



Usability Scale to Measure the Acceptability of Interactive Learning Media for Ratio Material in Grade VI

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Abstract

Mathematics learning, particularly for abstract topics such as ratios, requires a transition from additive to multiplicative thinking, which is often challenging to visualize. To support teachers, an Interactive Learning Media (ILM-Ratio) was developed using Canva to ensure accessibility and ease of content modification. Before measuring student effectiveness, it is crucial to assess the media's technical acceptability from the teachers' perspective, as they are the primary gatekeepers of classroom technology. This study aims to evaluate the usability of ILM-Ratio using the System Usability Scale (SUS). A total of 47 sixth-grade teachers participated by simulating a teaching session using the media. The SUS calculation yielded an average score of 90 (Grade A), categorized as "Excellent." This score indicates that ILM-Ratio possesses high usability and imposes minimal technical burden on teachers. These findings suggest that the media is technically robust and ready for classroom implementation to support the visualization of ratio concepts.

INTRODUCTION

Numeracy literacy is a fundamental ability students must possess to understand and apply mathematical concepts in daily life (Darwanto et al., 2021; Iasha et al., 2024; Iman, 2022; Purwoko, 2025; Sidiq et al., 2023; Sujadi, 2022; Witono & Hadi, 2025; Zukhrufurrohmah & Putri, 2021). However, mathematics learning, especially at the primary school level, often faces various challenges. One topic considered abstract and difficult for sixth-grade students to understand is the concept of ratio (comparison). This difficulty can be caused by less varied teaching methods and uninteresting learning media, potentially leading to the stigma that mathematics is a difficult and boring subject (Kartika & Arifudin, 2022; Rosni, 2021; Rozie & Pratikno, 2023). Specifically, the concept of ratio is difficult because it must shift from additive reasoning (addition/subtraction) to multiplicative reasoning. Students often fail to see the proportional relationship between quantities. Therefore, specific visual scaffolding is needed to bridge concrete objects to abstract symbols.

To overcome these problems and support the teacher's role in delivering material innovatively, the use of technology in the form of interactive learning media is an effective solution. Interactive learning media can help teachers visualize abstract concepts into more concrete ones, increase student engagement, and create a more enjoyable learning atmosphere (Alga et al., 2024; Ali et al., 2024; Kanti et al., 2022; Maenah et al., 2024; Rais et al., 2025; Sabrina et al., 2023; Zaid et al., 2022). In this context, researchers developed an "Interactive Learning Media" (hereinafter referred to as ILM-Ratio) specifically designed for ratio material in Grade VI. This ILM-Ratio aims to assist teachers in facilitating students' understanding of abstract ratio concepts, supporting the improvement of numeracy literacy, and endeavoring to eliminate negative stigmas about mathematics through a more engaging and interactive approach. This media was developed using the Canva design platform. Canva was deliberately selected over complex programming-based tools to ensure technological sustainability and remixability. By using a platform familiar to most teachers, the ILM-Ratio allows educators to easily adapt numbers or examples to their specific classroom context without requiring advanced coding skills, thereby reducing the technological anxiety often faced by primary school teachers.

Before a learning medium is recommended for use by educators, it is important to evaluate its acceptability (usability) from the user's perspective, in this case, classroom

teachers. Good usability ensures that teachers can use the media effectively, efficiently, and satisfactorily in supporting their teaching process (Al Rosyid et al., 2022; Ardhana, 2022; Azi et al., 2022; Gordeev, 2020; Mills & Hudson, 2025; Ningsih & Muzakir, 2021; Pratama et al., 2021). One standard method widely used to measure usability is the System Usability Scale (SUS), developed by John Brooke in 1986 (Brooke, 1996). SUS is known for its ease of use, reliability, and ability to provide a single, easily interpretable score.

This study aims to evaluate the usability of ILM-Ratio using the SUS method, focusing on classroom teachers' perceptions. The results of this evaluation are expected to provide insights into the ease of use and acceptance of the media by teachers, as well as input for further development and recommendations for classroom use.

RESEARCH METHODS

A. Research Design

This research uses a quantitative approach. Creswell defines quantitative research as a methodology in educational studies where researchers proactively determine the focus of investigation. Its main characteristics include the formulation of narrow and measurable questions, the acquisition of quantitative data from research subjects, the use of statistical analysis for numerical interpretation, and the execution of the entire research process with a neutral and objective attitude (Creswell, 2002, 2013; Creswell & Creswell, 2017). The goal is to describe and analyze the usability level of ILM-Ratio based on SUS scores obtained from respondents.

B. Research Participants

The participants were 47 classroom teachers who have experience teaching Grade VI mathematics in Bandung Regency and Bandung City. This specific criterion was set to ensure that the respondents understand the pedagogical challenges of the Ratio material. Participant selection was carried out using convenience sampling based on availability.

C. Research Instrument

The research instrument employed in this study was the standardized System Usability Scale (SUS) questionnaire, consisting of ten items. These items are systematically structured, where odd-numbered questions (1, 3, 5, 7, and 9) comprise positive statements, while even-numbered questions (2, 4, 6, 8, and 10) contain negative statements to ensure response consistency. Respondents provided their

evaluations using a 5-point Likert scale, where a score of 1 represents Strongly Disagree, 2 represents Disagree, 3 represents Neutral, 4 represents Agree, and 5 represents Strongly Agree.

The ten items of the SUS questionnaire adapted for the ILM-Ratio evaluation are presented in Table 1.

Table 1. Items of the System Usability Scale (SUS) Questionnaire

Item No.	Questionnaire Items
1	I think I would like to use this digital media system via Canva frequently.
2	I found this digital media via Canva unnecessarily complex.
3	I thought this digital media system via Canva was easy to use.
4	I think I would need the support of a technical person or another person to be able to use this digital media system via Canva.
5	I found the various functions in this digital media system via Canva were well integrated.
6	I thought there was too much inconsistency in this digital media system via Canva.
7	I would imagine that most people would learn to use this digital media system via Canva very quickly.
8	I found this digital media system via Canva to be very cumbersome to use.
9	I felt very confident using this digital media system via Canva.
10	I needed to learn a lot of things before I could get going with this digital media system via Canva.

D. Data Collection Procedure

To ensure the validity of the acceptability measure, a structured usage scenario was implemented. Teachers were provided with the ILM-Ratio link and a simulation guide. They were instructed to: (1) Explore the navigation menu to check for functionality, (2) Simulate a teaching session for the “Basic Ratio” sub-topic for approximately 15-20 minutes as if they were in front of a class, and (3) Attempt the interactive assessment features. Only after completing this comprehensive simulation were the teachers asked to complete the SUS questionnaire individually via Google Forms.

E. Data Analysis Technique

Data were analyzed using the standard System Usability Scale (SUS) scoring method established by Brooke (1996). The raw scores from the 10 items (Likert 1-5) were converted into

a composite score ranging from 0 to 100. The interpretation of the final SUS score refers to the adjective ratings by Bangor et al. (2008) and Sauro (2011), where scores above 80.3 are considered “Excellent”.

RESULT AND DISCUSSION

A. Result

1. Description of Learning Media

The Interactive Learning Media for Ratio (ILM-Ratio) was developed to address the pedagogical challenges of teaching abstract mathematical concepts to sixth-grade students. The primary objective of this media is to facilitate a smooth transition from additive to multiplicative thinking through visual scaffolding. Structurally, the media is designed with a high degree of integration to ensure that teachers can navigate between different instructional phases without technical anxiety. The layout of this integrated system is illustrated in Figure 1, which displays the main menu featuring centralized access to four essential components: learning materials, interactive assessment tools, student worksheets (LKPD), and teaching modules. This centralized design ensures that all necessary resources are available within a few clicks, promoting efficiency during the lesson.



Figure 1. The main menu interface showing integrated teaching components

Beyond its functional structure, the ILM-Ratio emphasizes the visualization of proportional relationships to make abstract concepts more concrete. This pedagogical approach is exemplified in the learning material

section (Figure 2), where real-world contexts, such as unit price comparisons, are used to anchor students' understanding. By utilizing the Canva platform, the media maintains a familiar and intuitive interface that supports "remixability," allowing teachers to adapt the content to their specific classroom needs. This combination of pedagogical depth and technical simplicity sets the stage for the high usability scores discussed in the following section.



Figure 2. Visual representation of ratio concepts in the learning material section

2. System Usability Scale (SUS) Results

The summary of respondents' responses to each item of the System Usability Scale (SUS) questionnaire is presented in Table 2. The data highlights the mean score and standard deviation for each usability aspect.

Table 2. Summary of SUS Item Scores

Item No.	SUS Statement (Summarized)	Mean Score	Standard Deviation (SD)
1	Like to use frequently	5.00	0.00
2	Unnecessarily complex (-)	1.00	0.00
3	Easy to use	5.00	0.00
4	Need technical support (-)	2.00	1.00
5	Functions well integrated	5.00	0.00
6	Inconsistency (-)	1.00	0.00
7	Learn very quickly	4.00	1.00
8	Cumbersome to use (-)	1.00	0.00
9	Felt very confident	5.00	1.00
10	Need to learn a lot (-)	2.10	1.40

From Table 3, it can be seen that the average SUS score for ILM-Ratio is 90.0. This score indicates a very high level of usability from the perspective of classroom teachers. The minimum score was 60.0, and the maximum was

100.0, indicating that most teacher respondents gave a very positive assessment of the media's usability.

Table 3. Summarized SUS Score Calculation Results

Category	Range Score	Grade	Adjective Rating
Worst Imaginable	0 - 25	F	Poor
Poor	26 - 39	F	Poor
Fair	40 - 52	F	Fair
OK	53 - 72	D	OK
Good	73 - 85	C	Good
Excellent	86 - 100	B / A	Excellent
Current Study	90.0	A	Excellent

The average SUS score of 90.0 for ILM-Ratio, based on classroom teachers' assessments, can generally be interpreted as "Excellent" (Sauro, 2011). Based on a more detailed SUS interpretation scale (Bangor et al., 2008): (1) Acceptability Ranges: A score of 90 falls into the "Acceptable" category; (2) Grade Scale: This score is equivalent to "Grade A," indicating superior usability quality; dan (3) Adjective Ratings: Can be categorized as "Excellent" or "Best Imaginable."

These results show that classroom teachers who participated in the survey felt that ILM-Ratio was very easy to use, not complicated, and that its features worked well to support learning activities. They also felt slightly more confident in using this media, even though they needed a little technical assistance. A high level of ease of use from the teachers' perspective is very important because teachers are the main users who will operate and integrate this media into the classroom learning process. If teachers find this media easy to use, they will be more motivated to use it optimally.

The high usability score of ILM-Ratio has great potential to support the achievement of media development goals, namely, making it easier for teachers to convey abstract ratio concepts and helping eliminate negative stigmas about mathematics. When teachers feel comfortable and can easily interact with the learning media, they can focus more on pedagogical strategies and student interactions, rather than on technical difficulties with the media. Perceived ease of use among teachers can increase their efficiency and effectiveness in teaching ratio material. Below is the range of System Usability Scale values.

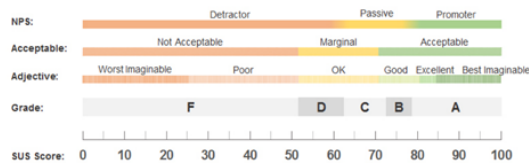


Figure 5. System usability scale value range

The importance of usability for teachers also lies in the adoption of technology. User-friendly media will be more easily adopted and integrated into daily teaching practices. These results indicate that ILM-Ratio has high adoption potential among teachers.

B. Discussion

The research findings show that the developed ILM-Ratio obtained an average SUS score of 90.0. This score significantly exceeds the global industry benchmark of 68.0, categorizing the media as 'Excellent' (Grade A). A deeper look at the item analysis reveals a strong consensus among teachers. As shown in Table 1, core usability items (Items 1, 3, 5) achieved a perfect mean score of 5.00 with a Standard Deviation (SD) of 0.00. This indicates an absolute agreement among all 47 respondents that the media is intuitive and functions smoothly without technical errors. However, a notable variation was observed in Item 10 ("Need to learn a lot of things before getting going"), with a mean of 2.10 and a higher SD of 1.40. This variability suggests that while the interface is user-friendly, a subset of teachers, likely those with lower digital literacy, felt the need for a brief adaptation period. This finding highlights the importance of providing a simple guidebook alongside the media to accommodate diverse technical skills among teachers.

From a pedagogical perspective, the high usability score directly supports the potential effectiveness of mathematics teaching. According to Cognitive Load Theory, if a learning tool is difficult to operate, it imposes an 'extraneous

cognitive load' on the teacher, diverting their attention from the actual teaching content. The high score on Item 9 ('Felt confident', Mean=5.00) confirms that ILM-Ratio minimizes this technical burden. By using Canva-based visuals, the media simplifies the complex task of demonstrating 'Ratio' concepts, specifically the shift from additive to multiplicative reasoning, which is traditionally difficult to visualize on a whiteboard. When teachers are not burdened by technical difficulties, they can focus entirely on scaffolding students' conceptual understanding.

Furthermore, addressing the concern regarding the 'frequent use' (Item 1) of a single-topic tool, the perfect score of 5.00 indicates a high intention for adoption. In the context of the primary school curriculum, 'frequent use' implies intensive usage during the specific weeks allocated for the Ratio module. Teachers perceive this tool as a necessary solution for that specific period. The choice of Canva as a development platform also contributes to this acceptance; teachers appreciate the familiar interface, which allows for 'Remixability', enabling them to adjust numbers or examples in the future without needing advanced programming skills.

CONCLUSION

Based on the evaluation using the System Usability Scale (SUS) with 47 sixth-grade teachers, the Interactive Learning Media (ILM-Ratio) achieved an average score of 90.0 ("Excellent"). It can be concluded that the media is technically highly usable, intuitive, and well-received by educators. The high usability score confirms that the choice of Canva as a development platform succeeds in creating a user-friendly tool that does not require extensive technical training. While this study focuses on teacher acceptance, the positive reception suggests that ILM-Ratio is a viable pedagogical tool ready for implementation in classrooms to support the visualization of ratio material.

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