

Developing audio-based pop-up book learning media for introducing numbers 1-10 for children with intellectual disability grade II in SLB negeri 1 barru

Ade Magfira A

Guidance and Counseling Specialty in Special Education, SLB Negeri 1 Barru, Indonesia

Email: ademagfira03@gmail.com

Triyanto Pristiwaluyo

Special Education, Makassar State University, Indonesia

Email: triyanto.pristi@unm.ac.id

Syamsuddin

Special Education, Makassar State University, Indonesia

Email: syamsuddin6270@gmail.com

(Approved: 19-12-2023; revised 24-05-2023; published: 01-06-2023)

Abstract: This research aimed to develop a product in the form of an audio-based pop-up book learning media for introducing numbers 1-10. The focus of this research is to find out the process of developing learning media starting from analyzing teacher needs, designing pop-up book learning media, validating media content, to determining the effectiveness of pop-up book learning media based on audio introduction to numbers 1-10. This research utilized the 4D development model (four-D model) modified into 3 stages without reducing the value or development itself. Data collection techniques in this study used interview techniques and questionnaires with descriptive qualitative and quantitative data analysis. The results of the study on the needs analysis indicated that teachers and students need learning media for the introduction of numbers 1-10. The design of the media is a 3D book that has a speaker and is equipped with a user manual. Content validity was tested using the Gregory formula with the results that have been declared valid for use, and the effectiveness of this media was analyzed using the Recode into different variables transformation using the SPSS program.

Keywords: learning media; pop-up book; audio; numbers; intellectual disability.

Abstrak: Tujuan penelitian ini adalah untuk menghasilkan produk berupa media pembelajaran *pop-up book* berbasis audio pengenalan angka 1-10. Masalah dalam penelitian ini adalah untuk mengetahui proses pembuatan media pembelajaran mulai dari analisis kebutuhan guru, desain media pembelajaran *pop-up book*, validitas isi media, hingga tingkat keefektifitan dari media pembelajarn *pop-up book* berbasis audio pengenalan angka 1-10. Penelitian ini menggunakan model pengembangan 4D (*four-D model*) dimodifikasi menjadi 3 tahapan tanpa mengurangi nilai atau pengembangan itu sendiri. Teknik pengumpulan data dalam penelitian ini menggunakan teknik wawancara serta angket dengan menganalisis data secara deskriptif kualitatif dan kuantitatif. Hasil penelitian pada analisis kebutuhan menunjukkan bahwa guru dan peserta didik membutuhkan media pembelajaran tuntuk pengenalan angka 1-10. Desain media ini berupa buku berbentuk 3D yang memiliki sebuah *speaker* serta dilengkapi dengan buku petunjuk penggunaan media. Validitas isi menggunakan uji validasi formula Gregory dengan hasil yang telah dinyatakan valid untuk digunakan, serta efektifitas media ini menggunakan transformasi *Recode into different variables* dengan program SPSS.

Kata kunci: media pembelajaran; *pop-up book*; audio; angka; tunagrahita.

Copyright © 2023 Universitas Negeri Makassar. This is an open access article under the CC BY-NC-ND license (<http://creativecommons.org/licenses/by-nc-nd/4.0/>).

INTRODUCTION

Education aims to improve the student's ability in the aspects of attitudes, social, knowledge, and skills. As stated by (Hambali, 2021), education aims to develop all students' potential units to be human beings who are faithful and devoted to God Almighty, have a noble character, are healthy, knowledgeable, capable, creative, independent, and responsible. To do so, some branches of science should be studied by every human being in everyday life, such as mathematics. Mathematics is a human activity that can be understood by everyone and is useful in everyday life such as problem-solving and modeling (Umam, M.K, 2018).

Students with intellectual disabilities have some difficulties in interaction and concentration so they require special treatment. It is in line with the opinion (Widiastuti, 2019) saying that students with intellectual disabilities require education along with specialized services. Thus, the teacher should help the students in dealing with their learning difficulties. Their under-70-intelligence level as well as weak memory and attention make them unable to maintain their focus on something serious for a long time. According to (Tarigan, 2019), both the attainment and development of their intelligence level are always below the average of children their age, as well as limited. It results in learning difficulties, especially in mathematics (Chasanah, 2019). One of the difficulties experienced by students with intellectual disabilities in the academic field is counting.

Counting is one of the basic cognitive skills that is as important as reading and writing skills. Quoted from (Khoirunnisa, 2022), counting is an activity that is also commonly referred to as the activity of mentioning the sequence of numbers. One of the numeracy skills is recognizing numbers. Basic competencies in the 2013 Curriculum for Mathematics subject mention recognizing numbers as the early and basic stage of the subject.

Ungurean (2021) mentions that the definition of intellectual disabilities based on the American Association of Intellectual and Developmental Disabilities (AAIDD) is a condition with significant limitations in intellectual function and adaptive behavior before the age of 22 years.

Moghimi et al. (2018) explained that according to American Psychological Association, students with intellectual disabilities

refer to students who have under 70 intelligence (IQ) scores, experience barriers in adaptive behavior, and occur before the age of 18.

Bennadi et al. (2020) elaborates that the American Association of Mental Deficiency (AAMD) classifies intellectual disabilities into four categories based on intelligence quotient (IQ); mild IQ score is 50-55 to 70, moderate (IQ score 35-40 to 50); severe (IQ score 20-25/35); or profound (IQ score below 20/25).

Intellectual disabilities can be classified based on their intelligence levels: *debil*, *embisil*, and *idiot*. Even though they have some barriers, teaching and learning processes in the academic field can be administered to students with intellectual disabilities in the form of learning to read, write, and do basic arithmetic.

To develop their ability to think logically and systematically, learning the ability to recognize numbers should be conducted for students with intellectual disabilities.

Number recognition given to the students can be used as the early foundation for students' knowledge development. According to Syamsiah (2019), number recognition is the ability to understand a number that will make students act according to their understanding gained through practice and perform certain tasks because of that skill.

Winda & Mahyuddin (2022) explain that number recognition is a skill that plays an important role in supporting students' achievement in both knowledge and social as well as emotional skills.

The purpose of number recognition for students is to help students develop their skills for communication using symbols and numbers as well as to solve the problem in their daily life. The ability to recognize the number 1 to 10 for students with intellectual disabilities is a crucial matter because it is a basic skill to support their daily life.

Students with intellectual disabilities are slow to recognize numbers because they are difficult in understanding and focus their concentration, thus it will be easier for the students to understand this learning process if they use interesting media. A simple and effective way to train students to recognize numbers is by using pictures. Pop-up book media with audio is a suitable and interesting medium in the number recognition learning process.

Tezer et al. (2019) elaborate that someone's visual abilities can be developed through their visions. Visual literacy is a language or material

equipped with images used to convey messages (Wulandari, 2021)

Nurfitri et al. (2022) explain that media is anything that is used to convey messages and able to develop children's thinking, and desires to learn.

The National Education Association (Arsyad, 2017) defines media as a communication tool in the form of both print and audio-visual media so that media can be seen, heard, or read.

The use of visual media can be a good source of information in education. Using media in learning will make the materials easy to deliver and understand. Visual media used in the learning process can strengthen the interaction between students and teachers, as well as increase students' desire, interest, and motivation to learn.

Hamalik (Karo & Rohani, 2018) argue that using media during teaching and learning activities can increase students' interest, motivation, and desire to participate in learning.

According to Nicolaou et al. (2019), the main reason for designing visual media is to improve oral communication.

Leshin, Pollock & Reigeluth (Arsyad, 2017) categorize media into five categories, which are Human media, including instructors, teachers, and tutors; Print media, such as commonly used instruments, such as books; Visual media, such as a picture; Audio-visual media, such as videos, films; and Computer media, that is media used in the learning process involving computers.

Manshur & Ramdlani (2019) state that audio-visual media can help the learning process more effectively because the information obtained by being seen and heard is fast and easy to remember.

Audio-visual media, according to Nicolaou et al. (2019), can be implemented by educators at all levels of education and disciplines, both as a tool for conveying knowledge and improving learner skills. This is in line with the opinion of Budhyani et al. (2020) that the use of audio-visual-based learning media can increase the enthusiasm and interest of students in participating in the learning process, thus improving the quality of learning as expected.

Audio-visual media are claimed to be a good tool used in the process of delivering learning materials. The audio-based pop-up book is one example of audio-visual media that can be used to introduce numbers 1-10.

A pop-up book is a fascinating interactive tool that plays a role in developing children's abilities in various aspects of knowledge and

skills. It combines words and images with beautiful and interesting design elements. This book has a 3-dimensional appearance that gives the impression of a living picture thus it makes the book look different from general books. The pop-up illustration is a 3D figure that appears when the sheet of the book is opened. When it is closed, it becomes a simple sheet of an ordinary book.

Bickel et al. (2018) explain that the pop-up model has a unique open configuration. The design of making pop-up books is generally found in children's books.

The advantages of pop-up books are able to visualize the story better and more interesting. The images in the Pop-up book are 3-dimensional which can appear when it is opened from one page to another page. It attracts the attention of students when they are using the media.

According to Sari & Suryana (2019), pop-up books can be used as a medium to improve children's learning motivation, develop children's creativity and imagination, increase knowledge, instill a love of reading, and be more active in learning. The two-dimensional display that is dynamic in a pop-up book is in accordance with the concrete operational stage of children's cognitive development. This book is suitable as a practical learning medium for the development of student's knowledge and is one of the innovative educational tools.

The audio-based pop-up book is multisensory media that pours material and images that are real in the form of 3 dimensions accompanied by audio. This media can be used with 3 kinds of learning consisting of audio, visual, and kinesthetic. The audio in this pop-up book aims to accompany the story on each page of the book. The audio shapes and strengthens the illustrations in the pop-up book, which is expected to increase students' motivation and interest in learning to recognize numbers 1-10.

Based on this research, learners experience difficulties in focusing attention, and children only memorize numbers without knowing the number symbols. If this problem is not handled properly, then learners will experience difficulties in their daily lives related to numeracy.

The needs analysis test conducted at SLB Negeri 1 Barru, obtained information about the need for the development of learning media for children with disabilities, especially in the field of mathematics. The limited multisensory-based media results in the provision of learning materials to students with intellectual disabilities becoming monotonous. In improving the learning

process, it is necessary to utilize the available technology by developing learning media for children in achieving mathematics teaching objectives.

The final product is in the form of learning media designed according to the needs and characteristics of children with intellectual disabilities. The learning media referred to is pop-up book learning media that was developed into an audio-based pop-up book with learning material that includes the introduction of numbers 1-10 with pictures, numbers 1-10, and simple words.

METHODS

This audio-based Pop-Up Book learning media development applied the Research and Development method. According to Muqdamien et al. (2021), research & development (R&D) is a process to develop or improve something that already exists and the products that have been developed are tested for effectiveness. The research development method was employed in this study to develop and validate the research product. The developed model was designed using the 4D model (Four-D Model) development type.

Muqdamien et al. (2021) pointed out that the developing model for tools or teaching aids suggested by Sivasailam 4D model (Four-D model) consisted of 4 stages, namely; define, develop, and disseminate.

According to Pratiwi et al. (2022), R&D is a type of research that creates or develops new products with a certain number of steps. The applied 4D model was modified according to the needs of the research without reducing the values or the development process itself in order to answer the proposed problem formulation consisting of defining, designing, and developing stages.

This research was conducted at SLB Negeri 1 Barru and the subject was a teacher of the intellectual disability class at the school, while the two validators are a media development expert in Educational Technology and a material expert in Special Education.

Data collection techniques in this research and development were interviews, instruments for validation tests, and questionnaires. Interviews with teachers were conducted to find out the difficulties and students' needs in learning numbers. There were two questionnaires used, one to assess the needs of the media and the other to measure the viability of the media to be

developed. The data collected from the questionnaire in identifying the students' needs were obtained through the teachers' responses regarding the availability of learning media.

The teacher needs questionnaire consisted of 10 questions used to find out the need for pop-up book media for learning numbers. The expert validation instrument is an instrument used by experts to assess the product and to provide validation for the developed learning media.

The data collected was then analyzed using descriptive analysis techniques. Content validity analysis by media and material experts was conducted based on Gregory's formula. The effectiveness test in the limited trial implemented the Recode Into Different Variables transformation with the help of SPSS program.

RESULTS AND DISCUSSION

This study produced an Audio-Based Pop-up Book product using Thiagarajan's 4-D (Four-D) development model.

1. Defining

In the initial analysis, interviews were conducted with teachers to analyze the problems found in learning activities, and the results obtained from the interviews stated that the teacher only used the Q&A and lecturing methods when learning took place and the limitations of multisensory-based media resulted in the provision of learning materials to students with intellectual disabilities being monotonous because the teacher only taught using thematic books with fully provided material.

Based on direct observation in the classroom, an analysis of the learners was conducted and preliminary information was obtained regarding the learners' interest in learning, learning habits, and behavior in the classroom, as well as direct interviews with the class teacher to obtain information on the learners' academic abilities and cognitive development. Furthermore, researchers have analyzed the content of teaching materials in accordance with the Basic Competencies (KD) of the 2013 curriculum used in SLB Negeri 1 Barru. The material taught covered the activities of introducing numbers. The formulation of learning objectives referred to the three types of intelligence developed, i.e., cognitive, affective, and psychomotor, but they still need to be adjusted to the basic competencies that have been set nationally and the results as reflected in the developed learning media.

2. Designing

This step prepared all the things that were used in designing the learning media and the manual book for using the media. The initial stage of product development was designing concepts, and materials based on the needs and capabilities of children with intellectual disability. The development process of number recognition learning media was carried out by developing various objects of number symbols, images, words, and audio that were integrated with speakers to produce a product that was tailored to the material or subject matter that would be used. This stage was divided into several parts, including the development of the media product and the manual book for using the media.

3. Developing

The development stage was assessed by validators and limited product trials. The validated draft was revised in accordance with the

suggestions given by the validator team, then tested on a limited basis at school by 6 teachers of SLB Negeri 1 Barru.

The validation test in the media validity test was carried out by a team of validators using material validation instruments and media validation instruments. The validation instrument was a questionnaire with a scale scoring system with 4 as the highest score and 1 as the lowest score. The results obtained from both validators were used for the content validity assessment which was measured using Gregory's formula so that the assessment and examination of the suitability between the indicators and the instrument items carried out by the two validators were presented in Gregory's formula.

The following formula is used to calculate the content validity coefficient using Gregory's formula:

Table 1. calculate the content validity coefficient

		Expert 1 Assessment	
		Weak Relevance (score item 1 or 2)	Strong Relevance (score item 3 or 4)
Expert 2 Assessment	Weak Relevance (score item 1 or 2)	A	B
	Strong Relevance (score item 3 or 4)	C	D

$$Koefisien Validitas Isi = \frac{D}{(A + B + C + D)}$$

Description:

A : The cell that was considered irrelevant by both assessors/experts

B and C: Cells that indicated different views between assessors/experts

D : The cell that was considered relevant by both assessors/experts. (Ayuningsih, 2020)

The range of possible validity coefficients is between 0.0 to 1.0, and the closer the validity coefficient value to 1.0, the better. According to Gregory (Sembung et al., 2022) the tabulated coefficient of validity completeness percentage ranges from 0.00 to 1.00 with invalid to very valid categories. In line with this opinion Wicaksono et al. (2020) interpreted the validation results of the

two validators used the standard index of agreement referred to as follows, < 0.4 which means very low validity, between 0.4 - 0.8 moderate (mediocre) and ≥ 0.8 which means high.

The media validation calculation was based on the assessment of 2 validators. With the calculation of cross tabulation 2 x 2 Gregory formula, which are:

Table 2. calculate the content validity coefficient

		Expert 1 Assessment	
		Weak Relevance (score item 1 or 2)	Strong Relevance (score item 3 or 4)
Expert 2 Assessment	Weak Relevance (score item 1 or 2)	0	0
	Strong Relevance (score item 3 or 4)	0	19

$$Kofisien Validitas Isi = \frac{19}{(0 + 0 + 0 + 19)} = \frac{19}{19} = 1$$

After obtaining the validation results from the two expert validators, these results were interpreted using Gregory's validity criteria standard, the validity coefficient value of 1 was in the highest category. Furthermore, material :

validation calculations were carried out based on feedback from 2 expert validators. With the calculation of 2 x 2 cross tabulation Gregory's formula as follows

Table 3. calculate the content validity coefficient

		Expert 1 Assessment	
		Weak Relevance (score item 1 or 2)	Strong Relevance (score item 3 or 4)
Expert 2 Assessment	Weak Relevance (score item 1 or 2)	0	6
	Strong Relevance (score item 3 or 4)	0	24

$$Kofisien Validitas Isi = \frac{24}{(0 + 6 + 0 + 24)} = \frac{24}{30} = 0.8$$

After obtaining the validation results from the two expert validators, these results were interpreted using Gregory's validity criteria standard, the validity coefficient value of 0.8 was in the high category. The value of the validation coefficient which was considered high indicated that the pop-up book learning media based on audio recognition of numbers 1-10 for children

with intellectual disabilities based on the material test by the expert was qualified to be proceeded to the limited trial stage.

This limited trial was carried out to test its effectiveness, at this stage, Recode into Different Variables transformation was applied using SPSS program and manually as presented below:

Category:

Low: ≤ 9 ($rata - rata = \underline{X} - 1Sd = 9$)

Neutral : $\underline{X} - 1Sd < N \leq \underline{X} + 1Sd$

Effective : $> \underline{X} + 1Sd = < 21$

Description:

R : Range

\underline{X} : Average

Sd : Standard of Differentiation

$$X_{min} = 6$$

$$X_{max} = 24$$

$$R = X_{max} - X_{min} = 24 - 6 = 18$$

$$\underline{X} = \frac{X_{max} + X_{min}}{2} = 15$$

$$Sd = \frac{R}{3} = 6$$

The calculation results using SPSS program can be seen in the following table:

Table 4. calculation results

Items	Score	Description
1	24	Effective
2	23	Effective
3	24	Effective
4	23	Effective
5	24	Effective
6	22	Effective
7	22	Effective
8	24	Effective
9	24	Effective
10	21	Neutral
11	24	Effective
12	22	Effective
13	21	Neutral
14	23	Effective
15	23	Effective
16	20	Neutral
17	24	Effective
18	24	Effective
19	24	Effective

After the assessment of 6 teachers of intellectual disability classes in SLB Negeri 1 Barru, audio-based pop-up book learning media for introducing numbers 1-10, based on the SPSS program, showed an effective category of 84%, while the neutral category was 16%.

The lack of varied media such as multisensory learning media has caused teachers to only teach using thematic books that only contain monotonous developed material, so that students' enthusiasm in learning becomes less and they quickly feel bored. The limitations of media have become a consideration for researchers in developing an audio-based pop-up book media for introducing numbers 1-10 considering the student with intellectual disability who learned easier with things that are more interesting and multisensory.

The audio-based pop-up book is a 3D book that has a speaker, each page of the book contains conceptual images, numbers, and simple sentences. The images' coloring was specially made to attract children's interest. The audio-based pop-up book was created using art carton papers for each page and a hardcover to get long-term quality and usability, sized 20 x 4 x 27.5 cm and equipped with a speaker.

The Validator Test of the audio-based pop-up book for introducing numbers 1-10 for children with intellectual disabilities was assessed by a team of validators, using a media validation instrument and a material validation instrument which were presented with the Gregory formula. The results obtained were based on the media expert validation score which showed a value of 1 which was classified in the highest category, while the material expert validation score was 0.8 which was also declared as a high category, thus based on the material test and media test by experts, the media was considered eligible to proceed to the limited trial stage.

The limited trial stage was a step to obtain questionnaire results which were answered by 6 teachers of children with intellectual disabilities and analyzed descriptively with an effectiveness test using the transformation of Recude into different variables using SPSS program. The results obtained for the effectiveness value from the limited trial was 84%. The acquisition of an effectiveness percentage of 84% proved that the pop-up book learning media based on audio recognition of numbers 1-10 is effective to use.

CONCLUSIONS AND SUGGESTIONS

Based on the results of research and discussion, it can be concluded that:

1. The results of the needs analysis conducted at SLB Negeri 1 Barru show that teachers and students need audio-based pop-up book learning media for introducing numbers 1-10 for children with intellectual disabilities.
2. The design of learning media that had been carried out started from planning, development, product development, and designing the production process of supporting learning instruments, with the final result being an audio-based pop-up book product for introducing numbers 1-10 along with an instruction book for using the media.
3. The validity results of the audio-based pop-up book for introducing numbers 1-10 have met the validity criteria.
4. The results of the effectiveness carried out in the limited trial according to the responses of the teachers of the intellectual disability class using the Recode into different variables transformation with the help of SPSS program showed that the audio-based pop-up book was effective to use.

The learning media developed in this study was an audio-based pop-up book for introducing numbers 1-10 for children with intellectual disabilities, therefore it is recommended to further researchers to develop a more interesting media and conduct field trials to see the learning outcomes of the finished product.

REFERENCES

- Arsyad, A. (2017). *Media Pembelajaran*. Raja Grafindo Persada.
- Ayuningsih, N. P. M. (2020). Validitas Isi Media Pembelajaran Interaktif Berorientasi Model Problem Based Learning dan Pendidikan Karakter. *Jurnal Matematics Paedagogic*, *V*(1), 54–62. <https://doi.org/https://doi.org/10.36294/jmp.v5i1.1398>
- Bennadi, D., Konekeri, V., Maurya, M., Reddy, V., Satish, G., & Reddy, C. V. K. (2020). Oral hygiene negligence among institutionalized mentally disabled children in Mysore city — A call for attention. *Journal of Family Medicine and Primary Care*, *9*(4).
- Bickel, B., Cignoni, P., Malomo, L., & Pietroni, N. (2018). State of the Art on Stylized Fabrication. *Computer Graphics Forum*, *37*(6), 1–18.
- Budhyani, I. D. A. M., Angendari, M. D., & Sudirtha, I. G. (2020). The effectiveness of using audio-visual media to improve student 's self-efficacy in fashion design course. *Jourlan of Physics: Conference Series*, *1516*.
- Wulandari, F., Yogica, R., & Darussyamsu, R. (2022). Analisis manfaat penggunaan e-modul interaktif sebagai media pembelajaran jarak jauh di masa pandemi COVID-19. *Khazanah Pendidikan*, *15*(2), 139-144.
- Hambali, I. (2021). Manajemen Pendidikan Karakter Dalam Meningkatkan Disiplin Peserta Didik. *Jurnal Ilmiah Ilmu Pendidikan*, *87-93*.
- Itsni Khoirunnisa, R. S. (2022). Analisis Media Magnetic Number Untuk Meningkatkan Kemampuan Berhitung Anak Usia 5-6 Tahun. *Jurnal Pendidikan dan Konseling*, *1748-1753*.
- Karo-Karo, I. R., & Rohani. (2018). Manfaat Media Dalam Pembelajaran. *AXIOM*, *VII*.
- Manshur, U., & Ramdlani, M. (2019). Media Audio Visual Dalam Pembelajaran Pai. *Al Murabbi*, *5*(1), 1–8. <https://doi.org/10.35891/amb.v5i1.1854>
- Moghimi, M., Esmaeilpour, N., Karimi, Z., Zoladl, M., & Moghimi, M. A. (2018). Effectiveness of Resilience Teaching via Short Message Service on Stress of Mothers of Educable Mentally Retarded Children. *Iranian Journal of Psychiatry and Behavioral Sciences*, *12*(4).
- Muqdamien, B., Umayah, Juhri, & Raraswaty, D. (2021). Tahap Definisi dalam Four-D Model Pada Penelitian Research & Development (R&D) Alat Peraga Edukasi Ular Tangga Untuk Meningkatkan Pengetahuan Sains dan Matematika Anak Usia 5-6 Tahun. *Jurnal Intersections*, *6*(1).
- Nicolaou, C., Matsiola, M., & Kalliris, G. (2019). Technology-Enhanced Learning and

- Teaching Methodologies through Audiovisual Media. *Education Sciences*, 9(3).
- Nurfitri, A., Octaverino, M. I. Y., Aisyi, N. S. R., Iskandar, S., & Rosmana, P. S. (2022). Meningkatkan Pengenalan Angka Melalui Media Kartu Angka Terhadap Anak Sekolah Dasar. *ALPEN: Jurnal Pendidikan Dasar*, 6(1).
- Ninik Usfatun Chasanah, R. F. (2019). Pengaruh Penggunaan Media Sempoa Geometri pada Kemampuan Berhitung Tunagrahita. *Jurnal Ortopedagogia*, 12-17.
- Pratiwi, N. T., Nopita, D., & Elfiza, R. (2022). Developing A Student Handout of English Material for Grade Eight. *Journal of Language, Literature, and English Teaching (JULIET)*, 3(2), 56–66.
- Sari, N. E., & Suryana, D. (2019). Thematic Pop-Up Book as a Learning Media for Early Childhood Language Development. *Jurnal Pendidikan Usia Dini*, 13(1). <https://doi.org/https://doi.org/10.21009/10.21009/JPUD.131.04>
- Sembung, F. Y., Arnyana, I. B. P., & Mulyadiharja, S. (2022). Pengembangan Media Pembelajaran Google Sites Berbasis STEM Materi Pencemaran Lingkungan Kelas X SMA Negeri Bali Mandara. *Jurnal Pendidikan Biologi Undiksha*, 9(2), 174–186.
- Syamsiah. (2019). Perancangan flowchart dan pseudocode pembelajaran mengenal angka dengan animasi untuk anak paud rambutan. *STRING (Satuan Tulisan Riset Dan Inovasi Teknologi)*, 4(1), 86–93.
- Tezer, M., Ucar, O., & Tepe, A. (2019). A Research on the Use of Visual Media Technology in Education. *Education in the Knowledge Society*, 20, 1–9.
- Tarigan, E. (2019). Efektivitas Metode Pembelajaran Pada Anak Tunagrahita di Slb Siborong-Borong. *Jurnal Pionir LPPM Universitas Asahan*, 56-63.
- Ungurean, B. C. (2021). Theoretical Aspects of Intellectual Disability-Definition, Classification. *Bulletin of The Transilvania University of Braşov*, 14(1).
- Veryawan, & Hasibuan, M. (2020). Penggunaan Media Kartu Angka Dalam Upaya Meningkatkan Kemampuan Mengenal Angka Pada Anak Usia Dini. *PAUDI*, 09(02), 62–70.
- Wicaksono, L. A., Ajie, H., & Duskarnaen, M. F. (2020). Pembuatan Video Tutorial Perawatan Notebook Mata Kuliah Praktikum Teknik Komputer program Studi Pendidikan Teknik Informatik dan Komputer Universitas Negeri Jakarta. *Jurnal Pinter*, 4(2).
- Widiastuti, N. L. G. K., & Winaya, I. M. A. (2019). Prinsip khusus dan jenis layanan pendidikan bagi anak tunagrahita. *Jurnal Santiaji Pendidikan (JSP)*, 9(2).
- Winda, N., & Mahyuddin, N. (2022). Pengaruh Gender pada Kemampuan Mengenal Angka pada Anak Usia Empat Tahun. *Jurnal Obsesi: Jurnal Pendidikan Anak Usia Dini*, 6(6), 6701–6709.