Scripta
ISSN-e 2746-2706
pbiumpwr20@umpwr.ac.id
ISSN-p 2302-6677
English Department Journal

Trial Braille Audio Media Development for Disability Foreign Student and Its Validation

Yuli Widiyono[1], Herlina Setyowati[2], Aris Aryanto[3], Rochimansyah[4], Chuang Chen[5], Luana Fogly
{widiyono@umpwr.ac.id[1], herlina@umpwr.ac.id[2], arisanto@umpwr.ac.id[3], rochimansyah@umpwr.ac.id[4], chenchuang@zzuit.edu.cn[5], fogli.luana@titoliviomartina.it[6]}

Universitas Muhammadiyah Purworejo, Indonesia[1234]
School of Art and Design, Zhengzhou University of Industrial Technology, China[5]
Liceo Tito Livio in Martina Franca, Italy[6]

DOI:10.37729/scripta.v11i1.5158

Abstract. Individuals with disabilities have equal rights to access education. For Disabilities Foreign Student (DFS), it is important to assist them in learning javanese scripts in Javanese Language and Literature Education Program (PBSJ). The development of a Braille audio media application (BAM) for script-based learning using technology was explored. This study aimed to analyze the validity of developing Braille audio media. The development method employed a 4-stage model: Define, Design, Develop, and Disseminate, adapted into a 4-D model. The Javanese script Braille audio media application was developed using the Software Development Life Cycle (SDLC) Waterfall model, encompassing planning, modeling, implementation, and testing phases. Validation results from practitioners and academics indicated that the media aspect validation was 82.5%, and validation from subject matter experts was 78.75%, both categorized as suitable. Developing the BAM based on information technology aids foreign students with disabilities in learning and exploring Javanese cultural values through Javanese scripts.

Keywords: Audio media, Javanese script, Braille, Disabilities foreign student.

1. INTRODUCTION

In the realm of education, factors influencing learning can be categorized into two groups: internal and external factors. Internal factors, such as physical, psychological, and fatigue-related elements, reside within the individual learner[1]-[2]-[3]. Conversely, external factors encompass familial, school-related, and societal influences [1], [2], [3].

Government education policy, as outlined in Article 3 of Law No. 20 of 2003, aims to stimulate educational strategies that foster comprehensive intelligence and uphold national educational objectives, emphasizing the development of a dignified national character and civilization. Additionally, Article five of the National Education System Law (Sisdiknas) in 2003 mandated specialized education for citizens with physical, emotional, mental, intellectual, or social impairments.

Universitas Muhammadiyah Purworejo (UMPWR), committed to being a disability-friendly campus, continually expands and enhances educational services for students with special needs, aligning with Minister of Research, Technology, and Higher Education Regulation No. 46 of 2017 on Special Education and Services in Higher Education. Data from the Disability Services Unit and Student Counseling at UMPWR indicates that there are 21 DFS enrolled, including 4 visually impaired and 17 physically DFS. These students are distributed across various programs, including PBSJ.

PBSJ in UMPWR, as a provider of Javanese language and literature education, supports university policies and operational guidelines aimed at facilitating education for DFS. The program adheres to the *Merdeka Belajar-Kampus Merdeka* curriculum framework, focusing on preparing future educators with competencies in Javanese language and literature through courses like Manuscript Reading in Javanese Script, Literary Writing, Philological Knowledge, and Manuscript Reading in Old Javanese Script. However, existing guidelines for Javanese script learning do not adequately accommodate DFS, particularly the visually impaired.

PBSJ faces challenges in teaching Javanese script, with visually impaired students encountering difficulties in practical script reading and writing exercises, limiting their exploration of the profound

cultural values within Javanese manuscripts. Moreover, the program's learning objectives have not been fully realized. To address these challenges, there is a pressing need for the development of Braille audio media application (BAM) that accommodate visually impaired students.

The learning media has been observed by some scholar to find the effectiveness, the easiness and the students‘ or teachers‘ perspective [4], [5], [6]. The creativity will develope the technology more useful for student. It needs also the colaboration with the cross field researchers [7].

This initiative proposes the development of a Javanese script BAM to assist students in enhancing their competencies in reading and writing Javanese script using audio guidance and Braille keyboard functionalities. Such advancements aim to support the educational needs of visually impaired individuals across different institutions, contributing to the preservation and enhancement of local cultural heritage, particularly Javanese script, as part of national cultural development. To scaffold the DFS, they used English as universal language that is undertandble. The research statement for this study are:

1.How is Braille audio media application (BAM) developed?

2.Is the Braille audio media application (BAM) able to validated?

Literature Review

Learning Media

In an optimal learning process for students, media-based learning is a tool used by teachers to convey It is to maximize the learning process. New technologies, especially multimedia, are playing an increasingly important role in the learning process [8], [9], [10]. Many people believe that multimedia brings us to learning situations that replace forced learning with fun learning [4], [5], [6]. The learning media that is quite popular with various groups today is multimedia-based learning media [14], [15], [16]. In language learning it needs media to motivate the students and give the positive feedback from them [17], [18], [19] In addition, educational tasks must include moral values, noble character, creativity, independence and leadership, which are very difficult in the existing education system . The traditional education system is less flexible in mastering competency material because the teacher has to study the material intensively [16], [20], [15].

Learning media needs to be created or developed based on the needs of the community. Especially for people with special needs such as learning Javanese script in studying language in special program in UMPWR. The development of learning media is possible to provide facilities in learning certain subject matter or courses [19]. Learning to write and read Javanese script to support the student’s competences this study program. Therefore, the development of learning media is an urgent thing to do [21].

Asynchronous Media Platform

Asynchronous learning is called self-regulated meaning that the student is able to keep track of and take responsibility for his or her own academic performance [22]. The quality of the study might be affected by how well the pupils are able to monitor their own progress in learning. Students are able to comprehend more information and acquire more knowledge when they have daily study routines that they adhere to. In addition, students who are able to self-regulate have a better chance of improving their academic performance since they are more aware of the techniques that they should use or prepare for in the future [23]. The researchers had been used for non English novice who studying English in Russia Federation, he found the new perception for this idea [24], [25]. It effectively avoids anxiety and shows the context visuality. The investigation consisted of an in-depth, subjective examination. A technique that included both meetings and surveys was implemented to compile the information. The discoveries of this review show that students' impression of internet learning at the University of Bengkulu The second previous study hung off during the Covid-19 pandemic at the University of Bengkulu [26]. It showed an equal relationship between students’ motivation and strategy in learning a second language. Practicing TEFL Using ICT course at IAIN Salatiga. The review found that learning English through infographics enjoys two benefits and disservices. It likewise found the challenges and inspiration of the students.

Learning to Write and Read Javanese Script

Learning to write and read the Javanese script are two of the four competencies that must be possessed by students in the study program in addition to listening and speaking competencies. The competence to write and read the Javanese script is an absolute must for students of the Javanese

Language and Literature Education study program in addition to listening and speaking. This needs to be a serious concern considering that some students in the Javanese Language and Literature Education study program are students with special needs. Remembering that education must be carried out fairly and equitably because it is absolutely needed for human sustainability [8]. Therefore, it is necessary to create learning media for writing and reading Javanese script that allows students with special needs (disabled/visually impaired) to be able to adaptively use learning media so as to help in achieving competence in writing and reading Javanese script.

Braille audio media application (BAM)

Limited visual abilities for the visually impaired have an impact on the lack of any information that is visual [27]. BAM is one way to help the visually impaired in learning, especially in learning to write and read the Javanese script in the PBSJ UMPWR. BAM is an adaptive technology intended for the visually impaired. Even so, until now there has been no assistive technology that uses BAM applied in keyboards on PCs or laptops. This research seeks to develop the BAM assistive technology [28]. This application use English as universal language to scaffold DFS to comprehend the material.

2. METHOD

This study is a Research and Development (R&D) endeavor utilizing the 4D model, as recommended [29], [30]. The 4D model comprises four stages: Define, Design, Develop, and Disseminate. The research was conducted at Muhammadiyah University of Purworejo during September-October 2023, involving three DFS students as subjects.

The instruments utilized in this research include media expert response instruments, subject matter expert response instruments, and student feedback [31]-[32]-[33]. Data collection instruments involved questionnaires (surveys) and test instruments. Data analysis employed Likert scale to measure attitudes, opinions, and perceptions of individuals or groups regarding social phenomena. The social phenomena in this study were specifically defined as research variables by the researcher [34].

Data analysis prerequisites included tests for normality, homogeneity, and t-tests. Specifically: Normality tests aimed to assess whether regression models of dependent and independent variables exhibited normal data distribution [35], ; Homogeneity tests were conducted to ascertain variance equality between two data groups, and T-tests were utilized to compare mean learning outcomes between experimental and control groups [36].

The design of the development of a BAM for students with special needs for the visually impaired, namely in the form of developing a technology-based learning media application that contains features and implementation steps in learning the Javanese script. Media tersebut memuat tentang BAM who helped DFS understand and evaluate the results of writing and reading Javanese script students, as well as developing the function of a PC or laptop keyboard in the form of *braille*. BAM development model is using *Software Development Life Cycle* (SDLC) model *Waterfall.* Model *Waterfall* adalah suatu proses Sequential software, seen as constantly flowing down (like a waterfall) through the phases of planning, modeling, implementation and testing.

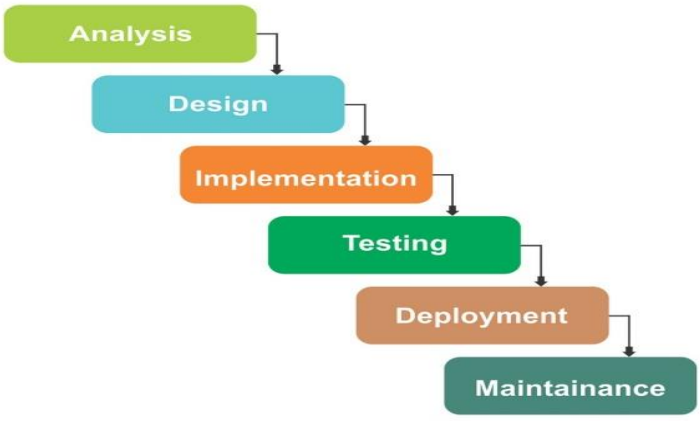

Figure 1. Model SDLC Waterfall

Requirement Gathering and analysis: Collecting the needs in full is then analyzed and defined the needs that must be met by the program to be built. This phase is used to identify the needs of BAM development needed. One of them is Javanese script material or material that will be included in the media to be developed.

Design

In the design stage, the researcher coordinates with the developer partner to select and determine *the software* to be used for program development. The design that will be developed is in the form of BAM.

Figure 2. *Braile Audio App Design*

Implementation, the implementation stage is the stage of creating a desktop-based BAM to make it easier to implement; Testing, BAM that have been made are tested for performance to find out whether the developed features are working or not; maintenance, Maintenance is the process of installing the BAM and the application repair process as needed.

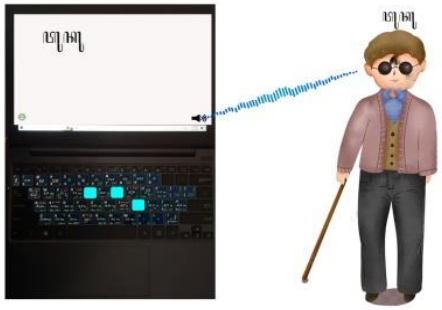

Figure 3. Javanese script media software BAM

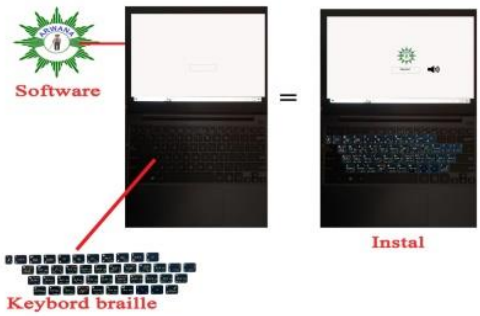

Figure 4. Implementation of Writing and Reading Javanese Script

If all SDLC processes have been implemented, the improvement process will be continued and the iteration will be carried out again from the beginning, in accordance with the established stages or development methods.

Assistive Technology Development Methods

The development method of Assistive Technology (Assistive/Adaptive Technology) uses the Research and Development (R&D) research method. The development of this media uses the ADDIE method approach, namely Analyze, Design, Develop, Implement, and Evaluate. The following are the stages of developing BAM for students with special needs or DFS. It is important to analyze of student needs related to learning Javanese script, learning objectives or course competency achievements related to the Javanese script, and analyze the sources, types, and materials of BAM develope design BAM for students with DFS, Make a prototype of a BAM, Validate by a team of media experts, material experts, and BAM media design. The plans are to develop Trial of Javanese braille audio media application products, Evaluate and revision of BAM products and Implement in a large class of BAM products. This Evaluation is the results of the validity, practicality, and effectiveness of Javanese script learning media. Indicators of success in the development of Javanese script learning media, namely: results of validation of Javanese script learning media by learning media experts and practitioners, as well as information technology practitioners [37].

Overall, the research employed quantitative descriptive analysis to understand the statistical aspects of the data gathered. These methods and analyses contributed to evaluating the effectiveness of the developed Braille audio media application for learning Javanese script among DFS.

4. DISCUSSION

The Javanese script Braille audio media developed underwent prior validation by subject matter experts and media experts. For this study, validation was conducted by validators from academia and industry practitioners. This application has been developed as an assistive tool for reading for DFS. Based on the data analysis of the 10 aspects validated by media experts, the assessment criteria are as follows: the total score obtained from the media expert validation was 66 out of a maximum score of 80. With this score, the percentage result from the data is 82.5%, which falls into the "valid" classification. Notes from the media experts regarding the platform suggest the need for pretest and posttest trials with students, and the inclusion of varied, straightforward questions. The validation indicates that the platform is deemed suitable for use as a tool for research and learning for DFS. The validation scores from the media experts are presented in a bar diagram as follows:

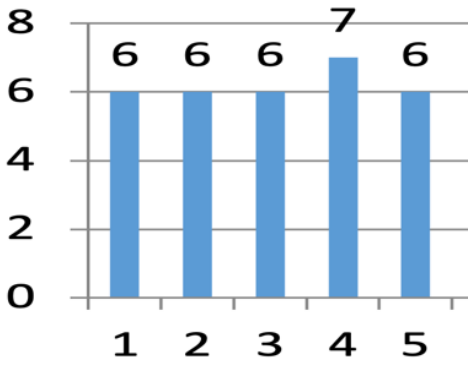

Figure 5. Media expert value validation of Histogram

The assessment scores from subject matter experts regarding the developed material are depicted in Figure 5, showing a score of 63. Thus, it can be stated that the validation results by subject matter experts classify the application as valid [38]-[39]-[40]. Based on the data analysis of the 10 aspects validated by subject matter experts, the assessment criteria are as follows: the total score obtained from the subject matter expert validation was 63 out of a maximum score of 80. With this score, the percentage result from the data is 78.75%, which falls into the "valid" classification. The validation scores from subject matter experts are presented in a bar diagram as follows:

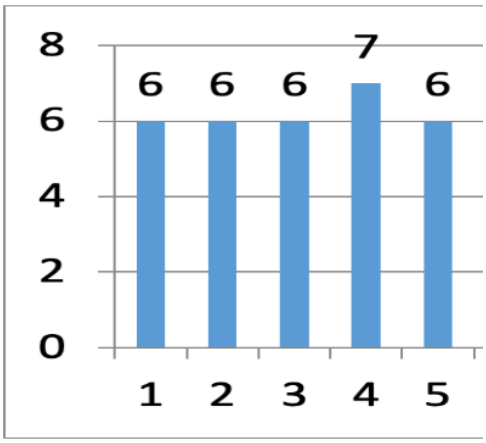

Figure 6. Expert validation value of Histogram

Based on the validation scores from subject matter experts shown in Figure 6, the average score is above 6. This result indicates that the Braille audio media developed for visually impaired student learning can proceed to the development stage or be tested with DFS.

5. CONCLUSION

Based on the analysis of data across the 10 aspects validated by subject matter experts, the developed Braille audio media for learning by visually impaired students received a total score of 63 out of a maximum of 80. This equates to a percentage of 78.75%, categorizing it as valid and suitable for further development stages. The validation process involved rigorous assessment by experts in the field, ensuring that the material meets the necessary criteria for effectiveness and usability in educational settings catering to DFS. The high validation score underscores the applicability and readiness of the Braille audio media in enhancing the learning experience for visually impaired students, particularly in the realm of Javanese script and cultural studies.

The findings from the subject matter expert validation, as illustrated in Figure 3, demonstrate an average score exceeding the benchmark of 6 across the evaluated dimensions. This signifies robust support for advancing the Braille audio media into subsequent developmental phases or conducting trials with DFS. Such progression is crucial for refining the application's functionalities and addressing any specific needs or challenges identified during the validation process. Moreover, the positive validation outcome reinforces confidence in the efficacy of the media as an educational tool that promotes accessibility and inclusivity within higher education institutions.

In conclusion, the validation results affirm the readiness of the Braille audio media developed for Javanese script learning among visually impaired students. By achieving a high validation score and meeting the established criteria, the media proves its viability for further developmental stages and potential implementation in educational settings. Moving forward, continued refinement and adaptation based on feedback from DFS and educators will be pivotal in maximizing the media's effectiveness and ensuring its seamless integration into educational practices that support diverse learning needs.

This study found that DFS have a high evaluation and good validation in using BAM as language medium. The mean score was good standard and it is categorized in strongly validated, and this finding can be interpreted to mean that the process of learning with BAM, and it can foster students' enthusiasm. In addition to this, the use of BAM was hindered by the poor quality of the internet connection. As a result, the students were made to feel extremely uninterested in the subject matter, and it was often challenging for them to comprehend it.

6. REFERENCES

[1] M. Nurfitriyanti, "Model Pembelajaran Project Based Learning Terhadap Kemampuan Pemecahan Masalah Matematika," *FRM*, vol. 6, no. 2, Nov. 2016, doi: 10.30998/formatif.v6i2.950.

[2] D. Subekti, "PENERAPAN MODEL COOPERATIVE LEARNING TIPE COURSE REVIEW HORAY UNTUK MENINGKATKAN HASIL BELAJAR EKONOMI," 2017.

[3] S. Suyitno and S. Syakirun, "Pengembangan media pembelajaran audio vidio pada motor bakar 4 langkah untuk meningkatkan prestasi belajar," *Jurnal Pendidikan Surya Edukasi*, vol. 4, no. 1, pp. 19–34, 2018.

[4] E. S. Masykuri, "Three Character Building by Using Comik Wayang," *Jurnal Pendidikan Surya Edukasi*, vol. 2, no. 2, pp. 1–13, 2017.

[5] N. M. Rodzi, J. A. Kumar, S. Osman, and E. Masykuri, "Exploring Lecturers' Acceptanceof Learning Management Systems in Malaysian Higher Educational Institution," 2020.

[6] S. Shintiani, S. Sukarni, and Edi Sunjayanto Masykuri, "Teacher's Strategies of English Online Learning during COVID-19 Pandemic in SMA N 8 Purworejo," *Scripta: English Department Journal*, vol. 9, no. 2, pp. 172–181, 2022, doi: 10.37729/scripta.v9i2.1470.

[7] E. Maskuri, Y. Hakim, A. Ashari, and S. Supriyono, "Integrated Technology And Mutual Participation For Changing Communities Socially, Economically And Religiously," presented at the Proceedings of the 1st International Conference on Science and Technology for an Internet of Things, European Alliance for Innovation (EAI), 2018.

[8] N. Prihatini, S. Sudar, and Edi Sunjayanto Masykuri, "The Impact of Using Blended Learning to Improve Reading Comprehension," *Scripta : English Department Journal*, vol. 10, no. 1, pp. 128–139.

[9] N. Nurhidayah, Tusino, and Edi Sunjayanto Masykuri, "Students' Perception toward EFL College Teacher Pedagogical Competence in Teaching Writing," *Scripta*, vol. 9, no. 2, pp. 209–216, 2022, doi: 10.37729/scripta.v9i2.1475.

[10] I. Edi Sunjayanto Masykuri Ike Nugraeni, J. Kumar, "Performing Discourse Student's Skill by Using Video," in *Islam, Media, and Education in Digital Era*, Taylor and Francis, 2022, pp. 336–319.

[11] Edi Sunjayanto Masykuri and R. Nurhadi, "Observing Illocution in E-Comic Strip The Adventure of Tintin and Its Implication in English Language Teaching During The Pandemic," *JIBS*, vol. 1, no. 1, pp. 29–43, 2022.

[12] L. Lubis, B. Febriani, R. Yana, A. Azhar, and M. Darajat, "The Use of Learning Media and its Effect on Improving the Quality of Student Learning Outcomes," *International Journal Of Education, Social Studies, And Management (IJESSM)*, vol. 3, pp. 7–14, Jun. 2023, doi: 10.52121/ijessm.v3i2.148.

[13] K. Khotimah, E. Sunjayanto, and I. Istiqhfarin, "COMBINING NEW TECHNOLOGY IN ELT TO CREATE INNOVATION IN STUDENT'S LEARNING," presented at the SEMINAR NASIONAL BAHASA, SASTRA, DAN BUDAYA, 2017.

[14] Aqib, "Model-Model Media dan Strategi Pembelajaran Kontekstual (Inovatif)," *J. Chem. Inf. Model*, vol. 53, pp. 1689–1699, 2013.

[15] R. Nurhadi and E. S. Masykuri, "Symbol Meaning and Dialectic Perspectives on Social Media," presented at the Proceedings of the 1st Borobudur International Symposium on Humanities, Economics and Social Sciences (BIS-HESS 2019), Magelang, Indonesia, 2020.

[16] Edi Sunjayanto Masykuri and B. Basuki, "Students' perception of digital media for English teaching learning," *Teaching Englis as A Foreign Language Jornal*, vol. 1, no. 1, pp. 64–73, 2022, doi: 10.12928/tefl.v1i1.171.

[17] Edi Sunjayanto Masykuri, S. Sukarni, T. Tusino, and P. Dewi, "The Cohessive Device in Hiver.com and Its Implication in Teaching Online Writing," *Jurnal Ilmu Bahasa Sastra dan Pengajarannya*, vol. 1, no. 2, pp. 124–135, 2022.

[18] Edi Sunjayanto Masykuri and A. T. Wan, "Kecenderungan Baru dalam Pendidikan Virtual di Metaverse," in *Kumpulan Kajian Metaverse*, 2023, pp. 111–130.

[19] Edi Sunjayanto Masykuri, "Optimizing Video in Zoom Meeting to Improve Students' Speaking Performance," *Premise*, vol. 12, no. 1, pp. 31–45, 2023, doi: 10.24127/pj.v12i1.4878.

[20] E. S. Masykuri, "Analysis the Clauses Using Modal with Perfect Infinitive on Novel the Other Side of Midnight and Its Translation in Bahasa Indonesia," *Jurnal Pendidikan Surya Edukasi*, vol. 1, no. 1, p. 121670, 2015.

[21] E. S. M. M. W. Latifah and F. Nuraini, “PRAGMATIC STUDIES: THE USE OF CODE-SWITCHING IN JAVANESE ART PERFORMANCE DONE BY STUDENTS OF SMPN 1 KESESI KABUPATEN PEKALONGAN,” presented at the ELTiC CONFERENCE, 2017.
[22] A. B. De Bruin, H. Thiede, K. W. Camp, and G. Redford, “Generating keywords improves metacomprehension and self-regulation in elementary and middle school children.,” *Journal of Experimental Child Psychology*, vol. 109, no. 3, pp. 294-310., 2011, doi: https://doi.org/10.1016/j.jecp.2011.02.005.
[23] J. Mahlberg, “Formative self-assessment college classes improves self- regulation and retention in first/second year community college students,” *Community College Journal of Research and Practice*, vol. 39, no. 8, pp. 772–783, 2015, doi: https://doi.org/10.1080/10668926.2014.922134.
[24] Edi Sunjayanto Masykuri, V. Olesya Vladimirovna, and M. I. Evgenevich, “First-year-students’ perceptions of asynchronous media platform (AMP) for learning English,” *ELTEJ*, vol. 6, no. 3, pp. 188–189, Dec. 2023, doi: https://doi.org/10.12928/eltej.v6i3.6661.
[25] I. Kusuma, A. Ngafif, and E. S. Masykuri, “E-Learning Usage Analysis in English Language in Universitas Muhammadiyah Purworejo,” *Scripta: English Department Journal*, vol. 8, no. 2, pp. 35–44, 2021.
[26] W. Yunita and I. Maisarah, “Students ’ Perception On Learning Language At The Graduate Program Of English Education Amids The Covid 19 Pandemic,” *Linguists: Journal of Linguistics and Language Teaching*, vol. 6, no. 2, 2020.
[27] M. Hardiah, “Improving Students Listening Skill by Using Audio Visual Media,” *Al-Lughah: Jurnal Bahasa*, vol. 7, no. 2, p. 39, 2019, doi: 10.29300/lughah.v7i2.1673.
[28] C. Chen, N. Jamiat, S. N. Abdul Rabu, and Y. Mao, “Effects of a self-regulated-based gamified interactive e-books on primary students’ learning performance and affection in a flipped mathematics classroom,” *Education and Information Technologies*, Jun. 2024, doi: 10.1007/s10639-024-12789-7.
[29] S. S. Thiagarajan, D.S., and M. I. Semmel, *Instructional Development for Training Teachers of Exceptional Children*. Indiana: Indiana University Bloomington, 1974.
[30] S. Suyitno, “Metodologi penelitian tindakan kelas, eksperimen, dan R & D.” Alfabeta Bandung, 2018.
[31] R. Mayefis and S. Barat, “Development of android based mobile learning media on computer assembly at a vocational high school,” *International Journal of Innovation, Creativity and Change*, vol. 11, no. 4, pp. 347–361, 2020.
[32] S. Syahril, R. A. Nabawi, and F. Prasetya, “The Instructional Media Development of Mechanical Drawing Course Based on Project-Based Learning,” *International Journal of Innovation, Creativity and Change*, vol. 11, no. 4, pp. 309–325, 2020.
[33] P. Purnamawati, M. Akil, and N. Nuridayanti, “Analysis of needs for the development of trainer sensor and transducer learning media based on Internet of Things (IoT),” *jpv*, vol. 11, no. 2, pp. 232–242, Nov. 2021, doi: 10.21831/jpv.v11i3.43833.
[34] Sugiyono, *Metode Penelitian Pendidikan*. Bandung: Alfabeta, 2015.
[35] R. E. Walpole, S. L. M. Myers, and R. E. Walpole, “Ye.Probability & Statistics For Engineers & Scientists,” 2017.
[36] D. Coghlan and M. Brydon-Miller, *The SAGE Encyclopedia of Action Research*. 1 Oliver’s Yard, 55 City Road, London EC1Y 1SP United Kingdom: SAGE Publications Ltd, 2014. doi: 10.4135/9781446294406.
[37] B. Al Fakih, A. Morei, and M. Salehi M, “Students’ Impression About Using Mobile Phones in Classroom,” *International Journal of Emerging Technologies in Learning (IJET)*, vol. 15, no. 22, p. 230, 2020, doi: 10.3991/ijet.v15i22.16219.
[38] Z. Abdullah, “Dalam Upaya Pencegahan Dan Penanganan Covid-19’,” *Jurnal Pengabdian Masyarakat*, pp. 11–29, 2020.
[39] T. Mahfud, M. B. Triyono, P. Sudira, and Y. Mulyani, “The influence of social capital and entrepreneurial attitude orientation on entrepreneurial intentions: the mediating role of psychological capital,” *European Research on Management and Business Economics*, vol. 26, no. 1, pp. 33–39, Jan. 2020, doi: 10.1016/j.iedeen.2019.12.005.
[40] T. L. H. Nghia and N. T. M. Duyen, “Developing and validating a scale for evaluating internship-related learning outcomes,” *High Educ*, vol. 77, no. 1, pp. 1–18, Jan. 2019, doi: 10.1007/s10734-018-0251-4.