Journal of Disability
Volume 2, No. 2, December, pp. 71 – 78

Analysis of Development Needs of Android-Based Dot Cards Media in Mathematics Subject for Children with Medium Intellectual Disability in XI Grade

Asri Dwi Puspasari[1*], Sunardi[2], Subagya[3]
[1,2,3] Special Education Master Degree Programs, Universitas Sebelas Maret, Indonesia

[*]Corresponding Email: asri.dwip29@student.uns.ac.id

Abstract
The objective of this research was to obtain the findings of an analysis of students' and teachers' needs for Android-based learning media in Mathematics. The focus of this needs assessment was on intellectual disability in IX grade students and teachers at SLB Kota Madiun. The quantitative research method was used, and the research subjects were teachers and students in XI grade with intellectual disability at SLB Kota Madiun. The instrument in this study was a questionnaire. The findings indicated that the analysis of teacher and student needs would use Android-based learning media, particularly in Mathematics subjects, with a percentage of 100%. This showed that teachers and students strongly agreed to create Android-based learning media in Mathematics.

Keywords: android; intellectual disability; learning media; mathematics

Abstrak
Penelitian ini bertujuan untuk memperoleh temuan analisis kebutuhan siswa dan guru terhadap media pembelajaran Matematika berbasis Android. Fokus asesmen kebutuhan ini adalah pada tunagrahita siswa kelas IX dan guru di SLB Kota Madiun. Metode yang digunakan adalah penelitian kuantitatif, dengan subjek penelitian adalah guru dan siswa kelas XI tunagrahita di SLB Kota Madiun. Instrumen dalam penelitian ini adalah kuesioner. Hasil temuan menunjukkan bahwa analisis kebutuhan guru dan siswa akan menggunakan media pembelajaran berbasis Android khususnya pada mata pelajaran Matematika dengan persentase 100%. Hal ini menunjukkan bahwa guru dan siswa sangat setuju untuk membuat media pembelajaran matematika berbasis android.

Kata kunci: android; hambatan intelektual; matematika; media pembelajaran

How to Cite: Puspasari, A.D., Sunardi, & Subagya. (2022). Analysis of development needs of android-based dot cards media in mathematics subject for children with medium intellectual disability in XI grade. *Journal of Disability, 2* (2), 71 – 78. https://dx.doi.org/ 10.20961/jod.v2i2.75262.

INTRODUCTION

Children with intellectual disability have special needs and have low intellectual barriers in their thinking abilities. According to Zahara and Efrina (2013), children with medium intellectual disability have intellectual barriers, have an IQ below the average of 70, and have functional academic disabilities. (Wikasanti, 2014) Children with intellectual disability have an IQ of 30-50; children with medium intellectual can still be trained independently and meet and carry out their own needs.

The characteristics of children with medium intellectual disability are nearly unable to learn academic lessons (Apriyanto, 2012). Meanwhile, (Lisinus & Sembiring, 2020) state that children with medium intellectual disability are almost unable to learn academic subjects, have limited language development when learning to read, but have the potential to be trained in self-control and some jobs

that require mechanical training. Intellectual barriers have a large impact on the academic abilities of children with intellectual disability. Children's with medium intellectual disability limited thinking ability makes it difficult for them to consider abstract concepts. As a result of this limitation, children with medium intellectual disability face academic challenges, including difficulties with mathematics.

Mathematics is one of the subjects that develops logical thinking, not just arithmetic, because counting can be done using a calculator or other sophisticated calculating tools. As a result, children who study mathematics must have a correct and complete understanding of concepts appropriate to their developmental stage (Hartati, 2013) Mathematics plays an important role in many fields. Mathematics serves to improve communication skills with numbers and symbols, as well as to solve problems in everyday life.

According to (Zahara & Efrina, 2013), mathematics is learning that cannot be separated from the concept of numbers and addition. There are several types of arithmetic operating systems in learning mathematics, such as addition, subtraction, multiplication, and division. According to (Suparman, 2015), teachers should use something concrete, easy to understand, simple examples, language that is easy to understand and equipped with teaching aids, carried out in interesting and fun situations with changing methods when teaching counting to children with medium intellectual disability so that children with medium intellectual disability are not bored and are motivated to learn.

According to Sukiman (2012), learning media is anything that can be used to send messages from the sender to the recipient in order to stimulate thoughts, feelings, concerns, and interests, as well as the willingness of students, so that the learning process can effectively achieve learning objectives. Learning media can be designed and developed in response to current technological advances. Various types of media, methods, and learning models have been developed in the field of education to keep up with the times. One of them is the development of learning media in today's demands, namely teachers' ability to develop learning media to support the online learning process. With the advancement of learning media, students should be able to learn more independently. Furthermore, students will be more active in following the learning process with more interesting media, and their behavior will change as a result of their involvement in learning (Lestari, 2013). Examples of educational technology use include the use of computers, laptops, LCD projectors, and Android smartphones as learning media to display images, writing, and videos during teaching and learning activities.

One of the learning media platforms that is currently being developed is based on Android. Android is software that is utilized on mobile devices (devices running processes) as an operating system, middleware, and core applications (Irawan, 2012). Satyaputra and Aritonang (2016) define Android as an operating system for mobile phones, smartphones, and tablets. The Android system's function is to serve as an intermediary between devices and their use in utilizing various applications, allowing users to interact with their devices and run applications that make it easier for them to carry out activities related to the digital world to assist with work or daily needs.

Various modifications to the learning were required for the implementation of learning activities in SLB Kota Madiun. However, there were still some barriers to learning continuity, one of which was the use of media. Classroom teachers' use of learning media was still not optimal and unappealing, particularly in mathematics lessons. The media used by the teacher was still improvised and manual, making it less practical and effective because it was easily damaged and lost.

The problem of low numeracy ability in children with medium intellectual disability must be addressed as an alternative solution. This is due to the fact that counting is the foundation of mathematics lessons, and if left unchecked, it will have an impact on learning in general. As a result, there is a need for additional efforts to overcome these learning problems, and researchers are interested in developing dot card media. Previous research (Faradillah & Ainin, 2017) used dot cards learning media to improve the ability to count addition and subtraction in autistic children. Dot cards learning media also improved the ability to count prime numbers in mild children with medium intellectual disability class V. (Nurbaeti et al., 2020).

Previous researchers used dot cards media to improve numeracy skills in mathematics lessons. Novelty in this study was that the dot cards product was packaged in an application that can be downloaded from Google Play with a minimum Android specification of version 4.0. (Jelly Bean). The Android-based dot card media that is developed is expected to be able to increase interest in learning mathematics, particularly counting material, which is currently used by children with medium intellectual disability to learn to count both inside and outside of school, learning material becomes more interesting and easy to convey in order to improve the numeracy skills of intellectual disability children.

The objective of this study was to examine the needs of teachers and students at SLB Kota Madiun for android-based dot card media in mathematics for children with medium intellectual disability. This study concludes with the goal of determining whether android-based dot card media will be developed in mathematics based on the results of the needs analysis in terms of student assessment as users or from the teacher's perspective as media providers or makers, with a focus on the use of android-based media.

METHOD

This study was quantitative research. According to (Sugiyono, 2018), the quantitative research method is based on positivist philosophy. Quantitative research typically uses specific populations or samples as research representatives. The sampling technique is used in research to make decisions at random, based on specific considerations, or by using all benchmarks.

This study included all intellectual disabilityteachers and students from grade XI of public and private SLBs in Madiun City. In its representation or the selection of respondents or samples was used in this study. In this study, the researchers used a purposive sampling technique. According to

(Sugiyono, 2018), purposive sampling, is a technique used to select research samples based on specific criteria in order to obtain representative data. Four teachers and twenty intellectual disabilitystudents in XI grade were chosen as respondents from all public or private SLB in Madiun City.

In this study, data was collected using specific research instruments as a benchmark for making research decisions. The objective of this research was to examine the needs of teachers and students at SLB Kota Madiun for android-based dot cards learning media.

This study used an instrument, which is a tool used to measure the phenomenon to be observed (Sugiyono, 2018). The instruments in this study included data from respondents on the need for Android-based learning media in the teaching and learning process. This instrument only describes the quantitative reality obtained from the field and is translated into qualitative form.

A questionnaire was used in this study as an instrument. The needs analysis questionnaire was used to collect information on the needs of teachers and students for the use of Android-based learning media. The questionnaire results were analyzed using the percentage formula shown below (Sugiyono, 2018).

$$P = \frac{F}{N}$$

Where:

P = Score Percentage

F = Score Frequency

N = The number of respondents

RESULTS AND DISCUSSION

The initial activity before developing Android-based Dot Cards media was to conduct a needs analysis as a foundation for developing android-based learning media. The study was an examination of the needs of teachers and students in the development of Android-based media. This study aimed to determine whether students already have supporting media for implementing Android-based learning media in mathematics subjects, as well as the teacher's requirements for developing Android-based Dot Cards media.

Four teachers and twenty children with medium intellectual disability of XI grade from SLB Kota Madiun participated in this study. A questionnaire was distributed to teachers and students as a research tool in order to determine the need for Android-based learning media. The objective of this research analysis was to determine whether teachers and students truly required the use of android-based technology in mathematics. As a result, the researcher devised a number of questions concerning the requirements of Android-based learning media. Based on the results of the questionnaire, the needs of students for Android-based learning media in mathematics subjects was identified by following the

development of existing technology and information. Table 1 shows the results of the questionnaire and data processing for the student needs analysis.

Table 1. Results of Student Needs for Android-based Dot Cards Media

No	Questions	Alternative Answers	Percentage
1.	Do you have Android and know how to use it?	I have it and can put it to use. I don't have it, but I could use it. I don't have it and I can't use it.	75 25 0
2.	Do you frequently use Android?	Yes No	50 25
3.	For what purposes do you often use Android?	Study Social Media Game	37, 5 37,5 25
4.	Has your teacher ever used learning media based on Android in the learning process?	Yes No	75 25
5.	If yes, how frequently does your teacher use Android-based learning media in the classroom?	Everyday Sometimes	0 100
6.	Do you believe that using Android-based media in the learning process will make it more enjoyable?	Yes No	100 0
7.	Do you have difficulty with learning to count in mathematics?	Yes No	100 0
8.	Is the teacher's explanation sufficient for you to comprehend the math material?	Yes No	25 75
9.	Is the teacher's media adequate for you to understand arithmetic material in mathematics?	Enough Less	25 75
10.	Do you agree with the new media in the form of a dot cards app for Android?	Agree Disagree	100 0

According to Table 1, 75% of students have Android and can use it, while 25% do not have Android but can use it. The use of these devices 75% of students frequently use Android, 25% do not use it in their daily lives, and 37.5% use it for learning. Some teachers, as many as 75%, have used android-based learning media to support their learning activities, but not in the form of an application that is specific to the time period the teacher sometimes uses android in the learning process, as many as 100% of teachers only use the search application on Google to find their reference sources.

As a result, as many as 100% of students believe that using Android makes the learning process easier for them, and 100% have difficulty learning to count in mathematics because 100% of the teacher's explanation is insufficient for students to understand counting material in mathematics. Because 100% of students believed that the teacher's media was insufficient for students to understand counting material in mathematics, 100% of students agreed with the new media in the form of an Android-based dot card application. Based on the data in table 1, the analysis of student needs concludes that students agree that if Android-based learning media is developed to support the process of learning activities as a necessity in helping students master the material, particularly in mathematics.

Analysis of Teacher Need

The next step is to assess the teacher's needs for Android-based dot card media. An initial analysis was performed at this stage, namely by using a questionnaire developed by researchers to learn about the concept of Android-based media development. Table 2 shows the results of the questionnaire and the processing of teacher needs analysis data.

Table 2. Analysis of Teacher Needs for Android-Based Media Dot Cards

No	Questions	Alternative Answers	Percentage
1.	Learning to count mathematics subjects through the use of learning media	Yes No	100% 0
2.	Currently used media	Manual Electronic	100% 0
3.	The existing media is sufficient to support the learning process.	Agree Disagree	50 % 50 %
4.	In response to the existence of new media, an Android-based dot cards application to improve numeracy skills has been developed.	Agree Disagree	100% 0
5.	The media content must be adjusted to the curriculum/KI/KD.	Ya Tidak	100% 0
6.	The content of the media must be modified to the student abilities.	Yes No	100% 0
7.	Learning objectives must be communicated through the media.	Yes No	100% 0
8.	After the achievement of the material, do you think it should be accompanied by examples of questions?	Yes No	100% 0
9.	Finally, an evaluation must be performed to determine how far the average retarded students' understanding of the material presented has progressed.	Yes No	100% 0
10.	What type of assessment should be used	Multiple choice True False Another answer: an essay assisted by the teacher	75 % 0 25 %
11.	What color character would you recommend for the display of the Android-based dot cards learning media	Bright base color Dark base color	100% 0
12.	The best font for presenting materials and questions	Arial Tahoma Times new roman	0 100% 0
13.	Which font size is best for presenting information and questions	16 18 20	% 0 %
14	There is a constant button in dot cards learning media to assist disabled children in using the media.	Yes No	100% 0
15	Sound effects or backsound are required in dot card learning media.	Yes No	100% 0

According to the results of a teacher's needs questionnaire for android-based media completed by four respondents, 100% of teachers in the mathematics learning process use instructional media, and all of them continue to use manual media. 50% of teachers believe that existing media is insufficient to

support the learning process. As a result, it is possible to conclude that 100% of teachers agreed with the existence of new media in the form of an Android-based dot cards application to improve numeracy skills. According to Mahmudah et al. (2018), most learning media are packaged in the form of printed media or printouts in the form of textbooks, which are less appealing and practical to use in the process of learning activities. This demonstrates that learning media innovation is in line with technological developments, particularly Android-based learning media.

CONCLUSION

Based on the findings of the research, it is possible to conclude that the analysis of the needs of teachers and students for the use of Android-based learning media, particularly in Mathematics for children with medium intellectual disabilityin XI grade at SLB Kota Madiun, assumes the development of Android-based learning media with a 100% presentation agreeing with the media new application in the form of an Android-based dot cards application to support the learning process. It is expected that the advancement of learning media will make it easier for students to master teaching material, allowing them to easily achieve learning objectives. Students are not required to access learning at school, but they can access media wherever and whenever they want using Android media devices that they already own.

REFERENCES

Apriyanto, N. (2012). *Seluk beluk tunagrahita & strategi pembelajarannya*. Javalitera.

Faradillah, Y., & Ainin, I. (2017). *Penggunaan media pembelajaran dot cards terhadap kemampuan hitung penjumlahan dan pengurangan pada anak autis di SDLB.*

Hartati, N. (2013). Meningkatkan kemampuan mengenal konsep bilangan 1 sampai 10 melalui pohon bilangan bagi anak tunagrahita ringan. *Jurnal Ilmiah Pendidikan Khusus*, *1*, 489–501.

Irawan. (2012). *Membuat aplikasi android untuk orang awam*. Maxikom.

Lestari, I. (2013). *Pengaruh waktu belajar dan minat belajar terhadap hasil belajar matematika.*

Lisinus, R., & Sembiring, P. (2020). *Pembinaan anak berkebutuhan khusus* (Muhammad Iqbal, Ed.). Yayasan Kita Menulis.

Mahmudah, M., Munzil, M., & Yulianti, E. (2018). Validity and reliability study of science-edutainment interactive multimedia on earth topic for the 7th graders of junior high schools. *Jurnal Penelitian Fisika Dan Aplikasinya (JPFA)*, *8*.

Nurbaeti, Alamsyah Sidik MPd, S., & Yudha Pratama, T. (2020). *Pengaruh penggunaan media dot cards terhadap kemampuan penjumlahan bilangan prima pada anak dengan hambatan intelektual kelas V di SKH Negeri 01 Lebak.* http://jurnal.untirta.ac.id/index.php/UNIK

Satyaputra, A., & Aritonang, E. M. (2016). *Let's build your Android apps with Android Studio*. PT Elexmedia Komputindo.

Sugiyono. (2018). *Metode penelitian kuantitatif, kualitatif dan r&d* (Sutopo, Ed.). Alfabeta.

Sukiman. (2012). *Pengembangan media pembelajaran*. Pustaka Insan Madani.

Suparman. (2015). *Peningkatan kemampuan berhitung pada anak tunagrahita ringan melalui media permainan kartu*. *EDU-MAT Jurnal Pendidikan Matematika*, 3 (2), 142 -148.

Wikasanti, E. (2014). *Mengupas therapy bagi tunagrahita retardasi mental sampai lambat belajar*. Redaksi Maxima.

Zahara, L., & Efrina, E. (2013). *Efektivitas media ceker-ceker untuk meningkatkan kemampuan operasi hitung bagi anak tunagrahita ringan*. http://ejournal.unp.ac.id/index.php/jupekhu