DEVELOPMENT OF EDUCATIONAL GAMES TO IMPROVE THE ABILITY OF COMPOSING SENTENCE STRUCTURES FOR DEAF STUDENTS IN SLBN CICENDO BANDUNG

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ABSTRACT

Educational Game is a game specifically programmed to provide an educational experience, educational and useful for improving language skills and thinking. Deaf children are children who experience interference with their hearing organs so that the ability to acquire language in deaf children is not normal due to their limitations. This has an impact on oral and written abilities, namely the ability to structure the sentence. In the formulation of sentence structure it is often found a sentence that is reversed. Therefore, efforts are needed to help deaf children in learning improve the ability to structure their sentences. Based on the results of direct research at Cicendo SLBN Bandung, that students have used an Android platform smartphone but the use of smartphones is only used to play games during recess. Unfortunately not used for learning. According to Ms. Dewi, this was the cause because of the limited teacher's conventional material on the preparation of sentence structure SP, SPO and SPOK. To prove it, pretest testing was carried out with SP (75%), SPO (64%) and SPOK (64%). So, an Android-based sentence stacking educational game was built using the Multimedia Development Life Cycle method by Luther Sutopo with posttest results showing an increase in SP (91%), SPO (94%) and SPOK (93%). In addition, based on beta testing, the Teacher feels helped because the use of smartphones is optimal and children can learn independently.

***Keywords**: Educational Games, Sentence Structure, Sentence Arrangement, Deaf, SLB, SIBI, MDLC.*

1. INTRODUCTION

SLBN Cicendo is one of the oldest schools in the city of Bandung. This school was founded by the Dutch government for Deaf Children. Schools have contributed to educating deaf children. Deaf children are children who have barriers to the sense of hearing, both permanent and temporary that are classified into deaf and hearing loss (hard of hearing) [1].

Deaf children have abnormal language skills, so they have an impact on their oral and written abilities. The impact includes the ability to composing sentence structures. Based on the results of interviews with Ms. Rini and Ms. Dewi as teachers in SLBN Cicendo Bandung, the ability of deaf children in composing sentence structures is often not according to the rules or reversed. It was proven by status on social media and chatting between students and teachers such as “Abdul Bola Main” should “Abdul Play Ball”, as well as doing pretest on 15 students with the results of the percentage of errors composing sentence with structure SP (25%), SPO (36 %), and SPOK (36%). According to Mrs. Dewi, one of the causes is the difficulty and limited teacher in delivering and improving the subject matter conventionally, especially regarding the preparation of sentences with the structure of SP, SPO and SPOK which must be repeatedly and consistently demonstrated so that learning can be easily understood. Based on that, the teacher gave permission to the students to bring their smartphone as a learning support. This was evidenced by the results of the questionnaire that 100% of students took smartphones to school. However, the existence of smartphones is considered not optimal because the applications used are less attractive, students who cannot learn independently and addicted to playing games at school are as many as 73.33% of students who have been proven by photos and results of questionnaires. Language acquisition in the aspect of composing sentences (sintaksis) for deaf children is very important because it will be useful in their daily lives. Therefore, deaf children need learning media that can improve their ability to compose sentences[1].

The use of media for deaf children must be visual, the availability of images, texts and animations so that they can attract the attention and interest of children in structured sentence learning. Through the media, kinesthetic abilities have increased [2]. Along with the development of Information and Communication Technology, and allowing students to bring

smartphones as a learning tool, one of the things that can be applied is to use games as an interactive learning media. Interactive learning is a system that has complete elements, such as sound, animation, text and graphics, one such model is called a games model [3]. Games turned out to be able to provide information about the basics of SIBI and practice getting to know Sign Language [4]. One of educational game about composing sentence structure that can be applied is Sentence Scramble Games (SSG). SSG is a game of composing sentences from scrambled words [1].

So based on that, it is necessary to do research on the **Development of Educational Games to Improve the Ability of Composing Sentence Structures for Deaf Students in Cicendo SLBN Bandung**, with the hope that this application can help improve students' abilities in composing sentence structures.

2. CONTENT

2.1 Theoritical Base

Here is a theory that is used as a reference in the development of educational games.

2.1.1 Deaf Children

Deaf children are children who have a disturbance in their sense of hearing so they are unable to hear. there are various types of deaf children, ranging from mild to very severe levels. According to Hallahan & Kauffman (1991), deaf people (a deaf person) are people who are unable to hear, so they experience obstacles in processing language information through their hearing. and, people who do not hear (a hard of hearing person) are people who use hearing aids, the rest of their hearing is quite possible to successfully process language information, if the person uses hearing aids, he can still catch the conversation through his hearing [5].

2.2 The Ability To Compose Sentence Structures

Language is an important aspect for humans because of the bridge for communication between humans. In deaf children, they need language as a communication aid in their environment, so they don't feel distinguished. Language acquisition in them is not normal and has an impact on their oral and written abilities, namely their syntactic abilities. Syntax is a linguistic branch of the arrangement of words in a sentence. Mastery of syntax is important for them because it is useful in their daily lives [1].

Deaf children generally make very simple and irregular sentences, so the meaning is often not understood by others. Then communication must also be effective and efficient. For this reason, they need to have language skills with correct grammar mastery through sentence structure. Therefore, they need to get learning by utilizing the visual senses, one way is to use learning media that can help improve the ability of deaf children to make sentence structures. [6].

2.1.3 Sistem Isyarat Bahasa Indonesia (SIBI)

The SIBI Dictionary is one of the media that helps communication between fellow deaf people in the wider community. The form is a systematic order of a set of fingers, hands and various motions that symbolize Indonesian vocabulary [7].

2.1.4 Educational Games

Educational Games are all forms of games designed to provide educational experiences or learning experiences to the players, usually there are educational and teaching content. In addition, educational games are activities that are very fun and educational and have benefits for improving language skills, thinking and socializing [8].

2.2 Research Methods

The research method used in the development of educational games is a descriptive method that has two stages, namely Collecting Data and Software Development.

2.2.1 Method Of Collecting Data

The method of collecting data is obtained directly from the research site. The stages of data collection used are :

a. Study Of Literature

This study is carried out by studying, researching and examining various written sources that are related to research topics.

b. Field Study

This study was conducted by visiting the research site. This includes:

- Interviews

Interviews are one way of collecting data with question and answer sessions directly with the place / school related to research.

- Observation

Observation is the collection of data related to research that has relevance to the research that will be conducted.

- Questionnaire

The questionnaire is a list of questions that will be used by researchers to obtain data from the source directly through the communication process or by asking questions.

- Pretest

Pretest is a test to find out the initial ability before learning is applied.

2.2.2 Software Development Phase

Software development in this research uses the Multimedia Development Life Cycle (MDLC) method by Luther-Sutopo. The plot can be seen in Figure 1[9]

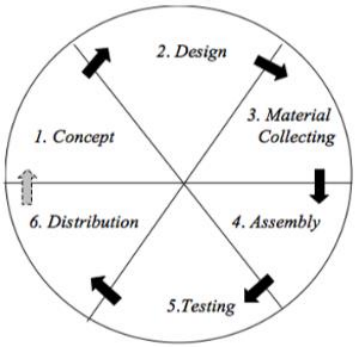

Figure 1 MDLC Method

a. Concept

This stage is a process to identify who is the user, what kind of application will be made, the purpose of making the application and other general specifications.

b. Concept

This stage is the process of determining gameplay, inerface and what is needed on "material collecting"

c. Material Collecting

This stage is the process of making and collecting assets based on the design stage that has been made such as characters, game components, sounds, animations and other materials that are needed in this game..

d. Assembly

This stage is the game development process. The game began to be built based on the plot found in the design involving scripting, scenes etc.

e. Testing

This stage is a testing process, the application is run and checked to make sure this game is in accordance with the design. The testing process using the blackbox testing method

f. Distribution

This stage, the application that has been created is stored on the storage media, to facilitate downloading directly for example the Play Store.

2.3 Hasil dan Pembahasan

To find out the results and explanation of the educational game that was built, it can be seen in points 2.3.1 - 2.3.9.

2.3.1 System Architecture

The design of the system built on this educational game is adjusted with permission from the SLBN Cicendo Bandung. The description of system architecture can be seen in Figure 2.

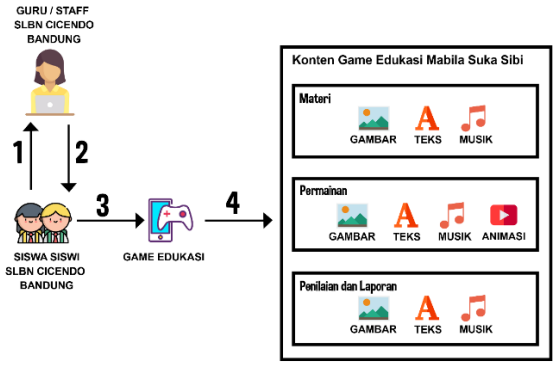

Figure 2 System Architecture

The explanation of Figure 2 (system architecture analysis) is as follows:

a. Students give their smartphone to the teacher / staff.
b. The teacher / staff installs the game application on each smartphone.
c. Students can start using educational games.
d. Students can choose menus (theory, games or reports).

2.3.2 Introduction Games

The game that will be built has the name "Mabila Suka Sibi" with the concept of educational and interactive games. This game utilizes smartphone technology as an intermediary to convey the theory of composing sentence structures in Indonesian. The genre of this game is Puzzle. This educational game is also built with 2-dimensional (2D) graphics.

2.3.3 Theory Analysis

Based on the pretest to 15 students. So, the results (percentages) of the difficulties based on the students' mistakes in composing sentences are SPOK (36%), SPO (36%) and SP (25%). Based on the percentage, this game is made of 3 levels, namely SP, SPO and SPOK.

The theory about the preparation of sentence structure (including word selection and number of words) is obtained from the results of interviews with teachers. The reference book given is the Dictionary of SIBI and based on previous research that is about the form of word messages in Indonesian [10], about the class words of communication activities of parents [11].

The following are examples of theories used at each level of the game can be seen in table 1.

Table 1 Contoh Materi Struktur Kalimat

Level	Theory	Number Of Words

SP	Adik Bermain	2
	Ibu akan pergi	3
	Adik dan Ibu selalu cantik	4
SPO	Ayah mengangkat televisi.	3
	Adik mengejar kelinci hitam.	4
	Ayah sedang memompa ban motor.	5
SPOK	Ibu membeli sayuran di pasar.	4
	Ayah akan mengantar adik ke sekolah.	6
	Ayah Budi selalu minum kopi setiap pagi.	7

2.3.4 *Story Line*

The educational game tells the story of a deaf child named Ahmad who aims to improve the ability to composing sentence structures and the Indonesian Sign Language.

Figure 3 *Storyline*

To find out the increase in his ability, Ahmad must collect scores and stars as much as possible.

2.3.5 *Gameplay*

In this educational game, the player acts as Ahmad (main character). Ahmad is a deaf child who wants to learn and improve his ability to composing Indonesian sentence structures and SIBI correctly

At the beginning of the game, players can choose the menu like Start Playing, Theory, Report, Game Controller and music settings. In this game education has 3 main stages :

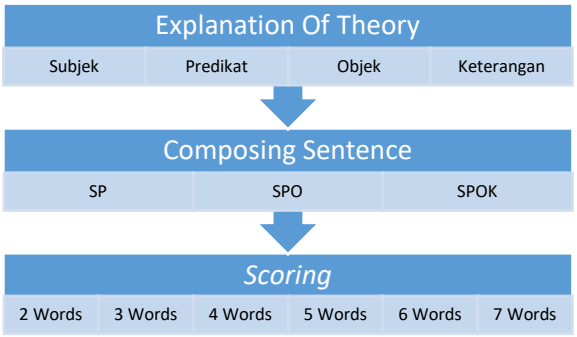

Figure 4 *Gameplay*

a. Explanation Of Theory

At explanation of theory, the player must read the theory carefully.

b. Composing Sentence.

There are 3 levels of games that can be played, namely SP, SPO and SPOK. The player must tap on the screen to drag & drop words into the empty slot as quickly as possible (backward time) and must be effective because at each drag & drop move there is a reduction in the swap parameters. Swaps are made to minimize experiments without thinking by deaf children, while backwards time is made to train deaf children to think faster.

c. *Scoring*.

The following are the rules for calculating scores can be seen in table 2.

Table 2 Score Calculation Rules

Rated Indicator					
Number Of Words	**Scores based on the number of words**				**Total**
	S	**P**	**O**	**K**	
2	1	1	-	-	2
3	1	2	-	-	3
4	2	2	-	-	4
3	1	1	1	-	3
4	1	1	2	-	4
5	1	2	2	-	5
4	1	1	1	1	4
6	1	2	1	2	6
7	2	2	1	2	7

Educational games need to use the tempo (time) that is adjusted to the teacher's estimates [12]. Using time has an effect on performance. This type of calculation is called high speed, high score scoring [13]. So to calculate the final score required accumulation with the remaining time. The time given at **SP level is 1.30 minutes**, **SPO level is 2 minutes**, and **SPOK Level is 2.30 minutes**. So, the final score calculation is "Score composing sentence structures (60%) + remaining time (40%), and the total score is (100%)". The example of calculating the final score is as follows:

a. 2 Words

Number of correct answers	**Scores Composing Sentences**	**Time Score**	**Final Maximum Score**
2 * 30	60	$\frac{\text{Remaining Time}}{\text{Start Time}} * 40$	100
0 * 30	0		40

b. 3 Words

Number of correct answers	**Scores Composing Sentences**	**Time Score**	**Final Maximum Score**

3 * 20	60	Remaining Time / Start Time * 40	100
1 * 20	20		60
0 * 20	0		40

c. 4 Words

Number of correct answers	Scores Composing Sentences	Time Score	Final Maximum Score
4 * 15	60	Remaining Time / Start Time * 40	100
2 * 15	30		70
1 * 15	15		55
0 * 15	0		40

However, the calculation of the score is not enough, there needs to be a sign of a mastery award like a star [14]. The mastery award can be seen in table 3.

Table 3 *Score Award Mastery*

Final Maximum Score	Number Of Stars
> 80	
> 60 and <= 80	
> 40 and <= 60	

If the player is at the SP level, and wants to play at the next level (SPO Level) then the criteria that must be obtained can be seen in table 4.

Table 4 SPO Level - Criteria

Kriteria	
Next Level	SPO
Minimal Score	1250
Total Scores Obtained	35

If the player is at the SPO level, and wants to play at the next level (SPOK Level) then the criteria that must be obtained can be seen in table 5.

Table 5 SPOK Level - Criteria

Criteria	
Next Level	SPOK
Minimal Score	2500
Total Scores Obtained	70

2.3.6 Use Case Diagram

Use Case is designing a scenario of interaction between users and systems. A Use Case Diagram describes the relationship between actors and activities that can be carried out on the system.

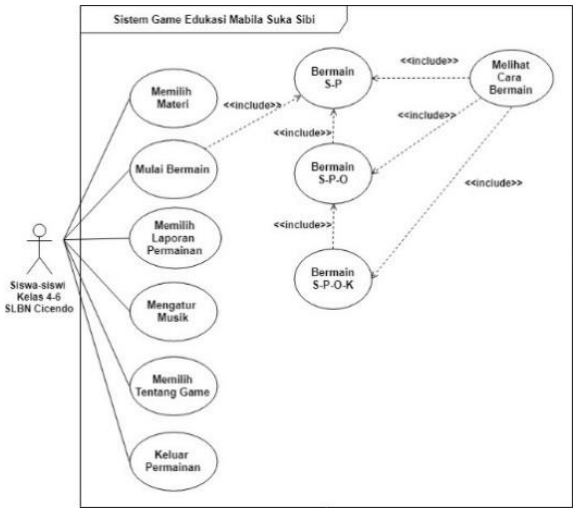

Figure 4 *Use Case Diagram*

2.3.7 Class Diagram

Class Diagram is a system structure design by defining classes that will be created to build the system.

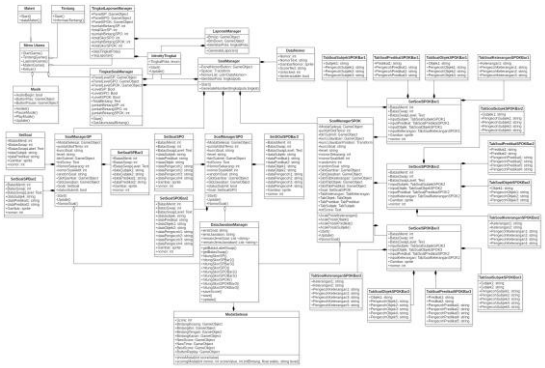

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Figure 5 *Class Diagram*

2.3.8 Interface Implementation

Interface implementation is the process of build UI in this educational games based on the previous process. So, the following is the result of the interface implementation based on the design that has been made:

Figure 6 Interface – Main Menu

The main menu interface is a page that displays menus starting playing, material, reports, about, music and exits that can be operated by players.

Figure 7 Interface – Level Selection

The level selection interface is a page that is displayed if the player chooses the menu to start playing, on this page the player starts playing at the SP level to collect as many scores and stars as possible according to the criteria / conditions, in order to start playing at the next level namely SPO and SPOK.

Figure 8 Interface – Selecting Number

The interface shown in figure 8 is the page displayed after selecting the level of the game. Players must complete the game on each number in order to proceed to the next number.

Figure 9 Interface – Level SP Number 1 – 5

Figure 10 Interface – Level SP Number 6 – 10

Figure 11 Interface – Level SP Number 11 – 15

The interface on the SP level game as shown in figure 9-11 is the main game page for composing sentences structures after selecting the number of game according to the SP level.

However, the number of words played varies. In addition, every word that is played has also been scrambled by the system. The provisions can be seen in table 6.

Table 6 Number of Words on SPO

Number	Number Of Words		Total
	S	P	
1 – 5	1	1	7
6 – 10	1	1	9
11 – 15	1	2	11

If the SP level game has been played and gets the total score and total stars that have met the next level criteria, then the player can start playing the SPO Level.

Figure 12 Interface – Level SPO Number 1 – 5

Figure 13 Interface – Level SPO Number 6 – 10

Figure 14 Interface – Level SPO Number 11 – 15

The interface on the SPO level game as shown in figure 12-14 is the main game page for composing sentences structures after selecting the number of game according to the SPO level. However, the number of words played varies. At the SPO level, a tricky word is given so that the player is more careful. In addition, every word that is played has also been scrambled by the system. The provisions can be seen in table 7.

Table 7 Number of Words on SPO

Number	Number Of Words				Total Words
	S	P	O	Pengecoh	
1 – 5	1	1	1	4	7
6 – 10	1	1	2	5	9
11 – 15	1	2	2	6	11

If the SPO level game has been played and gets the total score and total stars that have met the next level criteria, then the player can start playing the SPOK Level.

Figure 15 Interface – Level SPOK Number 1 – 5

Figure 16 Interface – Level SPOK Number 6 – 10

Figure 17 Interface – Level SPOK Number 11 –15

The interface on the SPOK level game (number 1-15) as shown in figure 15-17 is the main game page for composing sentence structures after selecting the number of game according to the SPOK level. However, the number of words played varies. At the SPOK level, a tricky word is given so that the player is more careful. In addition, every word that is played has also been scrambled by the system. The provisions can be seen in tables 8-10

Table 8 Number of Words on SPOK (1-5)

Level - SPOK			
Number 1 - 5			
S	1 Words	Incorrect (Subjek)	3 Words
P		Incorrect (Predikat)	
O		Incorrect (Objek)	
K		Incorrect (Keterangan)	
Total	4 Words	Total	12 Words

Table 9 Number of Words on SPOK (6-10)

Level - SPOK			
Number 6 - 10			
S	1 Words	Incorrect (Subjek)	4 Words
P	2 Words	Incorrect (Predikat)	
O	1 Words	Incorrect (Objek)	
K	2 Words	Incorrect (Keterangan)	
Total	6 Words	Total	16 Words

Table 10 Number of Words on SPOK (11-15)

Level - SPOK			
Number 11 – 15			
S	2 Words	Incorrect (Subjek)	5 Words
P	2 Words	Incorrect (Predikat)	
O	1 Words	Incorrect (Objek)	
K	2 Words	Incorrect (Keterangan)	
Total	7 Words	Total Pengecoh	20 Words

If the player has finished playing at any level, the player can view the game report based on the level of "Subjek Predikat" (SP), “Subjek Predikat Objek” (SPO) and “Subjek Predikat Objek Keterangan” (SPOK). The interface of the report page can be seen in Figure 18..

Figure 18 Interface - Report

The interface of the report detail page is the page that appears after clicking the report button, this page displays game reports based on sentence level, information displayed is level, number, star number, best score and best time.

Figure 19 Interface - Success

The interface that appears when the game results are "successful" is to pop up if the player gets 3 stars, besides that, the information displayed is the Indonesian Language Signal System (SIBI) according to the sentence in each game.

Figure 20 Interface – Game Over (Fail)

The interface that appears when the game results "Fail" is a pop up, if the player gets less than 3 star, besides, the information displayed is the motivation of the Indonesian Language Signing System (SIBI) in each game.

2.3.9 System Testing

The testing phase is the stage that is carried out after the implementation is complete and all required data has been entered. The testing process uses alpha testing and beta testing.

2.3.9.1 Alpha Test Results

The results of the testing phase to find out the software capabilities according to user requirements can be seen in table 11.

Table 11 Alpha Test Results on Games

Cases and Test Results (Correct Data)			
Input Data	**Expectation**	**Observation**	**Results**
Total Score >= 80	Showing 3 stars Showing animated sign language about structured sentences.	The system displays scores with stars, replay buttons, the next button and the correct sign language animation.	[√] Accepted [ ] Rejected
Total Score Between 60 - 79	Showing 2 stars Showing animated sign language for motivation.	The system displays scores with stars, replay buttons, the next button and sign language animation for motivation	[√] Accepted [ ] Rejected
Total Score Between 40 - 59	Showing 1 stars Showing animated sign language for motivation.		[√] Accepted [ ] Rejected
Cases and Test Results (Wrong Data)			
Input Data	**Expectation**	**Observation**	**Results**
Time has run out / Swap Limit is null	Showing 0 stars Time has run out / Swap Limit Expires	The system displays scores with stars, replay buttons, the next button (disable) and sign language animation for motivation	[√] Accepted [ ] Rejected

2.3.9.2 Beta Test Results

To see the results of the questionnaire on the teacher as a respondent, the calculation uses a Likert scale which can be seen in table 12.

Table 12 Likert Scale - Score

Skala Jawaban	Keterangan	Skor
SA	Strongly agree	5
A	Agree	4
N	Netral	3
D	Disagree	2
SD	Strongly Disagree	1

As for the results of the questionnaire with the results of calculating the scale in the form of a percentage, then the criteria of beta testing can be seen in table 13.

Table 13 Beta Test Percentage Criteria

Tingkat Persentase	Keterangan	Kriteria
81-100%	Very good	Very Good, Not Revised
61-80%	Good	Good, Not Revised
41-60%	Enough	Enough, Revision
21-40%	Poor	Poor, Revised
0-20%	Very Poor	Very Poor, Revised

The following are the results of calculating the educational game questionnaire:

a. Does the Educational Game make students enthusiastic and not feel bored when using this educational game?

Tabel 14 Beta Test Results on Teachers 1

Info	Score	Number Of Respondents	Total Score
SA	5	2	10
A	4	0	0
N	3	0	0
D	2	0	0
SD	1	0	0
Total		2	10

The results of the calculation of the total score are:

Final Value = $\frac{10}{10}$ x 100%

Final Value = 100%

Based on the percentage of the score, it can be concluded that this educational game is very good for students because it can make students enthusiastic and do not feel bored when learning, 100% results are obtained with very good criteria and not revised.

b. Is this Educational Game able to help and provide convenience for the teacher?

Table 15 Beta Test Results on Teachers 2

Info	Score	Number Of Respondents	Total Score
SA	5	2	10
A	4	0	0
N	3	0	0
D	2	0	0
SD	1	0	0
Total		2	10

The results of the calculation of the total score are:

Final Value = $\frac{10}{10}$ x 100%

Final Value = 100%

Based on the percentage score, the conclusion is that this educational game is very good for teachers because it is very able to provide convenience, obtained 100% results with very good criteria and not revised.

c. Is this educational game making smartphone use in the school more optimal?

Table 16 Beta Test Results on Teachers 3

Info	Score	Number Of Respondents	Total Score
SA	5	2	10
A	4	0	0
N	3	0	0
D	2	0	0
SD	1	0	0
Total		2	10

The results of the calculation of the total score are:

Final Value = $\frac{10}{10}$ x 100%

Final Value = 100%

Based on the percentage score, the conclusion is that this educational game is very good for students because it is very able to optimize the smartphone, obtained 100% results with very good criteria and not revised.

d. Does the Educational Game make students able to learn independently?

Table 17 Beta Test Results on Teachers 4

Desc	Score	Number Of Respondents	Total Score
SA	5	1	5
A	4	1	4
N	3	0	0
D	2	0	0
SD	1	0	0
Total		2	9

The results of the calculation of the total score are:

Final Value = $\frac{9}{10}$ x 100%

Final Value = 90%

Based on the percentage of the score, it can be concluded that this educational game is very good for students because it can make students learn independently, the results are 90%, the criteria are good and not revised

Whereas to see the results of the questionnaire on students, the calculation uses the Guttman scale [15] can be seen in the table 18.

Table 18 Guttman Scale - Score

Score	Desc
1	Yes
0	No

The following are the results of calculating the educational game questionnaire:

a. Is this Educational Game interesting?

Table 19 Beta Test Results on Students 1

Desc	Score	Number Of Respondents	Total Score
Yes	1	15	15
No	0	0	0
Total		15	15

The results of the calculation of the total score are:

Final Value = $\frac{15}{15}$ x 100%

Final Value = 100%

Based on the percentage of the score, the conclusion is that this educational game is very good for students because it can attract students to learn composing sentence structures, obtained 100% results, the criteria are very good and not revised.

b. Does the Educational Game improve the ability to compose sentence structures properly and correctly?

Table 20 Beta Test Results on Students 2

Desc	Score	Number Of Respondents	Total Score
Yes	1	15	15
No	0	0	0
Total		15	15

The results of the calculation of the total score are:

Final Value = $\frac{15}{15}$ x 100%

Final Value = 100%

Based on the percentage of the score, it can be concluded that this educational game is very good for students because it is very able to make students improve the ability to composing sentence structures, obtained 100% results, the criteria are very good and not revised.

c. Can this educational game improve sign language skills properly and correctly?

Table 21 Beta Test Results on Students 3

Desc	Score	Number Of Respondents	Total Score
Yes	1	14	14
No	0	1	0
Total		15	15

The results of the calculation of the total score are:

Final Value = $\frac{14}{15}$ x 100%

Final Value = 93.33%

Based on the percentage score, the conclusion is that this educational game is very good for students because it can make students improve the ability to use sign language, obtained 93.33% results, the criteria are very good and not revised.

d. Is this educational game easy to use?

Table 22 Beta Test Results on Students 4

Desc	Score	Number Of Respondents	Jumlah Skor
Yes	1	15	15
No	0	0	0
Total		15	15

The results of the calculation of the total score are:

Final Value = $\frac{15}{15}$ x 100%

Final Value = 100%

Based on the percentage score, the conclusion is that this educational game is very good for students because it can be used easily by students, obtained 100% results, the criteria are good and not revised.

e. Does this Educational Game make students learn independently?

Table 23 Beta Test Results on Students 5

Desc	Score	Number Of Respondents	Total Score
Yes	1	15	15
No	0	0	0
Total		15	15

The results of the calculation of the total score are:

Final Value = $\frac{15}{15}$ x 100%

Final Value = 100%

Based on the percentage score, the conclusion is that this educational game is very good for students because it can make students learn independently, obtained 100% results, the criteria are very good and not revised.

Based on the results of beta testing to students, it was concluded that this educational game has very good criteria and not revised. This is evidenced by the graphs of the results of the students' pretest and posttest.

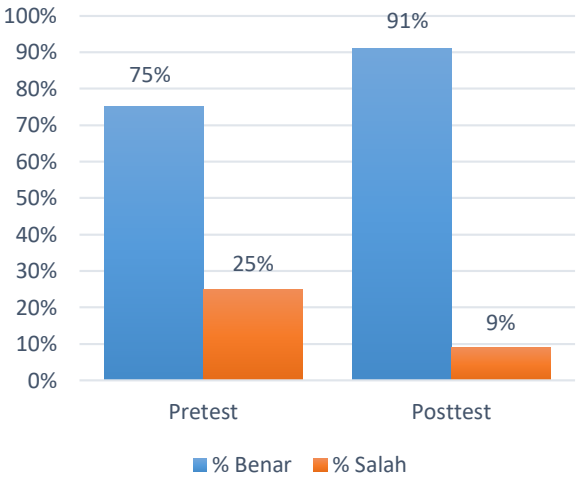

Figure 21 Pretest and Postest Level SP

The ability to compose sentence structures (SP) correctly at the pretest results of 75% and an increase in the results of the posttest with a percentage of 91%.

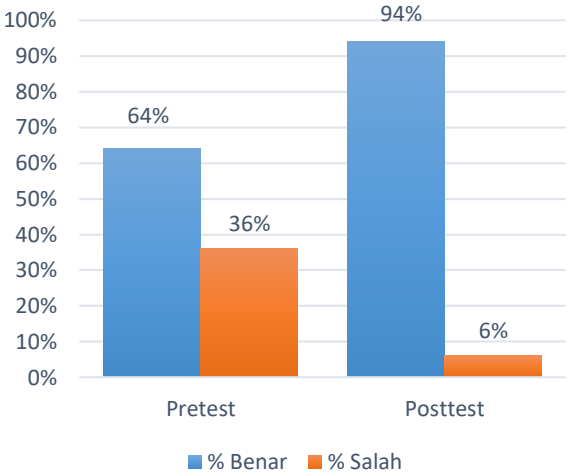

Figure 22 Pretest and Postest Level SPO

The ability to compose sentence structures (SPO) correctly at the pretest results of 64% increased in the posttest results with a percentage of 94%.

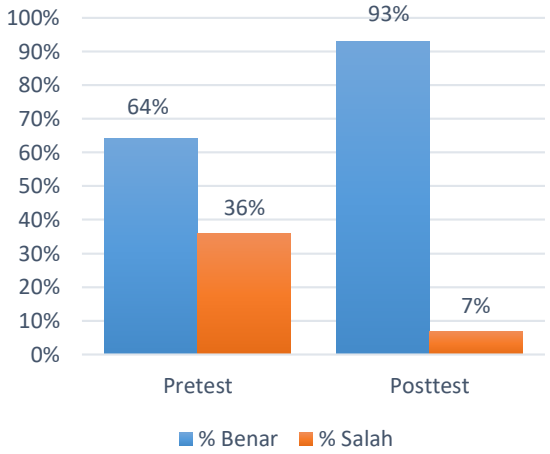

Figure 23 Pretest and Postest Level SPOK

The ability to compose sentence structures (SPOK) correctly at the pretest results of 64% increased in the posttest results with a percentage of 93%.

3. CLOSING

3.1 Conclusion

Based on the results of the implementation and testing, conclusions can be taken as follows:

1. Through the educational game "Mabila Suka Sibi", students can improve the ability to composing sentence structures regularly and not inversely, as evidencedby the improvement the ability to composing sentence structures of SP by 16%, SPO by 30%, and SPOK by 29%
2. Through the educational game "Mabila Suka Sibi", the teacher feels helpful in giving sentence structure theory to students.

3. Through the educational game "Mabila Suka Sibi", smartphone use in schools is more optimal because smartphone can support learning activities.

3.2 Suggestion

Educational games that have been built still have many disadvantages. The suggestions for developing this game are as follows:

1. The theme of educational game content can be developed on other themes, for example professional themes, vehicle themes, themes of natural knowledge.
2. Animation of Sign Language needs to be improved by adding mouth gesture
3. Add multiplayer features in order to see a comparison of abilities between students.
4. Need an explanation feature of each question that has been played.

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