

Development of project-based learning models with digital literacy to improve the ability to write procedural texts for junior high school students

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ABSTRACT

The learning model has an important role in improving students' ability to write procedural texts. This research aims to develop and test the feasibility of a project-based learning model with digital literacy to improve students' ability to write procedural texts. This research is motivated by the low use of gadgets to support learning. This research method uses a *Research and Development* (R&D) approach with ADDIE design, which includes the stages of needs analysis, model design, development, model trial, and evaluation. The subject of the study was a grade VII junior high school student in Kuningan Regency. The results showed that the developed learning model had a high level of feasibility, with an average feasibility percentage of 91%, learning syntax of 94%, and the use of digital media or applications of 93%. The results of the learning model trial received a very positive response from teachers with an average score of 100% and from students of 84.20% with the very good category. The results for learning to write procedural texts showed an average score of 90.30, classified as excellent. In addition, students show a high level of proficiency in the use of digital applications, especially in the aspects of editing, writing titles, using hashtags, and publishing works. Thus, the project-based learning model with digital literacy developed has proven to be feasible and effective for improving the writing ability of junior high school students' procedural texts.

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Introduction

The rapid development of technology, information, and communication has not been fully enjoyed by all students. This happens because there is no equal distribution of comprehensive education development in Indonesia (Zafitri et al., 2024). The development of education is required to be able to adapt to these developments through learning that is relevant to the needs of the 21st century, which emphasizes that students and teachers are required to have digital literacy skills in the learning process (Mardhiyah et al., 2021; Zahra & Salwa, 2025). The literacy strengthening program launched by the government can be integrated with the use of digital technology-based learning models so that competency development not only emphasizes mastery of materials, but also digital literacy skills (Limilia & Aristi, 2019; Nurfadiya & Susilo, 2025).

The essence of learning is a planned process to develop students' abilities as a whole that includes cognitive, affective, and psychomotor aspects (Tohari & Rahman, 2024). However, in practice, the achievement of these three aspects still faces various obstacles stemming from the factors of students, teachers, and limited educational facilities and infrastructure (Ana, 2020; Suplig, 2020). The rapid development of information and technology that can be accessed quickly is often not balanced by students'

ability to critically choose information (Ariyanto et al., 2022; Restianty, 2020; Rosyidah & Ismeirita, 2023). This shortage needs to be immediately overcome through innovative learning models that are able to direct students in utilizing technology positively and educationally.

This solution is immediately carried out because one of the successes of effective learning is determined by the right learning model (Sari & Angreni, 2018; Zainal & Nurhayatin, 2019). The learning model is a conceptual framework that describes the steps in systematically organizing the learning experience to achieve certain learning goals (Salsabila & Hindun, 2023). One of the learning models that is relevant to these needs is the Project-Based Learning model. This model actively involves students in producing output products or projects through the process of investigation and problem-solving (Purba et al., 2023; Sari & Angreni, 2018). The project-based learning model focuses on student-centered learning, encouraging cooperation, creativity, and producing meaningful real products (Alwi et al., 2021; Rasyad et al., 2017).

In order for the implementation of project-based learning to be more contextual with the times, it is necessary to integrate digital literacy into the learning process (Sugiarto et al., 2024). Digital literacy is the ability that a person has to understand, utilize, and access technology wisely (Anarizka & Wilsa, 2023; Purba et al., 2023). Digital literacy includes a person's ability to search for information on the internet, understand the structure of hypertext, evaluate content, and compile knowledge from various sources of information (Fauzi & Usmeldi, 2022). Digital literacy skills are very relevant and support 21st-century learning, which includes creative thinking, critical thinking and problem-solving, communication, and collaboration (Sirait & Nasution, 2024).

The integration of digital literacy has a very important and strategic role in learning the Indonesian language, especially in developing writing skills. Writing is one of the high-level language skills because it requires mastery in expressing ideas, thoughts, and feelings systematically and easily understood by readers (Trisniyati, 2023). One type of text that is important for junior high school/MTs students to master is procedural texts, which are texts that contain systematic steps to carry out an activity or achieve certain goals (Nuraidah & Sari, 2020).

Based on preliminary studies through interviews with Indonesian language teachers, it can be seen that procedural text learning in junior high school/MTs has not optimally integrated digital literacy. This happens because of the lack of teachers' ability to utilize technology that is in accordance with the characteristics of students in the digital era. This limitation needs to be solved immediately.

This research focuses on the use of the TikTok application as an innovative digital medium in learning to write procedural texts. TikTok is a popular social media application among teenagers. This media can be used by students to publish project results in the form of a video procedure creatively (Khotimah, 2023). Several previous studies have shown that the application of Project-Based Learning based on digital literacy is effective in increasing creativity, digital literacy, and student involvement in learning (Khauzanah & Wardani, 2023; Marcheilla et al., 2025). Other research also shows that students' digital literacy skills are in the category of sufficient to good, but have not been widely studied through research and development approaches (Fauzi & Usmeldi, 2022).

The Project-Based Learning (PjBL) model has a high level of effectiveness in improving students' writing skills (Sianturi, 2021; Susilo & Kholifah, 2013). However, the reality of implementing PjBL in writing learning in general still focuses on completing tasks, not integrating social media platforms as part of the learning stages. On the other hand, the development of digital literacy demands that students not only be able to produce good texts, but also be able to communicate information through digital media that is relevant to their lives (Sánchez-Cruzado et al., 2021; Wahjusaputri & Nastiti, 2022). One platform that has this potential is TikTok because it provides a short video-based information presentation feature that allows the delivery of procedural steps visually, systematically, and communicatively (Yot-domínguez et al., 2023).

This research offers novelty in the form of the development of a Project-Based Learning Model with Digital Literacy that integrates TikTok as part of the learning stages, ranging from the exploration of sample procedural texts, project design, script preparation, procedural video production, to publication and reflection on project results. Thus, TikTok not only functions as a medium for delivering material, but also becomes the main instrument in building a project-based learning experience that encourages the ability to write procedural texts while improving students' digital literacy competencies (Azzahra et al., 2025; Sirait & Nasution, 2024).

Therefore, this research aims to develop and implement a project-based learning model with digital literacy using the ADDIE development model. This research is expected to make a theoretical and practical contribution to the development of Indonesian language learning innovations that are relevant to the demands of 21st-century education can be seen in Figure 1.

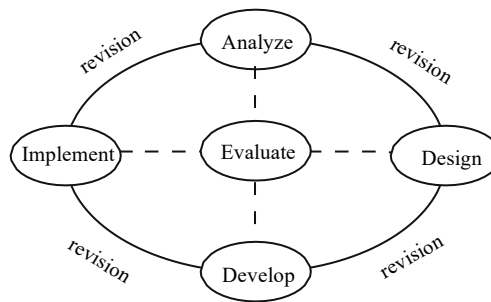


Fig. 1. ADDIE Model Concept (Branch, 2009)

Method

The research method used is research and development (R&D). This method is used to produce products in the form of a project-based learning model with digital literacy. The purpose of the developed model is to improve the ability of junior high school / MTs students in writing procedural texts. The R&D method was chosen with the assumption that researchers can develop, validate, and test the effectiveness of a learning product systematically (Sugiyono, 2019).

The design development and research used is ADDIE, which includes five stages: needs analysis, model design, model development, model testing, and evaluation. At the needs analysis stage, the researcher identifies learning needs through literature studies and analysis of learning conditions, texts, procedures, and students' digital literacy skills. The model design stage is carried out by integrating digital literacy with a project-based learning model. The development stage includes the preparation of learning model products and their supporting devices. The implementation stage is carried out through a trial of the learning model with students, while the evaluation stage aims to assess the feasibility and effectiveness of the developed learning model can be seen in Figure 2.

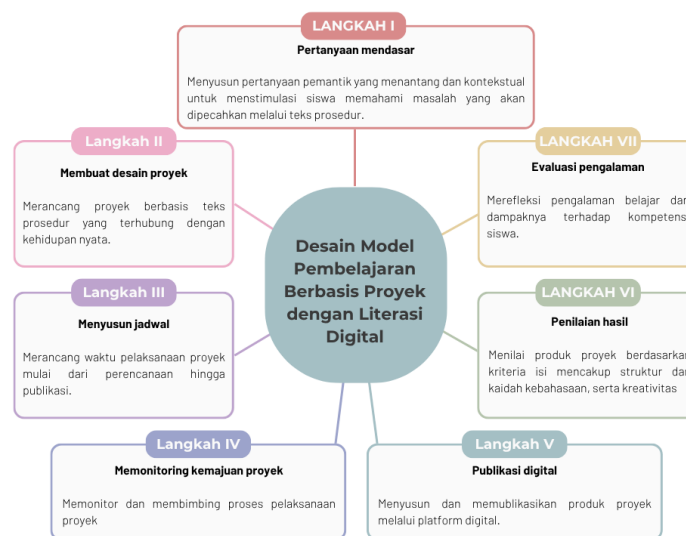


Fig. 2. Design for the Development of Project-Based Learning Models with Digital Literacy

The subjects of this study include grade VII junior high school students, Indonesian language teachers, and a team of experts as validators. The research was carried out at SMPN 2 Kuningan, Kuningan Regency, West Java, in the odd semester of the 2025/2026 school year. Data collection was carried out through observation, questionnaires, interviews, and tests. Observation was used to observe the activities of teachers and students during the learning process. The questionnaire was used to obtain the responses of teachers and students to the feasibility and practicality of the learning model. The interviews were conducted to explore supporting information related to learning conditions and model development needs (Sugiyono, 2019). The test was used to measure students' procedural text writing ability after the application of the learning model.

The data collection instruments used observation sheets, teacher and student response questionnaires, expert validation sheets, and procedural text writing ability tests. The data obtained was analyzed in a quantitative descriptive manner using percentages to determine the level of feasibility and effectiveness of the developed learning model.

Results and Discussion

Data

This study uses primary data obtained through observation, interviews, and questionnaires of teachers and students of grade VII of SMPN 2 Kuningan. The data is focused on the needs, design, and implementation of project-based learning models with digital literacy in procedural text learning. The implementation of the model is carried out through the use of digital media, especially TikTok, as a means of learning and publication of project results. Learning refers to the achievements and objectives of learning Bahasa Indonesia Phase D, which emphasizes the ability to understand, process, and produce procedural texts in a structured manner and communicate them in a social and academic context.

The learning model was developed using the Research and Development method with the ADDIE model. At the design stage, the project-based learning syntax is systematically designed starting from the determination of fundamental questions, project planning and execution, process monitoring, to digital publication and evaluation. The model design was prepared based on the analysis of the needs of teachers and students as well as literature reviews related to the use of digital technology in learning Bahasa Indonesia. The results of the expert validation show that the model design is feasible to implement with several improvements, especially in the allocation of learning time and the accuracy of language use, so that the implementation of learning can take place more effectively and not in a rush can be seen in Table 1.

Table 1. Data Value on the Results of Writing Procedural Texts

<i>No</i>	<i>Name</i>	<i>Student grades</i>	<i>L/P</i>
1.	Alifa Syahla Cibi Aghara	80	P
2.	Asyila Zahra Safira	74	P
3.	Azzam Kalbun Syakirun	72	L
4.	Bayanaka Gavin Al-Fatih	80	L
5.	Bunga Fatimah Lutfiah	74	P
6.	Dika Handika	72	L
7.	Dwifandinna Zhafirahasna	85	P
8.	Esa Putri Triyanti	70	P
9.	Fadli Firdaus	74	L
10.	Fahad Zaenal Aviza	74	L
11.	Fathan Habibi Danadyaksa	70	L
12.	Fazar Gumelar	73	L
13.	Fhizar Juniar Arif	72	L
14.	Frishilia Putri	85	P
15.	Helmi Fajar Nugraha	69	L
16.	Kiandra Adenta Pratama	73	L
17.	Kirana Hilya Annafisha	90	P
18.	Lean Aziksyah	74	L
19.	Malika	70	P
20.	Maudy Nur Dwiyanti	78	P
21.	Melda Merlianda	78	P
22.	Muhammad Azka Alfarizi	67	L
23.	Muhammad Lutfhy	70	L
24.	Muhammad Nizam Al Faisal	71	L
25.	Muhammad Rafiiandra Sanjaya	73	L
26.	Nadhifa Insyira Athfa	90	P
27.	Naina Junaira	80	P
28.	Naydha Risma Ayura	70	P
29.	Nayla Aghnia Hasanah	77	P
30.	Naysa Aulia Vetrianti	91	P
31.	Nurina Japa Dhita	79	P
32.	Qireina Devoni Chega	80	P
33.	Riska Aulia	78	P
34.	Sandria Anjani	74	P
35.	Sela Nur Rizki Aprilia	73	P
36.	Tasya Aulia Putri	82	P

No	Name	Student grades	L/P
37.	Zaky Bachrul Ilmi	76	L
38.	Zaula Raisya Nizza	77	P
Score		2.815	
Average score		74,078	
Persentase		74,08%	
<75		21	
>75		17	

The results of the needs analysis show that teachers need a learning model that is able to increase student activity and integrate digital media practically and flexibly. Preliminary data on students' procedural text writing ability showed an average score of 74.08, with 21 out of 38 students not yet reaching the KKM, indicating low procedural text writing skills. These findings confirm that the *Project-Based Learning* model based on digital literacy is relevant to address learning problems because it encourages active student involvement, hands-on practice, and the production of authentic works.

Data Analysis

The results of product design validation of project-based learning models with digital literacy show a very high level of feasibility. Validation was carried out by two lecturers who are experts in materials from Universitas Swadaya Gunung Jati with assessment instruments that include aspects of content feasibility and suitability of learning model design. Based on the results of the assessment, an average percentage of 91% was obtained, which placed the development model in the Very Feasible category (range 81%–100%). The two validators provided a consistent and positive assessment of the suitability of the material with learning outcomes and objectives, the accuracy and up-to-date nature of the material, as well as the completeness of the presentation of the design and teaching modules.

Validation of the Project-Based Learning Model (PjBL) syntax also showed very strong results with an average percentage of 94%, indicating that the learning measures have been systematically arranged and are feasible to implement. The entire syntax, from the formulation of fundamental questions, project design and implementation, monitoring, digital publications, result assessment, to experience evaluation, was considered to be in the very good category by both validators. The consistency of scores between validators shows that the syntax design has met the PjBL principles and is aligned with the integration of digital literacy can be seen in Table 2.

Table 2. Comments/Reviews/Validator Recommendations

No	Aspects	Criteria	Comments/ Reviews / Validator Recommendations
1.	Model development design.	The suitability of the design of the development model with digital literacy.	It is in accordance with model development.
2.	Material with learning outcomes and learning objectives.	Conformity of the material with CP and TP.	It is in accordance with CP and TP.
3.	Learning Objectives.	Suitability of the material with the learning objectives.	It is clear about the purpose of learning.
4.	Material accuracy	The accuracy of the material is related to principles and facts.	It is clear about the accuracy of the material.
5.	Product design and development.	Product design and development suitability (PjBL model steps are able to produce products according to CP and TP).	Product design is appropriate.
6.	Assessment instruments.	Suitability of the assessment instrument.	The instrument corresponds to the measured.

In addition, the results of the validation of the use of digital media and applications in the learning model obtained an average percentage of 93%, which is included in the very good category. These findings confirm that the use of digital media in the learning model is not only pedagogically relevant, but also feasible and ready to be tested. Thus, the Project-Based Learning Model with Digital Literacy Oriented to Improving Procedural Text Writing Skills is declared to be expertly valid and feasible to be used in the learning process without requiring significant improvement.

Design of A Project-Based Learning Model with Digital Literacy Oriented to Improve Procedural Text Writing Skills in Junior High School

The project-based learning model with digital literacy developed in this study refers to the syntax of *project-based learning* according to Suyaman (2020) and is directed to improve the ability to write procedural texts can be seen in Figure 3.



Fig. 3. Development of Project-Based Learning Models with Digital Literacy

This model begins with the determination of fundamental questions that are contextual and relevant to the lives of students, so that they are able to foster curiosity, motivation to learn, and encourage critical thinking as the basis for project implementation. The next stage includes project design and schedule preparation, which is carried out collaboratively between teachers and students. At this stage, students are involved in planning objectives, work steps, information resources, as well as the division of tasks and project time. These activities not only lead students to work systematically, but also train responsibility, independence, and time management skills in completing learning projects. At the implementation stage, teachers monitor the progress of the project continuously through process observation and feedback. This monitoring aims to ensure the achievement of learning objectives and help students overcome obstacles that arise during the project process. The integration of digital literacy is strongly seen at the digital publication stage, where students present the results of the project in the form of procedural text videos published through the TikTok platform. This stage trains students' digital literacy skills, including the ability to sort information, compose messages, edit videos, and apply digital publication ethics responsibly (Solikah, 2020).

The assessment of results was carried out using rubrics that included aspects of content, structure of procedural text, language, creativity, and quality of product presentation. The final stage, in the form of learning experience evaluation, is carried out through joint reflection between teachers and students on the process and results of the project. This reflection serves to strengthen understanding, increase students' metacognitive awareness, and become the basis for improving the implementation of learning models in subsequent learning. Thus, the design of this project-based learning model with digital literacy is not only results-oriented, but also on the quality of the learning process in a sustainable manner.

Results of Learning Model Implementation

Based on the results of the observation of learning implementation, the implementation of the project-based learning model with digital literacy in the procedural text material of class VII SMPN 2 Kuningan obtained a feasibility level of 100% according to the observer's assessment, as can be seen in Table 3.

Table 3. Analysis of Teacher Activity Observation

No	Criteria	Rating Scale				
		1	2	3	4	5
1.	The suitability of the learning model design can help achieve the learning process.					✓
2.	The accuracy of the learning steps in the learning model can produce an ideal learning concept.					✓
3.	The learning model in the module can be used effectively and efficiently in the learning process.					✓
4.	Active involvement of students in the learning process based on the development of learning models.					✓

No	Criteria	Rating Scale				
		1	2	3	4	5
5.	The ability of learning models to create meaningful learning for students' lives.					✓
6.	The ability of learning models to bring out life skills (personal, social, academic, and vocational) in the learning process.					✓
7.	The ability of learning models to make students critical and creative in the learning process.					✓
8.	The ability of the learning model to involve students in constructing knowledge.					✓
9.	The ability of the learning model to achieve learning objectives after the learning process is completed.					✓
10.	The ability of the learning model to conduct exploration and investigation by students.					✓
11.	Reflection activities and follow-up plans can be carried out well in the learning process in accordance with the learning model.					✓
Total Score		55				
Average		5				
Percentage		100%				
Score Range		81% - 100%				
Category		Very Worthy				

These results put the model in the category of very feasible for use in learning. In addition, students' responses to the design and implementation of the model showed an average score percentage of 84.20%, which was in the very good range, indicating that the learning model is effective in supporting student engagement and learning activities. Student interest and involvement are the dominant factors in learning success. Students show a positive response to project-based learning and group work, discussions, as well as presentation and publication activities of the work. The use of digital technology, especially in the assignment of application-based procedural texts, is considered fun and motivating. Students also demonstrate excellent ability in following the steps of writing procedural texts, understanding linguistic structures and features, and developing writing skills systematically. These findings show that the integration of digital literacy in the learning model is able to improve students' conceptual understanding as well as practical skills can be seen in Table 4.

Table 4. Value of Procedural Text Writing Results

Subject	Aspects Assessed in the Analysis of the Procedural Text				Total Value
	Accuracy of the Content of the Procedural Text (1-4)	Structure of the Procedural Text (1-4)	Sentence Accuracy (1-4)	Spelling and Spelling (1-4)	
1.	3	4	3	4	87,5
2.	4	4	4	3	93,75
3.	4	4	3	4	93,75
4.	4	3	3	4	87,5
5.	4	4	3	4	93,75
6.	4	4	3	4	93,75
7.	4	3	3	4	87,5
8.	4	4	3	3	87,5
9.	4	4	4	3	93,75
10.	4	4	3	4	93,75
11.	4	4	3	3	87,5
12.	4	4	3	4	93,75
13.	4	4	3	3	87,5
14.	4	3	3	4	87,5
15.	3	4	3	4	87,5
16.	4	4	3	3	87,5
17.	4	4	3	4	93,75
18.	4	4	3	4	93,75
19.	4	4	3	3	87,5
20.	4	4	3	4	93,75
21.	4	4	3	4	93,75
22.	3	4	3	4	87,5
23.	4	4	3	3	87,5
24.	4	4	3	4	93,75
25.	4	4	4	3	93,75
26.	4	4	4	3	93,75

Subject	Aspects Assessed in the Analysis of the Procedural Text				Total Value
	Accuracy of the Content of the Procedural Text (1-4)	Structure of the Procedural Text (1-4)	Sentence Accuracy (1-4)	Spelling and Spelling (1-4)	
27.	4	4	3	3	87,5
28.	4	4	3	3	87,5
29.	4	4	3	3	87,5
30.	4	4	3	4	93,75
31.	4	4	3	4	93,75
32.	4	3	3	4	87,5
33.	4	4	3	3	87,5
34.	4	4	3	3	87,5
35.	4	4	3	4	93,75
36.	4	4	3	3	87,5
37.	4	4	3	3	87,5
38.	3	4	3	4	87,5
Average					90,30

The results of the product assessment of writing procedural texts showed an average post-test score of 90.30 with the very good category, where all students achieved the very good category without any students in the category of sufficient or less. This shows an increase in the ability to write procedural texts evenly among all students, as shown in Table 5 and Table 6.

Table 5. Model Summary

Model	R	R Square	Adjusted R Square	Std. error of the Estimate
1	132 ^a	018	-010	3.03813

a. Predictors (Constant). Nilai Awal

Tabel 6. Model ANOVA^a

Model	Sum of Squares	df	Mean Square	F	Sig
Regression	5.923	1	5.923	.642	.428 ^b
Residual	332.228	36	9.230		
Total	338.211	37			

a. Dependent Variable: Nilai Akhir

b. Predictors: (Constant). Nilai Awal

Then obtained N-Gain:

$$\text{N-Gain} = \frac{90,30 - 74,08}{100 - 74,08}$$

$$\text{N-Gain} = \frac{16,22}{25,92} = 0,63$$

The results of the simple linear regression test showed an R Square value of 0.018, which indicated that the final achievement of students was more predominantly influenced by learning treatment than by initial ability. The N-Gain calculation of 0.63 is in the medium category, which indicates the effectiveness of learning in improving the ability to write procedural texts significantly and consistently can be seen in Table 7.

Table 7. Recapitulation of the Results of the Acquisition of Usage Criteria

No	Data	Kriteria			
		1	2	3	4
1.	Data 1	M	M	SM	SM
2.	Data 2	M	SM	SM	SM
3.	Data 3	M	SM	SM	SM
4.	Data 4	SM	SM	SM	SM
5.	Data 5	SM	SM	SM	SM
6.	Data 6	KM	SM	SM	SM
7.	Data 7	M	SM	SM	SM
8.	Data 8	SM	SM	SM	SM
9.	Data 9	SM	SM	SM	SM

Description:

SM = Sangat Mahir

M = Mahir

KM = Kurang Mahir

MPL = Masih Perlu Latihan

In addition to improving writing skills, students also show excellent mastery of digital literacy. Students are considered proficient or very proficient in the use of CapCut, Canva, and TikTok applications, especially in the aspects of editing techniques, the use of captions and hashtags, and the video upload process. The audience's response to the student-generated procedural text video also shows that the learning product is informative and useful. Thus, the results of the study confirm that the project-based learning model with digital literacy is effective in improving the ability to write procedural texts as well as the digital literacy skills of junior high school students.

Discussion of Research Results

1. The Need for the Development of Project-Based Learning Models with Digital Literacy

The results of the needs analysis show that procedural text learning in junior high schools still faces various obstacles. Students have difficulty in systematically arranging steps, using the linguistic rules of procedural texts, and developing ideas into coherent writing. In addition, the learning that takes place is still dominated by conventional methods and has not made optimal use of digital technology.

These findings show that there is a gap between the demands of 21st-century learning that emphasizes digital literacy and writing learning practices that are still oriented solely towards written products. This is in line with the statement of A'yuni (2015) that the advancement of internet technology causes excessive use of information technology among teenagers, causing unwanted cases. This statement emphasizes that mastery of digital literacy needs to be instilled in students, one of which is through a digital-based learning model. Therefore, a learning model is needed that is able to integrate writing skills with the ability to utilize digital technology productively.

These findings are in line with the theory of constructivism (Haryanto, 2021), which emphasizes that knowledge is built through authentic and meaningful learning experiences. In this context, digital projects are a means for students to construct knowledge through planning, writing, producing, and publishing works.

2. Characteristics of Developed Models

The results of the research resulted in a Project-Based Learning Model with Digital Literacy, which consists of several stages, namely: (1) problem identification and exploration of digital information, (2) project planning, (3) preparation of procedural texts, (4) production of digital content, (5) publication of project results, and (6) reflection and evaluation. The main characteristic of this model lies in the integration of digital literacy at every stage of learning. Students not only write procedural texts, but also seek information from digital sources, evaluate the credibility of the information, develop digital products, and communicate the results through digital platforms.

These findings show that digital literacy does not function as an additional medium, but rather becomes an integral part of the learning process. This is in line with Joyo's (2019) statement that digital literacy is related to the ability of individuals to use, search, and process a variety of information obtained through gadgets. This statement strongly supports the role of digital literacy among students, especially in the implementation of learning in the classroom (Umihani et al., 2023).

3. Validity of Learning Models

The results of expert validation showed that the developed model obtained a category that was very feasible to apply in learning. Aspects that received high scores included (1) suitability with learning outcomes, (2) integration of model syntax, (3) digital literacy integration, and (4) relevance to the characteristics of junior high school students. The results show that the developed model has a strong theoretical and practical foundation to be applied in learning to write procedural texts.

4. Practicality of Learning Models

The results of the trial showed that teachers and students responded positively to the developed model. From the teacher's perspective, the developed model is easy to implement, has a clear syntax, and helps manage project-based learning. Meanwhile, students stated that the developed model can motivate

students to participate in learning, increase student activity in participating in learning activities, and make students very enthusiastic about doing writing assignments because the writing results are developed into digital products.

These findings show that the use of projects and digital media is able to increase student involvement in the learning process. Student involvement in the learning process can occur because there are real products or projects that must be produced, so students need to design learning objectives according to their interests and knowledge, both individually and in groups (Rasyad et al., 2017).

5. Model Effectiveness on Procedural Text Writing Ability

The results of the study showed an increase in the ability to write procedural texts after the application of the developed learning model. Improvements are seen in several aspects, namely:

1. Structure of the procedure text. Students are better able to compile objectives, tools and materials, steps, and conclusions completely and systematically.
2. Collapse of steps. Projects that require learners to practice the procedure directly help them understand the logical relationships between the steps so that the resulting text is more concise.
3. Language rules. Students show improvements in the use of imperative sentences, temporal conjunctions, action verbs, spelling, and punctuation.
4. Quality of content. Students' writing becomes clearer, communicative, and easier to understand because it is based on real experiences during the implementation of the project.

Some of the factors that cause the developed learning model to be more effective, including, (1) learning is authentic because students learn through real experience, not just learning theories about procedural texts, (2) projects encourage active engagement because students are directly involved in the entire learning process from planning to publication of results, (3) the use of digital technology that is close to students' lives that can make learning more interesting and relevant, and (4) publication of the work, students are allowed to showcase the results of the project to others through digital media. This can encourage the creation of better writing. These findings reinforce the view that project-based learning can improve writing skills through authentic experiences. Students are motivated in learning and encouraged to develop and practice their learning experiences (Sakaria & Nojeng, 2018).

Thus, it can be concluded that the results of the study show that the Project-Based Learning Model with Digital Literacy has proven to be valid, practical, and effective in improving the ability to write procedural texts of junior high school students. The novelty of the model lies in the systematic integration of project activities and digital literacy in writing learning, resulting in a learning experience that is more authentic, contextual, and relevant to the characteristics of today's digital generation.

Conclusion

Based on the results of the research on the development of a project-based learning model with digital literacy that is oriented towards improving the ability to write procedural texts in junior high schools, it can be concluded that the design of the developed learning model is in the category of being very feasible for use in learning. This is shown by the results of the feasibility assessment of model design with an average percentage of 91%, feasibility of learning syntax of 94%, and the use of digital media or applications of 93%, all of which are in the score range of 81%–100%. The integration of digital literacy in each learning syntax has been proven to be able to support the learning process of writing procedural texts in a more creative, contextual, and interesting way, while reducing student boredom through the use of digital applications in producing learning products. The implementation of a project-based learning model with digital literacy also showed very positive results. The response of teachers or observers to the application of the model obtained an average score of 100% with the very feasible category, while the students' response reached an average percentage of 84.20% with the very good category. In addition, the learning results of writing procedural texts showed very optimal achievements with an average score of 90.30 students who were included in the very good category (A). All students scored in the excellent category, with the highest score of 93.75 and the lowest score of 87.5. Judging from the aspect of using digital applications, students showed a high level of proficiency in all criteria, including the use of effects and filters, editing techniques, caption writing, and the use of hashtags, as well as the video upload process. Thus, the project-based learning model with digital literacy developed has proven to be effective in improving the ability to write procedural texts and is suitable for use as an alternative to the Indonesian language learning model in junior high school.

Declarations

- Author contribution** : Jimat Susilo plays the role of the main writer who is responsible for the entire research process, from planning, implementation, to manuscript preparation. Abdul Rozak, as the third author, provided conceptual direction and substantive input in the development and refinement of the manuscript. Fanni Tamara, as the second author, also helped collect data and analyze the research data. All authors have read and approved the final version of the manuscript.
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