Clustering elementary education students' literacy skills as a key aspect of interaction with digital media on writing ability

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Abstract: Writing skills for descriptive texts are essential for helping students effectively convey their ideas. Many students still struggle to construct descriptive sentences and to utilize digital technology as a learning medium. This study examines the effect of digital media and its interaction with elementary education students' literacy levels on writing skills. The research employs a 2x2 factorial experimental design to generate four different treatment groups, specifically digital media tools (Sketchbook and IbisPaint X) and students' literacy levels (high and low). The results indicate a significant difference in writing skills between users of Sketchbook and IbisPaint X, with high-literacy students demonstrating a greater ability to utilize the media more creatively and structurally. Conversely, low-literacy students showed better results when using Sketchbook compared to IbisPaint X. The findings also reveal a significant interaction between the learning media and literacy level, where the difference in media effectiveness is more pronounced among low-literacy students, while the difference is less noticeable among high-literacy students. The conclusion of this study is that there is a significant difference in descriptive text writing skills between users of Sketchbook and IbisPaint X, influenced by literacy levels. Additionally, there is a significant interaction between learning media and literacy level in supporting the improvement of students' writing skills.

Keywords: Digital media, Interaction, Literacy level, Text description, Writing skills.

1. Introduction

Writing skills for descriptive texts are viewed as an effort to improve students' writing ability in systematically describing objects or situations [1, 2]. This skill requires a good understanding of structure, language use, and appropriate organization of ideas to clearly and attractively depict the object [3-5]. Writing ability is an essential foundation for developing students' creativity and sensitivity to detail, as well as enhancing their overall written communication skills.

The problem phenomenon is that many students still struggle to develop writing skills, especially in using digital technology. This is evident from students' low writing skills, which hinder the achievement of language learning objectives in schools [6]. Writing is one of the most difficult competencies for students to master, given that it is a required skill to face developments in information and communication technology [7].

Another phenomenon is that many students experience difficulties in writing caused by a lack of basic writing skills, writing anxiety, and limited interest in traditional literacy [1, 8]. In addition, less engaging teaching methods and limited use of digital technology result in low motivation among students to develop their writing skills [9]. Consequently, students' writing skills remain low and underdeveloped, negatively impacting their academic performance and readiness to face the demands of the digital era, which heavily depends on digital literacy skills [10-12].

Many students still have difficulty composing effective descriptive sentences, making the objects or situations they write about less vivid and hard for readers to visualize. This difficulty is often due to a

lack of understanding regarding the proper use of descriptive language, including rich vocabulary selection and using sensory details to present concrete imagery [1]. As a result, the writing tends to be general and less stimulating for readers' imagination.

Students' writing skills are influenced by their literacy level. Low literacy levels often become the main obstacle to understanding and expressing ideas in writing. Literacy survey data show that literacy skills in Indonesia lag behind other countries, impacting students' academic achievement, particularly in writing [13]. This situation is exacerbated by limited access to or utilization of effective learning media to support the writing learning process [14]. This underscores the need for innovative learning media to help students overcome writing problems.

The use of digital media is considered a solution as a learning aid to improve students' writing skills interactively and attractively. Digital media provide a more visual and creative learning experience, motivating students to be more active and enthusiastic in writing [15]. In practice, the effectiveness of these media greatly depends on students' literacy levels. Students with high literacy can utilize digital media optimally [16] while students with low literacy need additional guidance to keep up with learning [17].

Differences in literacy skills imply that the choice of digital media should be tailored to students' literacy abilities to positively impact their writing skills. If the digital media used is not matched to students' literacy levels, the potential improvement in writing skills may be hindered, even risking lowered learning motivation. Therefore, teachers need to consider students' literacy levels when selecting and integrating digital learning media as a solution to improve descriptive text writing skills [18].

This study examines the effect of digital learning media on students' descriptive text writing skills across different literacy levels (high and low). Additionally, the study investigates the interaction between types of digital media and literacy levels in influencing students' writing skills. This aligns with the study's aim to determine differences in descriptive writing skills between users of Sketchbook and IbisPaint X among students with high and low literacy, and to identify any interaction between media type and literacy level on writing skills. This research is expected to help understand how to select appropriate learning media according to students' literacy levels so that writing skills can develop effectively.

This study is relevant to Joseph and Khan [16] research, which states that using digital-based media can significantly improve students' writing skills. Furthermore, Suprayogi, et al. [19] also found that digital media (web-based) effectively enhances students' writing skills. Both studies indicate that optimizing digital media integration can provide more stimulating support for facilitating creative writing.

Previous research shows that digital media is more effective in improving students' writing ability than traditional methods because it offers immediate feedback, diverse activities, and higher motivation, encouraging more frequent and quality writing practice [20]. Although digital media is effective, the teacher's role remains crucial in addressing writing challenges. Alneyadi, et al. [21] mention challenges such as limited device access, internet connectivity, and varying digital skills among students, which affect the effectiveness of digital learning media in improving writing skills and literacy.

Literacy is also a key factor in students' writing success, especially when integrating digital media in learning. Cahyo, et al. [9] show a significant interaction between the type of learning media and students' literacy levels on writing achievement. The study emphasizes that integration should enable students to express ideas, share viewpoints, and practice written argumentation more effectively. In other words, the use of learning media must consider students' literacy levels for optimal writing learning processes Graham [22]. Selfa-Sastre, et al. [23] highlight that the combination of digital media use and literacy mastery can be applied collaboratively among students to improve writing skills. This combination allows students to provide feedback to one another and discuss their writing more interactively and dynamically. Therefore, such combinations become effective learning strategies to optimize the development of students' writing skills in the current digital era.

The urgency of this study is important given the rapid development of digital technology that has transformed learning methods, especially in descriptive text writing. The use of digital learning media offers new opportunities for improving students' writing skills [9, 13] but its effectiveness may vary depending on students' diverse literacy levels (high and low). Therefore, this study is essential to examine the effects of each digital media and their interaction with students' literacy levels to provide accurate recommendations in choosing learning media. With this understanding, teachers and educators can optimize technology use in teaching and learning processes, enabling students' writing skills to develop more effectively and according to each student's literacy needs, thus supporting the improvement of education quality in the digital era [1, 3].

2. Materials and Methods

This study employs a 2 x 2 factorial experimental design, which aligns with Fisher's theory. This design is characterized by the presence of two independent variables, resulting in four distinct treatment combinations [24, 25]. The two independent variables in this study are digital media and literacy level. The digital media used are Sketchbook and IbisPaint X, while the literacy levels are categorized into high literacy and low literacy groups. The combination of these two variables results in four different treatments, which are then analyzed to observe their effect on descriptive text writing skills.

Table 1.
2 x 2 Factorial Experimental Design.

Variable	Group	Sketchbook (X1a)	IbisPaint X (X1b)
Literacy Proficiency	High	✓	✓
	Low	✓	✓

Table 1 shows that the independent variables focused on are the use of digital learning media, namely Sketchbook (X1a) and IbisPaint X (X1b), as well as students' literacy proficiency (X2), which consists of two categories: high literacy proficiency (PLT) and low literacy proficiency (PLR). The dependent variable measured is descriptive text writing skill (Y). Based on these variables, the problem constellation model can be described as follows:

Table 2.
Problem Constellation Model.

Intervention Variable	Learning Media	
	Sketchbook	IbisPaint X
High Literacy	A1 B1	A2 B1
Low Literacy	A1 B2	A2 B2

Note:
A1: Students taught using the digital media Sketchbook.
A2: Students taught using the digital media IbisPaint X.
B1: Students with high literacy proficiency using Sketchbook.
B2: Students with low literacy proficiency using IbisPaint X.

This constellation model in Table 2 is designed to observe the effect of digital learning media (Sketchbook and IbisPaint X) on descriptive text writing skills, by first measuring students' literacy proficiency. The treatments experimented on are the use of digital learning media Sketchbook and IbisPaint X as tools in teaching descriptive writing skills.

The validity of the descriptive text writing skills instrument is calculated through construct and content validity [26, 27]. Construct validity refers to the indicators of writing skills, while content validity relates to learning objectives in the Learning Implementation Plan (RPP). The instrument's validity in this study consists of two aspects: internal and external validity. Internal validity ensures that the research results are truly caused by the treatment, while external validity measures the ability to generalize the results to real-world conditions.

In this study, the population is defined as the entire area or group exhibiting the research problem [28]. The population includes all students of SMPN JS2 DKI Jakarta, with samples taken from two comparable schools, namely SMP Negeri 19 Jakarta and SMP Negeri 115 Jakarta fall under the category of Elementary Education, according to the Regulation of the Minister of Primary and Secondary Education of the Republic of Indonesia, Number 3 of 2025. Each school has 8 classes with 36 students, whose descriptive text writing skill scores are below the mastery standard. The multistage random sampling technique is used by randomly selecting two seventh-grade classes from each school. The class at SMPN 19 receives treatment using Sketchbook, while SMPN 115 uses IbisPaint X.

The test scores of students are sorted and divided into two groups: the top 27% of students with the highest scores are considered high literacy proficiency, while the bottom 27% with the lowest scores are considered low literacy proficiency. The grouping size ranges between 27%–33% [29]. From this process, it is determined that 27% of students with the highest scores belong to the high literacy group, and 27% with the lowest scores belong to the low literacy group, resulting in a total sample of 40 students, evenly divided between experimental and control groups. The treatment for each group is further explained in Table 3.

Table 3.
Number of Students in Each Treatment Group.

Digital Media	Sketchbook	IbisPaint X
Literacy Proficiency		
High Literacy	10 students	10 students
Low Literacy	10 students	10 students

Table 3 shows the distribution of students in each treatment group. The digital media used consists of two types: Sketchbook and IbisPaint X. Each medium is tested on two levels of student literacy proficiency: high and low. The total sample consists of 40 students divided into four groups, each with 10 students based on the combination of learning media (Sketchbook and IbisPaint X) and literacy level (high and low).

This study uses test and non-test instruments, namely a literacy proficiency test and a non-test for descriptive text writing skills. The test instruments are developed with grids based on modified indicators from expert theories. Modified literacy proficiency indicators include object description skills, mastery of text structure, vocabulary and grammar use, and idea organization [3-5, 30-32]. Meanwhile, modifications for descriptive writing skill tests refer to Mauludin [33] supported by several expert theories, including accuracy of title, identification, proper language use, and effective conclusion [29, 34, 35].

In the study implementation, students receive four treatments in learning descriptive text writing using digital media (Sketchbook and IbisPaint X). The treatments include material introduction, writing practice, and evaluation through post-tests [36, 37]. Students are first introduced to both digital media applications, then taught descriptive writing skills, followed by practicing writing by drawing using the applications. The final stage is an evaluation with a post-test, where students write descriptive texts using the studied media to enhance their descriptive writing skills with digital literacy application.

The research procedure begins with assigning students to write descriptions of objects in predetermined images using both digital media. This step serves as the achievement outcome for improving students' descriptive text writing skills. Next, data analysis techniques include descriptive statistics to describe the basic characteristics of the observed data [38, 39]. The following step is conducting normality and homogeneity tests as data requirement tests [40]. Normality tests utilize the Lilliefors method to ensure data distribution is normal, while homogeneity tests employ Levene's Test to check variance equality among treatment groups [41, 42]. Once assumptions are met, hypothesis testing is conducted using two-way ANOVA at a 0.05 significance level, followed by Tukey's test to determine groups with significant differences [43]. This test is also used to analyze interactions between treatment groups.

3. Result and Discussion

The results of this study refer to the evaluation of descriptive text writing skills of seventh-grade students at SMP JS2 in Jakarta. This evaluation is based on the students' pre-test and post-test results as a consequence of the intervention involving digital media and literacy on their descriptive writing ability.

3.1. Descriptive Statistics

The following are the results of descriptive analysis based on the distribution of descriptive text writing skill scores of students learning with digital media and having high and low literacy proficiency.

Table 4.
Descriptive Statistics Results.

Dependent Variable: Score					
Digital Media	Group	Literacy Proficiency	Mean	Std. Deviation	N
Sketchbook Media	Y11	High Literacy using Sketchbook	78.40	1.578	10
	Y12	Low Literacy using Sketchbook	83.00	3.742	10
	Y1	Total	80.70	3.658	20
IbisPaint X Media	Y21	High Literacy using IbisPaint X	78.30	2.214	10
	Y22	Low Literacy using IbisPaint X	82.70	2.751	10
	Y2	Total	80.50	3.317	20

The descriptive statistics in Table 4 show the average scores of high and low literacy groups using two different digital media. For Sketchbook, the low literacy group has an average score of 83.00, which is higher than the high literacy group's average of 78.40. Similarly, for IbisPaint X, the low literacy group also has a higher average score of 82.70 compared to the high literacy group's 78.30. The overall average score for Sketchbook users is 80.70, while for IbisPaint X users it is 80.50. Thus, the low literacy groups have higher average scores on both digital media. The descriptive statistics results in this study can be further illustrated by the following histogram.
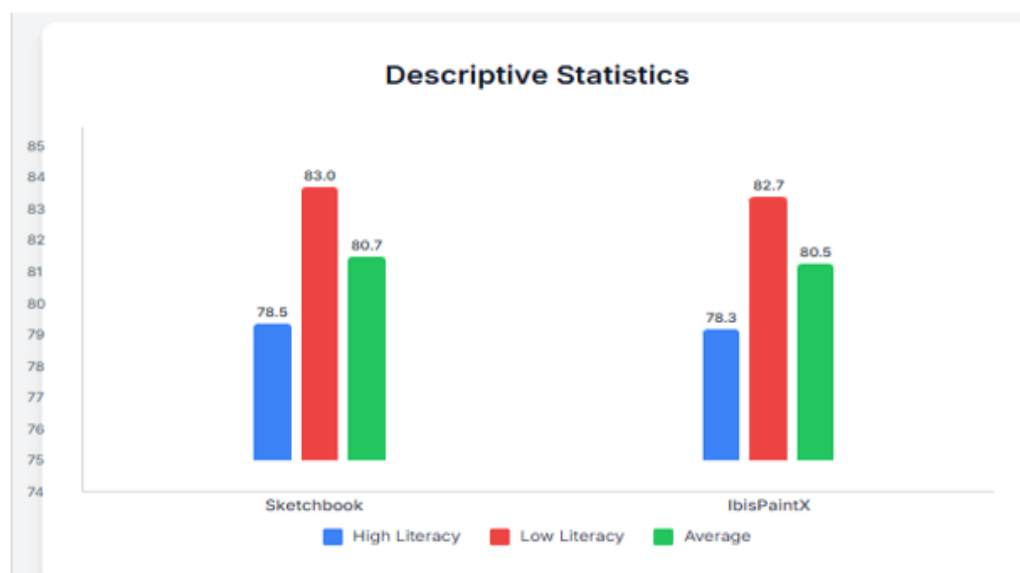

Figure 1.
Descriptive Histogram.

Figure 1 shows that the group of students with low literacy proficiency achieved higher average scores compared to the group with high literacy proficiency. This indicates that students with lower

literacy levels were able to achieve better average results than those with higher literacy when using each respective digital media. This finding suggests that students' literacy proficiency level is not the sole determinant of success in using digital media to improve descriptive text writing skills.

3.2. Data Assumption Test

This study conducted assumption tests through normality and homogeneity tests as an effort to ensure that statistical requirements are met. The results of these assumption tests are presented in Table 5.

Table 5.
Results of Assumption Tests.

Tests of Normality							Homogenity	
Groups	Kolmogorov-Smirnov[a]			Shapiro-Wilk			ANOVA	
	Statistic	Sig.	Result	Statistic	Sig.	Result	Sig	Result
Y_{11}	0.200	0.200*	Normal	0.953	0.709	Normal	0.057	Homogen
Y_{21}	0.111	0.200*	Normal	0.961	0.799	Normal	0.062	Homogen
Y_{12}	0.179	0.200*	Normal	0.915	0.319	Normal	0.066	Homogen
Y_{22}	0.182	0.200*	Normal	0.967	0.860	Normal	0.392	Homogen

Table 5 shows the results of normality and homogeneity tests indicating that the normality tests for all groups (Y_{11}, Y_{12}, Y_{21}, Y_{22}) using the Kolmogorov-Smirnov and Shapiro-Wilk methods show data are normally distributed, as both tests exceed the significance level of 0.05. Meanwhile, the homogeneity test results using ANOVA show all homogeneity values are greater than 0.05, indicating that the variances are homogeneous or uniform.

3.3. Hypothesis Testing

This study aims to test the hypothesis that there is a difference in descriptive text writing skills between users of Sketchbook and IbisPaint X among student groups with high and low literacy levels, as well as the interaction between the type of digital media and literacy level on descriptive writing skills. To test this hypothesis, a Two-Way ANOVA and Tukey test were used. The results are presented in Table 6.

Table 6.
Results of Two-Way ANOVA and Tukey Test.

Two Way ANAVA						
Dependent Variable: Score						
Source	Type III Sum of Squares	df	Mean Square	F_{Value}	F_{Table}	Sig.
Corrected Model	203.000[a]	3	67.667	9.348	0.316	0.000
Intercept	259854.400	1	259854.400	35897.001		0.000
Digital Media	0.000	0	.	.		0.000
Literacy	202.600	2	101.300	13.994		0.000
Media * Literacy (Interaction)	0.000	0	.	.		0.000
Error	260.600	36	7.239			
Total	260318.000	40				
Corrected Total	463.600	39				

Based on the results of the Two-Way ANOVA and Tukey test in Table 6, the following summary answers the hypotheses.

Table 7.
Hypothesis Test 1.

Compared Groups	F_{Value}	F_{Table}	Significance Level	*Sig.*
A$_1$ B$_1$ and A$_2$ B$_1$	13.994	0.316	0.05	0.000

Explanation:
A1 B1: Descriptive text writing skills with high literacy mastery taught using Sketchbook digital media.
A2 B1: Descriptive text writing skills with high literacy mastery taught using IbisPaint X digital media.

Hypothesis 1 test in Table 7 shows that for the student group with high literacy mastery, there is a significant difference in descriptive writing skills between those who use Sketchbook and IbisPaint X as digital learning media. This is proven by the F-value of 13.994, which is greater than the F-critical of 0.316, and the significance value of 0.000, which is below 0.05. Thus, the difference in writing skills is real and consistent, and this hypothesis is accepted.

Table 8.
Test Hypothesis 2.

Compared Groups	F_{Value}	F_{Table}	Significance Level	*Sig.*
A$_1$ B$_2$ and A$_2$ B$_2$	0.437	0.316	0.05	0.000

Explanation:
A1 B2: Descriptive text writing skills with low literacy mastery taught using Sketchbook digital media.
A2 B2: Descriptive text writing skills with low literacy mastery taught using IbisPaint X digital media.

Hypothesis 2 test in Table 8 shows that for the student group with low literacy mastery, there is a significant difference in descriptive writing skills between those who use Sketchbook and IbisPaint X digital learning media. The F-value of 0.437 is greater than the F-critical of 0.316, and the significance value of 0.000 is below 0.05. This result indicates a meaningful and real difference between the two media. Thus, this hypothesis is accepted.

Table 9.
Hypothesis Test 3.

Compared Groups	F_{Value}	F_{Table}	Significance Level	*Sig.*
Interaction A with B	23.342	0.312	0.05	0.000

Explanation:
A: Digital learning media Sketchbook and IbisPaint X.
B: Literacy Mastery.

Hypothesis 3 test in Table 9 shows a significant interaction effect between the use of Sketchbook and IbisPaint X digital learning media and literacy levels on students' descriptive writing skills. This is proven by the F-value of 23.342, which is higher than the F-critical of 0.312, and the significance value of 0.000, which is less than 0.05. This finding confirms that the combination of digital media type and literacy level significantly affects students' improvement in descriptive writing skills. Therefore, this hypothesis stating the presence of interaction effects is accepted.

4. Discussion

The teaching of descriptive text writing is conducted as an effort to fulfill the basic competencies students must master in the Indonesian language subject. This learning process is implemented by utilizing digital media and literacy to improve the quality of students' writing. The steps are carried out through several systematic treatment stages.

Table 10.
Learning Treatment

Digital Media	Treatment Sequence/Stage	Material	Treatment	Evaluation
Sketchbook	1. Introduction	- Introduction to Sketchbook features	- How to use Sketchbook for drawing	- Observation of application usage
	2. Teaching Descriptive Writing	- Structure of descriptive texts, vocabulary, idea organization	- Teaching descriptive texts based on relevant theory	- Formative tests or group discussions
	3. Practice Descriptive Writing	- Writing descriptive texts based on illustrations	- Writing descriptive texts using Sketchbook	- Written assignments and teacher observation
	4. Evaluation (Post-test)	- Application of descriptive writing skills	- Writing descriptive texts independently using Sketchbook	- Post-test writing
IbisPaint X	1. Introduction	- Introduction to IbisPaint X features	- How to use IbisPaint X	- Observation of application usage
	2. Teaching Descriptive Writing	- Structure of descriptive texts, vocabulary, idea organization	- Teaching descriptive texts based on relevant theory	- Formative tests or group discussions
	3. Practice Descriptive Writing	- Writing descriptive texts based on illustrations	- Writing descriptive texts using IbisPaint X	- Written assignments and teacher observation
	4. Evaluation (Post-test)	- Application of descriptive writing skills	- Writing descriptive texts independently using IbisPaint X	- Post-test writing

Table 10 outlines the systematic treatment stages administered to students to enhance the quality of their descriptive texts. Initially, students are familiarized with the features and usage of each application. This phase involves direct observation by the teacher to ensure students comprehend how to use the digital drawing media [44, 45]. Direct classroom observation by the teacher effectively ensures students' understanding of digital media for drawing [46, 47]. Subsequently, students receive instruction on descriptive text structure, vocabulary, and systematic idea organization [3-5]. This instruction is delivered based on relevant theory and followed by formative tests or group discussions to assess student comprehension.

During the practice stage, students are tasked with writing descriptive texts based on illustrations, utilizing the previously introduced media. Assessment is conducted through written assignments and direct teacher observation to evaluate students' application of the learned material [48, 49]. In the evaluation stage, a post-test is administered, where students independently write descriptive texts using the media. The post-test measures students' progress in writing after the treatment [33, 50].

The study results indicate a significant difference in writing skills between students using the two digital media. This difference is attributed to the distinct characteristics of each medium. Sketchbook, with its more comprehensive drawing features, facilitates students in expressing creativity in writing [51, 52]. Conversely, IbisPaint X possesses strong drawing features but is less supportive in visually and textually developing ideas compared to Sketchbook [53]. Therefore, selecting appropriate media is a crucial factor in optimizing the learning of descriptive text writing skills [22].

The results also reveal a significant difference in writing skills for students with high literacy levels when using both digital media. Sketchbook proved more effective due to its complex features that assist students in organizing ideas and producing better descriptive texts [54, 55]. This finding suggests that students with high literacy require media that support deep exploration of ideas [56].

This study confirms that students with high literacy levels can leverage digital media as tools to optimize technological potential, thereby improving writing skills both creatively and structurally. This findings also supports Zakaria and Abdul Aziz [57] who found that high-literacy students can enhance

text quality by exploring and integrating ideas through interactive digital media. In other words, high-literacy students can systematically and creatively organize ideas using digital technology [10].

The use of digital applications significantly affects writing skills in the high-literacy group because these students can optimize advanced features of each application. This finding aligns with Joseph and Khan [16] who stated that students with good visual literacy can maximize the potential of complex digital media tools to improve writing quality [58]. Thus, high literacy enables students to comprehend content by effectively integrating various digital elements during writing, resulting in more productive texts [21, 59].

The use of digital media in the writing process significantly improves academic achievement, especially for students with high literacy skills. This aligns with Li, et al. [60] who found that high-literacy students can use advanced features like animation and layering in digital media to enrich texts according to the text structure. This consistency is supported by Chan, et al. [61] emphasizing the importance of digital literacy in enhancing students' writing skills [62].

De Rossi and Trevisan [63] also support these findings, showing that students with high literacy skills can adapt to various learning media types without a decline in learning quality. This demonstrates that high-literacy students possess strong internal cognitive abilities to formulate ideas clearly and effectively, reducing reliance on visual media support during learning [64]. In other words, high-literacy students are more independent in organizing ideas without heavy dependence on learning media [65, 66].

The study also shows that low-literacy students using Sketchbook perform better than IbisPaint X users. Sketchbook's simple and visually exploratory focus helps low-literacy students engage in writing, assisting in overcoming their difficulties [51, 52]. The complex features of IbisPaint X tend to be obstacles for these students [67, 68].

Digital media use (Sketchbook and IbisPaint X) produces significant differences in descriptive writing skills within low-literacy groups. Sketchbook users achieve higher performance than IbisPaint X users due to Sketchbook's simplicity, allowing low-literacy students to focus more on developing content without being burdened by complex features [54].

Students with low literacy often struggle to choose appropriate vocabulary when writing descriptions. Their vocabulary is relatively simple and limited, which hinders clear idea expression [69, 70]. This difficulty stems from minimal and shallow literacy, making it hard to express details effectively [71]. This is reinforced by Murnan and Cornell [72] study, which found that low-literacy students have difficulties managing writing processes requiring high self-regulation, especially when using more complex digital tools.

Nurhidayat and Azhar [73] emphasize that low-literacy students struggle to utilize complex features on digital learning tools. Therefore, simplifying digital tools and providing additional guidance is important so students can gradually and more effectively understand advanced features. Without this approach, the use of digital tools has minimal impact, as students tend to focus only on basic, easy-to-use features. Low-literacy students require simpler approaches to using digital tools to help develop better writing skills [29]. Simpler tools like Sketchbook are more suitable for this group [29]. Thus, a pedagogical approach involving intensive guidance and simpler-featured tools can help low-literacy students improve their writing skills.

Students' literacy levels also significantly impact writing skills when using digital media. Literacy level is an important variable in utilizing digital media. In writing contexts, digital media can encourage students to be more active in learning and enhance motivation and cognitive abilities, affecting writing outcomes [74]. Digital media such as Sketchbook and IbisPaint X are considered important as digital drawing tools with visualization features that enrich descriptive texts [75, 76].

This study also found a significant interaction effect between learning media and literacy level on students' writing skills. The difference in media effectiveness is more pronounced among low-literacy students, while among high-literacy students, the difference between Sketchbook and IbisPaint X is almost negligible. This shows that media interacts differently depending on students' literacy levels

[77, 78]. Specifically, Sketchbook is more effective for low-literacy students, whereas IbisPaint X suits high-literacy students better. These findings emphasize the need for optimal efforts in selecting learning media appropriate to students' literacy levels to maximize learning outcomes [79, 80].

There is a significant interaction between digital media type and students' literacy level in teaching descriptive writing skills. The interaction among students in systematically developing digital literacy cannot be ignored. Improving students' writing skills as part of digital literacy relates to their ability to analyze and evaluate digital content, as well as mastery of technology [12]. Therefore, integrating students' literacy levels into the curriculum is necessary for students to effectively use digital media to optimally improve writing skills [61, 70].

The interaction between digital media types and literacy levels is very significant, where learning media must be adapted to students' literacy levels for optimal learning outcomes. When media is tailored to users' literacy abilities, writing skills improve more maximally [81]. High-literacy students can explore advanced features to enrich writing, while low-literacy students benefit more from simpler media to reduce technical barriers [17].

This study confirms the importance of selecting digital learning media that considers students' literacy levels to support positive interaction in developing writing skills effectively and sustainably. Positive interaction emphasizes that digital learning media and literacy levels significantly affect writing skill improvements. The study finds that using digital media adapted to students' literacy levels can increase motivation and engagement in writing, ultimately contributing to improved descriptive writing skills.

5. Conclusion

This study concludes that there is a significant difference in descriptive text writing skills between students using the digital media Sketchbook and IbisPaint X, which is especially influenced by students' literacy levels (high and low). Furthermore, a significant interaction was found between the type of digital media and students' literacy levels, indicating that the effectiveness of the learning media varies according to students' literacy abilities in supporting the improvement of writing skills. Therefore, teachers and curriculum developers need to select digital media that match students' literacy levels and provide special guidance for students with low literacy to enhance their writing skills.

Transparency:
The authors confirm that the manuscript is an honest, accurate, and transparent account of the study; that no vital features of the study have been omitted; and that any discrepancies from the study as planned have been explained. This study followed all ethical practices during writing.

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