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Enhancing Malay Language Education: Usability Evaluation of the Kia ArPoly Kit for Malay Figurative Compound Nouns

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ABSTRACT

The creation and evaluation of instructional tools are vital for improving the quality of education. This research assesses the usability of a newly developed instructional aid called the "Kia ArPoly Kit" for teaching Malay figurative compound nouns. Despite the availability of various instructional aids, their usability is often overlooked, leading to inefficiencies and decreased user satisfaction. The main objective of this study is to gauge the effectiveness, efficiency, and user satisfaction of the instructional aid and provide insights for further enhancements. The study comprises three phases: needs analysis, design and development, and usability evaluation. Usability testing, conducted through questionnaires with eight Malay Language Expert Teachers, formed the basis of the third phase. The evaluation focused on four key constructs: usefulness, ease of use, ease of learning, and user satisfaction. The results of the usability assessment demonstrate the high effectiveness and efficiency of the instructional aid kit. Specifically, 87.5% of respondents acknowledged the kit's contribution to helping teachers achieve teaching objectives more efficiently, while 90% found it easy to use and 88.3% expressed overall satisfaction. Furthermore, the kit was found to facilitate effective classroom activity management (90%), save preparation time (87.5%), and align with existing curriculum standards (92.5%). The research's key findings suggest that the instructional aid kit significantly enhances the teaching and learning process of Malay figurative compound nouns. The feedback obtained emphasizes the kit's strengths, including its user-friendliness and practical application in classroom settings. Moreover, the study offers valuable suggestions for further improvement, ensuring that the kit meets the evolving needs of both educators and students. These findings highlight the potential for broader applications of similar instructional aids in language education.

1. Introduction

Quality education for teachers is crucial, as it directly impacts student learning outcomes and overall educational effectiveness in an ever-evolving academic landscape as mentioned by previous studies [1-3]. Quality education hinges on effective instructional teaching aids, which empower

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teachers to deliver content more engagingly and efficiently. These tools bridge theoretical concepts with practical understanding, enhancing student comprehension and retention. For teachers, well-designed aids can simplify complex topics and facilitate more interactive, student-centred learning experiences. Aliyu *et al.*, [4], Ahmadi and Zarei [5] and Rafatbakhsh and Ahmadi [6] claimed that teaching approaches continue to evolve, it becomes increasingly crucial to develop and implement effective instructional tools that enhance the understanding and retention of complex subjects or topics. In the realm of language education, particularly in teaching figurative languages, previous studies conducted by Ponniah *et al.*, [7], Reyes and Saldivar [8] and Peel *et al.*, [9] claimed that educators face unique challenges that require innovative approaches. For this reason, Zokhi [10] proposed the integration of advanced technologies into instructional tools that emerged as a promising solution to address these challenges. The previous study by Suhaimi *et al.*, [11] found that digital learning materials have significantly enhanced the ability to remember and identify functional groups engagingly and interactively. In recent years, Ramli *et al.*, [12] claimed that there has been a notable rise in the utilization of digital tool such as augmented reality within educational settings.

Despite the availability of various instructional aids, studies from Gulzar *et al.*, [13], Ahmad *et al.*, [14], along with Alomari *et al.*, [15] insisted that usability often goes under-evaluated, leading to potential inefficiencies and reduced user satisfaction. As mentioned by Muhammad [16], technological readiness is influenced by optimism, innovativeness, discomfort, and anxiety that related to usefulness and ease of use. This study addresses the critical gap in evaluating the usability of instructional aids, which is essential for enhancing educational outcomes by focusing on the Kia ArPoly Kit, an innovative instructional aid that incorporates gamified augmented reality (AR) for language education of particularly figurative compound nouns. The name Kia derived from the acronym for the Malay word; *Kiasan* (figurative), Ar stands for Augmented Reality, and Poly is adapted from the popular board game of Monopoly. By conducting usability testing with expert Malay language teachers, comprehensive feedback is gathered. These insights guide further refinements of the instructional tool as Azlan *et al.*, [17] and Rashid *et al.*, [18] agreed that high usability ensures efficient and effective interaction, enhances learning experiences, reduces frustration, and increases engagement, leading to better educational outcomes and user satisfaction.

The findings from this study will not only contribute to the improvement of the specific instructional aid but also provide valuable insights for the broader field of educational technology and instructional design, potentially influencing future developments in language teaching tools and methodologies. This study's primary goal is to conduct a thorough usability evaluation of the Kia ArPoly Kit. To this end, the following research questions are asked:

- a) To what extent does the Kia ArPoly Kit help teachers achieve their instructional objectives for teaching Malay figurative compound nouns?
- b) How seamless is the integration of the Kia ArPoly Kit for teachers in classroom settings?
- c) How quickly and effectively can teachers familiarize themselves with the Kia ArPoly Kit?
- d) What is the overall satisfaction level of teachers when using the Kia ArPoly Kit in their educational activities?

2. Methodology

2.1 Study Design

This study employed a Type One Development Research design by Richey and Klein [19] focusing on the third phase of usability evaluation, as outlined in the Design and Development Research (DDR) approach. The DDR approach then modified by Siraj *et al.*, [20] and adapted for developing the Kia ArPoly kit, focusing on evaluating the product's usefulness, ease of use, ease of learning, and user

satisfaction, driven by USE model from Lund [21]. Figure 1 below shows the study design to ensure that the instructional kit meets the needs of its users and achieves its intended educational outcomes.

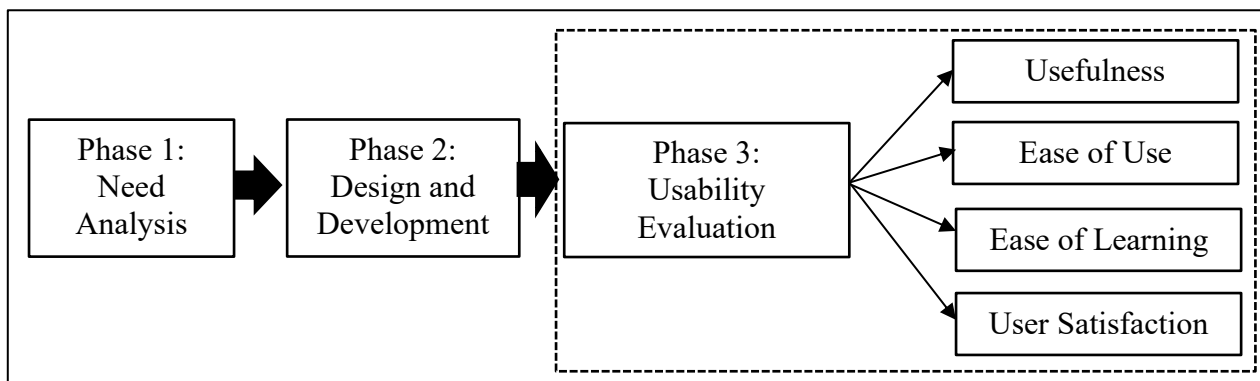


Fig. 1. Study design adapted from Siraj [20] and USE model by Lund [21]

2.2 Procedure of Study

The selection of Malay Language Expert Teachers was based on specific criteria upon receiving their initial informed consent. Following approval from the Education Planning and Research Division (EPRD) and the respective state education departments, online questionnaires via Google Forms were distributed along with hard and softcopies of the kit. Respondents were made aware that the Kia ArPoly Kit is safeguarded by the Intellectual Property Corporation of Malaysia (MYIPO), with registration numbers CRAR2024P01038 and CRLY2024P01039, ensuring its intellectual property rights. They were requested to provide written feedback on the overall kit in the designated sections. The feedback was then utilized to enhance the instructional aid kit and ensure its effective application in teaching and learning Malay figurative compound nouns or known as idioms. Usability evaluation, in the context of design and development research, denotes the assessment conducted after a product has been successfully developed. This phase came after testing and expert validation of the complete prototype of the instructional aid kit. Figure 2 and Figure 3 show the Kia ArPoly Kit with example of a question in gamified augmented reality apps.



Fig. 2. Kia ArPoly Kit

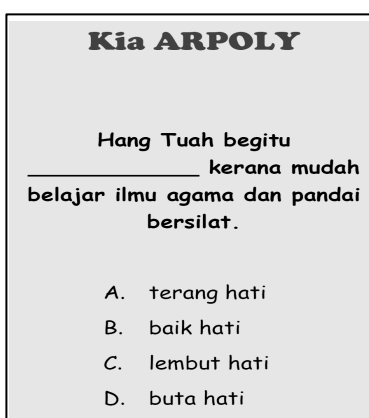


Fig. 3. Example of a question

2.3 Sample of Study

The respondents in this study initially consisted of ten Expert Malay Language Teachers selected purposefully. According to Campbell [22], Patton [23], and Ames *et al.*, [24], purposeful sampling can be conducted by identifying respondent groups that represented the population and considering all individuals in those groups as the potential respondents. The number of respondents was based on recommendation by Hollingsed and Novick [25] which stated that five to ten experts could be used for usability examinations. However, only eight respondents committed to and collaborated with the researchers in this phase. Based on guidance from Norman and Nielsen [26], the relationship between the number of test users and the percentage of usability problems detected indicates that five participants are sufficient to identify about 85% of usability issues. Most critical usability problems can be detected with a small sample, and adding more participants afterward only yields a few new findings. Therefore, a total of eight respondents are considered optimal in terms of cost and effectiveness for most usability evaluations. Figure 4 shows an average percentage line graph of usability testing.

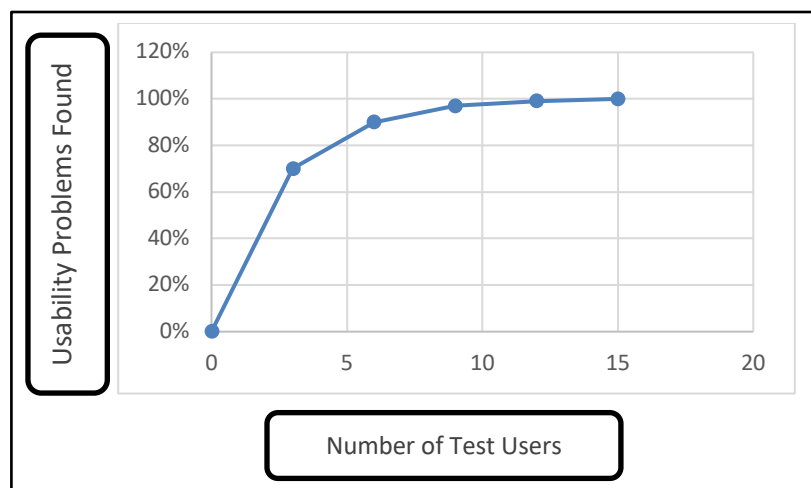


Fig. 4. Average percentage line graph of usability testing adapted from Norman and Nielsen [26]

2.4 Instrument

The instrument for this study was a questionnaire adapted from previous research by Amin *et al.*, [27], utilizing the USE Model by Lund [21]. The questionnaire included 27 items divided into two sections; Section A covered respondent demographics, and Section B encompassed items related to the four main constructs; usefulness, ease of use, ease of learning, and user satisfaction. A five-point Likert scale was used to measure responses, with scores ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree").

2.5 Data Collection

Data were collected quantitatively using the adapted questionnaire, which was distributed to the respondents electronically using *google form*. The usability evaluation was conducted through this questionnaire, targeting Malay Language Expert Teachers who used the Kia ArPoly Kit as instructional kit. Respondents were also asked to provide feedback on various aspects of the kit.

3.6 Data Analysis

Data collected from the questionnaires were analyzed descriptively using SPSS version 27.0. Descriptive analysis was employed to calculate the percentage agreement for each item and the average percentage for each construct. Percentage agreement was determined by summing the number of respondents who selected scores 4 ("Agree") and 5 ("Strongly Agree") for each item, divided by the total number of respondents and multiplied by hundred. The average percentage was calculated by summing the percentage agreements for all items within each construct and dividing by the number of items in that construct. The data analysis was conducted using the Percentage Calculation Method (PCM). According to Sidek and Jamaludin [28] that also aligned with Tuckman and Waheed [29], expert agreement is considered satisfactory if it exceeds 70%. The formula used for this calculation is shown in Figure 5.

$$\text{Content Validity (\%)} = (\text{Total Expert Score} / \text{Maximum Score}) \times 100$$

Fig. 5. Percentage calculation method formula adapted from Sidek and Jamaludin [28]

Using the formula as shown in Figure 5, the usability evaluation aggregates feedback from respondents. This total score was compared to the maximum possible value to obtain the percentage and level of agreement. If the evaluation results reach or exceed 70%, the usability assessment is considered to have satisfactory agreement. This approach allows us to quantitatively assess how well the instructional kit meets the needs and expectations of its target users from the perspective of Malay Language Expert Teachers.

2.7 Credibility of Study

The credibility of the questionnaire was ensured through several measures. The questionnaire was adapted from Amin *et al.*, [27] with a high content of validity. The content validity index (CVI) was used to assess the relevance of each item in that item-level CVI (I-CVI) and scale-level CVI (S-CVI) were calculated. All constructs achieved perfect I-CVI and S-CVI values of 1.00, indicating unanimous agreement among five experts on the relevance and importance of each item. The reliability of the questionnaire was evaluated through a pilot study, where Cronbach's Alpha coefficients were calculated for each construct. The overall Cronbach's Alpha value was 0.967, indicating a very high level of internal consistency as found by Muhammad Nidzam [30]. The constructs of usefulness, ease of use, ease of learning, and user satisfaction had Cronbach's Alpha values of 0.936, 0.891, 0.804, and 0.753, respectively. These results confirm that the instrument can accurately measure the constructs it intends to evaluate, ensuring both its validity and reliability.

3. Results

To evaluate the usability of the Kia ArPoly Kit, descriptive analyses were employed to classify and summarize the data in tabular, graphical, and analytical forms. These methods allow for the creation of comprehensive summaries of the data. Descriptive statistics involve the aggregation of systematized data, which is particularly important in empirical research and the description of experimental results. Utilizing statistical methods allows for the data to be analyzed while considering the randomness and uncertainty of the observations, enabling conclusions to be drawn from the underlying patterns and regularities

3.1 Demographics

The Kia ArPoly Kit's usability assessment involved eight participants, with a well-balanced representation of 37.5% males and 62.5% females. The respondents possessed extensive teaching experience, with 37.5% having taught for 10-15 years and 62.5% for over 20 years, ensuring feedback from highly seasoned educators. In terms of academic qualifications, 62.5% held Bachelor's degrees, while 12.5% each had Doctorate, Master's, and Diploma qualifications, showcasing a diverse educational background among the participants. In their respective service grades, the majority (62.5%) were in the DG 44 grade, with 25% in DG 41 and 12.5% in DG 48. This diverse group provided comprehensive insights into the kit's usability, effectiveness, and potential areas for improvement, offering valuable feedback for refining the Kia ArPoly Kit to better cater to educational needs. Table 1 shows the information about respondents.

Table 1
Respondents in the usability evaluation phase

Item	Frequency	Percentage
1. Gender		
- Male	3	37.5%
- Female	5	62.5%
2. Years of Teaching		
- 10-15 Years	3	37.5%
- 20 Years and above	5	62.5%
3. Academic Qualification		
- Doctorate	1	12.5%
- Master's Degree	1	12.5%
- Bachelor's Degree	5	62.5%
- Diploma	1	12.5%
4. Service Grade		
- DG 41	2	25.0%
- DG 44	5	62.5%
- DG 48	1	12.5%

3.2 Usefulness

The analysis of the findings indicates that the Kia ArPoly Kit significantly enhances the teaching and learning process of Malay figurative compound nouns. With an average agreement percentage of 87.5%, the kit is highly regarded for its efficiency in helping teachers achieve instructional goals. Notably, 90% of respondents appreciated its utility in managing student activities, suggesting its practical application in classroom settings. The kit practicality was confirmed by 85% of the respondents, reflecting its user-friendly design. Additionally, the high agreement percentage for time-saving (87.5%) underscores its efficiency in reducing teachers' preparation time. Overall, the consistently high percentages across various aspects of the kit usability demonstrate its effectiveness, practicality, and valuable support in achieving teaching objectives, making it a beneficial tool for educators. This mirrors the findings of Azlan *et al.*, [17] and Rashid *et al.*, [18] that also noted high user satisfaction with digital educational tools, indicating that user competence and system quality are crucial factors in perceived ease of use and overall satisfaction. The analysis Percentage of Usefulness can be seen in the following Figure 6.

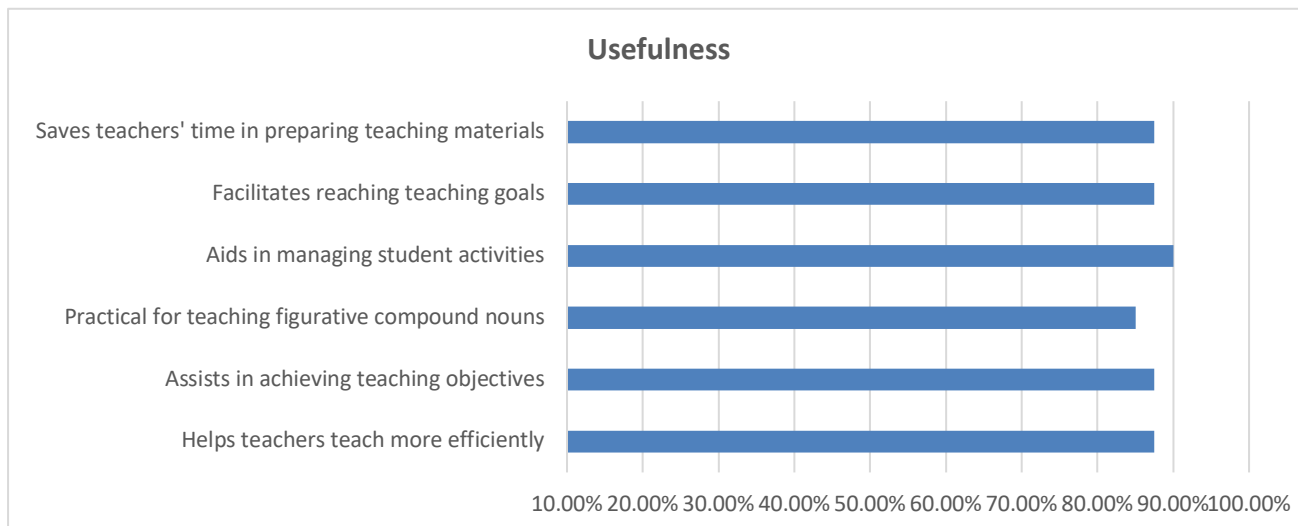


Fig. 6. Percentage of usefulness

3.3 Ease of Use

The findings demonstrate that the Kia ArPoly Kit is highly effective in enhancing the teaching and learning of Malay figurative compound nouns. With an average agreement percentage of 86.4%, the kit is notably praised for its ease of use, with 90% of respondents acknowledging its user-friendly design. Additionally, 90% of respondents found the kit practical, and 87.5% highlighted its user-friendly nature. The kit's usability in various settings was confirmed by 82.5% of respondents, and its non-burdensome nature was noted by 85%. Moreover, the kit can be used without referring to a manual, as indicated by 82.5% of respondents, and it meets the Ministry of Education's standards, with a high agreement of 92.5%. This aligns with previous studies by Zulkifli *et al.*, [31] which found that perceived ease significantly correlates intending to use technology similar to Kia ArPoly Kit. Overall, these high agreement percentages across various usability aspects underscore the Kia ArPoly Kit's effectiveness and practicality, making it a valuable educational tool. Figure 7 shows an analysis of Ease of Use.

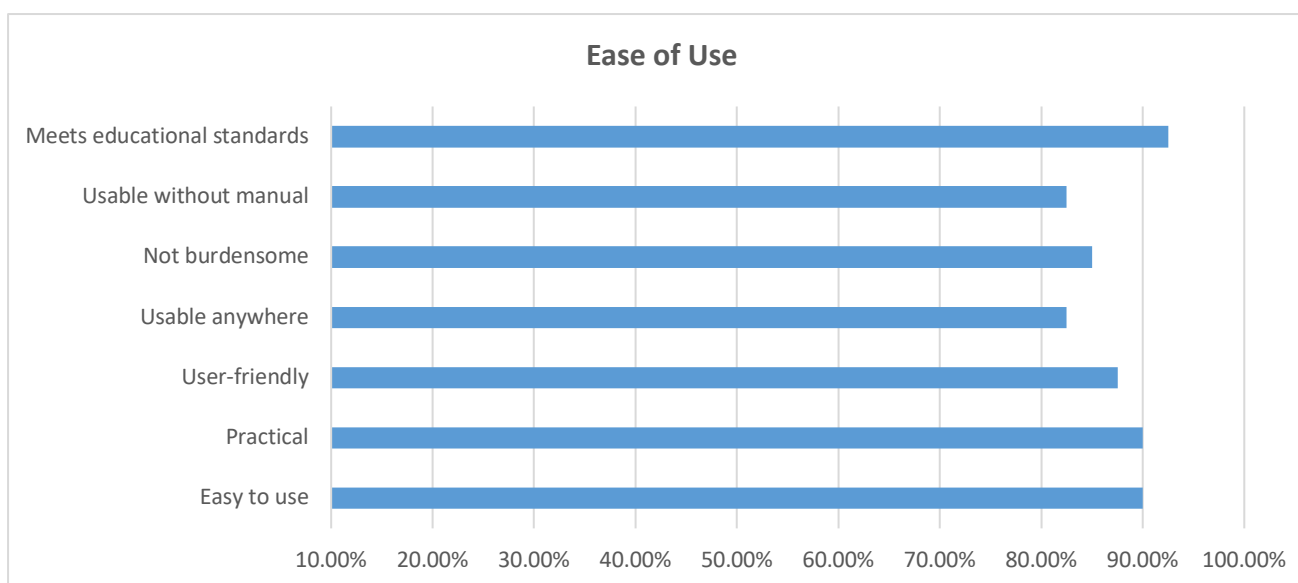


Fig. 7. Percentage of ease of use

3.4 Ease of Learning

The findings show that the Kia ArPoly Kit is highly regarded by teachers for its ease of learning. An average agreement percentage of 83.0% indicates that teachers enjoy using the kit. Notably, 92.5% of respondents found it easy to learn how to use it, and 90% reported that they could quickly become proficient. The kit's ability to facilitate rapid correction of mistakes was appreciated by 82.5% of respondents. Moreover, 87.5% of teachers stated it was easy to remember how to use the kit, and 85% of them reported using it successfully in their lessons. Furthermore, 87.5% of respondents noted that they could quickly learn to use the kit through training, reminiscent of Ramli [32] stating that perceived usefulness and ease of learning have a positive correlation with user satisfaction when implementing new technology like Augmented Reality as a part of Kia ArPoly Kit. Overall, these high agreement percentages underscore the kit's user-friendliness and effectiveness, as referred from analysis in Figure 8 below, making it an invaluable tool for enhancing the teaching and learning of Malay figurative compound nouns.

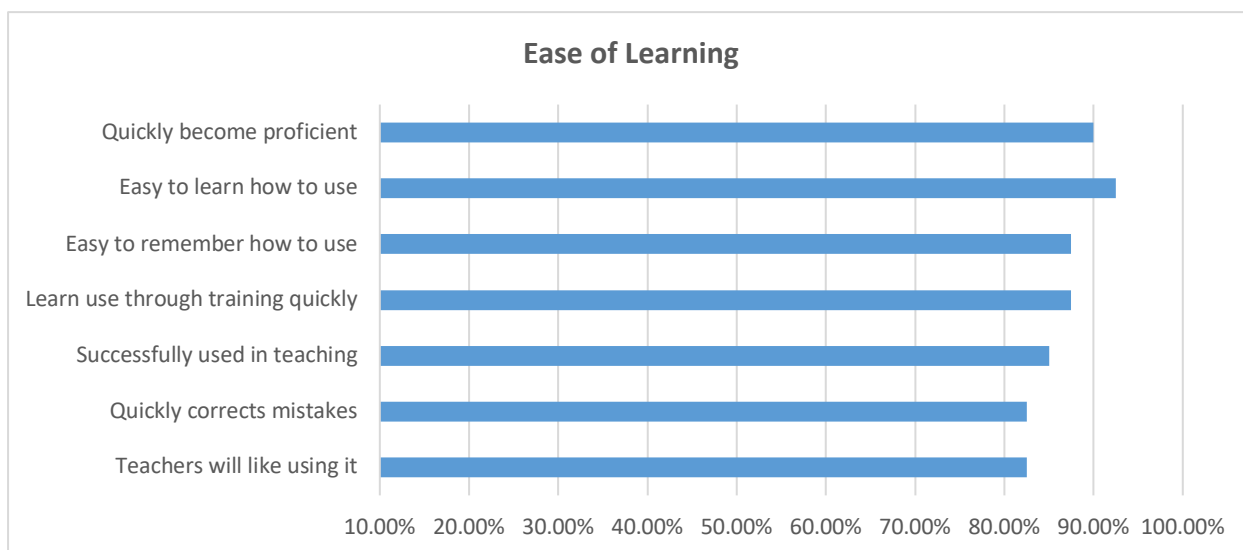


Fig. 8. Percentage of ease of learning

3.5 User Satisfaction

The findings indicate strong positive feedback for Kia ArPoly Kit, with an average satisfaction percentage of 88.3%. Teachers generously expressed satisfaction with the kit (87.5%) and found it enjoyable to use (92.5%). The kit's effectiveness in functioning as intended was affirmed by 87.5% of respondents, highlighting its reliability as a teaching tool. Additionally, 87.5% of teachers considered it an innovative teaching aid and essential for Malay language instruction. The same percentage of respondents also recommended the kit to other teachers and demonstrating strong endorsement. Overall, the high agreement percentages reflect the kit's effectiveness, user satisfaction, and innovative value. This makes it a highly recommended tool for enhancing the teaching and learning experience of Malay figurative compound nouns. Figure 9 shows an analysis Percentage of User Satisfaction.

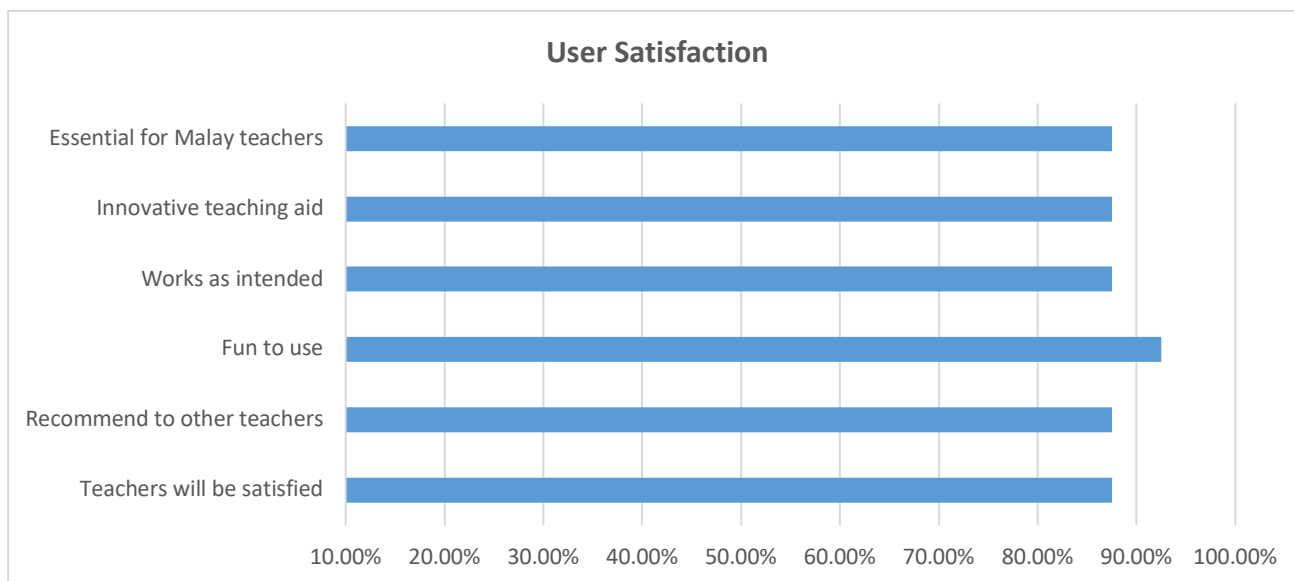


Fig. 9. Percentage of user satisfaction

The findings from the usability evaluation of the Kia ArPoly Kit show high levels of agreement across all constructs, indicating its effectiveness and user satisfaction. The overall percentage of 86.3% reflects the kit's strong performance. Specifically, the 'Usefulness' construct received an agreement percentage of 87.5%, suggesting that teachers find the kit highly effective in meeting their instructional goals. 'Ease of Use' scored 86.4%, demonstrating that the kit is user-friendly, and straightforward to implement in teaching. 'Ease of Learning' received 83.0%, indicating that teachers can quickly learn to use the kit efficiently. Lastly, 'User Satisfaction' scored the highest at 88.3%, reflecting high levels of satisfaction among teachers. These results highlight the Kia ArPoly Kit's overall reliability, practicality, and user approval, making it a valuable tool for enhancing the teaching and learning of Malay figurative compound nouns as shown in Table 2.

Table 2

Overall evaluation analysis

Construct	Agreement Percentage	Overall Percentage
Usefulness	87.5%	86.3%
Ease of Use	86.4%	
Ease of Learning	83.0%	
User Satisfaction	88.3%	

4. Conclusions

The positive feedback on the Kia ArPoly Kit underscores its potential to revolutionize language teaching by providing teachers with effective and user-friendly tools. This study's findings can inform the development of similar instructional aids across various subjects, ultimately enhancing the quality of education. With an overall agreement percentage of 86.3%, the kit excels in various aspects critical to educational tools. In particular, the 'Usefulness' construct achieved an 87.5% agreement, indicating that the kit significantly aids teachers in meeting their instructional objectives efficiently. The 'Ease of Use' scored 86.4%, highlighting the kit's user-friendly nature and straightforward implementation in classroom settings. Additionally, the 'Ease of Learning' construct, with an 83.0%

agreement, reflects that teachers can quickly and efficiently learn to use the kit, enhancing its practicality. Moreover, the highest agreement percentage was observed in the 'User Satisfaction' construct, with an 88.3% score. This high satisfaction rate underscores the kit's reliability, innovative design, and overall positive reception among teachers. The kit's ability to function as intended and its enjoyable use experience were particularly noted in that 92.5% of teachers found it fun and would recommend it to peers.

The findings provide compelling evidence of the Kia ArPoly Kit's efficacy in meeting its intended objectives, offering a robust, practical, and widely endorsed solution for enhancing the teaching and learning of Malay figurative compound nouns. Key recommendations include fostering continuous teacher feedback to drive iterative improvements, implementing targeted training sessions and workshops to boost educators' proficiency, and expanding the kit's content to cover a broader spectrum of linguistic topics. While the study demonstrates Kit's effectiveness, limitations such as the small sample size and specific context of Malay figurative compound nouns warrant consideration. Future research should explore the Kit's long-term impact on student performance and engagement, as well as its applicability in diverse language learning contexts. Additionally, investigating the usability of similar instructional aids across various educational settings with larger, more diverse samples could yield valuable insights. Rini *et al.*, [33] emphasize that digital tools must fully integrate into the learning process, facilitating comprehensive monitoring and management by teachers to achieve high satisfaction levels. By implementing these recommendations, the Kia ArPoly Kit, with its augmented reality capabilities, can continue to evolve, amplify its impact, and solidify its position as an indispensable tool in modern education.

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