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The Development and Usability of KITATORA for the Topic of Algebraic Expressions in Form 1

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ABSTRACT

This study aimed to develop KIT Tambah Tolak Algebra (KITATORA), which is designed to teach students how to add and subtract two or more algebraic expressions, according to the Secondary School Standard Curriculum (KSSM) Mathematics at Form 1 in Malaysia. The study also sought to determine the validity and usability of KITATORA. The research design used for this study was Design and Development Research (DRD). The sample for the validity of KITATORA included a mathematics lecturer from a public university and two experienced mathematics teachers. The study sample consisted of 30 Form 1 students from a school in the state of Selangor. This study used two types of instruments: the Kit Validation Assessment Form (KVAF) and the Kit Usability Survey (KUS). The validity, reliability, and usability data were analysed using Content Validity Index (CVI) calculations, Cronbach's alpha value, and interpretation of minimum scores. The study findings showed a CVI value of 1.00, a Cronbach's alpha value of 0.938, and an average minimum score of 3.83. In conclusion, this study suggests that KITATORA has satisfactory validity and usability. Therefore, teachers can use KITATORA as an alternative teaching aid for the topic of adding and subtracting two or more algebraic expressions. The educational significance of KITATORA lies in its ability to enhance students' understanding of algebraic concepts while promoting greater engagement with the subject, making algebra more accessible and enjoyable for learners.

Keywords: algebra; algebraic expression; mathematics education; teaching aids; KITATORA

1. INTRODUCTION

Algebraic expression is a topic within the domain of relationships and algebra, and it is studied in the Form 1 Malaysian Mathematics syllabus under the Standard Curriculum for Secondary Schools (KSSM). This topic is crucial because it forms the foundation for various mathematical problem-solving methods students need to learn up to Form 5 (Sarimah Baco, 2022). However, algebra is often perceived as one of the most challenging topics for students to understand (Foo et al., 2021). This challenge is not unique to one region; curricula worldwide face issues with algebra, a topic long documented as difficult for students (Wahyuni et al., 2021). Specifically, it has been recognised as a particularly challenging subject for students since elementary school (Somasundram, 2021). If students fail to master the topic of algebraic expressions, they may struggle to apply algebraic knowledge in the study of equations, formulas, and algebraic functions (Foo et al., 2021). Therefore, it is crucial for students to fully grasp algebraic concepts at the early stages of their education.

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There were positive impacts of constructivist learning methods on students' comprehension and performance in algebra. Katz and Moore (2019) found that problem-based learning and collaborative techniques enhance high school students' ability to solve algebraic problems. Similarly, Cheng and Lin (2020) showed that integrating real-life contexts into algebra lessons not only increases student motivation but also deepens their understanding of algebraic concepts. Owusu (2015) observed that constructivist strategies, such as cooperative learning, promote higher engagement and achievement in algebra. Moreover, Li et al. (2024) highlighted the role of scaffolding in constructivist algebra teaching, noting that providing targeted support helps students manage complex algebraic challenges.

The abstract nature of algebra creates another problem, as teachers frequently underestimate the importance of having sufficient teaching materials. (Veith, Bitzenbauer and Girnat, 2022). Many teachers rely solely on textbooks and explain problem-solving processes by writing on the whiteboard. Technologically based teaching aids are cost-effective and do not require significant financial investment (Norshila Roslin and Norshidah Mohamad Salleh, 2021). Nevertheless, numerous teachers encounter difficulties in creating teaching resources because of the time needed for their creation, leading to a shortage of accessible teaching materials. (Wahyuningsih, Wahyono and Nugroho, 2021).

According to Borhman and Abdul Karim (2023), teaching kits can enhance students' understanding and skills during the teaching and learning process. Researchers in the field of mathematics education have designed various teaching aids. These include The Isometric Trio, developed by Arbin et al. (2022), for the topic of translations; the SLEQ Kit, developed by Chai et al. (2023), for the topic of linear equations; the Polygon Kit, developed by Fauzi and Abdullah (2021), for the topic of basic polygons; the Dolphin Jump Number Line Kit, developed by Jamaludin et al. (2023), for integer multiplication; the Algebra Story Kit, developed by Noor Azimah Abdul Ghani (2019), for basic algebra; a teaching kit for the topic of addition and subtraction of integer numbers, developed by Borhman and Abdul Karim (2023); a training module for algebraic expressions, developed by Foo et al. (2021); and a manipulative module, Modul Latihan Matematik Pengguna, for the topic of financial management, developed by Norazura Said et al. (2022). Despite these advancements, past development studies have not focused significantly on the development of kits specifically for algebra topics. This gap in resources has prompted the authors to develop a teaching kit named Kit Tambah Tolak Algebra (KITATORA), concentrating on the topic of algebraic expressions.

The abstract nature of algebra and the insufficient availability of teaching aids suggest that many teachers encounter challenges in effectively delivering this subject. To address this issue, KITATORA was developed as a teaching tool aimed at enhancing the learning experience for Form 1 students, making the process of learning algebra more engaging and accessible. This study focuses on the development, validation, and usability of KITATORA. Specifically, it seeks to evaluate its content validity through expert assessments and its usability from the perspectives of both students and teachers. By examining these aspects, the study aims to determine whether KITATORA can be an effective teaching aid in the Malaysian Mathematics curriculum.

A relevant study by Foo et al. (2021) highlights the need for interactive teaching resources in mathematics, particularly for algebraic concepts, which aligns with the challenges identified in the current study. This explains the importance of developing targeted teaching aids like KITATORA. Unlike other algebra teaching aids, KITATORA integrates interactive elements and real-life applications specifically designed for Form 1 students, thereby fostering a deeper understanding of algebraic expressions through hands-on learning experiences.

Here are the research questions (RQs) that we need to answer in this research.
(RQ1) What is the process of developing KITATORA for the topic of adding and subtracting two or more algebraic expressions in Form 1 Mathematics?
(RQ2) What is the content validity of KITATORA as evaluated by a mathematics lecturer and experienced teachers?
(RQ3) What is the reliability of the Kit Usability Survey (KUS) instrument based on Cronbach's alpha analysis?
(RQ4) How do users (teachers and students) perceive the usability of KITATORA in terms of usefulness, ease of use, and satisfaction?

2. LITERATURE REVIEW

2.1 Constructivist Learning Theory

Implementing constructivism in teaching enables students to be actively involved in learning, analyse information, comprehend ideas, build self-assurance, and enhance interpersonal abilities. (Saleem et al., 2021). This theory also has an impact on the learning environment by promoting student-centred learning. Bada and Olusegun (2020) emphasize that constructivist methods, such as problem-based learning and group activities, are crucial for enhancing critical thinking and problem-solving abilities. Similarly, Shehzad & Charles (2023) found that applying constructivist approaches in online learning settings increases student engagement and performance, particularly in challenging subjects like mathematics. Furthermore, Çakar Özkan (2022) point out that scaffolding, a core element of constructivism, helps learners build on existing knowledge and approach new concepts with greater assurance. These studies demonstrate the enduring value of constructivist methods in developing independent, active learners who can apply their knowledge effectively in real-world situations and adapt to various learning environments.

2.2 Technology-assisted Learning in Algebra

Technology-assisted learning in algebra involves using digital tools and platforms to enhance the understanding of algebraic concepts. This includes interactive apps, online platforms, virtual manipulatives that provide visualizations, and manipulative materials. Recent research highlights the positive impact of technology-assisted learning on algebra, particularly in enhancing student engagement and comprehension of challenging mathematical concepts. Shehzad & Charles (2023) showed that digital tools, such as interactive apps and software, help students understand algebra by providing instant feedback and visualizations of abstract ideas. Likewise, Li and Yang (2020) found that mobile learning applications aid students in solving algebraic problems more effectively, resulting in better academic outcomes. Additionally, Li (2024) pointed out that incorporating technology, such as online platforms and gamified learning tools, significantly increases student motivation and interest in algebra by making the learning process more interactive and enjoyable. Overall, these studies highlight how technology can enhance and make algebra education more engaging and accessible for students.

2.3 Instructional Material Development Model

To develop instructional materials, it is important to use a development model as the foundation for the process. There are various instructional design models available, each with its own methods for achieving specific goals. In this study, the ADDIE (Analysis, Design, Development, Implementation, and Evaluation) model was chosen as the development model for KITATORA. The ADDIE model has been widely applied to design effective educational tools and programs due to its structured and iterative approach. Recent studies highlight its successful application in

developing educational resources in various fields. For example, the design of an interactive learning toolkit for STEM education incorporated the ADDIE model to ensure both instructional effectiveness and student engagement. During the analysis phase, learning needs and objectives are clearly identified; during the design and development phase, interactive elements are developed; implementation involves testing with real students; and evaluation helps improve the tools for future use (Stapa and Mohammad, 2019). By integrating the ADDIE model with constructivist principles, these educational tools promote active learning and help students acquire knowledge through hands-on problem-solving activities (Abuhassna et al., 2023). These developments demonstrate the continued relevance and adaptability of the ADDIE model in creating impactful educational experiences. The model's flexibility allows it to adapt to different educational contexts. When integrated with constructivist learning theory, which emphasizes active, learner cantered experiences, the ADDIE model promotes an environment in which learners actively construct knowledge (Abuhassna et al., 2023). Together, it helps guide the development of engaging and effective educational tools.

3. METHODOLOGY

3.1 Research Design

This quantitative developmental study uses statistical data to assess the usability of KITATORA for teaching the standard of adding and subtracting two or more algebraic expressions. The study employs the Developmental Research Design (DRD), which focuses on the development of the kit and uses the ADDIE instructional design model as a guide. The ADDIE model was chosen because it is a systematic instructional design model.

3.2 Population and Sample

The study's selection of experts included a mathematics lecturer from Universiti Pendidikan Sultan Idris (UPSI) and two secondary school mathematics teachers with over five years of teaching experience. These experts were responsible for validating the kit using the Kit Validation Assessment Form (KVAF).

For the pilot study, 15 Form 1 students were selected to test the instrument reliability of the Kit Usability Survey (KUS). Additionally, 30 Form 1 students were chosen as respondents to evaluate the kit's usability for the topic of algebraic expressions in Form 1 using the KUS instrument. According to Bougie and Sekaran (2019), a sample size of 30 to 50 is sufficient for a study. Thus, a total of 30 samples or respondents were selected to make this study a success, consisting of Form 1 students at a national secondary school located around Sepang, Selangor, Malaysia. This selection was done carefully using the convenience sampling techniques to ensure that the research conducted would yield good results.

The researchers used this convenience sampling method to ensure that the results of the study were easy to obtain, such as selecting schools close to the researcher's residence to save on cost, time, and energy in carrying out the study. Although convenient and cost-effective, convenience sampling has several disadvantages. Because it relies on readily available participants, it is susceptible to bias, potentially failing to accurately reflect the larger population. This limits the generalizability of results and makes it difficult to determine the margin of error. Additionally, unknown errors can occur due to the sample's lack of representativeness, leading to inaccurate conclusions. While useful for initial research, convenience sampling should be used with caution and its limitations recognized.

3.3 Research Instruments

The Research instruments are tools that are used to obtain and collect data. For this particular study, two types of instruments were utilized: the KVAF and KUS. Both of these instruments employed a 4-point Likert Scale to measure the level of agreement among respondents with the items that were presented. The Likert Scale was utilized in the following manner:

Table 1 Interpretation Level of the 4-Point Likert Scale

Scale	Interpretation Level
1	Strongly Disagree
2	Do Not Agree
3	Agree
4	Strongly Agree

3.4 Data Analysis

In this study, the Content Validity Index (CVI) was used to assess the face validity and content validity of the KVAF instrument. Face validity of the kit was evaluated based on language clarity and understanding, while content validity examined the overall content of the kit. The CVI value, as outlined in Table 2, was employed to establish the validity based on the number of experts.

Table 2 CVI Range According to the Number of Experts (Lynn, 1986)

Number of Experts	Reliability level
2 - 4	1.00
5	>0.86
6	>0.83
7 - 10	>0.78

Three experts, including a mathematics lecturer and two experienced mathematics teachers in the field of education were recruited to independently review and validate both face and content validity of kit using the content validity index (CVI) based on relevant aspects, with a 4-point Likert scale rating: scale 1=strongly disagree, 2=did not agree (submodule needs revision), 3=agree but needs minor revision, 4=strongly agree. Following these ratings, the scale was further categorized into relevant content (ratings 3 and 4) and nonrelevant content (ratings 1 and 2). See e.g. To obtain the final score of CVI, we measured: item-CVI (I-CVI), using equation (1), which was computed as the number of experts who rate “relevant content” for an item, divided by the total number of experts, and scale-CVI (S-CVI/Ave), using equation (2), an average of the I-CVI for all items. Based on table 2, if the number of experts is 3, it required a CVI of 1.00 to indicate the item was perfect validity, while scores between 0.66 and 0.99 required revision, and scores below 0.66 led to item elimination.

$$\text{I-CVI} = \frac{\text{Number of expert who rate "relevant content"}}{\text{Total number of experts}} \quad (1)$$

$$\text{S-CVI} = \frac{\text{Sum of all I-CVI}}{\text{Total number of item}} \quad (2)$$

Before conducting the field study, a pilot study will be carried out to assess the reliability of the kit and the developed instruments. The reliability testing will involve 15 respondents who are Form 1 students studying mathematics. The data from the pilot study will be analysed using Cronbach's alpha to determine the reliability level of the questionnaire instrument. According to Lim (2007), a Cronbach's alpha value approaching 1 indicates excellent reliability. A value exceeding 0.8 is considered good reliability, while a value below 0.8 is considered moderate reliability. A Cronbach's alpha value of 0.6 or lower indicates that the instrument is questionable and unacceptable. Table 3 presents Cronbach's alpha value scale based on Lim (2007) adaptation. A Cronbach's alpha coefficient of 0.7 and above indicates satisfactory reliability, demonstrating that the adapted instrument has sufficient reliability for administration (Cronbach, 1951). Table 3 displays the Cronbach's alpha scale value adapted by Lim (2007).

Table 3 Cronbach's Alpha Scale Value (Lim, 2007)

Cronbach's Alpha Scale Value	Reliability level
> 0.9	Very Good
0.89 – 0.80	Good
0.79 – 0.60	Moderate
0.59 – 0.40	Doubtful
0.39 – 0.00	Rejected

Next, mean scores and their interpretations are used to determine the usability level of the kit. These scores are obtained quantitatively from the field study conducted on the study sample. Subsequently, the data are analysed descriptively using SPSS software to obtain the mean values and determine the usability level for each item. Table 4 shows the mean score value and the interpretation of the mean score of the four-point likert scale adapted from Budiaji (2018) to determine the usability of KITATORA.

Table 4 Mean Score Interpretation of the 4-Point Likert Scale (Budiaji, 2018)

Mean Score	Mean Interpretation
0.00 – 1.50	Lack of Relevance
1.51 – 2.50	Low
2.51 – 3.50	Medium
3.51 – 4.00	High

4. RESEARCH FINDINGS AND DISCUSSION

The findings of this study include the validity of the kit, the instrument's reliability, and the kit's usability.

4.1 Kit Validity

The validity of the kit assesses how well KITATORA performs its intended functions. This validity is determined based on the entire kit and was obtained from three experts. The analysis of the validity was done using the CVI range as proposed by Lynn (1986). According to Lynn (1986), a satisfactory validity range is achieved when the validity from the three experts exceeds 1.00. The KVAF includes 16 items that are divided into two sections: face validity and overall content validity.

Table 5 Findings for The Face Validity of KITATORA

No.	Item	Ordinal scale			I-CVI
		Expert 1	Expert 2	Expert 3	
1.	KITATORA design is attractive.	1	1	1	1.00
2.	KITATORA's layout is acceptable.	1	1	1	1.00
3.	The instructions in KITATORA given are clear.	1	1	1	1.00
4.	Common word used in KITATORA.	1	1	1	1.00
5.	Fonts in KITATORA that are suitable to use.	1	1	1	1.00
6.	The spelling in KITATORA is correct.	1	1	1	1.00
7.	The grammar in KITATORA is good.	1	1	1	1.00
8.	The terms used in KITATORA are appropriate.	1	1	1	1.00
				S-CVI/Ave	**1.00**

Table 5 presents the consensus among the three experts regarding the face validity of KITATORA. According to the table, all items received a rating of 1 on an ordinal scale from the three experts involved. This indicates unanimous agreement and acceptance of the kit's face validity. The study findings demonstrate that each expert obtained a CVI value of 1.00. Based on these results, the kit's design, layout, font, and language are considered suitable teaching aids for use by teachers in schools.

Table 6 Findings for The Overall Content Validity of KITATORA

No.	Item	Ordinal Scale			I-CVI
		Expert 1	Expert 2	Expert 3	
1.	The content in KITATORA meets KSSM Mathematics Form 1.	1	1	1	1.00
2.	KITATORA content is directly related to the learning standards.	1	1	1	1.00
3.	KITATORA contains material or activities that can achieve the learning standard of adding and subtracting two or more algebraic expressions.	1	1	1	1.00
4.	KITATORA contains material or activities that can achieve the learning outcomes of adding and subtracting two or more algebraic expressions.	1	1	1	1.00
5.	The content of KITATORA is suitable for the level of ability of students in Form 1.	1	1	1	1.00
6.	The content of KITATORA follows the experience of students in Form 1.	1	1	1	1.00
7.	KITATORA content can improve student achievement for the topic of adding and subtracting two or more Form 1 algebra expressions.	1	1	1	1.00
8.	The contents of KITATORA correspond to the allotted time.	1	1	1	1.00
				S-CVI/Ave	**1.00**

Table 6 displays the consensus among the three experts on the content validity of KITATORA. Based on the table, the CVI value for the overall content validity of KITATORA is 1.00, indicating that it is deemed satisfactory. Consequently, the developed kit is suitable for teaching the standard of adding and subtracting two or more algebraic expressions.

4.2 Reliability

A pilot study was conducted with 15 Form 1 students to test the reliability of the instrument. The data was analysed using Statistical Packages for Social Science (SPSS) software version 29.0 to obtain Cronbach's alpha value. The following Cronbach's alpha values were determined through SPSS analysis:

Table 7 Cronbach's Alpha Value of Instrument Reliability

Number of Items	Cronbach's Alpha Value
18	0.938

The obtained Cronbach's alpha value is 0.938, which is considered excellent according to Table 3. This value must exceed 0.7 to indicate satisfactory reliability, demonstrating that the adapted instrument has sufficient reliability for administration (Cronbach, 1951). Therefore, the KUS instrument has satisfactory reliability and can be used by students to evaluate KITATORA for the learning session on adding and subtracting two or more algebraic expressions.

4.3 Usability

The KUS was used to assess the usability of this study, which consists of 18 items. In this stage, we will evaluate KITATORA to determine its usability for teachers during teaching and learning sessions. The usability of the kit is divided into three aspects: usefulness, user convenience, and satisfaction. Table 8 presents the results of KITATORA's usability in terms of these aspects. Item 3, "KITATORA saves me time in completing assignment questions," and Item 6, "Using KITATORA in the teaching process makes classroom activities more effective," received the highest mean scores of 3.90. Overall, the average score for this section is 3.84, indicating that KITATORA has a high level of usability.

Table 8 Mean Analysis Part A: Usefulness

No.	Item	Mean Score	Mean Score Interpretation
1.	Using KITATORA helped me in the learning process of adding and subtracting two or more algebraic expressions.	3.77	High
2.	Using KITATORA in the learning process is very useful for me to understand the concept of adding and subtracting two or more algebraic expressions.	3.76	High
3.	KITATORA saves me time in completing assignment questions.	3.90	High
4.	Using KITATORA in the learning process makes it easier for me to understand the topic of adding and subtracting two or more algebraic expressions.	3.87	High
5.	Using KITATORA in the teaching process makes classroom activities more productive.	3.87	High
6.	Using KITATORA in the teaching process makes classroom activities more effective.	3.90	High
	AVERAGE OVERALL MEAN	**3.84**	**High**

Analysis on table 8 had demonstrates its positive impact on both student learning and classroom effectiveness. With high scores in usefulness category such as saving time on assignments and making classroom activities more productive, KITATORA proves to be a valuable tool in the learning process. Specifically, users reported that using KITATORA helped them understand the concepts of adding and subtracting algebraic expressions more easily and effectively. As highlighted in the literature on Constructivist Learning Theory, which emphasizes student-centred learning and active engagement, KITATORA aligns with these principles by fostering a more interactive and effective learning environment. The high ratings for the tool's ability to enhance both student comprehension and classroom productivity reflect the core values of constructivism, which encourages active participation, critical thinking, and problem-solving skills. Thus, KITATORA not only aids in understanding complex algebraic concepts but also contributes to more efficient and engaging classroom experiences, making it a powerful tool for enhancing the learning of algebra.

Table 9 presents the results of the usability analysis of KITATORA, specifically focusing on user convenience. Notably, Item 1, which assesses the ease of use of KITATORA, received the highest mean score of 3.90. Additionally, all other items scored a mean of 3.70 or higher, indicating that users found the kit easy to use.

Table 9 Mean Analysis Part B: User-Convenience

No.	Item	Mean Score	Mean Score Interpretation
1.	KITATORA is easy to use.	3.90	High
2.	KITATORA has clear instructions.	3.87	High
3.	KITATORA was able to easily correct my mistakes when completing the worksheet.	3.70	High
4.	KITATORA is user-friendly.	3.77	High
5.	Activities that use KITATORA are easy to carry out in class.	3.77	High
6.	KITATORA was successfully used in completing activities.	3.83	High
	OVERALL AVERAGE MEAN	**3.84**	**High**

The usability analysis for part B had reveals a high user convenience score, supports the successful application of the ADDIE model in its development. With an average mean score of 3.84, indicating that users found KITATORA easy to use, this outcome aligns with the principles of the ADDIE model, particularly in the design and development phases. The ADDIE model's structured and iterative approach ensures that educational tools are both effective and user-friendly, as evidenced by the high usability ratings of KITATORA. The integration of constructivist principles further enhances this by promoting active, hands-on learning, ensuring that the tool is not only easy to use but also engaging and supportive of student learning. Thus, KITATORA's design exemplifies how the ADDIE model can lead to the creation of educational tools that are both pedagogically sound and user-friendly.

The final section of the usability analysis for KITATORA focuses on satisfaction. Table 10 presents an analysis of satisfaction for each item, with an overall average mean score of 3.84. Among the items in this aspect, Item 5, which asks about the impact of KITATORA on users' interest in learning the topic of adding and subtracting two or more algebraic expressions, received the highest mean score of 3.84. Other items also obtained high mean scores of 3.50 or higher.

Table 10 Mean Analysis Part C: Satisfaction

No.	Item	Mean Score	Mean Score Interpretation
1.	I enjoy using KITATORA.	3.80	High
2.	I found that KITATORA works well.	3.80	High
3.	I was able to solve the question of adding and subtracting two or more algebraic expressions through the steps provided in KITATORA.	3.80	High
4.	KITATORA helps me to study more effectively.	3.77	High
5.	KITATORA helps increase my interest in learning the topic of adding and subtracting two or more algebraic expressions.	3.84	High
6.	I got excited when I learnt to use KITATORA.	3.77	High
	OVERALL AVERAGE MEAN	**3.80**	**High**

Based on the usability analysis on satisfaction, it supports the findings in the literature on technology-assisted learning in algebra. Similar to previous research highlights the positive impact of digital tools in improving student engagement and comprehension of algebra, KITATORA's high satisfaction scores, particularly in its ability to increase user interest in algebraic topics, reflect similar benefits. With an average mean score of 3.80 and a high score of 3.84 for its impact on student interest, KITATORA aligns with the literature by demonstrating how interactive, technology-based tools can enhance learning experiences, foster engagement, and make algebra more accessible and enjoyable for students.

Table 11 Analysis of Field Research Findings

Section	Mean Score	Mean Score Interpretation
Part A: Usefulness	3.84	High
Part B: User-Convenience	3.84	High
Part C: Satisfaction	3.80	High
OVERALL AVERAGE	**3.83**	**High**

Based on the analysis in Table 11, the findings indicate that the usability of KITATORA, in terms of usefulness, user-friendliness, and satisfaction, has high mean score interpretations. The overall average value is 3.83, indicating satisfactory usability. All the feedback gathered from both students and teachers regarding the use of KITATORA in teaching and learning lesson, specifically for the standard learning focused on adding and subtracting two or more algebraic expressions. A selection of this feedback has been carefully chosen and recorded in table 12 for further analysis, with the aim of evaluating the effectiveness and impact of the kit in enhancing the understanding of algebraic concepts.

Table 12 Feedback from Students and Teachers

No.	Feedback From	Feedback Given
1.	Teacher 1	The use of the KITATORA teaching kit can attract students' interest in learning algebra easily. Students also find it easier to understand concepts and solve problems involving the addition and subtraction of two or more algebraic expressions accurately. It is recommended to expand the potential use of the kit to cover algebraic expressions involving multiplication and division.
2.	Teacher 2	In my opinion, I feel that the use of KITATORA in teaching and learning sessions (PdP) can help students understand algebra more deeply. The instructions for use are very clear, simple, and easy to understand by both teachers and students. The KITATORA board is also very attractive and successfully make the students' interest to use it.
3.	Student 1	KITATORA helps me understand addition and subtraction of algebraic expressions more deeply.
4.	Student 2	It is very interesting and fun to use.
5.	Student 3	In my opinion, I can learn algebra more easily and comfortably.
6.	Student 4	It's great because it makes it easy to get the answers and solve algebraic expression problems during the activity.
7.	Student 5	KITATORA helps me understand better and makes me excited to learn.

The feedback gathered from both teachers and students highlights the effectiveness of the KITATORA teaching kit in enhancing the learning of algebra, particularly in the areas of adding and subtracting algebraic expressions. Teachers noted that the kit successfully captures students' interest, making algebra more accessible and easier to understand. The clear instructions and attractive design of the KITATORA board were also praised for helping both teachers and students engage with the material effectively. Students expressed that the kit made learning algebra more enjoyable, comfortable, and motivating, with several mentioning how it helped them solve problems more efficiently. Therefore, both teachers and students agree that KITATORA is a suitable teaching kit to covering the topic of adding and subtracting two or more algebraic expressions.

The educational significance of KITATORA is evident in its ability to enhance students' understanding of algebraic concepts while fostering greater engagement with the subject. By integrating technology and adhering to a structured instructional design model, KITATORA makes algebra more accessible and enjoyable for learners. The findings from the usability analysis further emphasize its effectiveness, as the tool not only supports the comprehension of complex algebraic concepts but also improves classroom productivity. The results demonstrate that KITATORA effectively engages students, aligning with constructivist principles by encouraging active participation and deeper learning. Overall, KITATORA stands as a valuable educational tool that enhances both the understanding and enjoyment of algebra, offering an interactive and supportive learning experience.

5. CONCLUSION

This study set out to develop, validate, and evaluate the usability of KIT Tambah Tolak Algebra (KITATORA) for teaching the topic of adding and subtracting two or more algebraic expressions in Form 1 Mathematics. The findings provide clear answers to the research questions (RQs):

Process of Developing KITATORA (RQ1)
KITATORA was developed following a systematic Design and Development Research (DDR) process. The development involved creating a user-friendly, pedagogically kit that aligns with the KSSM Mathematics curriculum in Malaysia. The kit was designed to enhance students' understanding of algebraic expressions by integrating engaging and hands-on learning materials for both teachers and students.

Content Validity of KITATORA (RQ2)
The content validity of KITATORA was assessed by a panel of experts, including a mathematics lecturer and experienced teachers. The Content Validity Index (CVI) for both face and content validity were found to be 1.00, indicating unanimous agreement that the kit is valid for use in teaching algebraic expressions. The experts agreed that KITATORA's design, structure, and content are appropriate for the targeted topic and audience.

Reliability of the Kit Usability Survey (KUS) (RQ3)
The reliability of the SSKK instrument was confirmed through a pilot study involving 15 students. The Cronbach's alpha value of 0.938 exceeded the acceptable threshold of 0.7, indicating excellent reliability. This demonstrates that the SSKK instrument is consistent and reliable for measuring the usability of KITATORA.

Perception of Usability by Teachers and Students (RQ4)
The usability analysis of KITATORA, which focused on three aspects i.e. usefulness, ease of use, and user satisfaction, revealed high mean scores across all items. Teachers and students rated KITATORA highly for its effectiveness in simplifying problem-solving, ease of use in classroom settings, and overall satisfaction. The overall usability score was 3.83, indicating that the kit is practical, user-friendly, and well-received by its intended users.

While the KITATORA teaching kit has proven effective in teaching algebra, particularly in adding and subtracting algebraic expressions, there is potential for broader application. Future directions could include expanding its use to cover more advanced algebraic topics, including multiplication and division of algebraic expressions. Also integrating KITATORA into a digital platform, such as an app or an interactive website, will greatly enhance wider access and involvement, especially in limited-resource regions. Additionally, the study's reliance on convenience sampling suggests the need for more representative sampling methods in future research to address potential biases and improve the generalizability of the findings. By adapting the kit for a wider range of educational contexts and using more robust sampling techniques, KITATORA could have an even greater impact in diverse learning environments.

In summary, KITATORA has demonstrated strong validity, reliability, and usability, making it an effective teaching tool for the topic of adding and subtracting algebraic expressions in Form 1 Mathematics. The findings support its potential for enhancing teaching and learning outcomes in mathematics classrooms.

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