



## Reflective Gem to Improve Receptive Communication Skills for Students with Hearing Impairment

Erlin Fitria\*, Oktavia Hardiyantari

Faculty of Business and Humanities, Universitas Teknologi Yogyakarta, Indonesia

### Article History:

Received: November 21<sup>st</sup>, 2020  
Revised: February 18<sup>th</sup>, 2021  
Accepted: March 3<sup>rd</sup>, 2021  
Published: June 29<sup>th</sup>, 2021

### Keywords:

Android,  
Students with hearing impairment,  
The reflective maternal method,  
Word comprehension

### \*Correspondence Address:

erlin.fitriana@uty.ac.id

**Abstract:** The inability to receive excitatory voice experienced by the student with hearing impairments presents diverse impacts. The impacts include difficulties in understanding the information that others convey, lengthy understanding sentences, and holding verbal communication. This research aimed to develop a reflective maternal method integrated with the Android system to improve vocabulary mastery to support students with hearing impairments to perform receptive communication. There were twelve students with hearing impairments within the 15-23 age range as the samples. This research belongs to research and development adapted from the multimedia development model for learning. Product feasibility test was performed through the alpha and beta tests. The average expert validation score was 4.25, and the average score of the material expert was 4.50. Both expert validation results were in an excellent category. Also, the results of the media experts' validation were 3.58 in the good category. Meanwhile, the average score of beta test was 3.58 in the good category. It can be concluded that Android apps can be operated via smartphones or computer devices to improve the receptive communicative ability of students with hearing impairments. This application is called Reflective Game. This research recommends an Android application program that can be used by Guidance and Counseling teacher accompanied by special school teachers to improve students' vocabulary understanding for the student with hearing impairment. Besides, it provides skills to understand proverbs, opposites (anonymous), and synonyms.

## INTRODUCTION

Communication is fundamental in human life to form a community that is integrated by information, where each individual in the community shares information to achieve common goals (Awi Victoria et al., 2016; Hantono & Pramitasari, 2018). Interactions involve the source of the message and the recipient. Humans as social beings are required to interact with each other and take oral and verbal actions and reactions. Verbal interactions utilize words and written, while non-verbal communication

utilizes cues, attitudes, and behavior (Arif Khoiruddin, 2012; Soekanto, 2012; D. Wulandari et al., 2017). Communication cannot be separated from humans' everyday activities. Every time they communicate, even in silence, communication can still occur based on body language, facial expressions, and other attributes that can provide certain information to the interlocutor (Rahmawati, 2015).

The definition of communication is the transfer of a message from one source to the recipient to be understood. The

recipient of the message must understand the information conveyed by the message source (Liliweri, 2015; Ngalimun, 2018; Nurhadi & Niswah, 2019). A person's ability to receive or understand messages conveyed by the message source is called receptive communication (Mustika, 2017; Somad, 2016). In receptive communication, the recipient of the message processes the message to be correctly perceived by the recipient. The receptive communication process becomes more complicated for the student with hearing impairments. The difficulties experienced are related to receptive communication, including abstract (idiomatic) expressions and words, long sentences, and figurative meanings (Bintoro, 2011; Fitria & Yudhawati, 2019).

Students with hearing impairments have difficulty understanding messages from message sources because of their inability to receive sound stimuli. Consequently, the process of interpreting an object or activity is also limited only through visual or sight. However, language imitation through hearing is the most dominant language forming in a child (Mudjiyanto, 2018; Saputri, 2017). The impact of language development delays can result in students with hearing impairment having less basic requirements for oral communication. Hence, in expressing their feelings, thoughts, and wills, they face many obstacles. Difficulty in expressing feelings, thoughts, and desires makes it difficult for a student with hearing impairment to communicate verbally with people who are used to verbal communication (Hernawati, 2007; Novialassafitri & Purbaningrum, 2020; Pujiwati, 2012).

Another difficulty experienced by the student with hearing impairments is a limited vocabulary. They have difficulty interpreting figurative meanings and abstract words (Haenudin, 2013; Lan, 2020; Weluk et al., 2020). It is even more

difficult for a student with hearing impairments to communicate verbally. They rely on their sight to understand something around them. They are often referred to as gems because they cannot visualize the verbal concepts (Jambor & Elliott, 2005; Mudjiyanto, 2018; Wardani, 2011).

In the academic field, the student with hearing impairments, due to the low vocabulary mastery, cannot understand long sentences and compose sentences according to the SPOK pattern (subject-predicate-object-description), interpret words that contain synonyms and antonyms, and interpret abstract words. These obstacles cause low learning achievement. The low learning achievement is due to the lack of information received through the sense of hearing and the low abstraction ability (Septiani et al., 2010; A. Wulandari et al., 2014).

Other studies suggest that receptive communication failure affects other developments, such as psychological, social, intelligence, and economic development. Students with hearing impairments need to be given special education to develop according to their disabilities (Azizah & Kurniawati, 2013; Fatimah, 2012; Mousley & Kelly, 1998).

A reflective maternal method is a form of teaching technique for students with hearing impairments that prioritize conversation as the axis of teaching and learning activities. It is supported by the method and the teacher's dual role (Gunawan & Susiloyuwati, 2000; Zulmiyetri, 2017). The reflective maternal method is sufficient to improve the student's language and speech skills with hearing impairment. The reflective maternal method can also increase students' focus on the material presented by the teacher (Rois & Astina, 2018; Saputro et al., 2019; Zulmiyetri, 2017).

Teachers must face with students to implement the reflective maternal method (Rois & Astina, 2018). It is unfortunate

because the learning is conducted online to suppress the spread of the COVID-19. One of the efforts to overcome this problem is to develop the reflective maternal method integrated with the Android system. Integrating the Android system into the reflective maternal method is relatively easy to develop. Furthermore, Android application learning media is attractive to students with hearing impairments who predominantly rely on sight. Besides, it can be used anywhere by students independently.

The android application is beautiful visually, while the reflective maternal method can help maximize a students' speech organs' function and provide a separate understanding (Adiati, 2017; Noermasari & M. Efendi, 2016). Students with hearing impairment utilize the sense of sight as the dominant sense to capture information (Csizér & Kontra, 2020; Mutiara, 2013; Witri Erdiawati S.R, 2016; Yuknis et al., 2017). Visual media can facilitate students with hearing impairments through elaboration, structure, organization, and memory (Fajrin & Hernawati, 2018; Smith & Colton, 2020).

The use of audio-visual media can be an alternative for the student with hearing impairments to understand the subject matter, especially the learning skills (Kaba & Ellala, 2020; Kurnia et al., 2019; Liu, 2020). Previous research produced an Android-based simple sentence pattern media in science learning for the student with hearing impairments. The learning media developed is accompanied by images or graphics. One of the features displays material about energy sources, sun, water, and wind. The material is displayed in a written description using pictures and writing (Fibrianti, 2020).

This research's novelty is the videos equipped with illustrated images to help students with hearing impairments understand the meaning of words and

sentences. It also features short writing or short stories to stimulate students' ability to understand new vocabulary. Also, it provides features to invite students to learn antonym and synonym commonly used in daily communication. This research produced an Android application that can be used by a student with hearing impairments with or without assistance from the teachers. It aims to improve students with hearing impairments' vocabulary mastery to support their receptive communication skills.

## METHOD

This research employed the Research and Development model adapted from the multimedia development learning model (Alessi & Trolip, 2001). The steps include planning, design, and development. The research subjects were twelve students aged 13-25 years at SLB (Special School) B Wiyata Dharma 1 Sleman.

The sampling technique used in this research was purposive sampling to determine the sample based on individual considerations. The considerations are an adolescent student with hearing impairments who have mild disabilities. The instruments employed were word comprehension tests, observation, validation sheets for the alpha test, and the beta test. The alpha test was used to find out whether the product met the material and media feasibility. The beta test was used to test the feasibility of a product based on users' needs. The reliability test for the word comprehension test was performed using Cronbach's Alpha. The reliability test value obtained was 0.791, which is included in the high category. The word comprehension test consisted of 10 valid statements. The types of data in this research were qualitative and quantitative data.

The qualitative data was obtained by interpreting the results of observations obtained in the preliminary study and

interpreting the alpha test results in the form of input, suggestions, and criticism. This research also employed the quantitative descriptive analysis by analyzing the alpha test evaluation results.

To test the effectiveness of the product, Wilcoxon matched pairs test was performed. The research flowchart is presented in Figure 1.

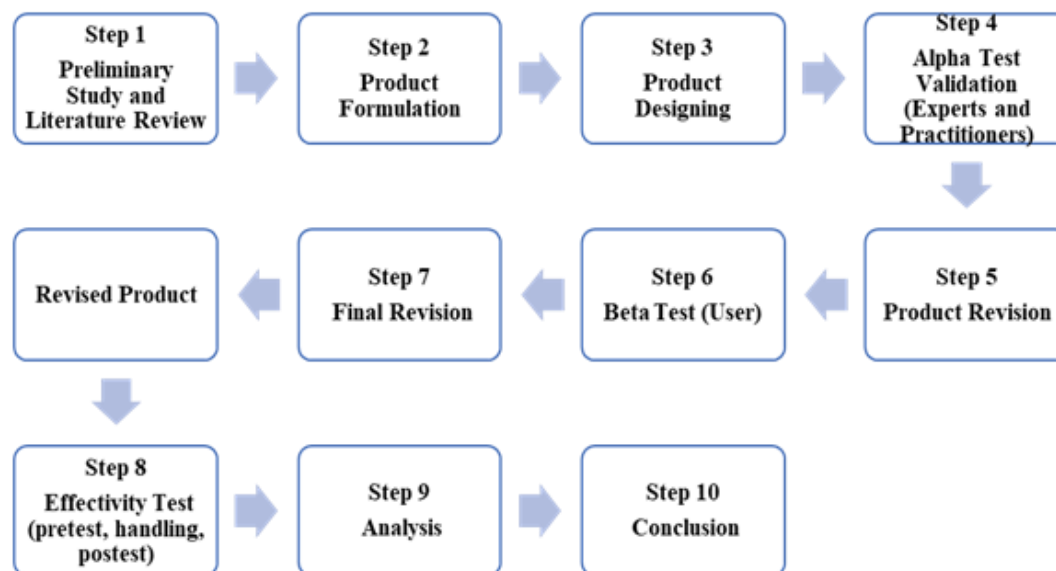


Figure 1. Research Flowchart.

The preliminary study and literature studies' purpose is to analyze the teachers' and students' needs regarding learning methods for the student with hearing impairments. The second stage is formulating the product based on the results of the preliminary studies and literature studies. The third stage is designing the product using a storyboard. The fourth stage is to make a validation sheet for the alpha test and conduct a product feasibility test. The alpha test results were then analyzed, and product improvements were immediately carried out (step 5). Stage 6 is a beta test aimed at testing the product's feasibility from the user's side. The product will be tested on the student with hearing impairments to obtain their input, suggestions, and development after trying the product. The results of user input are immediately realized by revising the product. Stage 8 is the effectiveness test. Products that have been revised are then tested for their effectiveness to the research sample. The effectiveness test results were analyzed

(stage 9) so that the research conclusions could then be drawn (stage 10).

## RESULT AND DISCUSSION

Stage 1 was the initial field survey to analyze the needs of teachers and students at schools. The research found that the learning media for students with hearing impairments was limited, consisting of books, blackboards, and glass as learning media. The majority of students used cellphones to communicate and surf social media. The vocabulary mastery was lacking, so it was difficult to communicate without sign language. Teachers must carry out intensive guidance to train students in mastering new vocabulary.

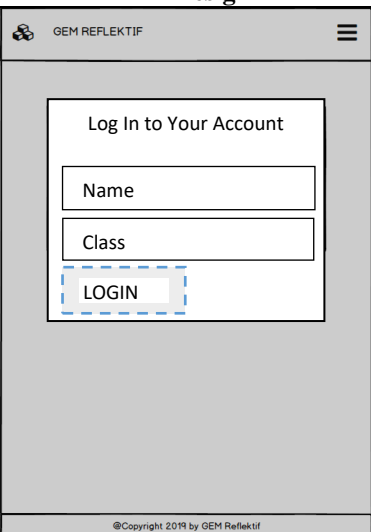
Students with hearing impairments are physically no different from regular students. Both have body postures according to their sex, have a developmental stage according to their age. However, they are unable to receive information through the sense of hearing. This language limitation makes students

with hearing impairments not understand what the other person is saying, cannot give feedback spontaneously to the other person, tend to be awkward with new people, and tend to be more sensitive. However, they are fluent at using cellphones to surf cyberspace without any difficulties.

Based on the results of the literature study, the widely used method is the reflective maternal method. The teacher-designed and planned the based on the theme following the grade level. The materials are displayed with pictures that will be expressed verbally. Students write down sentences or nouns that have been spoken verbally on a piece of paper or the blackboard and then followed by an

evaluation (Gunawan & Susiloyuwati, 2000; Irwanto et al., 2018).

Stage 2 was formulating the product through discussion and brainstorming. Idea gathering was carried out by discussing with media and material experts as well as research members. The students conducted this discussion to collect as much material as possible that is relevant to students. Stage 3 was designing the product by determining the product display plan. The researchers made compiled a storyboard (can be seen in Figures 2 and 3). The application consisted of four activities: learning to understand vocabulary through short stories, proverbs, synonyms, and antonyms.

No	Page	Design	Information
1	Login page		<ul style="list-style-type: none"> <li>➤ This section is the main page when the application is open for the first time.</li> <li>➤ Users are required to log in by inserting username and class; as long as the users do not log out or delete the application data, no login is needed after the first login.</li> <li>➤ There is a login button.</li> </ul>

**Figure 2.** Storyboard

Figure 2 illustrates the initial process when a user logs in. Users are required to fill in the appropriate name and class. Then click login to proceed to the next step.

Stage 4 was a product feasibility test with an alpha test to determine whether the product met the material and media requirements. The alpha test was carried out by asking for input from two special school teachers and the IT experts. The average score obtained from the

validation was 4.25 (excellent). The material validation 2 obtained an average score of 4.50 (excellent). Also, the material expert provided input, namely, the length of the short story quiz questions should be shortened because the previous ones were too long for the student with hearing impairment. The long text will make it more difficult for a student with hearing impairments to understand the context of the story. IT experts carried out media validation.

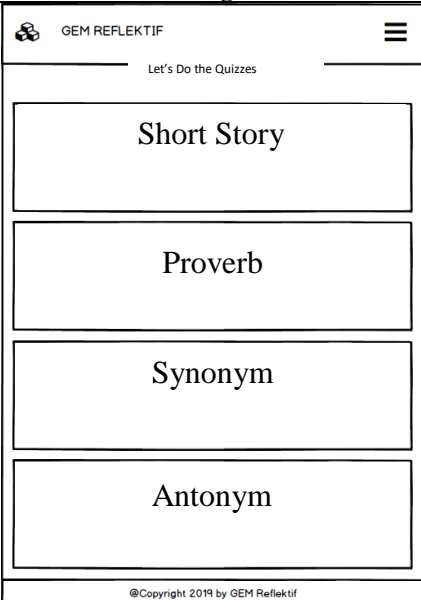
No	Page	Design	Information
	Home Page		<ul style="list-style-type: none"> <li>➤ There are several main buttons on the Home page, including the logo and additional menu buttons.</li> <li>➤ The logo button will direct to this Home page.</li> <li>➤ The additional menu buttons will show two new menus: Home and About Us;                         <ul style="list-style-type: none"> <li>- the Home button will direct to the home page;</li> <li>- About Us button will direct to the about us page.</li> </ul> </li> <li>➤ Four main quiz buttons will open each quiz page, respectively, namely:                         <ul style="list-style-type: none"> <li>- Short story for short story quizzes,</li> <li>- Proverb for proverb quizzes,</li> <li>- Synonym for synonym quizzes,</li> <li>- Antonym for antonym quizzes.</li> </ul> </li> </ul>

Figure 3. Storyboard

Figure 3 is the home display of the application after the user has logged in. Four feature options appear that can be selected. The average score of media validation by IT experts was 3.58 within the good category. The media experts suggested changing the background and header color to better suit the student's age as a user. Besides, the researchers changed each aspect of the quiz into the middle/center because previously, it was too indented towards the left.

Stage 5 was product improvement based on the input from media experts and material experts. The activity at stage

6 was the product feasibility test with a beta test. The beta test was conducted to get input from the users. Twelve students performed the beta test with hearing impairments. The students were asked to try the products and were asked to fill out the assessment sheet. The media aspect's assessment score was 4.27, and the score of the material aspect was 4.28. Both scores were in a suitable category.

Stage 7 was the products' final revision. The product was revised again based on beta test results. The appearance of the product after the final revision can be seen in Figure 4 and Figure 5.

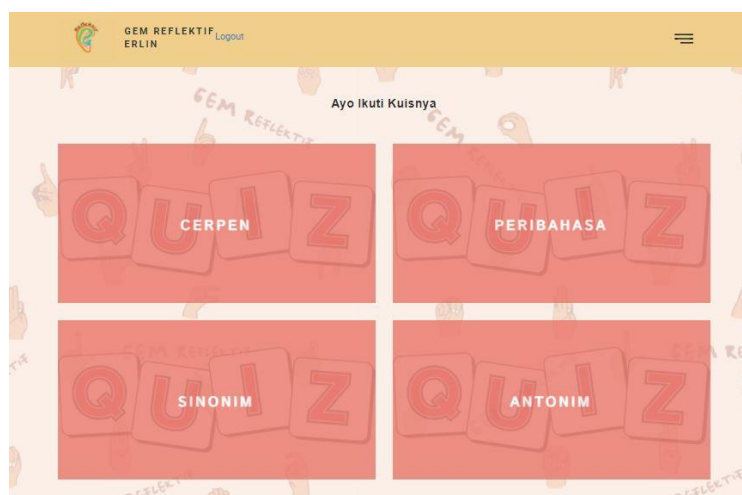
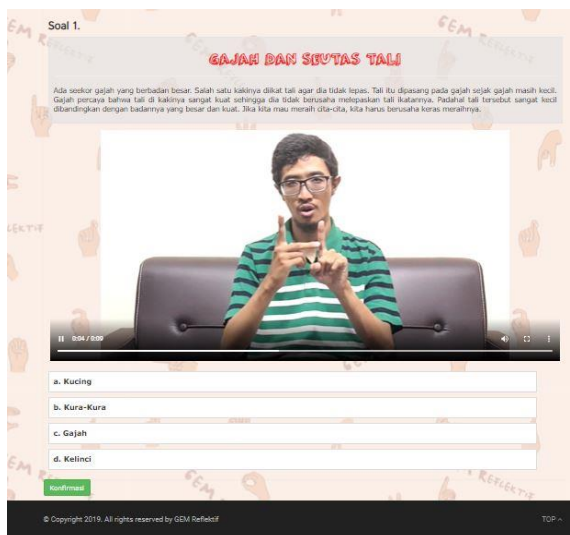


Figure 4. The Final Product Display

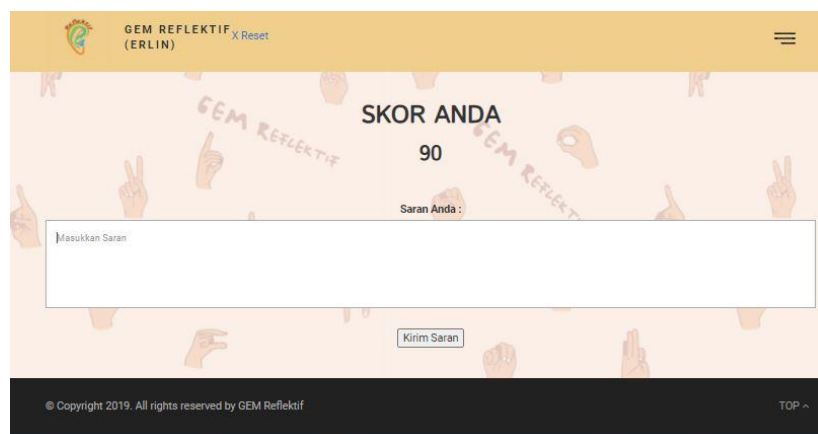


**Figure 5.** Display Product

Figure 4 is a front view of the final product that has been developed. There are four features for users. The first feature contains four short stories. At the end of the short story, users are directed to answer questions by selecting available answers. The questions are simulated in the form of a video.

Figure 5 displays the short story feature. Users are asked to read the written story and then answer the video's questions using sign language. The

second feature is proverbs that contain definitions of proverbs, questions about proverbs, and several answer options. The third feature is synonyms and antonyms. In the third and fourth features, users are asked to understand the definitions of synonyms and antonyms. Then, the users are directed to answer some questions in the form of a video using sign language. Users can freely choose one of the four features provided. Also, the users can replay these features.



**Figure 6.** The Display of Scoring Results

Users can see their scores from the first to the fourth features, as displayed in Figure 6. The users can provide input in the column provided by typing their suggestion.

Stage 8 was the effectiveness test through treatment using the product to determine the level of effectiveness. The effectiveness test used was the Wilcoxon test assisted by SPSS. The pretest scores were compared to the posttest scores.

**Table 1.** The Results of Wilcoxon Test

			Mean Rank	Sum of Ranks
Posttest– Pretest	Negative Ranks	0 <sup>a</sup>	.00	.00
	Positive Ranks	12 <sup>b</sup>	6.50	78.00
	Ties	0 <sup>c</sup>		
	Total	12		

Based on Table 1, it can be seen that twelve students improved their posttest scores. The average improvement score was 6.50, while the number of positive rankings was 78.00. The pretest and posttest were the word comprehension tests which contained ten multiple-choice written questions. The pretest and posttest questions contained questions to measure students' understanding of everyday vocabulary, proverbs, synonyms, and antonyms.

**Table 2.** Wilcoxon Hypothesis Test Results

	Posttest- Pretest
Z	-3.104 <sup>b</sup>
Asymp. Sig. (2-tailed)	.002

- a. Wilcoxon Signed Ranks Test
- b. Based on negative ranks.

Stage 9 was the analysis of research hypothesis testing. The hypotheses proposed in this research were:

Ho: Asymp. sig value > 0.005 (there is no difference between before and after using the Android-based reflective method).

Ha: Asymp. sig value < 0.005 (there is a difference between before and after using the Android-based reflective method).

The Wilcoxon test results displayed in table 3 show that the Asymp.Sig. (2-tailed) was smaller than 0.005 or 0.002 < 0.005. Therefore, Ha was accepted, and Ho was rejected.

Stage 10 was concluding. It can be concluded that there was a significant difference in receptive communication skills between before and after using the Android-based reflective maternal method. Research products can be a solution for special school teachers to

teach receptive communication to students with hearing impairments.

The product developed can be an alternative for online learning media's needs, significantly to improve receptive communication for the student with hearing impairments. Besides mentoring provided by classroom teachers, students also need to be accompanied by guidance and counseling teachers because failure in receptive communication will impact other developments, such as psychological development. One of the functions of guidance and counseling services as stipulated by the Ministry of Education and Culture, (2014) Permendikbud no 111 of 2014 point 2 is facilitating growth and development. It means that counseling teachers need to innovate to facilitate students' growth and development. One of the innovations is collaborating with class teachers in classroom learning using technological media developed in this research. Media in guidance and counseling services can clarify the presentation of messages or information so that they are not verbalized, overcome space limitations, change behavior from undesirable to desirable, and equalize perceptions between mentors and individuals being mentored (Prasetiawan & Alhadi, 2018; Risqiyain & Purwanta, 2019; Setiawan, 2016).

Optimization of services for particular school students is needed by supporting the guidance and counseling services. Students' achievement and talent development with special needs will be more helpful because the guidance services provided are adjusted to the disabilities (Awwad, 2015; Fitria & Yudhawati, 2018). Guidance and counseling services for students with special needs should adapt to the limitations. For a student with hearing impairments, the media or activities mostly use visual media. By extending visual experiences, the student with hearing impairments will connect visual



symbols with the experiences received, after which they will begin to learn to understand what has been seen through utterances or gestures, with speech or signs. Students with hearing impairments will learn how to interpret a word or sentence well (Hamidah, 2016; Hidayat et al., 2017; Junaidi, 2016).

The development of the reflective maternal method carried out by researchers using the android system resulted in an Android application product called a Reflective Gem. The Reflective Gem Android application prioritizes the visual senses to run it. It is equipped with simulation videos using sign language to make it easier for students to understand the context being conveyed. The short story feature will train students to understand longer sentences, especially those commonly used in everyday life. The antonym and synonym features will train the ability to understand abstract sentences for the student with hearing impairments. In contrast, the proverb feature will train students' ability to compose figurative form vocabulary.

## CONCLUSION

Students with hearing impairments have the same rights as other students. They should get proper education to facilitate their development according to their disabilities. The final product development in this research was an Android-based innovation for the student with hearing impairments. The Reflective Gem is easy to use for the student with hearing impairments and contains four interactive features that help them develop their receptive communication ability. The available features are short stories, proverbs, synonyms, and antonyms. However, the features that have been developed cannot detect students' oral responses, which has become the limitation of this research. Wilcoxon test was used to determine the effectiveness of the product. The Asymp.Sig (2 tailed) value obtained was

less than 0.005 or  $0.002 < 0.005$ . It means that there were differences in the student's receptive communication skills with hearing impairments before and after being given treatment using the Reflective Gem.

## REFERENCES

- Adiati, A. (2017). Meningkatkan kemampuan penguasaan kosakata berbasis denah desa Teluk Labuan pada mata pelajaran Bahasa Indonesia melalui penerapan metode maternal reflektif (MMR) di Kelas IV SDLB/B Bahari. *Jurnal Membaca Bahasa & Sastra Indonesia*, 2(1–9).
- Alessi, S. ., & Trolip, S. . (2001). *Computer based instruction: methods and development*. Prentice Hall International, Inc..
- Arif Khoiruddin, M. (2012). Peran komunikasi. *Tribakti Jurnal Pemikiran Keislaman*, 23, 118–131.
- Awi Victoria, M., Mewengkang, N., & Golung, A. (2016). Peranan komunikasi antar pribadi dalam menciptakan harmonisasi keluarga di Desa Kimaam Kabupaten Merauke. *E-Journal "Acta Diurna,"* 5(2).
- Awwad, M. (2015). Urgensi layanan bimbingan dan konseling bagi anak berkebutuhan khusus. *Al-Tazkiah: Jurnal Bimbingan Dan Konseling Islam*, 4(1), 46–64.
- Azizah, N., & Kurniawati, Y. (2013). Penerapan metode maternal reflektif dalam pembelajaran berbahasa pada anak tunarungu di kelas persiapan SLB Negeri Semarang. *Indonesian Journal of Early Childhood*, 2(2), 50–57.
- Bintoro, T. (2011). Kemampuan komunikasi anak tunarungu. *Perspektif Ilmu Pendidikan*, 23(XIV), 12–40. <https://doi.org/10.21009/pip.231.2>
- Csizer, K., & Kontra, E. H. (2020). Foreign language learning characteristics of deaf and severely

- hard-of-hearing students. *Modern Language Journal*, 104(1), 233–249. <https://doi.org/10.1111/modl.12630>
- Fajrin, A. S., & Hernawati, T. (2018). Media komik untuk melatih kemampuan membaca pemahaman pada siswa tunarungu. *Jurnal Asesmen Dan Intervensi Anak Berkebutuhan Khusus*, 18(2), 63–69.
- Fatimah, L. (2012). Pelaksanaan pengembangan kemampuan bahasa reseptif dan bahasa ekspresif anak tunarungu kelas TK 1 a studi deskriptif di LPATR Pangudi Luhur, Kembangan Jakarta Barat. *JPK: Jurnal Pendidikan Khusus*, 1(01), 48–56.
- Fibrianti, F. D. W. I. (2020). Pengembangan media pola kalimat sederhana berbasis android pada pembelajaran sains Universitas Negeri Surabaya. *Jurnal Pendidikan Khusus*, 15(1).
- Fitria, E., & Yudhawati, D. (2019). Pengaruh bimbingan kelompok teknik permainan simulasi terhadap peningkatan komunikasi reseptif siswa tunarungu. *Jurnal EDUCATIO: Jurnal Pendidikan Indonesia*, 5(2), 61. <https://doi.org/10.29210/120192328>
- Fitria, E., & Yudhawati, D. (2018). Pengembangan model bimbingan kelompok teknik permainan simulasi berbasis token economy untuk meningkatkan konsep diri positif siswa tunarungu. *Prosiding Seminar Nasional Strategi Pelayanan Bimbingan Dan Konseling Di Era Disrupsi*, 77–87.
- Gunawan, L., & Susiloyuwati, C. (2000). *Penguasaan bahasa anak tunarungu*. Yayasan Santirama.
- Haenudin. (2013). *Pendidikan anak berkebutuhan khusus tunarungu*. Luxima Metro Media.
- Hamidah, I. (2016). Penerapan metode demonstrasi dalam pembelajaran Bahasa Indonesia untuk meningkatkan kemampuan menulis kalimat sederhana pada siswa tunarungu. *Jurnal Asesmen Dan Intervensi Anak Berkebutuhan Khusus*, 12(1), 1–10.
- Hantono, D., & Pramitasari, D. (2018). Aspek perilaku manusia sebagai makhluk individu dan sosial pada ruang terbuka publik. *Nature: National Academic Journal of Architecture*, 5(2), 85. <https://doi.org/10.24252/nature.v5i2a1>
- Hernawati, T. (2007). Pengembangan kemampuan berbahasa dan berbicara anak tunarungu. *Jurnal Asesmen Dan Intervensi Anak Berkebutuhan Khusus*, 7(1), 101110.
- Hidayat, L., Gunarhadi, G., & Hidayatulloh, F. (2017). Multimedia based learning materials for deaf students. *European Journal of Special Education Research*, 2(3), 77–87. <https://doi.org/10.5281/zenodo.376744>
- Irwanto, F., Iswari, M., & Efrina, E. (2018). Efektivitas metode maternal reflektif dalam meningkatkan kemampuan bahasa anak tunarungu. *Jurnal Pendidikan Kebutuhan Khusus*, 2(2), 25. <https://doi.org/10.24036/jpkk.v2i2.140>
- Jambor, E., & Elliott, M. (2005). Self-esteem and coping strategies among deaf students. *Journal of Deaf Studies and Deaf Education*, 10(1), 63–81. <https://doi.org/10.1093/deafed/eni004>
- Junaidi, R. A. (2016). Permasalahan membaca pada siswa tunarungu. *Jurnal Rehabilitasi Dan Remediasi*, 25(1), 13–18.
- Kaba, A., & Ellala, Z. K. (2020). Exploring the use of educational technology among deaf students in the United Arab Emirates. *Universal Journal of Educational Research*, 8(10), 4845–4852.

- <https://doi.org/10.13189/ujer.2020.081056>
- Kurnia, R. A. M., Hakim, D. L., & Ana, A. (2019). The development of digital video applications for deaf students. *Journal of Physics: Conference Series*, 1318(1). <https://doi.org/10.1088/1742-6596/1318/1/012149>
- Lan, F. (2020). The employment guidance model based on the psychological characteristics of deaf college students. *2020 Conference on Education, Language and Inter-Cultural Communication (ELIC 2020)*, 490, 116–120. <https://doi.org/10.2991/assehr.k.201127.023>
- Liliweri, A. (2015). *Komunikasi antar personal*. Kencana.
- Liu, Q. (2020). The application of visual teaching resources in Chinese teaching in schools for the deaf\*. *5th International Conference on Economics, Management, Law and Education (EMLE 2019)*, 110(Emle), 1156–1159. <https://doi.org/10.2991/aebmr.k.191225.226>
- Peraturan menteri pendidikan dan kebudayaan republik Indonesia tentang bimbingan dan konseling pada pendidikan dasar dan pendidikan menengah, Pedoman Evaluasi Kurikulum 1 (2014).
- Mousley, K., & Kelly, R. R. (1998). Problem-solving strategies for teaching mathematics to deaf students. *American Annals of the Deaf*, 143(4), 325–336. <https://doi.org/10.1353/aad.2012.0082>
- Mudjiyanto, B. (2018). Pola komunikasi siswa tunarungu di Sekolah Luar Biasa Negeri Bagian B Kota Jayapura. *Jurnal Studi Komunikasi Dan Media*, 22(2), 151. <https://doi.org/10.31445/jskm.2018.220205>
- Mustika, A. (2017). Pembelajaran bahasa reseptif anak tunarungu pada usia dini di Sekolah Prima Bhakti Mulya. *Inclusive: Journal of Special Education*, III(01), 117–121.
- Mutiara, I. M. (2013). *Penggunaan media komunikasi visual dalam meningkatkan bahasa reseptif anak tunarungu*. Universitas Pendidikan Indonesia.
- Ngalimun. (2018). *Komunikasi interpersonal*. Pustaka Pelajar.
- Noermasari, Y. A., & M. Efendi. (2016). Efek metode maternal reflektif terhadap kemampuan berbicara anak tunarungu. *Jurnal Ortopedagogia*, 2(2), 82–85.
- Novialassafitri, S. D., & Purbaningrum, E. (2020). Penggunaan koklea implan sejak dini terhadap perkembangan berbahasa anak tunarungu: Sebuah literatur review artikel ilmiah. *Jurnal Pendidikan Khusus*, 1(1).
- Nurhadi, A., & Niswah, F. (2019). Penerapan komunikasi interpersonal tenaga pendidik dalam pencapaian prestasi belajar siswa di MTs Nahdliyatul Islamiyah Blumbungan Larangan Pamekasan. *AL-FIKRAH: Jurnal Studi Ilmu Pendidikan Dan Keislaman*, 2(1), 1–20.
- Prasetiawan, H., & Alhadi, S. (2018). Pemanfaatan media bimbingan dan konseling di Sekolah Menengah Kejuruan Muhammadiyah se-Kota Yogyakarta. *Jurnal Kajian Bimbingan Dan Konseling*, 3(2), 87–98. <https://doi.org/10.17977/um001v3i22018p087>
- Pujiwati, S. (2012). Meningkatkan pemahaman kosakata benda anak tunarungu melalui metode maternal reflektif di Kelas D II B di SDLBN Tarantang Lima Puluh Kota. *Jurnal Penelitian Pendidikan Khusus*, 1, 142–151.
- Rahmawati, I. (2015). Komunikasi sebagai motor melihat realitas bersama (kajian shared reality

- theory). *Buletin Psikologi*, 23(1), 31. <https://doi.org/10.22146/bpsi.10575>
- Risqiyain, L. H., & Purwanta, E. (2019). Pengembangan multimedia interaktif informasi karier untuk meningkatkan kematangan karier siswa Sekolah Menengah Kejuruan. *Jurnal Kajian Bimbingan Dan Konseling*, 4(3), 88–93. <https://doi.org/10.17977/um001v4i32019p088>
- Rois, A., & Astina, C. (2018). Implementasi metode maternal reflektif dalam pembelajaran bahasa arab bagi anak tuna rungu di SLB Purwosari Kudus. *Jurnal Penelitian Dan Pengabdian Kepada Masyarakat UNSIQ*, 5(3), 372–387. <https://doi.org/10.32699/ppkm.v5i3.486>
- Saputri, A. (2017). Analisis pola komunikasi pada siswa tunarungu di SMALB Dharma Asih Kota Pontianak. *Jurnal Pendidikan Dan Pembelajaran Untan*, 6(6), 192515.
- Saputro, A. D., Irwanto, Sri Atun, & Wilujeng, I. (2019). The impact of problem solving instruction on academic achievement and science process skills among prospective elementary teachers. *Elementary Education Online*, 18(2), 496–507. <https://doi.org/10.17051/ilkonline.2019.561896>
- Septiani, D., Meiyani, N., & Assjari, M. (2010). Pengembangan komunikasi verbal pada anak tunarungu. *Jurnal Asesmen Dan Intervensi Anak Berkebutuhan Khusus*, 9(2), 124–130.
- Setiawan, M. A. (2016). Peranan teknologi informasi dalam bimbingan dan konseling. *Bitnet: Jurnal Pendidikan Teknologi Informasi*, 1(1), 46–49. <https://doi.org/10.33084/bitnet.v1i1.770>
- Smith, C., & Colton, S. (2020). Creating a youtube channel to equip parents and teachers of students who are deaf. *Journal of Technology and Teacher Education*, 28(2), 453–461.
- Soekanto, S. (2012). *Sosiologi suatu pengantar*. PT Raja Grafindo Persada.
- Somad, P. (2016). Teori ekologi sebagai dasar pengembangan keterampilan komunikasi siswa tunarungu usia pra-sekolah. *Jassi Anakku*, 12(1), 97–111.
- Wardani. (2011). *Pengantar pendidikan luar biasa*. Universitas Terbuka Press.
- Weluk, K., Leton, S. I., & Lakapu, M. (2020). The ability of mathematical connections to deaf students in completing math test. *Journal of Honai Math*, 3(2), 432–437. <https://doi.org/10.5220/0008523204320437>
- Witri Erdiawati S.R, B. S. (2016). Counter balance. *Jurnal Asesmen Dan Intervensi Anak Berkebutuhan Khusus*, 18(2), 1–5.
- Wulandari, A., Dafik, & Susanto. (2014). Penerapan pembelajaran matematika realistik dengan whole brain teaching pada pokok bahasan teorema pythagoras untuk meningkatkan hasil belajar dan aktivitas siswa tunarungu kelas VIII B SMPLB Sinar Harapan Probolinggo tahun ajaran 2014/2015. *Edukasi UNEJ*, 1(2), 40–46.
- Wulandari, D., Unde, A., & Fatima, J. M. (2017). Kemampuan adaptasi dan integrasi pedagang jawa dengan pedagang lokal pasar tradisional di Kota Makassar. *Jurnal Analisis*, 6(1), 65–71.
- Yuknis, C., Santini, J., & Appanah, T. (2017). Supporting deaf students — and all students. *Educational Leadership*, 74(April 2017), 68–72.
- Zulmiyetri. (2017). Metoda maternal reflektif (MMR) untuk meningkatkan kemampuan bahasa lisan anak tunarungu. *Jurnal Konseling Dan Pendidikan*, 5, 62–67.