foreign language.

In learning English vocabulary, there is systematic instruction between the teacher and the students inside or outside the class. Regularly, the teacher and the students learn together to master the vocabulary based on the curriculum, syllabus which is developed by the education ministers and the lesson plans have been

determined before consciously with the ordered learning strategies, method, and evaluation. Hence, it can be emphasized that English vocabulary learning is a conscious process of grabbing English vocabulary systematically that is usually done by the interaction between students and the teacher to create a sustainable education process. Moreover, the students employ different forms of memory strategies such as pictures, linking the new word with a group of other words which relates to it, therefore consolidating the newly learned word (Yaacob et al., 2019). It means that the importance of strategy in learning English vocabulary took a part of the mastery to earn vocabulary in students' memories. English vocabulary learning is an important side of foreign language learning as the meanings of new words are very often considered, whether in books or classrooms (Alqahtani, 2015). Vocabulary is the main part of language teaching and is of the highest importance to students.

Learning vocabulary is hard work, an attempt is required to understand, produce and manipulate the target words (Derakhshan & Davoodi Khatir, 2015). Learning vocabulary is important for learning the English language, vocabulary is essential for speaking more than other language skills, it believes that learning vocabulary is difficult while they face the challenge by repeating the new word until they learn it (Hassan & Abubakar, 2015).

2.1.2 Aspect of Vocabulary

The first step in learning vocabulary is to figure out what it means to know a word (Schmitt, 2007). Schmitt claims that more knowledge is needed to fully master a word and to be able to use it in any situation the student wants. Knowing

a word at its most basic level entails understanding its form, meaning, and application (Nation, 2001). Some aspects involved in knowing the word according to (Nation, 2001) are as follows:

Table 1.1 Aspects of Vocabulary

Form	Spoken	R	What does the word sound like?
		P	How is the word pronounced?
	Written	R	What does the word look like?
		P	How is the word written and spelled?
	Word parts	R	What parts are recognizable in this word?
		P	What word parts are needed to express the meaning
Meaning	Form and meaning	R	What meaning does this word form signal?
		P	What word form can be used to express the meaning?
	Concept of referents	R	What is included in the concept?
		P	What the items can the concept referto?
	Associations	R	What other word does this make us think of?
		P	What other words could we use insteadof this one?
Use	Grammatical function	R	In what pattern does the word occur?
		P	In what pattern must we use the word?
	Collocation	R	What words or types of words occurwith this one?
		P	What words or types of words must weuse with this word?
	Constrains on use (register, frequency,..)	R	Where, when and how often would weexpect to meet this word?
		P	Where, when and how often would weuse this word?

Source: (Nation, 2001)

Information:

R = receptive knowledge

P = productive knowledge.

Based on the previous explanation, the students' learning a language must have a grasp of how to find out the meaning of the words they use or receive by considering crucial vocabulary features.

2.1.3 Teaching Vocabulary

Vocabulary is the basis in learning a language. Without mastering vocabulary, speakers cannot communicate properly both orally and in writing. Therefore, it is important to master vocabulary for foreign language learners. Vocabulary is something people have to learn and develop throughout the lives because it is an infinite skill. The straightforward idea of word form is used to determine the number of words in the texts, and word counts were based on how many different words appeared in the text, regardless of capital letters (Sutarsyah, 2021). There are two main types of vocabulary: active and passive (Nordquist, 2019). An active vocabulary is the words students understand and use in regular speech and writing that make up our active vocabulary. Passive vocabulary is made up of terms that the students recognize but don't use in daily conversation. Because it is the basis, mastery of vocabulary needs to be emphasized in the teaching and learning process in the classroom. Teaching is guiding and facilitating learning, enabling the learner to learn, setting the condition for learning (Brown, 2006).

The effective vocabulary instruction within the 6M learning framework includes opportunities to motivate, model, master, magnify and maintain vocabulary knowledge with meaningful feedback guiding the sequence of learning (Ankucic, 2019). The concept behind word frequency is that students should have a minimal learning burden and a maximum learning outcome (Sutarsyah, 2021). In teaching vocabulary, teachers are expected to deliver learning well. A teacher should be able to make the students master their vocabulary. In designing vocabulary learning activities, the researcher tried to start the learning process by introducing things in the classroom. It was contextual learning where students could

see the objects they were learning directly. Then, the researcher might introduce other objects they like, for example, fruits, things in the class, etc. The following are the steps of teaching vocabulary in using digital game-based learning materials:

a. Pre-activity

In this step, the researcher conditioned the students with mental retardation in the class:

1. The researcher greeted the students and asked how they were doing.
2. The researcher explained the material that students learned.

b. Main-activity

1. The researcher lent them a smartphone
2. Students operated it by following some instructions of the researcher.
3. The students open the application 'Vocabulary for SwMR' and click 'Play' button, and then they click menu 'Number'.
4. The students were asked to repeat and memorize 'the Vocabulary of Number' that they found on the application one by one.
5. When they had done with one vocabulary, they could click 'Next' button to do so to another word.
6. When they had mastered all the vocabulary, the students were asked to click 'Home' button and click 'Play' button.
7. The students chose and click menu 'Number.'
8. The students were asked to rearrange the jumbled words.

d. Post Activity

Then, the students were instructed to ask the number of things in the class to their seatmate, for example: How many pens do you have, how many desks is in the class, etc.

2.1.4 Mental Retardation

Mental retardation is a lifelong condition in which one's mental development is impaired or inadequate. Mental retardation is defined by three criteria: considerably subaverage intellectual performance, concurrent and associated deficits in two or more adaptive skill domains, and manifestation before the age of eighteen. Mental retardation is a condition in which mental development does not take place normally. As a result, there is an inability in the intellectual field, willingness, feeling, social adjustment, and so on, and the risk is this condition influences the cognitive or learning process (Wardany & Choiri, 2017). Students with mental retardation experience lag in the learning process and adjust to the surrounding environment. The lag is triggered by a mind that is not well developed with an IQ score that develops below the average of other normal students. Learning is given in various ways that are more effective by paying attention to special circumstances. Mental retardation is the condition of the limitations in intelligence that makes children are indicated as it feels difficult to follow education programs in ordinary schools classically, therefore mentally retarded students require special education services that is suitable with the ability (Somantri, 2006). Usually, the IQ score of mentally retarded students is below 70. The condition makes them in problems in mental capability as in adaptive activities, which they are difficult to

adapt activities to everyday life. They cannot master an age-appropriate skill because of the lack of cognitive (IQ).

2.1.5 Learning Media

Learning media acts as a source of learning for learners (Cahyadi, 2019). Learning media serves as a communicative tool, it also serves as a source of motivation, meaning, equality of perception, and individuality because it caters to a variety of interests and learning styles (Sanjaya, 2016). Learning media is anything that may be utilized to efficiently and effectively disseminate and spread messages from a source in a planned manner to create a conducive learning environment and stimulate the learning process (Angkowo & Kosasih, 2007; Aqib, 2015; Munadi, 2013). Learning media attempts to teach a broad range of skills, not just in connection to the text, but also in the other symbolic systems of images and sounds (Buckingham, 2007). Learning media is divided into 6 types, namely: text, audio, visual, motion, real objects and models, and people (Marpanaji et al., 2018). The combination of text, audio, visual, and real objects and models can be in the form of learning games that are considered effective to present interesting learning media for students.

a. Game-Based Learning

Game-based learning has become increasingly popular in recent years. A game is a system in which players engage in an artificial conflict, defined by rules, that results in a quantifiable outcome (Salen, Katie; Zimmerman, 2003). Games are facts that are analyzed to understand behavioral processes in games; each decision choice in acting or saying

becomes a conclusion as learning to produce oneself (Dananjaya, 2010). Meanwhile, teaching is an art that includes knowledge, presentation, the art of dissemination, and above all paralinguistic aspects. Teaching demands broad knowledge of the subject matter in all areas, a comprehensive curriculum with standards, a positive and caring attitude with enthusiasm, a desire to learn classroom management techniques, and a desire to make a difference in the lives of young people (Kumar, 2017). Game-based learning materials are a game that contained learning material to replace the books' function in the teaching and learning process. recently, the potential of game-based learning for supporting collaborative learning has been increasingly discussed, especially because of the widespread use of massively Multiplayer Online Games (Steinkuehler, 2004). The game-based learning materials are believed to be able to facilitate the learning process becomes more interesting and fun as the students have good motivation to master the material.

The statements are supported by some previous researches that use the games as learning materials or learning activities as research conducted by Liu et al (2020) entitled "Using the Concept of Game-Based Learning in Education." They argued that the students who were taught by using game-based learning and gamification applied showed an increase in learning motivation and attraction. The students gave their efforts to understand the material studied, and also showed significantly higher learning results compared to the students of other classes (Liu et al., 2020). They employ the simplest gaming applications, which are brief gaming apps with simple graphics and game mechanics, that were made using JavaScript. Each game

is based on classroom activity and can be utilized in the classroom as well as at home on mobile devices or computers to learn information. The course content is presented in the form of animated infographics, and there are various "missions" to complete. The solving of game problems needs a thorough understanding of the subject. The scripting language is chosen with care to make the software adaptable to any platform. The game is browser-based, and the content could be readily updated depending on the program for studying a particular subject or if the teacher wants to add new information.

Meanwhile Stiller & Schworm (2019) in their article “Game-Based Learning of the Structure and Functioning of Body Cells in a Foreign Language: Effects on Motivation, Cognitive Load, and Performance” opine that the gaming group reported a higher level of interest, challenge, and anxiety of failing after introducing the task. Aspects of motivation are assessed before and after studying and gaming, the cognitive load is rated during and after learning, and the level of performance is measured before and after studying (Stiller & Schworm, 2019). Results point to gaming and English expertise as two mediating factors for learning success with educational games. They use CellCraft v. 1.0.1 for gaming based on the following two criteria: (1) The game should have a high level of ecological validity and be web-based, allowing anyone to play it. (2) In terms of programming, inventiveness, and factual accuracy, the game should also meet a high standard of excellence. Carolina Biological Supply Company, based in the United States, has been providing science education materials around the world since 1927. It's designed to run on Adobe Flash.

The future of game-based learning seems promising (Mihaljević, 2017). It is found in his article entitled “Creation and Use of game-based learning material.” He concludes that several games were created as a fun way to help students learn languages (Croatian, German, Latin) as well as basic Computer Science facts (recognize the parts of a computer). Even the results of the pilot study show that there is an interest in game-based learning among high school students. Good cooperation between programmers, designers, and teachers should be built or teachers on how to design and create games for their subjects is the best solution (Mihaljević, 2017). At the current time, technology is becoming more available and easier to use so that in a few years many teachers may be able to create their game-based learning resources.

b. The Strengths and Weaknesses of Game-Based Learning Material

With its potential to provide interesting and motivating training experiences for learners, game-based learning has shown to be an excellent training solution for businesses. Immersive learning experiences and experiential learning are fostered through games. Students have a greater understanding of knowledge, tools, and materials because of the interactions provided by the games. As a result of the advantages, more businesses are turning to game-based learning. But, like anything worthwhile, game-based learning has its strength and weakness:

The Strengths of Game-Based Learning Material

Games can have a good impact on students in the learning process in a variety of ways, including:

1. Help students in learning problem-solving

The students can use game-based learning to solve problems by developing abilities such as comprehending causation, logic, and decision-making that they can apply outside of school (Nisbet, 2021).

2. Encourage students to think critically

Students' critical thinking skills can be improved through game-based learning, which includes the development of individual beliefs before engaging in collaborative discourse and opportunities for guided reflection (Cicchino, 2015).

3. Increase students' motivation and engagement

Students become more interested and motivated to learn when teachers add game-based learning components such as feedback, choice, and collaboration into their instructional design (Serrano, 2019).

4. Meet the education of students with special needs

Students with autism was more effective and motivated when employing computerized games for academic sessions, which helped steer education, create a good environment, and generate academic success (James, 2020).

The Weaknesses of Game-Based Learning Material

Some weaknesses of using digital game-based learning materials in teaching are explained by (Adams, 2017), (Nisbet, 2021) such as:

1. The attention of the learner moves from learning to winning, especially if the rewards become more significant.
2. Reduces the value of collaboration and exchange of ideas.
3. Too much time spent in front of the screen is unhealthy.
4. Games aren't usually made in the same way.
5. Games can be a source of distraction; nevertheless, they do necessitate a technological learning curve.
6. Doesn't take the role of established learning methods.
7. Not always in line with teaching or learning objectives.

2.1.6 Digital game-based learning materials for Students with Mental

Retardation

In this context, the researcher developed digital game-based learning materials of vocabulary for students with moderate and mild mental retardation. The digital game-based learning materials are designed simplest to provide some vocabularies to help students with mental retardation in SLB Wiyata Dharma. The learning game is developed using Unity. It can be run through Android (Mobile). The learning game is perfect for beginners. The light material on nouns is developed by combining pictures, spelling letters, pronouncing words, accompanied by their meanings. Some steps in vocabulary learning, namely: (1) listening to the words, (2) pronouncing the words, (3) understanding the meaning, (4) making illustrations in the form of a sentence, (5) doing practice in expressing the meaning, (6) pronouncing the words in a loud voice, and (7) spelling the words (Smith, 1969). Hence it can make students with mental retardation more interested

in learning vocabulary The learning game consists of vocabulary which has 8 categories as things in the class, animals, fruits, transportation, kitchen tools, vegetables, solar system, and numbers. The vocabularies are designed colorful both in terms of font and its pictures. Students with mental retardation prefer colorful learning materials. The teacher should present learning materials using calming and cool colors for hyperactive students with mental retardation and learning materials with bright colors for hypoactive ones (Novita, 2014). It can increase their passion and enthusiasm in communicating and interacting.

a. The Procedure of Operating the Digital game-based learning materials

Here are the steps of using game-based learning material to enhance vocabulary mastery of students with mental retardation:

1. The students operate their android and click the application named “Vocabulary for SwMR”
2. The students will find the button “play” to start the game and symbol “x” to close the game application;
3. After they click the button “play”, the students will see three buttons such as “Belajar” to start the learning process of vocabulary, “Bermain” to measure their understanding of their knowledge of vocabulary they have learned, and “Backspace” to go back to the previous menu;
4. Then, the students have to click the button “Belajar”.

5. The students will find 8 categories of vocabulary that they will learn like: things in the class, animals, fruits, transportation, kitchen tools, vegetables, solar system, and numbers.
6. After the students click one of 8 categories, they will see one word in English and Bahasa Indonesia on the right side, and the picture of the word on the left side. They will be led to spell the letters one by one, and the way to pronounce the word completely.
7. If they have memorized the word, they can click the button “>” to go to the next word.
8. The learning process can be at the school or when they are at their home.
9. If they have memorized all words of 8 categories, then they are asked to click the button “home” and click the button “Bermain.”
10. To make sure that they have known the vocabulary, they are asked to do a jumble word task. The menu presents the picture related to the word that they should answer, the box, and the random letters. The students should arrange those random letters into the word related to the picture.
11. Last, the students are asked to do the vocabulary test as many as 10 questions. After they do the task, they will get their score at the end section.

b. The Strengths and Weaknesses of Digital Game-Based Learning

Materials

There are some strengths in using the digital game-based learning materials to enhance vocabulary mastery of students with mental retardation:

1. The process of teaching and learning activities to be better and more effective;
2. Students become more active, communicative, and not shy in doing when they want to do something;
3. By applying games in learning activities can help students understand the subject matter;
4. Improve students' abilities in terms of coordination, communication, and cooperation;
5. The game does not internet plan to operate;
6. The students can learn the vocabulary anytime and anywhere.

Otherwise, the digital game-based learning materials have some weaknesses in the teaching and learning process, such as:

1. Not all students bring the android to the school;
2. There are only a few types of quizzes; hence the students play it continuously, it is feared that they will get bored with the pattern.

Nevertheless, the weaknesses can still be handled in the following way:

1. The teacher confirms to the students' parent to permit their children bringing their android to the school. The teacher/researcher should explain the android that their children bring is to support learning process.
2. The teacher should prepare another media to support the learning process in other meeting. It derives the students to not bore in operating the games in the learning process in a semester.

2.2 Theoretical Assumption

In teaching English, it is necessary to arrange teaching-learning situations where students feel safe, fun, and full of problem-solving. The teaching and learning process adapts it by presenting a learning game that can build a new learning atmosphere. Digital game-based learning materials are a learning game that can help students master vocabulary in a fun and interesting way. Students were spoiled with more interesting learning activities by operating digital game-based learning materials while in class or at home. Students become more interested and motivated to learn when the teacher asks them to operate a learning game equipped with colorful pictures and fonts plus the pronunciation of the correct word. With the statements, the researcher assumes that the digital game-based learning materials can increase students' vocabulary mastery.

III. METHOD

In this chapter, the author explains the crucial things in conducting the research. They are research design, variables, population and sample, research instruments, criteria for evaluating learners' vocabulary mastery, data collecting technique, research procedures, data analysis, and hypotheses testing.

3.1 Research Design

The study is part of a research and development (R&D). Research and development procedures are research methods used to create specific goods and test their performance (Sugiyono, 2014). In this case, research and development methods are used to test the efficacy of a process and the results of a specific product. The effectiveness of the process is investigated using qualitative methods, and the effectiveness of the results is tested through experimentation. The research design employs the system approach model of educational research and development (R&D) by Branch (2009).

3.2 Subject

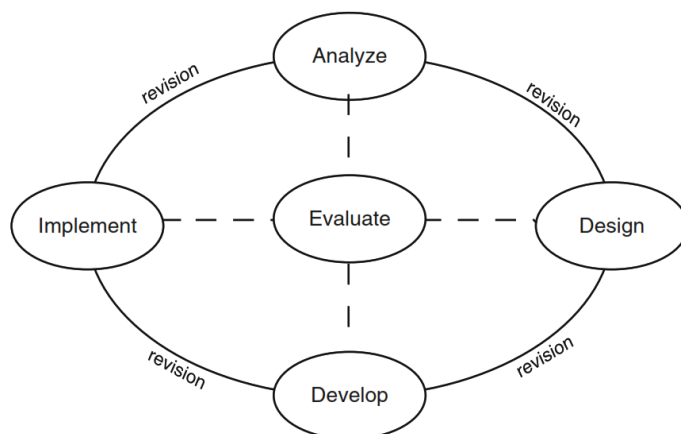
The research conducted in Sekolah Luar Biasa Wiyata Dharma (a special school for students with mental retardation) that is located in Jalan Banteng No.22 A, Metro City, Lampung, Indonesia. The involved students are from all eighth graders of class C that are consisted of 10 students. The students consist of 4 male

students and 6 female students. While their age ranges from 15-to 21 years. The students were selected as the subject. It is applied based on the consideration that all students in the population have the same chance to be chosen (Setiyadi, 2018).

3.3 Development Procedure

R&D is a process for creating new products or improving existing ones, as well as evaluating their efficacy. The following are the main steps in the system approach model of educational research and development (R&D) by Branch (2009) named Analyze, Design, Develop, Implement, and Evaluate (ADDIE) model:

Figure 3.1. The ADDIE Model



Source: (Branch, 2009)

a. Analyze

At this stage, the researcher surveys the school in question to interview English teacher at SLB Wiyata Dharma about the common learning media used in the school, the obstacles that students face when learning English, students' grades, the number and age of students, and the curriculum used. In addition, the researcher also interviews the English teachers at SLB Wiyata Dharma about the characteristics of media preferred by students with mental

retardation and their mental retardation classification in which they are categorized as mild, moderate, severe, and profound mental retardation.

The researcher conducts an instructional analysis based on the needs of students with mental retardation at SLB Wiyata Dharma regarding their scores, attitudes, and daily behavior in class through direct observation in class and interviews with the teacher. The researcher analyses the learning context of students with mental retardation at SLB Wiyata Dharma based on the 2013 curriculum on English in class VIII which is applied at the school. The Core Competencies read: "Understanding factual knowledge by observing [hearing, seeing, reading] and asking questions based on curiosity about himself, God's creatures and their activities, and the objects he finds at home, at school, and the playground." While the Basic Competence reads: "Identifying the structure of the text and linguistic elements to carry out social functions in stating and asking the number of objects found at home and school, according to the context of their use."

b. Design

Based on the analysis in the previous stage, the researcher developed a game-based learning media called digital game-based learning materials to facilitate English learning activities for class VIII students with mental retardation at SLB Wiyata Dharma. The learning game concentrated on improving students' vocabulary mastery by taking into account the appropriateness of the content based on the curriculum, as well as the feasibility of the display based on the results of previous interviews, as stated

in stage 1. Therefore, the learning materials packaged in the development of Digital Game-Based Learning focused on learning vocabulary which discusses things in the class, numbers, fruits, animals, transportation, kitchen tools, vegetables, and solar systems.

c. Develop

This stage is to develop parallel assessment items to measure students' abilities as expected from the goal (Branch, 2009). In this case, the researcher designs jumbled words questions to measure the vocabulary mastery of students with mental retardation at SLB Wiyata Dharma.

Generate content, select or develop supporting media, develop guidance for the student, develop guidance for the teacher, conduct formative revisions, conduct a pilot test are all components of the instructional strategy that emphasize components for developing student learning (Branch, 2009). The first development component is developing the material in the form of grouping vocabulary that was studied by students with mental retardation. This vocabulary was grouped into 8 categories, namely: things in the class, animals, fruits, transportation, kitchen tools, vegetables, solar system, and numbers. Each category contained 20 words. Students were asked to play digital game-based learning materials while memorizing vocabulary per category. Then, the students were asked to work on 10 questions in the same learning game to measure whether they have memorized the vocabulary they have learned or not.

In developing the Digital game-based learning materials Application, the researcher uses Unity 2D. Meanwhile, to meet the needs of the required noun images and appearance, the researchers used the Photoshop application. It is conducted because Unity 2D does not yet provide templates to meet image and display needs. The learning game is divided into two activities, namely:

1. Learning Activities

In this menu, Digital game-based learning materials presented several vocabulary words in 8 categories, namely: things in the class, animals, fruits, transportation, kitchen tools, vegetables, solar system, and numbers. Each word was equipped with a real picture, spelling of letters, pronunciation of the word, along the meaning of the word in Indonesian. The word that has been displayed in the first part can be repeated if the student using it has not heard the pronunciation well by using the 'Replay' button. In addition, on the same page, a 'next' button was presented, so that students can learn other vocabularies.

2. Assessment Activities

In this menu, Digital game-based learning materials presented some questions about the vocabulary they are learning. The questions are designed to consist of 10 questions where at the end, it displayed the score for the student's answers. The questions were randomly generated based on the 8 categories studied by students. In addition, the Digital game-based

learning materials also provides a test of students' vocabulary mastery by applying the jumbled word game. The word that is part of the question was scrambled for letters and students as users are asked to arrange the letters into the correct word by looking at the pictures associated with the word as a clue.

d. Implement

The next step is to review the findings of the feasibility test of Digital Game-Based Learning Materials conducted by teachers, validators, experts, and students. The outcomes of considerations and assessments were incorporated into the instructional revision to develop better and more effective instructional tools. After obtaining validation results from experts, validators, and teachers, the researcher used Digital Game-Based Learning Materials in English learning classes that discuss vocabulary. The use of Digital Game-Based Learning Materials aim to enhance vocabulary mastery of students with mental retardation in class VIII C at SLB Wiyata Dharma.

A one-on-one assessment used in this study to assess the feasibility of digital game-based learning materials for media experts and teachers. Furthermore, the game employed small group assessments, in which trials were conducted on a limited number of students with mental retardation.

e. Evaluation

In this step, the researcher evaluated and revised the product after implementation based on the feedback. Evaluation is important process of the

study because it was the action of perfecting the development of the product. The purpose of evaluation is to evaluate each step to make the product is a good product. This stage conducts to assess the quality of the instructional products and processes, both before and after implementation (Branch, 2009). It is also done to check the completion of the stages.

3.4 Data Collecting Technique

The researcher collected the data by using the instruments to answer the research questions. The researcher employed data collection techniques such as questionnaires, interviews, and documentation.

a. Questionnaires

A questionnaire is a data collection technique in which the participant or respondent fills out the question and then returns it to the researcher once it is filled out. The questionnaires provided in this study are used to collect data in order to determine the product's feasibility. The research objects and questionnaires are distributed to media experts, material experts, teachers, and students.

1. Validation Questionnaires

A design or product display validation questionnaire, as well as a material validation questionnaire, are the intended validation questionnaires. The appointed validator completed the validation questionnaire. Questions were developed in the design validation questionnaire or product display to assess the appearance or design of the

product, whereas questions in the material validation questionnaire was developed to assess the suitability of the material contained in the product with the 2013 curriculum. the product's lingua franca This validation questionnaire generates qualitative data, which can be presented as a percentage and processed using a Likert measurement scale.

2. Teacher's Responses

Teacher' responses were collected after the application product is tested to collect data, which were analyzed using a Likert scale.

b. Interview

The interview is used as a data collection technique when the researcher wants to conduct a preliminary study to identify problems and potentials that need to be investigated, as well as when the researcher wants to learn more about the respondents (Sugiyono, 2014).

In this study, the researcher has interviewed students and English teacher at SLB Wiyata Dharma. The goal is to discover the English learning process in the class, especially about Vocabulary Mastery. In addition, the interview is done to seek how the teacher reacts to the product that is being developed.

c. Documentation

Documentation is a data collection technique in the form of records of events that have passed, usually in the form of writing, pictures, or a work. The

documentation in this study is in the form of videos and photos in the form of an ongoing learning process as data needs analysis and documentation during the product trial process.

3.4 Research Instrument

The previous research instrument is validated and the validation results are given to the validator after first consulting with the supervisor. The instrument is created in accordance with the guidelines stated by Walker and Hess in (Arsyad, 2019), which provides criteria for evaluating software as a learning medium. Because the digital game-based learning materials is one of the learning media included in the software, the Walker and Hess criteria can be used as a reference for developing the instrument, as described in the table below:

Table 3.1. Media Assessment Criteria According to Walker and Hess Based on Quality

No	Aspects	Indicators
1	Content quality and purpose	<ul style="list-style-type: none"> a. Accuracy b. Interest c. Completeness d. Balance e. Concern f. Justice g. Suitability to student situations
2	Instructional Quality	<ul style="list-style-type: none"> a. Provide learning opportunities b. Providing help for studying c. Motivating quality d. Instructional flexible e. Relationships with other learning programs f. The social quality of instructional interaction g. Test quality and assessment h. Can make an impact for students i. Can have an impact on teachers and their learning

3	Technical quality	<ul style="list-style-type: none"> a. Legibility b. Easy to use c. Quality of display/impression d. Quality of response handling e. Quality of program management f. Quality of documentation
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Source: adopted from (Arsyad, 2019)

The researchers modified the instrument by adjusting the research needs based on the criteria provided by Walker and Hess in (Arsyad, 2019). The following instruments were used in this study:

Table 3.2 Research Instruments

No	Instruments	Objectives	Sources	Time
1	Media Expert Validation Questionnaires	Obtain advice and media feasibility assessment	Media Expert	During research
2	Material Experts Validation Questionnaires	Acquire suggestions and material feasibility assessment	Material Expert	During research
3	Linguist Experts Validation Questionnaires	Gain advice and assessment of language and education eligibility	Linguist Expert	During research
4	Students' Responses Questionnaires	Procure feedback and assess product feasibility for use	Students	During research
5	Teachers' Responses Questionnaires	Get feedback, suggestions, and assessments regarding product feasibility	English Teacher	During research

Source: adopted from (Arsyad, 2019)

a. Media Expert Validation Questionnaires

The media expert validators are two lecturers with expertise in technology and computers from Universitas Muhammadiyah Metro. The collected data is used to revise the product. The instrument was given to media

experts who evaluated the application's quality in terms of both appearance and program. The grid of media expert questionnaires is shown in the table below:

Table 3.3. Media Expert Instruments

No	Aspects	Indicator	Items Number
1	Quality Aspect	a. Meet the proper criteria	1
		b. The practical use of media	2
		c. Attractive display design	3
2	Effectiveness aspect	a. Meeting learning needs	4
		b. Media is easy to use	5
		c. Fun media	6
3	Programming aspect	a. Easy to navigate	7
		b. Instructions for use are clear	8
		c. Serving menu can be selected easily	9
		d. Ease of playing the game	10

Source: adopted from (Arsyad, 2019)

b. Material Expert Validation Questionnaires

The instrument is given to two lecturers who put it through its paces in terms of material testing. English Education lecturer and English Teacher who are experts in their fields perform the material expert validation. The instrument evaluated the suitability of the application's material concepts. The following table contains the material expert's instrument grid:

Table 3.4. Material Expert Instruments

Aspects	Indicator	Item Number
Content	a. The suitability of the material presented in the learning media	1
	b. The suitability of the concept of the subject matter with the media used	2
	c. Contextual	3
	d. Material depth and completeness	4
	e. The material is easy to understand	5
	f. Systematic, coherent, logical, and clear	6
	g. Clarity of discussion descriptions, examples and exercises	7
	h. The suitability of the number of exercises with a lot of material presented	8
	i. The suitability of the image in supporting the material presentation	9
	j. Attractive use of colors	10

Source: (Arsyad, 2019)

c. Linguist Validation Questionnaires

To evaluate the use of language in the Digital game-based learning materials on Vocabulary, a linguist validation instrument is used. The linguist validators are two lecturers who are grammar experts. The grid of linguist validation instruments is shown in the table below:

Table 3.5. Linguist Instruments

Aspect	Indicators	Instruments Number		Number of items
		+	-	
Linguistic Eligibility	a. Language accuracy according to the General Guidelines for Indonesian Spelling	1	2	2
	b. Conformity with the intellectual students	3	4	2
	c. Use of punctuation marks	5	6	2
	d. Correct sentence structure	7	8	2
	e. Accuracy in the use of terms	9	10	2
	f. Interpretation in sentences	11	12	2
Total				12

Source: (Arsyad, 2019)

d. Teacher' Feedback Questionnaires

This instrument is used as a data collection technique if the researcher wants to know the existing problems as a preliminary study, but it is also used to know the response of the things the researcher wants to know in-depth. In this study, researchers interviewed English teachers at SLB Wiyata Dharma. The instrument grid for the teacher's feedback questionnaire is as follows:

Table 3.6. Teacher' Response Questionnaires

No	Aspects	Indicator	Item Number
1	Aspect of the learning objectives formulation	a. Media in accordance with Basic Competencies	1
		b. The suitability of indicators with learning objectives	2
		c. The suitability of indicators with the cognitive level of students	3
		d. The suitability of the material with the learning objectives	4
2	Aspect of media quality	a. The media meets the standard criteria for learning media	5
		b. The use of media has a practical function	6
		c. Media design looks good	7
		d. The medium is easy to use	8
		e. The media does not experience errors when used	9
3	Aspect of Media Effectiveness	a. Media developed according to learning needs	10
		b. The media used can increase students' interest in learning	11
		c. Student interaction with the media is good	12
		d. Media can be used anywhere and anytime	13
		e. Media has a pleasant nature	14
4	Aspect of presentation	a. The suitability and accuracy of the illustration with the material	15
		b. Instructions for use are clear	16
		c. Ease of choosing the menu	17
		d. Easy-to-use navigation buttons	18

		e. The media display looks interesting	19
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Source: (Arsyad, 2019)

e. Students' Responses

After field trials, this instrument was used to find out the students' responses. The researcher designed the instrument to be some questions that were used to interview the students about their responses of digital game-based learning materials. The following is the items of the instruments:

Table 3.7. Students' Responses Items

Aspect	Indicators	Item Number
Aspects of use	a. Ease of use	1
	b. The media can be used anywhere.	2
	c. The media doesn't run into unexpected errors when running.	3
	d. The media can help in understanding vocabulary learning.	4
	e. The media can increase curiosity and enthusiasm in learning.	5
	f. The material presented is easy to understand.	6
	g. The media developed is fun.	7
	h. Appropriate display of each media page.	8
	i. The language used is communicative.	9
	j. Supported by appropriate audiovisual.	10
	k. The instruction for using the media is easy-to-understand.	11
	l. The question is easy to understand.	12
Total		

Source: (Arsyad, 2019)

3.5 Data Analysis Technique

a. Likert Scale

A Likert scale is used in the data analysis technique used to test all instrument questionnaires; the validator is given four response options, each with a different score. A score that describes the transition from a negative to a positive position. The neutral response is omitted in order to see the respondent's attitude and opinion toward the questionnaire and to avoid Likert scale method errors, specifically the medium tendency error. The measurement scale for research and development of the questionnaire uses a Likert scale as follows:

Table 3.8. Likert Scale

No	Quantitative Analysis	Statements	
		+	-
1	HE (Highly Feasible)	5	1
2	E (Feasible)	4	2
3	Neutral (N)	3	3
4	I (Infeasible)	2	4
5	HI (Highly Infeasible)	1	5

Source: (Sugiyono, 2014)

Intervals are used to measure the level of measurement in this study. to calculate the percentage of questionnaire responses on each item, the interval data can be analyzed by using the formula:

$$P_s = \frac{S}{N} \times 100\%$$

Information:

P_s : The ideal percentage

S : The number of components of research findings

N : The number of maximum scores

Table 3.9. Feasibility Criteria

Average score (%)	Category
0% - 20%	Highly Infeasible
21% - 40%	Infeasible
41%-60%	Neutral
61% - 80%	Feasible
81% -100%	Highly Feasible

Applications of Digital Game-Based Learning Materials for Vocabulary Learning are said to be feasible if the average score obtained is \geq 61% (Riduwan, 2020).

b. Triangulation

The researcher used the triangulation method to validate the validity of the interview data. As an effort to verify the data found, there are extensive triangulation activities, both method triangulation which using cross-methods in data collection, data source triangulation which using a variety of relevant data sources, and data collector triangulation which several researchers who collect data separately (Ahyar et al., 2020).

V. CONCLUSIONS AND SUGGESTIONS

This chapter describes the conclusions and suggestions of the research. The conclusions are the answers to the research questions formulated from the objectives of the study. Some suggestions are given to the English teachers and other researchers for better improvement of the materials.

5.1 Conclusion

Learning games are very commonly used today. The demands of the digital era make teachers and students must be familiar with the use of technology both at school and at home. Especially with the rise of Android-based games that make the younger generation addicted to spending their time playing games. Hence, it needs to be anticipated with learning games. The presence of this digital game-based learning material allows students to play games while learning English.

Based on the results of research that has been conducted on the development of digital game-based learning materials conducted at SLB Wiyata Dharma, it can be concluded that:

- a. This digital game-based learning material is suitable for use at school and at home based on the validation results from material experts, media experts, and media experts.
- b. The results of student and teacher responses as users of digital game-based learning materials strengthen the feasibility of the products developed to be implemented as learning media in schools.

5.2 Suggestion

a. For the Teachers

Teachers who are required to be more creative in utilizing technology as a learning medium can use digital game-based learning materials.

b. For Futher Researchers

The researcher suggests that other researchers who want to do the same research and development on other material content use the latest version of the application to make assessments more interactive and interesting. Other researchers can also do media that have been developed for students with special needs with other types.

The weakness of the digital game-based learning material called 'Vocabulary for SwMR' is an offline game. It has no vocabulary updated automatically. In addition, this game is also not yet available on the play store so that it can be accessed by more users. Therefore, the researcher suggests other researchers who are interested in conducting research in the same field to pay attention to the limitations.

The researcher realizes that the research conducted is still not perfect. Therefore, the researcher expects suggestions and criticisms to make it perfect. Finally, the researcher hopes that the results of this research and the products developed will be useful for the readers

REFERENCES

- Adams, C. (2017). *The Disadvantages of Using Games As a Learning Tool*.
<https://itstillworks.com/12328164/the-disadvantages-of-using-games-as-a-learning-tool>
- Afriyanda. (2020). *Penerapan Rancangan Bahan Ajar yang Ramah Anak di Salah Satu Sekolah Inklusi: Studi Deskriptif*. Universitas Sanata Dharma.
- Ahyar, H., Maret, U. S., Andriani, H., Sukmana, D. J., Mada, U. G., Hardani, S.Pd., M. S., Nur Hikmatul Auliya, G. C. B., Helmina Andriani, M. S., Fardani, R. A., Ustiawaty, J., Utami, E. F., Sukmana, D. J., & Istiqomah, R. R. (2020). *Metode Penelitian Kualitatif & Kuantitatif* (H. Abadi (ed.); Cetakan I, Issue March). CV. Pustaka Ilmu.
- Alqahtani, M. (2015). The importance of vocabulary in language learning and how to be taught. *International Journal of Teaching and Education*, III(3), 21–34. <https://doi.org/10.20472/te.2015.3.3.002>
- Angkowo, R., & Kosasih, A. (2007). *Optimalisasi Media Pembelajaran* (1st ed.). Grasindo.
- Ankucic, M. (2019). *Everything Teachers Need to Know About Teaching Vocabulary Effectively*. <https://www.3plearning.com/blog/how-to-teach-vocabulary/>
- Aqib, Z. (2015). *Model-model, Media, dan Strategi Pembelajaran, Kontekstual (Inovatif)*. Yrama Widya.
- Arsyad, A. (2019). *Media Pembelajaran* (Edisi Revi). Rajawali Pers.
- Bakar, R. (2014). The Effect of Learning Motivation on Students Productive Competencies in Vocational High School, West Sumatra. *International Journal of Asian Social Science*, 4(6), 722–737.
<http://www.aessweb.com/journals/5007%0A>
- Branch, R. M. (2009). Instructional Design: The ADDIE Approach. In *Department of Educational Psychology and Instructional Technology University of Georgia* (Vol. 53, Issue 9). Springer.
- Brown, D. (2006). Principles of Language Learning and Teaching. In *Encyclopedia of the Sciences of Learning* (5th Editio). Pearson Education ESL.
- Buckingham, D. (2007). Media education goes digital: An introduction. *Learning, Media and Technology*, 32(2), 111–119.
<https://doi.org/10.1080/17439880701343006>

- Cahyadi, A. (2019). *Pengembangan Media dan Sumber Belajar: Teori dan Prosedur* (Cetakan I). Penerbit Laksita Indonesia.
- Cicchino, M. I. (2015). Using game-based learning to foster critical thinking in student discourse. *Interdisciplinary Journal of Problem-Based Learning*, 9(2). <https://doi.org/10.7771/1541-5015.1481>
- Dananjaya, U. (2010). *Media Pembelajaran Aktif* (1st ed.). Bandung Nuansa.
- Derakhshan, A., & Davoodi Khatir, E. (2015). The Effects of Using Games on English Vocabulary Learning. *Journal of Applied Linguistics and Language Research*, 2(3), 39–47. www.jallr.ir
- Filgona, J., Sakiyo, J., Gwany, D. M., & Okoronka, A. U. (2020). Motivation in Learning. *Asian Journal of Education and Social Studies*, September, 16–37. <https://doi.org/10.9734/ajess/2020/v10i430273>
- Hadi, S., & Lestari, D. R. (2021). *Using Bookwidgets To Attract Students ' Interest in*. 9(4), 504–511.
- Hallahan, D. P., Pullen, P. C., Kauffman, J. M., & Badar, J. (2020). Exceptional Learners. *Oxford Research Encyclopedia of Education*, February. <https://doi.org/10.1093/acrefore/9780190264093.013.926>
- Hassan, Z. M., & Abubakar, S. N. (2015). English Vocabulary Learning Strategies by EFL Learners at University of Sulaimani : A Case Study. *International Journal on Studies in English Language and Literature (IJSELL)*, 3(3), 23–29. www.arcjournals.org
- James, M. (2020). The Impact of Game-Based Learning in a Special Education Classroom . *Northwestern College*, 1–19. https://nwcommons.nwciowa.edu/cgi/viewcontent.cgi?article=1240&context=education_masters
- Kemdikbud.go.id. (2018). *Badan Bahasa Petakan 652 Bahasa Daerah di Indonesia*. <https://www.kemdikbud.go.id/main/blog/2018/07/badan-bahasa-petakan-652-bahasa-daerah-di-indonesia>
- Kumar, S. (2017). Teaching Materials and Teaching Aids. In N. Tandon (Ed.), *Module 24* (1st ed.). CSJM University.
- Liu, Z. Y., Shaikh, Z. A., & Gazizova, F. (2020). Using the concept of game-based learning in education. *International Journal of Emerging Technologies in Learning*, 15(14), 53–64. <https://doi.org/10.3991/ijet.v15i14.14675>
- Marpanaji, E., Mahali, M. I., & Putra, R. A. S. (2018). Survey on How to Select and Develop Learning Media Conducted by Teacher Professional Education Participants. *Journal of Physics: Conference Series*, 1140(1). <https://doi.org/10.1088/1742-6596/1140/1/012014>
- Mihaljević, J. (2017). *Creation and use of game-based learning material*. January, 317–330. <https://doi.org/10.17234/infuture.2017.31>

- Mir, J. A., Mushtaq, B., & Mushtaq, O. A. (2022). Mental illness vs mental retardation. *IP International Journal of Medical Paediatrics and Oncology*, 8(1), 10–14. <https://doi.org/10.18231/j.ijmpo.2022.003>
- Munadi, Y. (2013). *Media Pembelajaran: Sebuah Pendekatan Baru* (A. Syaf (ed.)). REFERENSI (GP Press Group).
- Nation, I. S. P. (2001). *Learning Vocabulary in Another Language* (C. A. Chapelle & S. Hunston (eds.)). Cambridge University Press. <https://doi.org/https://doi.org/10.1017/CBO9781139524759>
- Nisbet, J. (2021). *Understanding Game-Based Learning: Benefits, Potential Drawbacks and Where to Begin*. <https://www.prodigygame.com/main-en/blog/game-based-learning/>
- Nordquist, R. (2019). *What is Vocabulary in Grammar?* <https://www.thoughtco.com/vocabulary-definition-1692597#:~:text=Richard Nordquist-,Richard Nordquist, person or group of people.>
- Novita, Y. (2014). Relasi Karakteristik Anak Tunagrahita dengan Pola Tata Ruang Belajar di Sekolah Luar Biasa. *E-Journal Graduate Unpar*, 1(2), 111–124.
- Rahimi, M., & Donyaie, S. (2016). Towards a better way to teach and promote mentally retarded EFL learners' vocabulary learning and retention. *International Journal of Research Studies in Psychology*, 5(2), 31–39. <https://doi.org/10.5861/ijrsp.2016.1387>
- Reeves, S., Albert, M., Kuper, A., & Hodges, B. D. (2013). Why use theories in qualitative research? *British Medical Journal*, 337(7670), 631–634.
- Riduwan. (2020). *Dasar-dasar Statistika* (Edisi ke-1). Alfabeta.
- Salen, Katie; Zimmerman, E. (2003). *Rules of Play : Game Design Fundamentals*. The MIT Press.
- Sanjaya, W. (2016). *Strategi pembelajaran berorientasi standar proses pendidikan* (1st ed.). Prenadamedia.
- Schmitt, N. (2007). Current Perspectives on Vocabulary Teaching and Learning. *International Handbook of English Language Teaching*. <https://doi.org/10.1007/978-0-387-46301-8>
- Serrano, K. (2019). *The effect of digital game-based learning on student learning: A literature review*. 943.
- Setiyadi, A. B. (2018). *Metode Penelitian untuk Pengajaran Bahasa Asing: Pendekatan Kuantitatif dan Kualitatif* (2nd ed.). Graha Ilmu.
- Singh, Y. P., & Agarwal, A. (2013). *Teaching Mathematics to Children with Mental Retardation using Computer Games*. 2(1), 44–58.

- Smith, P. (1969). Teaching Vocabulary. *The Modern Language Journal*, 53(8), 531–537. <https://doi.org/10.1111/j.1540-4781.1969.tb04998.x>
- Somantri, T. S. (2006). *Psikologi anak luar biasa* (R. Herlina (ed.)). Refika Aditama.
- Steinkuehler, C. . (2004). *Learning in Massively Multiplayer Online Games*. 521–528.
- Stiller, K. D., & Schworm, S. (2019). Game-Based Learning of the Structure and Functioning of Body Cells in a Foreign Language: Effects on Motivation, Cognitive Load, and Performance. *Frontiers in Education*, 4(March), 1–19. <https://doi.org/10.3389/educ.2019.00018>
- Sugiyono. (2014). *Cara Mudah Menyusun: Skripsi, Tesis, dan Disertasi* (A. Nuryanto (ed.); Cetakan ke). Alfabeta.
- Susanto, A. (2017). the Teaching of vocabulary. *Jurnal KATA*, 1(2), 182–191. <https://www.researchgate.net>
- Sutarsyah, C. (2021). *Vocabulary in Language Research* (1st Editio). Textium.
- Thornbury, S. (2002). *How to Teach Vocabulary.pdf* (p. 185).
- Wardany, O. F., & Choiri, A. S. (2017). The Effectiveness of Differential Reinforcement of Incompatible Behaviour (Dri) To Overcome Disruptive Behaviour of Intellectual Disability Students. *European Journal of Special Education Research*, 2(1), 23–37. <https://doi.org/10.5281/zenodo.219585>
- Weiss, S., Markowetz, R., & Kiel, E. (2018). How to teach students with moderate and severe intellectual disabilities in inclusive and special education settings : Teachers ’ perspectives on skills , knowledge and attitudes. *European Educational Research Journal*, 1–20. <https://doi.org/10.1177/1474904118780171>
- Widodo, S., Azizah, N., & Ikhwanudin, T. (2019). Teaching mild mentally retarded children using augmented reality. *International Journal of Learning, Teaching and Educational Research*, 18(7), 184–199. <https://doi.org/10.26803/ijlter.18.7.12>
- Yaacob, A., Shapii, A., Saad Alobaisy, A., Al-Rahmi, W. M., Al-Dheleai, Y. M., Yahaya, N., & Alamri, M. M. (2019). Vocabulary Learning Strategies Through Secondary Students at Saudi School in Malaysia. *SAGE Open*, 9(1). <https://doi.org/10.1177/2158244019835935>