Development and Usability of "From Formulas to A+" SPM Mathematics Comprehensive Module among Upper Secondary School Students

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ABSTRACT

The research aims to develop and evaluate the validity and usability of the "From Formulas to A+" Malaysian Certificate of Education (SPM) Mathematics Comprehensive Module, covering Kurikulum Standard Sekolah Menengah (KSSM), which is the Malaysian National Secondary School Standard Curriculum, Mathematics topics from Form 1 through Form 5. Targeted at Upper Secondary students, the module seeks to enhance their understanding of mathematics and support effective teaching and learning sessions. The study adopts a Developmental Research Design (DRD) and utilizes the ADDIE model as its instructional framework. The ADDIE model Analysis, Design, Development, Implementation, and Evaluation systematically creates educational materials. Content validity was assessed using the Content Validity Index (CVI), ensuring alignment with educational standards and objectives. Feedback from four experts with over five years of teaching experience confirmed the module's content validity, achieving a perfect CVI score of 1.00. The research used structured questionnaires, including the Module Validity Questionnaire and Module Usability Questionnaire. A pilot study was conducted with 30 Form 4 students from a school in Pasir Gudang, Johor, selected through convenience sampling. The usability questionnaire achieved a high-reliability score, with a Cronbach's alpha of 0.881. Usability results showed an overall mean score of 3.6406 across usefulness (3.6533), ease of use (3.6625), ease of learning (3.5222), and satisfaction (3.6571). These findings suggest that the module is highly usable and effective in supporting the learning of KSSM Mathematics topics. The study demonstrates that the "From Formulas to A+" module not only meets educational standards but also significantly fosters active learning. Its originality lies in the comprehensive coverage of the entire KSSM syllabus and its use of the ADDIE model for systematic instructional design, contributing valuable insights to mathematics education research.

Keywords: ADDIE model, KSSM, Module, SPM, Usability.

INTRODUCTION

According to the Malaysia Education Blueprint (PPPM) 2013-2025, one of the primary objectives is to understand the current performance and challenges of the Malaysian education system. This involves improving access to education, raising standards (quality), closing achievement gaps (equity), fostering unity among students, and maximizing system efficiency. In line with this blueprint, the KBSM was replaced by the KSSM in secondary schools, beginning with Form 1 students in 2017. KSSM Mathematics is recognized as one of the most challenging subjects within the National Education System. The secondary school mathematics curriculum consists of three distinct programs: lower secondary mathematics, upper secondary mathematics, and additional mathematics at the upper secondary level. This curriculum builds upon the knowledge and skills acquired at the primary school level.

The SPM examination, administered regularly at the end of secondary school education, serves as the main public exam for certification purposes. The SPM certificate records students' academic achievements, which

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are crucial for pursuing higher education and exploring career paths. The examination aims to measure how well students have progressed academically over the past 11 years, with the awarding of certificates recognizing their achievements. Among other targets, the Blueprint seeks improvements in PISA and TIMSS assessments, indicating the Government's strong commitment to enhancing the teaching and learning of mathematics and science (Awang, H., Hashim, F., Salleh, A. L. H., & Tan, L. Y, 2021).

A major concern for mathematics teachers has been the persistent challenges in mathematics learning (Ramli, M. S., Shafie, S., & Nasir, N., 2023). Comparatively, the reality reveals that students often achieve lower levels of performance in mathematics than in other subjects (Djafar et al., 2019). Many students struggle to solve problems and demonstrate mastery of concepts, resulting in poor outcomes in mathematics learning. This situation is exacerbated by frequent mathematical errors, often rooted in misunderstandings of basic concepts, incorrect techniques, and the application of wrong formulas (Fuzi et al., 2020).

In response to these challenges, the positive impact of Science, Technology, Engineering, and Mathematics (STEM) programs on student achievement, attitude, interest, communication skills, and problem-solving has prompted the education community to reform instructional approaches in STEM subjects (Siregar et al., 2019). Developing a module based on a student-cantered approach appears to be an effective way to integrate STEM education into the curriculum. Therefore, this study aims to develop the "From Formulas to A+" SPM Mathematics comprehensive short notes module for upper secondary students.

The objectives of this study are as follows:

1. To develop the "From Formulas to A+" module that comprehensively covers KSSM Mathematics topics from Form 1 to Form 5, ensuring alignment with the current curriculum standards.
2. To evaluate the content validity of the module through expert feedback, aiming for a Content Validity Index (CVI) score of 1.00, confirming its appropriateness for educational use.
3. To assess the usability of the module among upper secondary students, targeting an overall usability score of at least 3.5 in the constructs of usefulness, ease of use, ease of learning, and satisfaction based on structured questionnaires.
4. To investigate the module's impact on student learning outcomes in mathematics, aiming for an improvement in problem-solving skills and overall performance in SPM-related exercises.
5. To identify and address specific challenges SPM candidates face in preparing for their mathematics examinations, providing a practical resource to enhance their study experience.

The developed module will be released as a hands-on short notebook to address students' specific challenges, such as their need for appropriate study materials amidst the hectic schedules of SPM candidates and recent curriculum changes. This module is designed to give students a reliable reference while completing exercises. Overall, this study seeks to identify solutions to specific educational problems, leveraging the design and development strengths of the module.

MATERIALS AND METHODS

This study is primarily grounded in constructivism theory and employs the ADDIE model as the module development framework. These frameworks were carefully chosen to ensure that the module not only meets the educational objectives of the KSSM Mathematics syllabus but also facilitates meaningful learning experiences for upper secondary school students in Malaysia.

Constructivism theory

Constructivism is critical in this study as it emphasizes that learning is an active process where learners build their understanding and knowledge through experiences and reflection. This theory suggests that students do not passively receive information but actively engage with new material using prior knowledge to interpret and make sense of it (Bruner, 1966). In mathematics education, constructivism promotes problem-solving, inquiry-

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based learning, and active engagement with concepts. According to this theory, students learning mathematics are more successful when involved in social activities like peer discussions and collaborative problem-solving, as these promote deeper understanding and practical application of mathematical concepts (Vygotsky, 1978). Constructivism theory, therefore, serves as the pedagogical foundation for developing a module that emphasizes active participation and real-world problem-solving in mathematics.

ADDIE model

The ADDIE model is a systematic instructional design framework that encompasses five distinct phases: Analysis, Design, Development, Implementation, and Evaluation (Dick & Carey, 1978). This model was employed in this study to provide a structured approach for the creation and refinement of the "From Formulas to A+" module. The systematic nature of the ADDIE model ensures that each phase is carefully executed to address the learning needs of the students and the educational requirements of the Malaysian syllabus.

Analysis phase

During the analysis phase, the researcher conducted a comprehensive needs assessment to identify students' challenges in mastering mathematical concepts. It was found that students often struggle with a multitude of formulas, which results in confusion and errors during problem-solving. This phase was crucial in establishing the learning goals and objectives for the module, which aimed to reduce these learning difficulties and enhance students' conceptual understanding (Foo & Ng, 2022).

Design phase

The design phase translated the findings from the analysis into an actionable plan for the module's development. The module was designed to include visual aids such as diagrams, graphs, and flowcharts to simplify complex mathematical concepts. The design was grounded in constructivist principles, emphasizing active student engagement and the use of multiple representations to support different learning styles. Each mathematical formula was carefully structured to ensure that students could visually and conceptually understand its application.

Development phase

This phase involved the actual creation of the module's content, guided by the principles of constructivism. The module was designed to include concise notes, relevant examples, and practice exercises that cover the KSSM Mathematics syllabus from Form 1 to Form 5. Additional resources, such as a dedicated Padlet page featuring tutorial videos and interactive exercises, were also developed to provide supplementary support to students. This phase ensured that the module was comprehensive, accessible, and aligned with the cognitive development stages of the learners.

Implementation phase

In the implementation phase, the module was piloted and reviewed by a panel of experts, including a university lecturer and three experienced secondary school mathematics teachers. The purpose of this phase was to validate the module's content and usability, allowing for adjustments based on expert feedback. The pilot test involved 15 Form 4 students, who used the module over a set period, providing valuable insights into its practical applicability in the classroom setting.

Evaluation phase

The final evaluation phase focused on assessing the module's effectiveness in improving student learning outcomes. The researcher used structured questionnaires to collect data on the module's usability and validity, analyzing it quantitatively to determine its impact on students' understanding of mathematics. The evaluation results indicated that the module significantly enhanced students' ability to grasp complex mathematical concepts and improved their problem-solving skills.

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The constructivism theory and the ADDIE model together form the theoretical foundation of the module's development. While the constructivist approach emphasizes creating a learning environment where students actively engage in constructing their knowledge, the ADDIE model offers a systematic and structured framework that guides the design, development, and evaluation of the educational tool, ensuring both practical application and continuous refinement.

METHODOLOGY

Introduction

This methodology aims to establish a solid theoretical foundation for the tools and techniques used in data collection, as well as the subsequent analysis of this data. In the context of this study, which examines the development and usability of the "From Formulas to A+" SPM Mathematics Comprehensive Module, a carefully designed research framework has been implemented. This framework includes the strategic selection of research design, data collection methods, and analytical approaches, all of which are essential to the successful execution and progression of the study.

Research design

In this study, a developmental research design (DRD) is employed to systematically develop, test, and enhance educational materials, specifically the “From Formulas to A+” SPM Mathematics Comprehensive Module. This design is particularly suitable for evaluating the usability of educational resources and ensuring they meet the intended learning objectives.

Definition and rationale

Developmental research design is characterized by its focus on creating effective educational interventions. It involves a cyclical process that includes planning, developing, implementing, and evaluating educational materials. This approach allows researchers to refine the instructional tools based on feedback and empirical evidence, thereby enhancing their effectiveness in real educational settings.

The rationale for selecting DRD in this study lies in its structured nature, which provides a systematic framework for addressing specific educational challenges faced by students in mastering the KSSM Mathematics syllabus. By utilizing DRD, the study aims to create a module that not only enhances students' understanding of mathematics but also fosters active engagement and learning.

Components of the research design

The research design for this study encompasses the following key components:

1. Analysis phase the initial phase of identifying the educational needs and gaps in existing mathematics resources. It focuses on understanding the challenges faced by upper-secondary students in learning mathematics, particularly within the context of the SPM examination.
2. Design phase - the conceptual framework for the “From Formulas to A+” module is developed. The design includes determining the structure and content of the module, aligning it with the KSSM Mathematics syllabus, and incorporating effective pedagogical strategies that promote comprehension and retention.
3. Development phase - the actual creation of the module takes place during this phase. Educational materials, including concise notes, exercises, and problem-solving strategies, are crafted to facilitate student learning. Attention is given to ensuring that the module is user-friendly and accessible to the target audience.
4. Implementation phase - the module is introduced to a sample of Form 4 students at Sekolah Menengah Kembangan Pasir Putih (SePASTI) in Johor. This phase involves conducting usability testing, where students interact with the module during their mathematics lessons. Feedback is gathered to assess its effectiveness in meeting learning objectives.

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5. Evaluation phase - the final phase focuses on evaluating the module's impact on students' understanding and engagement with mathematics. This involves analysing data collected from usability questionnaires and performance assessments to determine the module's effectiveness and areas for improvement.

Sampling technique

In terms of the particular study, the researcher chose convenience sampling techniques for choosing appropriate participants who were willing to join the survey and promote the research objectives. There have been multiple benefits of the convenience sampling technique as it has provided an opportunity to perform and analyze the data with a lower risk of errors.

Researchers have been focused on choosing convenience sampling techniques as it has reduced bias and various kinds of randomness (Sorkkila et al. 2020). In the context of the research convenience sampling techniques have been selected that have been helping to develop the research population. There are two kinds of convenience sampling techniques available such as probability sampling and non-probability sampling (Peeters & Harper, 2020). Therefore, the probability sampling techniques have been selected for the study as it has enabled the research process to create a generalization about the population in a simple efficient way.

A total of 30 Form 4 students who learning Mathematics in DLP participated in the study by using the convenience sampling method. A sample size of 30 individuals is evaluated as the minimum number of samples for a study (Louangrath, 2017). The pilot study conducted involved Form 4, 4 Jazari class students at SMK Pasir Putih as respondents. According to Hertzog (2008), the number of respondents required in the pilot study is 15. In this study, a pilot test was conducted with 15 students who were not part of the actual study sample. This was done to ensure that the instrument used was easy to understand, appropriate, relevant, and capable of eliciting suitable responses from the target sample.

Research instrument

Two types of questionnaires were developed for the "From Formulas to A+" module: the Module Validity Questionnaire and the Module Usability Questionnaire. Both questionnaires use a four-point Likert scale, which allows respondents to indicate their level of agreement with each item. This approach facilitates the collection of comprehensive data on respondent perceptions.

To ensure the accuracy and reliability of the responses, the questionnaires were developed in Malay, the primary language of the respondents, who are secondary school students in Malaysia. Using Malay enhances their understanding of the questions, allowing for more accurate and thoughtful responses. The questionnaires were designed to be clear, concise, and age-appropriate, and were reviewed by educators and linguists to ensure the suitability and relevance of the language and content.

The Module Validity Questionnaire consists of three components: respondent information, face validity, and module content validity. There are 23 items, with a blank space at the end for experts to provide comments and suggestions for improvement. The validity questionnaire was distributed to four experts, including one university lecturer from UPSI's Mathematics Department and three mathematics teachers from SMK Pasir Putih, Pasir Gudang, Johor.

The Module Usability Questionnaire comprises two parts. Part A collects demographic information of the respondents, such as class, gender, and race, while Part B assesses the usability of the module. This section is divided into four constructs: usefulness of the module, ease of use, ease of learning, and satisfaction with the module. Similar to the validity questionnaire, the usability questionnaire also includes 23 items and provides space at the end for respondents to share their comments and suggestions for improvement.

Validity test data was analysed by using the Contact Validity Index (CVI) which is a popular and widely used scale and procedure for evaluating the quantitative data and information in a study. CVI scale can provide excellent validity of data and it depends on the characteristics of the research methods (Fernandez et al. 2022).

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Expert feedback with Likert scale ratings of 1 and 2 was classified as ordinal scale 0, representing the disagree. Meanwhile, Likert scale ratings of 3 and 4 were classified as ordinal scale 1, representing the agree. $I-CVI$ is calculated by using the formula, $I-CVI = \frac{\text{agree item}}{\text{number of experts}}$. Calculation of the $I-CVI$ score has been effective for assessing the usability of the "From formulas to A+" SPM mathematical module among upper secondary students. Score of 1.00 indicates 100% agreement among the experts (Alrige et al., 2021). To investigate the usability of the module, mean values are calculated. Table 1 is the four-point Likert scale's mean value and mean score, as adapted from Suyatmi and Wibowo (2016).

Table 1 Mean score interpretation

Mean Score	Interpretation of Mean
1.00 - 1.75	Very Low
1.76 - 2.50	Low
2.51 - 3.25	High
3.26 - 4.00	Very High

Pilot test

The pilot test was crucial in validating the questionnaire for the study. It was conducted to ensure the instrument was clear, relevant, and suitable for the target audience. A sample of 15 students, representing the intended users of the "From Formulas to A+" module, participated in the pilot test.

During this phase, the students were asked to complete the questionnaire, and their responses were meticulously analysed. The primary objective of this analysis was to identify any ambiguities, misinterpretations, or difficulties encountered by the participants in understanding and responding to the items. Feedback from the students helped the researchers pinpoint potential issues with item wording, structure, or content that might affect the instrument's effectiveness.

Adjustments were made to refine the questionnaire based on the pilot test's findings. This iterative process helped to ensure that the final version of the instrument was user-friendly and capable of accurately capturing the data needed for the study. By addressing these issues in the pilot phase, the researchers enhanced the reliability and validity of the questionnaire for broader application in the main study.

Reliability test

Reliability testing using Cronbach's Alpha was critical in validating the questionnaire to ensure that the items consistently measured the constructs under investigation. Cronbach's Alpha is a widely accepted statistical tool used to assess the internal consistency of a questionnaire, which reflects how closely related the set of items are as a group. In this study, the calculation of Cronbach's Alpha served to evaluate the degree to which the questionnaire items were reliable and produced consistent results. An overall alpha coefficient of 0.881 was obtained. This result falls within the range classified as "very good," indicating a high level of internal consistency across the items. A high Cronbach's Alpha value suggests that the items are well-correlated and measure the same underlying construct, which, in this case, pertains to the usability of the "From Formulas to A+" module.

Not only the reliability testing process confirmed the robustness of the questionnaire, but also underscored its suitability for the intended purpose. The high reliability score demonstrated that the questionnaire could be used confidently to gather consistent and dependable data, supporting the broader objectives of the research.

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This step ensured that the results derived from the questionnaire would be credible and could form a strong foundation for further analysis and conclusions in the study.

Data analysis

Face validity of "From Formulas to A+" SPM Mathematics comprehensive module

Face validity refers to the extent to which a module or tool appears effective in terms of its intended purpose. It is often evaluated by experts who assess whether the module looks like it would work well in a real-world educational setting. Based on Appendix A, the researcher found that the ordinal scale was 1 for all 11 items, according to the feedback from all four experts involved. All the experts provided satisfactory approval for the face validity of this module. The findings indicate that the Content Validity Index (CVI) for the 'From Formulas to A+' Module is 1.00, successfully achieving a satisfactory I-CVI value. The reference to Noor Azura Mat Said et al. (2022) indicates that an I-CVI value should be above 0.79 to be considered satisfactory. Thus, based on this analysis, it can be concluded that the module's design, size, materials, colors, and other aspects are suitable as an educational teaching and learning aid for 248 use by students in schools. Table 2 below shows the study findings for the face validity of the 'From Formulas to A+' Module.

Content validity of "From Formulas to A+" SPM Mathematics comprehensive module

The Content Validity Index (CVI) is a measure used to assess the validity of the content in a module or instrument. It indicates how well the content covers the intended educational objectives and whether it aligns with the relevant curriculum standards.

In your study, the CVI for the "From Formulas to A+" module was found to be 1.00 (Appendix B). This is an excellent score, indicating that all experts involved in the evaluation unanimously agreed that the content of the module is highly relevant and appropriate for the educational objectives it is designed to achieve. A CVI of 1.00 suggests that there is no need for significant revisions, as the content is deemed comprehensive and accurate. Typically, a CVI value above 0.79 is considered satisfactory for content validity. In this context, the module's CVI of 1.00 exceeds this threshold, implying the module's suitability for teaching the KSSM Mathematics syllabus.

The results of these validity assessments suggest that the "From Formulas to A+" module is well-designed and highly suitable for use in teaching and learning the basic concepts of the KSSM Mathematics syllabus. The unanimous agreement among experts in both content and face validity indicates that the module is likely to be effective in achieving its educational objectives.

Reliability of "From Formulas to A+" SPM Mathematics comprehensive module

The Cronbach's Alpha coefficient was computed to determine the internal consistency of the items in the questionnaire. This measure is commonly used to verify the reliability of scales in psychometric evaluations. The reliability test was conducted using data collected during a pilot study with responses from 30 Form 4 students from Sekolah Menengah Kebangsaan Pasir Putih (SePASTI).

The commonly accepted benchmarks for interpreting Cronbach's Alpha are:

- ≥ **0.9**: Excellent
- 0.8–**0.9**: Good
- 0.7–**0.8**: Acceptable
- < **0.7**: Poor reliability.

The questionnaire consisted of multiple constructs, namely, Usefulness, Ease of Use, Ease of Learning, and Satisfaction which collectively formed the overall usability evaluation. From Table 2, the Cronbach's Alpha value of 0.881 confirmed the questionnaire was reliable for assessing these constructs.

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Table 2 Reliability of all four constructs in pilot questionnaire

Construct	Cronbach's Alpha
Usefulness	0.763
Ease of Use	0.383
Ease of Learning	0.807
Satisfaction	0.796
Overall	**0.881**

Usability of "From Formulas to A+" SPM Mathematics comprehensive module

The usability analysis of the "From Formulas to A+" SPM Mathematics Comprehensive Module provides a detailed insight into how well the module performs in practical educational settings. This evaluation focuses on four key constructs: usefulness, ease of use, ease of learning, and satisfaction, each of which plays a crucial role in determining the overall effectiveness and user-friendliness of the module.

Usefulness

Usefulness refers to the degree to which the module helps users achieve their goals, specifically in mastering the SPM Mathematics syllabus. It measures how beneficial the module is in enhancing students' understanding and performance. With an average mean score of 3.6533 (Table 3), the "From Formulas to A+" module is considered highly useful by the respondents. This suggests that the module effectively supports students in grasping complex mathematical concepts and aids teachers in delivering the curriculum efficiently.

Table 3 The overall usability averages of the four constructs

Construct	Mean	Interpretation of Mean
Usefulness	3.6533	Very High
Ease of Use	3.6625	Very High
Ease of Learning	3.5222	Very High
Satisfaction	3.6571	Very High

Ease of use

Ease of use evaluates how simple and intuitive it is for users (both teachers and students) to navigate and utilize the module. This construct considers the layout, design, and accessibility of the content.Achieving the highest score among the four constructs, ease of use with an average mean of 3.6625 indicates that the module is particularly user-friendly. This means that the design and structure of the module allow users to interact with the content with minimal effort, leading to a smoother and more efficient learning experience.

Ease of learning

Ease of learning assesses how quickly and effectively users can learn to use the module without requiring extensive instructions or prior experience. It is an important factor in ensuring that new users can adopt the

module easily.With a score of 3.5222, ease of learning is slightly lower than the other constructs, yet it still indicates a high level of usability. This suggests that while the module is generally easy to learn, there might be some areas where users could benefit from additional guidance or clearer instructions.

Satisfactory

Satisfaction measures the overall contentment of users with the module, reflecting how enjoyable and fulfilling it is to use in an educational setting. High satisfaction is often linked to positive attitudes toward the module and its continued use.A score of 3.6571 in satisfaction indicates that users are highly pleased with the module. This high level of satisfaction suggests that the module meets or exceeds user expectations, contributing to a positive learning environment. Overall, the usability analysis and the mean 312 scores for each of the four constructs can be found in the Appendix Appendix C.

RESULTS AND DISCUSSION

Based on the findings of the study on the "From Formulas to A+" SPM Mathematics Comprehensive Module, the research successfully achieved its objectives of developing a content-valid and user-friendly module for upper secondary students. The module was evaluated based on its validity and usability, where it scored highly across all key constructs such as usefulness, ease of use, ease of learning, and satisfaction. The usability testing demonstrated that the module effectively supports both teachers and students, enhancing learning outcomes through clear, concise, and accessible content.

The usability of the "From Formulas to A+" module was evaluated using a structured questionnaire distributed to 30 Form 4 students. The results indicated a very high level of usability across all constructs measured: usefulness (mean = 3.6533), ease of use (mean = 3.6625), ease of learning (mean = 3.5222), and satisfaction (mean = 3.6571). The overall usability score was 3.6406, signifying that students found the module easy to use and beneficial for their learning.

The module's content validity, as assessed by four mathematics experts, received high scores, confirming that the module meets curriculum standards and instructional goals. This indicates that the content is aligned with the academic requirements of the SPM Mathematics syllabus. The usability analysis highlighted that the module has a high level of user-friendliness, with an overall average mean score of 3.6406. This score suggests that students found the module to be an effective tool for learning, with particular emphasis on its ease of use and satisfaction. The module also successfully supported self-study and promoted a positive attitude towards learning mathematics.

Descriptive statistics indicated positive attitudes among students regarding the module's impact on their learning. For instance, students reported that the module facilitated their understanding of KSSM Mathematics topics and increased their enjoyment of learning. High mean ratings across various usability constructs reflect students' satisfaction with the module's content and structure.

The research further suggests that the "From Formulas to A+" module could serve as a valuable educational resource, helping teachers create a more engaging learning environment. Teachers are encouraged to consider students’ diverse learning styles and preferences to enhance the module’s effectiveness.

The "From Formulas to A+" module proved to be an efficient and reliable resource for upper-secondary students, enhancing their learning experience in mathematics. The module's design, grounded in the ADDIE model and constructivism theory, offers a structured and engaging approach to mastering complex mathematical concepts. Teachers and students alike benefit from the module's clarity, interactive features, and practical applications. Future studies could explore the long-term impact of the module on students' performance in standardized tests like SPM and investigate additional ways to incorporate multimedia and adaptive learning tools.

CONCLUSION

This study successfully developed and evaluated the "From Formulas to A+ SPM Mathematics Comprehensive Module" for upper secondary school students, with a particular focus on those in the Dual Language Programme (DLP). The module was designed to cover essential mathematical concepts aligned with the KSSM Mathematics syllabus and to provide students with a user-friendly, concise resource to enhance their exam preparation.

The usability evaluation demonstrated that the module was well-received by students, achieving high ratings for usefulness, ease of use, ease of learning, and overall satisfaction. This indicates that the module not only met the technical requirements of an effective educational tool but also aligned with the learning preferences of students. Additionally, the module's content validity was confirmed by experts, affirming that it is both accurate and comprehensive, making it a suitable resource for educational use.

The research findings suggest that the "From Formulas to A+" module can play a pivotal role in improving students' understanding of key mathematical topics, promoting more efficient study habits, and supporting active learning in classrooms. The positive feedback from both students and experts underlines the module's potential to facilitate improved learning outcomes and greater engagement with mathematical concepts.

In conclusion, the "From Formulas to A+" module is a valuable educational tool that adheres to the curriculum standards and significantly enhances the learning experience for students. Its practical design, ease of use, and alignment with the KSSM syllabus make it a viable resource for widespread adoption. Future research could focus on further refining the module based on classroom implementation feedback and exploring its effectiveness in different learning environments. This study also opens opportunities for developing similar modules in other subject areas to enhance educational experiences and outcomes across Malaysia's secondary schools.

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APPENDICES

Appendix A: Face Validity of "From Formulas to A+" Module

Item	Criteria	Expert Evaluation	I-CVI Value
1. Reka bentuk modul adalah menarik.	Sangat Setuju	4	1
2. Susun atur komponen dalam modul boleh diterima.	Sangat Setuju	4	1
3. Penggunaan warna dalam modul adalah sesuai.	Sangat Setuju	4	1
4. Jenis fon yang digunakan dalam modul adalah sesuai.	Sangat Setuju	4	1
5. Saiz tulisan dalam modul adalah sesuai.	Sangat Setuju	4	1
6. Arahan yang diberikan dalam modul adalah jelas.	Sangat Setuju	4	1
7. Tatabahasa dalam modul adalah baik.	Sangat Setuju	4	1
8. Istilah yang digunakan dalam modul adalah sesuai.	Sangat Setuju	4	1
9. Ejaan dalam modul adalah tepat.	Sangat Setuju	4	1
10. Ilustrasi dalam modul adalah sesuai.	Sangat Setuju	4	1
11. Formula dan jadual yang digunakan dalam modul adalah menarik.	Sangat Setuju	4	1

Average I-CVI Value: 1.00

Appendix B: Content Validity of "From Formulas to A+" Module

Item	Criteria	Expert Evaluation	I-CVI Value
1. Kandungan modul menepati standard kandungan KSSM Matematik Tingkatan 1 hingga Tingkatan 5.	Sangat Setuju	4	1
2. Kandungan modul berkait secara langsung dengan standard pembelajaran KSSM Matematik Tingkatan 1 hingga Tingkatan 5.	Sangat Setuju	4	1
3. Kandungan modul mengandungi nota yang boleh membantu murid sebagai rujukan semasa membuat ulangkaji.	Sangat Setuju	4	1
4. Kandungan modul mengandungi latihan yang boleh membantu murid untuk membuat ulangkaji.	Sangat Setuju	4	1
5. Kandungan modul sesuai dengan tahap kebolehan murid menengah atas.	Sangat Setuju	4	1
6. Kandungan modul sesuai dengan pengalaman murid menengah atas.	Sangat Setuju	4	1

7. Kandungan modul sesuai dengan aktiviti berkaitan pembelajaran konstruktivisme.	Sangat Setuju	4	1
8. Soalan dalam modul mempunyai tahap penguasaan yang berbeza.	Sangat Setuju	4	1
9. Contoh-contoh yang diberikan dalam modul membantu murid memahami konsep matematik dengan lebih baik.	Sangat Setuju	4	1
10. Kandungan modul mampu meningkatkan kefahaman murid tentang konsep-konsep matematik dengan lebih mudah.	Sangat Setuju	4	1
11. Kandungan modul boleh mengukuhkan kefahaman murid terhadap konsep-konsep matematik dengan lebih mudah.	Sangat Setuju	4	1
12. Semua kandungan modul bersesuaian untuk mencapai hasil pembelajaran KSSM Matematik Tingkatan 1 hingga Tingkatan 5.	Sangat Setuju	4	1

Average I-CVI Value: 1.00

Appendix C:

(A) Module's usability for the usefulness construct

Item	**Respondent Ratings**	**Mean**	**Standard Deviation**
1. Modul 'FROM FORMULAS TO A+' sangat berguna dalam menyediakan pengalaman yang membantu saya dalam proses pengajaran dan pembelajaran.	12 (2) | 18 (3) | 26 (4)	3.6	0.498
2. Modul 'FROM FORMULAS TO A+' sangat berguna kepada saya untuk memahami konsep-konsep matematik.	8 (2) | 21 (3) | 26 (4)	3.67	0.547
3. Modul 'FROM FORMULAS TO A+' menjimatkan masa saya untuk menyelesaikan tugasan.	12 (2) | 18 (3)	3.6	0.498
4. Modul 'FROM FORMULAS TO A+' memudahkan saya untuk merujuk konsep dan formula yang saya belajar semasa Tingkatan 1 hingga kini.	4 (2) | 26 (3)	3.87	0.346
5. Modul 'FROM FORMULAS TO A+' ini memenuhi keperluan saya dalam proses pembelajaran.	14 (2) | 16 (3)	3.53	0.507
	Overall	3.6533	0.3014

(B) Module's usability for the ease of use construct

Item	**Ratings (Count per Score)**	**Mean**	**Standard Deviation**
1. Modul 'FROM FORMULAS TO A+' mudah digunakan.	8 (2) | 21 (3)	3.67	0.547
2. Modul 'FROM FORMULAS TO A+' mesra pengguna.	18 (2) | 11 (3)	3.37	0.49

3. Modul 'FROM FORMULAS TO A+' mempunyai arahan yang jelas.	9 (2) | 20 (3)	3.63	0.556
4. Nota yang diberikan dalam modul 'FROM FORMULAS TO A+' mudah difahami.	11 (2) | 19 (3)	3.63	0.49
5. Soalan latihan di dalam modul 'FROM FORMULAS TO A+' mudah dijawab dengan menggunakan nota yang diberi.	12 (2) | 18 (3)	3.6	0.498
6. Penggunaan modul 'FROM FORMULAS TO A+' memudahkan proses pembelajaran bagi topik-topik matematik KSSM.	8 (2) | 22 (3)	3.73	0.45
7. Modul 'FROM FORMULAS TO A+' ini boleh digunakan pada bila-bila masa.	6 (2) | 24 (3)	3.8	0.407
8. Saya mendapati modul 'FROM FORMULAS TO A+' ini berguna sebagai bahan ulang kaji sebelum peperiksaan.	4 (2) | 26 (3)	3.87	0.346
	Overall	3.6625	0.2416

(C) Module's usability for the ease of learning construct

Item	**Ratings (Count per Score)**	**Mean**	**Standard Deviation**
1. Saya mempelajari cara menggunakan modul 'FROM FORMULAS TO A+' dengan cepat.	14 (2) | 16 (3)	3.53	0.507
2. Contoh-contoh yang dibincangkan dalam modul 'FROM FORMULAS TO A+' mudah difahami.	12 (2) | 17 (3)	3.53	0.571
3. Reka bentuk modul (contoh: saiz, fon, huruf, warna) membantu dalam pembelajaran saya.	11 (2) | 17 (3)	3.5	0.63
	Overall	3.5222	0.4349

(D) Module's usability for the satisfaction construct

Item	**Ratings (Count per Score)**	**Mean**	**Standard Deviation**
1. Modul 'FROM FORMULAS TO A+' ini sangat menarik untuk digunakan.	12 (2) | 16 (3)	3.47	0.629
2. Saya berasa seronok menggunakan modul 'FROM FORMULAS TO A+' ini.	9 (2) | 21 (3)	3.7	0.466
3. Modul 'FROM FORMULAS TO A+' dapat meningkatkan minat saya untuk mempelajari topik-topik matematik.	8 (2) | 22 (3)	3.73	0.45
4. Modul 'FROM FORMULAS TO A+' dapat mengukuhkan	16 (2) | 14 (3)	3.47	0.507

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kefahaman saya terhadap topik-topik matematik.			
5. Saya teruja apabila membuat ulangkaji menggunakan modul 'FROM FORMULAS TO A+' ini.	8 (2) | 21 (3)	3.67	0.547
6. Saya berpuas hati kerana dapat menggunakan modul 'FROM FORMULAS TO A+' dalam pembelajaran saya.	7 (2) | 23 (3)	3.77	0.43
7. Saya akan mencadangkan kepada rakan-rakan saya untuk menggunakan modul 'FROM FORMULAS TO A+' ini.	6 (2) | 24 (3)	3.8	0.407
	Overall	3.6571	0.2945