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CHALLENGES IN TEACHING MATERIALS FOR MATHEMATICS CAPITA SELECTA COURSE: INSIGHTS FROM PROSPECTIVE SECONDARY SCHOOL TEACHERS

Suci Wulandari[1], Widdya Rahmalina[2], Asrina Mulyati[3], Meria Ultra Gusteti[4], Rahmatul Hayati[5], Khairul Azmi[6], Andini Putri Yunita[7], Warlan Sukandar[8]

[1234567]Universitas Adzkia, Jl. Raya Taratak Paneh No.7 Korong Gadang, Kalumbuk, Kec.Kuranji, Kota Padang, Sumatera Barat, Indonesia

[8]Universiti Sains Islam Malaysia, Bandar Baru Nilai, 71800 Nilai, Negeri Sembilan, Malaysia

e-mail: suci.w@adzkia.ac.id

Abstract

The lack of learning resources that facilitate students in the Secondary School Mathematics Capita Selecta course served as the background for this study. These materials are considered insufficient due to lack of real-world applications. This deficiency significantly impacts the learning process by leading to shallow understanding. Consequently, students may not achieve optimal learning outcomes in this crucial subject. This research aimed to investigate the challenges faced by prospective mathematics teachers in the Secondary School Mathematics Capita Selecta course at Universitas Adzkia. Using a descriptive-qualitative approach, this study involved 18 students and course instructors as participants. Data were collected through surveys and structured interviews, then analyzed to identify key themes related to learning difficulties. The results showed that students experienced difficulties in understanding abstract mathematical concepts, connecting theory with practical applications, and utilizing available learning resources. This condition indicates the need to develop systematic, varied, and interactive learning materials to improve student comprehension and motivation. This study also revealed that the integration of technology in learning can help students understand complex topics and create a more engaging learning environment. Therefore, the development of well-organized and technology-integrated learning resources is crucial to improve the effectiveness of the course and help students overcome learning obstacles. Based on these findings, it was concluded that the development of innovative and technology-integrated learning resources plays an important role in improving the quality of learning in the Secondary School Mathematics Capita Selecta course. Further research is recommended to explore more advanced technological interventions and collaborative learning techniques to enhance instructional delivery and student learning outcomes.

Keywords: instructional materials, mathematics learning, mathematics capita selecta

Abstrak

Kurangnya bahan ajar yang memfasilitasi mahasiswa dalam perkuliahan Kapita Selekta Matematika Sekolah Menengah menjadi latar belakang penelitian ini. Penelitian ini bertujuan untuk menyelidiki tantangan yang dihadapi oleh calon guru matematika dalam mata kuliah Kapita Selekta Matematika di Universitas Adzkia. Melalui pendekatan deskriptif-kualitatif, penelitian ini melibatkan 18 mahasiswa dan dosen mata kuliah sebagai partisipan. Data dikumpulkan menggunakan survei dan wawancara terstruktur, kemudian dianalisis untuk mengidentifikasi tema-tema kunci terkait kesulitan belajar. Hasil penelitian menunjukkan bahwa mahasiswa mengalami kesulitan dalam memahami konsep matematika yang abstrak, menghubungkan teori dengan aplikasi praktis, dan memanfaatkan sumber belajar yang tersedia. Kondisi ini mengindikasikan perlunya pengembangan bahan ajar yang sistematis, bervariasi, dan interaktif untuk meningkatkan pemahaman dan motivasi mahasiswa. Penelitian ini juga mengungkap bahwa integrasi teknologi dalam pembelajaran dapat membantu mahasiswa memahami topik kompleks dan menciptakan lingkungan belajar yang lebih menarik. Oleh karena itu, pengembangan sumber belajar yang terorganisir dengan baik dan terintegrasi dengan teknologi menjadi krusial untuk meningkatkan efektivitas perkuliahan dan membantu mahasiswa mengatasi hambatan belajar. Berdasarkan temuan tersebut, disimpulkan bahwa pengembangan bahan ajar yang inovatif dan terintegrasi dengan teknologi berperan penting dalam meningkatkan kualitas pembelajaran Kapita Selekta Matematika. Penelitian selanjutnya direkomendasikan untuk mengeksplorasi intervensi teknologi yang lebih maju dan teknik pembelajaran kolaboratif guna meningkatkan penyampaian materi dan hasil belajar mahasiswa.

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Kata kunci: bahan ajar, pembelajaran matematika, kapita selekta matematika

INTRODUCTION

High-quality education is one of the main pillars in creating competent and competitive human resources (Cao et al., 2022; Moses, 2016). Developed countries are often characterized by high-quality education systems (Ivanova et al., 2020; Lee & Manzon, 2014; Moussa, 2008). Improving the quality of education is crucial to strengthening various aspects of national development, such as the economy, industry, technology, and others (Pandey, 2006; Schweisfurth, 2023). In Indonesia, the importance of education is reflected in the Preamble of the 1945 Constitution, which emphasizes that education is the right of every citizen (Ramadani et al., 2021). Teachers and lecturers play an important role in this educational framework. They are required to be creative in their teaching methods to create a more engaging and effective learning environment. Classroom learning should provide students with a rich experience that encourages understanding and retention (Huang et al., 2015; Kong, 2008). Therefore, educators are encouraged to use various teaching methods and resources to create an optimal learning atmosphere.

In the field of mathematics education, the challenges faced by prospective mathematics teachers are very complex. At Universitas Adzkia, the Mathematics Capita Selecta course for secondary schools is an integral part of the Mathematics Education program. The Secondary School Mathematics Capita Selecta course is one of the important courses designed to enrich the knowledge and skills of prospective teachers in teaching mathematics at the secondary school level. This course is designed to deepen students' understanding of mathematical concepts and their applications in secondary education. Although important, both students and lecturers face significant challenges in the learning process, such as difficulties in understanding the material and the need for more systematic and varied learning resources. However, the implementation of this course is often faced with various obstacles, both from students and lecturers. These obstacles include difficulties in understanding the material, lack of systematic teaching materials, and the need for more varied and innovative teaching methods (Busquets et al., 2016; de Vries, 2014).

The current state of the Mathematics Capita Selecta course at Universitas Adzkia is not as effective and efficient as it should be. Learning outcome indicators show that some

students do not meet the expected standards in understanding and mastering key mathematical concepts. This problem is exacerbated by the lack of teaching materials that align with the course objectives. Lecturers often rely on various resources found on the internet, such as books, modules, and videos, which can confuse students and hinder their learning process (Pow & Li, 2015). In addition to difficulties in understanding the material, students also reported that they face challenges in solving mathematics problems based on story problems or real-world issues. These difficulties are often caused by a lack of ability to connect mathematical concepts with their practical applications (Stickels, 2019). Therefore, a learning approach that focuses not only on theory but also on the practical application of mathematical concepts is needed.

The development of systematic and varied teaching materials can be a solution to these challenges. Good teaching materials should meet the learning needs of students and help them understand the material better. In addition, varied teaching materials can also increase students' learning motivation, making them more interested and motivated to learn (Chen et al., 2024).

To address this issue, it is essential for lecturers to provide well-organized and systematic teaching materials that align with the course objectives. Recent studies in mathematics education highlight the importance of using varied and structured teaching materials to enhance students' understanding and motivation (Kul et al., 2018a). Developing innovative and effective educational resources is crucial to improving the learning experience and outcomes.

This research aims to identify the challenges faced by students and lecturers in the learning process of the Secondary School Mathematics Capita Selecta course, as well as to develop more systematic, varied, and effective teaching materials to meet these needs. This study is expected to make a significant contribution to improving the quality of the learning process and providing recommendations that can be implemented to develop better teaching materials.

In the context of mathematics education, effective teaching materials should encompass various aspects, such as the use of multiple examples and exercises, systematic and clear explanations of concepts, and the presentation of engaging and interactive materials (Rusiman et al., 2017). Research on mathematics teaching materials shows the

importance of the quality of teaching materials in influencing students' understanding of concepts and critical thinking skills (Kul et al., 2018b). The need for effective and relevant teaching materials is a particular concern in the field of education, especially since teaching materials are the primary source of information for most students (Simanjuntak et al., 2022).

Textbooks are one of the essential components of the learning process, used as the main reference by teachers and students. Textbooks contain systematic, comprehensive, and in-depth information about a particular subject or field of study (Modén et al., 2023). In the educational context, textbooks serve as the primary guide for students and teachers in conducting classroom learning activities. A good textbook not only presents information but also can stimulate interest in learning and help students understand the material more easily and deeply.

According to Pisha dan Stahl (Pisha & Stahl, 2005), textbooks should be designed considering the applicable curriculum, relevant learning theories, and students' needs. Effective textbooks can help students develop critical, analytical, and problem-solving skills. Additionally, textbooks play a role in facilitating a more structured and systematic learning process, enabling students to achieve learning objectives more effectively.

A good textbook has several key components that must be present to support an effective learning process (Agrawal et al., 2011; Crossley, 2024; Wolfe, 2005). These components include:

1. Introduction. This section provides an overview of the learning objectives, scope of the material, and structure of the textbook. A good introduction should capture students' attention and motivate them to learn the material presented.
2. Learning Objectives. The learning objectives should be clear and specific, describing the competencies that students must achieve after studying the material in the textbook. These objectives serve as a reference for evaluating students' learning achievements.
3. Learning Materials. The learning materials should be organized systematically and logically, starting from basic concepts to more complex ones. The materials should be presented in a language that is easy to understand and accompanied by relevant examples (Grewal et al., 2024; Weber, 2006).

4. Exercises and Evaluation. The exercises included in the textbook serve to reinforce students' understanding of the material they have learned. Evaluations are used to measure how well students have achieved the learning objectives set.
5. Summary. This section contains a summary of the material that has been discussed, helping students to recall important points and facilitate their learning process.
6. References. The references list the sources used in the preparation of the textbook, giving credit to the original authors and allowing students to explore further information.

Textbooks at the higher education level have characteristics that differ from textbooks at other educational levels. According to research (Allred & Murphy, 2019; Hilton, 2016, 2020; Thufailah & Rejeki, 2024; Wang & Hartsell, 2017), the characteristics of textbooks in higher education include the following:

1. Multidisciplinary Approach. Textbooks in higher education often integrate various disciplines to provide a broader and deeper perspective on a topic. This approach helps students understand the relationships between various concepts and theories.
2. Depth of Material. The material presented in textbooks in higher education is usually more in-depth and complex, requiring students to have higher analytical skills. These textbooks are designed to help students master core concepts and apply them in a broader context (Krudysz & McClellan, 2011).
3. Use of Academic Language. Textbooks in higher education use more formal and academic language. This language reflects a higher level of scholarship and helps students develop academic reading and writing skills (Moreira, 2020).
4. Research-Related Content. Textbooks in higher education often include the latest research findings and critical discussions on recent developments in a particular field of study. This is important to maintain the relevance of the material taught with advancements in science and technology.
5. Interactive and Technology-Based. Modern textbooks in higher education are often equipped with interactive and technology-based features, such as e-books, instructional videos, and online simulations. These features help enhance student engagement in the learning process and facilitate independent learning (Poznic & Pecjak, 2017).

Textbooks are an important tool in the learning process in higher education, serving as the primary guide for instructors and students. A good textbook must meet several key components, such as introduction, learning objectives, learning materials, exercises and evaluation, summary, and references. The characteristics of textbooks in higher education include a multidisciplinary approach, depth of material, use of academic language, research-related content, and interactive and technology-based features. The development of effective and relevant textbooks is essential to improving the quality of learning and academic achievement of students.

METHODS

This study employs a descriptive-qualitative approach combined with a survey method. According to Creswell (Creswell, 2018), descriptive-qualitative research involves the collection of narrative and descriptive data, which are then analyzed inductively. This approach allows researchers to identify emerging themes and patterns from the data, leading to a deeper understanding of the challenges in teaching the Secondary School Mathematics Capita Selecta course and the need for effective and targeted instructional materials. Meanwhile, the survey method involves gathering information from a group of respondents selected through questionnaires or structured interviews. Surveys are used to collect data on attitudes, opinions, behaviors, or specific characteristics of the population being studied (Fowler, 2014). In this study, the survey was conducted online.

The research design for this study is a descriptive-qualitative approach aimed at exploring the challenges in the learning process of the Secondary School Mathematics Capita Selecta course at Universitas Adzkia. In general, the research design can be illustrated in the form of a diagram as follows.

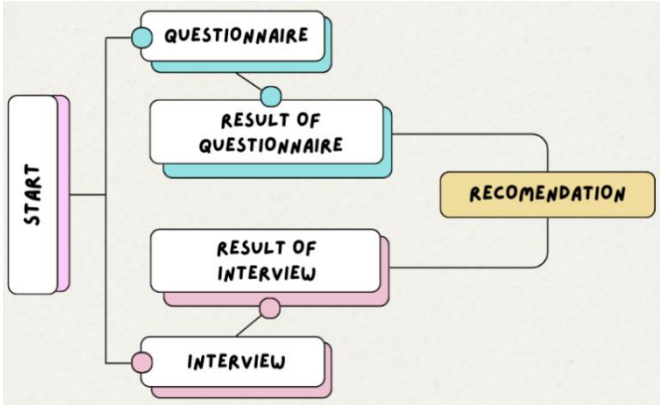

Figure 1. Research Design

This study involves a lecturer who teach the Secondary School Mathematics Capita Selecta course and 18 sixth-semester students enrolled in the Secondary School Mathematics Capita Selecta course within the Mathematics Education Program at Universitas Adzkia.

The data collection techniques used in this study are structured interviews and questionnaires. The research instruments include interview guidelines and questionnaire forms. The first step taken was to prepare the research instruments. The interview and questionnaire sheets were created using Google Forms. The next step was to distribute the URL to all participants who have taken the Secondary School Mathematics Capita Selecta course, consisting of 18 students from the Mathematics Education Program at Universitas Adzkia.

The data collected from interviews and questionnaires were analyzed using qualitative methods. According to Miles and Huberman (Mayer, 2015; Murdiyanto, 2020), qualitative data analysis techniques consist of three main steps: data reduction, data display, and conclusion drawing/verification. The details of each step are as follows:

1. Data Reduction

Data reduction is the process of selecting, focusing, simplifying, abstracting, and transforming raw data from field notes or interview transcripts. The purpose of data reduction is to summarize and filter the data so that it is easier to understand and analyze. This involves selecting interview transcripts and questionnaire responses that are relevant to the research objectives, identifying key themes such as challenges in teaching the Mathematics Capita Selecta course, student needs, and suggestions for improvement.

2. Data Display

Data display is the process of organizing data in such a way that it allows for drawing conclusions and taking further action. Data display helps researchers understand what is happening and see patterns or themes in the data that has been collected. This may involve organizing the data into matrices to see relationships between themes or creating diagrams to visualize challenges and proposed solutions.

3. Conclusion Drawing/Verification

Conclusion drawing is the process of making interpretations from the data that has been reduced and displayed. Verification is the process of checking the validity and reliability of the

conclusions that have been made. This involves interpreting the emerging themes and patterns, making initial conclusions about the effectiveness of current teaching methods and the need for better instructional materials, and verifying the conclusions with additional data or through triangulation. Triangulation involves comparing data from various sources (lecturers and students) and consulting with education experts to validate the findings.

RESULTS AND DISCUSSION

Based on the survey conducted, it was revealed that the majority of students face challenges in following the Secondary School Mathematics Capita Selecta course. A total of 22.2% of students reported difficulties in understanding the material presented (figure 2). This finding indicates an urgent need to develop more effective teaching materials to support the learning process (Ramdhani, 2018). Additionally, most students stated that they prefer learning using various learning resources, such as textbooks, modules, e-books, and tutorial videos, rather than relying on a single type of teaching material(Wynter et al., 2019). Meanwhile, the remaining 77.8% did not experience any difficulties.

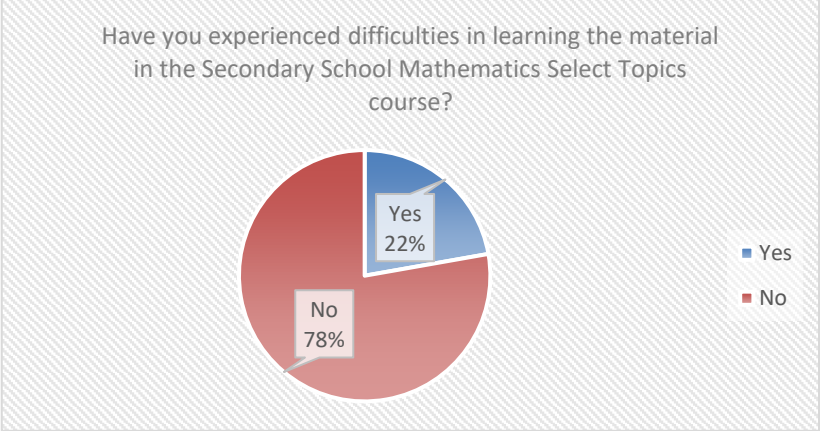

Figure 2. Student Difficulties in the Secondary School Mathematics Capita Selecta course

The teaching materials used by lecturers for the Secondary School Mathematics Capita Selecta course include articles (88.9%), textbooks (22.2%), e-books (38.9%), tutorial videos (22.2%), and modules (33.3%). Based on this data, it is evident that the use of textbooks in the course is still very limited.

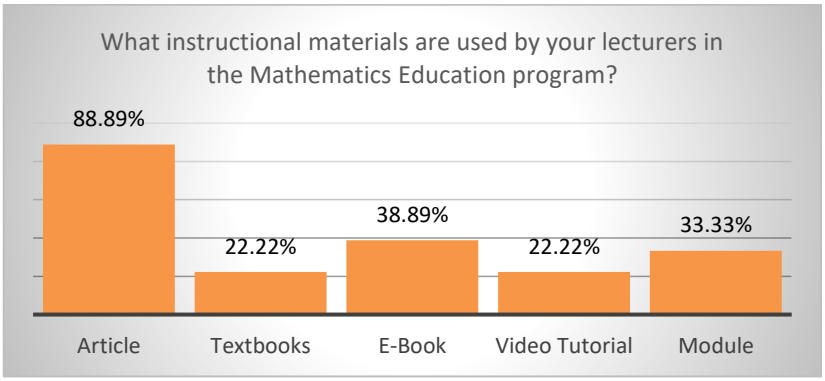

Figure 3. Various Teaching Materials for the Secondary School Mathematics Capita Selecta course

A total of 66.7% of students expressed satisfaction when learning using textbooks, modules, or other instructional materials to understand the course content (Figure 4). Meanwhile, 72.2% of students reported enjoying learning with audio, visual, or audiovisual media (Figure 5). All students (100%) expect the Secondary School Mathematics Capita Selecta course to be delivered using various learning resources (Figure 6). Additionally, 100% of students believe that the course is easier to understand when presented with systematic teaching materials and various media (Figure 7). Furthermore, 94.5% of students indicated that the use of media that demonstrates procedures, images, videos, or detailed material tends to result in more engaging learning (Figure 8).

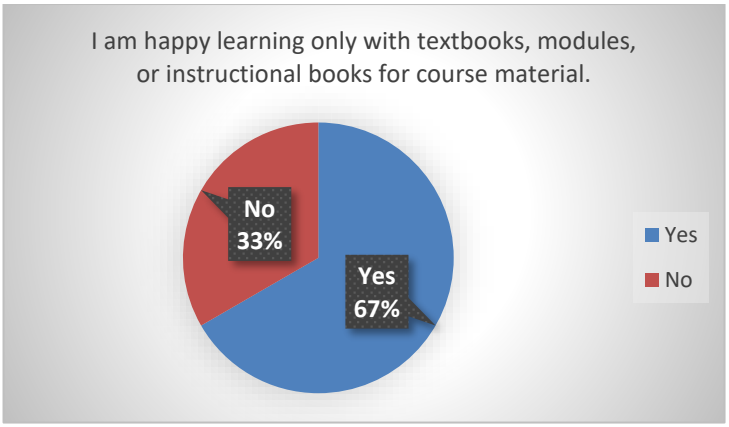

Figure 1. Students prefer learning using textbooks, modules, and other materials

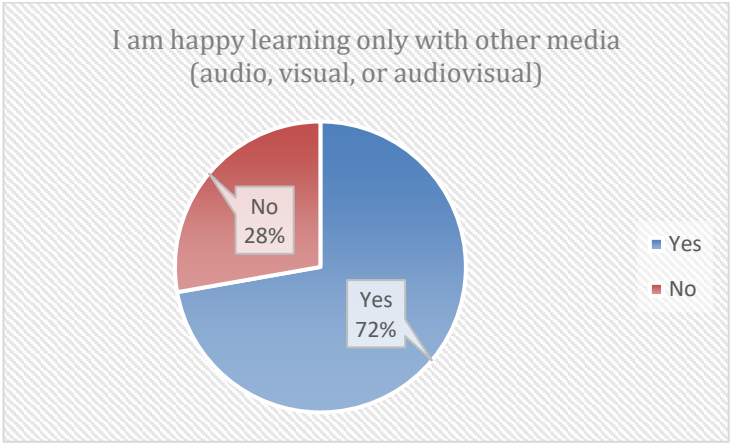

Figure 2. Students prefer learning using audio, visual, and audiovisual media

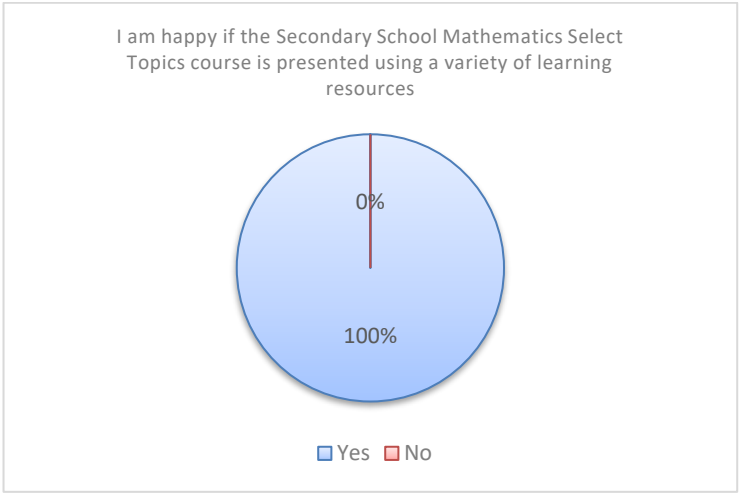

Figure 3. Students prefer varied instructional materials

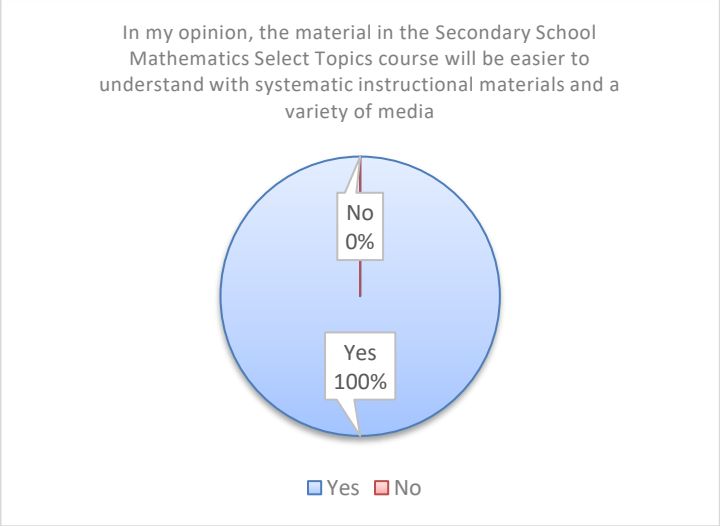

Figure 4. Systematic and varied instructional materials are easier for students to understand

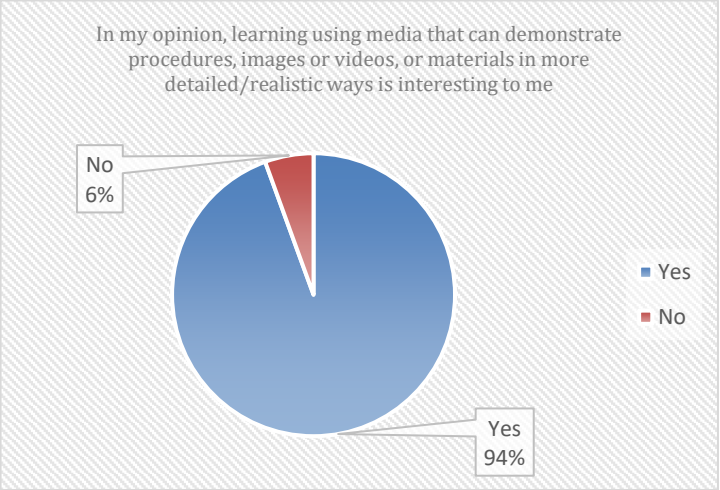

Figure 5. The use of images or videos in learning is very engaging

Interviews with students enrolled in the Secondary School Mathematics Capita Selecta course revealed their enthusiasm in following and paying attention to what the lecturer presented during the class (Figure 9), as well as in completing the assignments given by the lecturer (Figure 10). However, it was observed that while some students understood the material, others experienced difficulties (Figure 11). A total of 50% of students comprehended the material in the Secondary School Mathematics Capita Selecta course with an understanding level between 50% - 75% (Figure 12). The factors contributing to the students' difficulties included challenges in understanding the material and managing time effectively, which impacted their ability to complete tasks and story problems correctly and on time. Lecturers could provide additional time for step-by-step understanding of practice problems and hold extra discussion sessions to assist students in overcoming learning difficulties.

Students also expressed that understanding story problems was a challenge. They enjoyed the material presented by the lecturer using varied instructional materials, as evidenced by the survey data (Figures 4, 5 and 6).

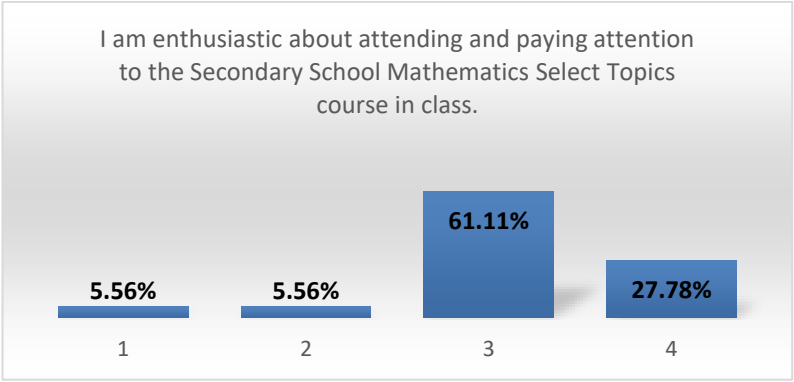

Figure 6. Students' enthusiasm in attending and paying attention to the Secondary School Mathematics Capita Selecta course

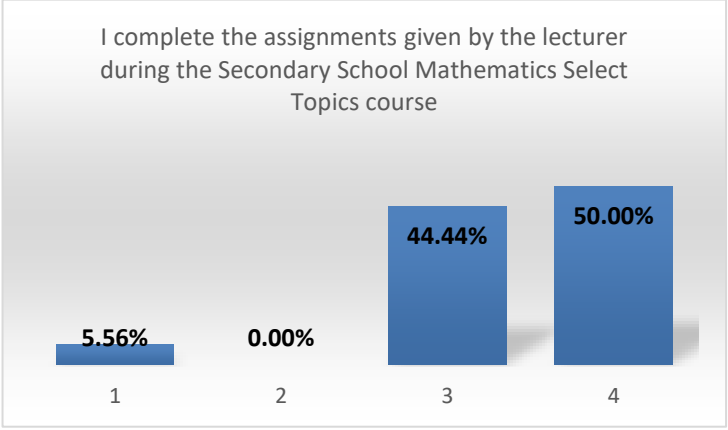

Figure 7. Students' enthusiasm in completing assignments for the Secondary School Mathematics Capita Selecta course

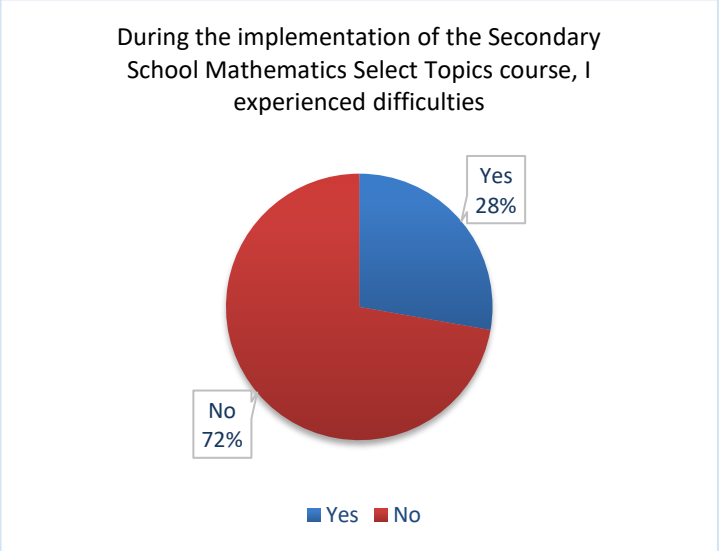

Figure 8. Students did not experience difficulties during the Secondary School Mathematics Capita Selecta course

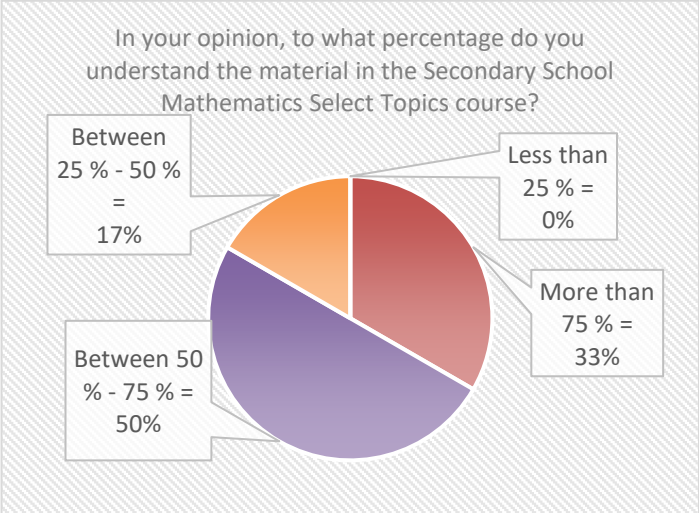

Figure 9. Percentage of Students Understanding the Material in the Secondary School Mathematics Capita Selecta course.

Based on the previously presented data from the questionnaires and interviews, the research findings can be summarized as follows.

Table 1. Research Findings and Recommendations

No	Findings	Percentages	Recommendations
1	Students reported difficulties in understanding the material in the Secondary School Mathematics Capita Selecta course.	22,2 %	Need to develop textbooks that are more varied, systematic, and engaging.
2	The average use of teaching materials such as textbooks, e-books, video tutorials, and modules is still low.	Textbooks 22,2 % E-book 38,9 % Video tutorial 22,2, % Module 33,3 % Average: 29,15 %	
3	Students felt happy when learning using textbooks, modules, or other instructional materials to understand the course material.	66,7%	
4	Students felt happy when learning using audio, visual, or audiovisual media.	72,2,%	
5	Students expect the Secondary School Mathematics Capita Selecta course to be delivered using various learning resources.	100 %	

6	Students believe that the Secondary School Mathematics Capita Selecta course is easier to understand if delivered using systematic teaching materials and various media.	100 %	
7	Students stated that the use of media that demonstrates procedures, images, videos, or detailed materials tends to result in more engaging learning.	94,5 %	
8	Students' difficulties in understanding the Secondary School Mathematics Capita Selecta course include: understanding secondary school mathematics material understanding problems in secondary school mathematics story problems	72 %	Need to develop textbooks that emphasize understanding real-world problems in secondary school mathematics.

This study found that the majority of students experience difficulties in understanding the material taught in the Secondary School Mathematics Capita Selecta course. A total of 22.2% of students reported having difficulty in understanding the material, indicating the need for the development of more effective teaching materials that align with the needs of the students (Ramdhani, 2018). A deep understanding of basic mathematical concepts is crucial, especially since the material taught is often complex and requires a high level of abstract thinking (W. Chen, 2024; Lipkovski et al., 2024; Simon, 2022; Solani et al., 2022; Tirosh, 2013). Therefore, it is necessary to have teaching materials that are systematically and structurally organized to support a more effective learning process (Krause & Kelly, 2011; Prediger et al., 2019; Wlekły & Piwowarski, 2022).

Previous research also shows that variation in the use of teaching media, including digital technology, can enhance students' motivation and understanding (Budiman et al., 2018; Mandernach, 2009; Prawira et al., 2023). The use of technology in learning, such as e-books, video tutorials, and online learning platforms, has been proven to help students access information more easily and efficiently (Ayas, 2023). However, it is important to ensure that the developed teaching materials remain focused on the needs and characteristics of the students. This aligns with research indicating that effective teaching materials should be designed with students' learning needs in mind and should be easily accessible and understandable (Tarrayo & Anudin, 2023).

Additionally, interviews with students revealed that they are more engaged and motivated when learning with varied teaching materials, such as textbooks, modules, e-books, and video tutorials. This suggests that diverse instructional approaches can be more effective in enhancing students' understanding and engagement in the learning process (Diggs, 2022). However, the main challenge in using various media is ensuring their effective integration to support the overall learning objectives (Elmunsyah et al., 2023).

A total of 94.5% of students stated that using media that displays procedures, images, videos, or detailed material can make learning more engaging and effective. Other studies support this finding, stating that the use of visual and interactive media can help clarify difficult concepts and make learning more engaging for students (Palilonis et al., 2013). Furthermore, the development of teaching materials that utilize modern technology allows for more adaptive and responsive learning to individual student needs (Bekaulova et al., 2024).

Although the use of technology and diverse media has many benefits, some students still face difficulties (Wulandari & Gusteti, 2021), particularly in understanding story problems related to secondary school mathematics. This indicates that, in addition to developing varied teaching materials, a more focused teaching approach is needed to develop critical thinking skills and a deep understanding of concepts (Khikmiyah & Midjan, 2017). In this regard, teaching materials designed to help students overcome difficulties in understanding story problems and the practical application of mathematical concepts can be very beneficial (Ramdhani, 2018).

Overall, the results of this study emphasize the importance of developing teaching materials that are not only systematic and varied but also interactive and aligned with students' needs. Therefore, it is hoped that the learning process in the Secondary School Mathematics Capita Selecta course at Universitas Adzkia can run more effectively and efficiently, and enhance students' understanding and motivation. Developing teaching materials that consider students' needs and effectively integrate technology is a crucial step in achieving this goal.

CONCLUSION

This study reveals that students in the Mathematics Education Program at Universitas Adzkia experience difficulties in following the Secondary School Mathematics Capita Selecta

course, particularly in understanding the material and connecting mathematical concepts with their applications in story problems. These findings highlight the importance of developing systematic, varied, and interactive teaching materials that can support students' understanding and motivation to learn. The use of various learning resources, including textbooks, modules, e-books, and video tutorials, can enhance student engagement in the learning process. Additionally, integrating technology into teaching materials allows for more engaging and effective content delivery. Therefore, the development of teaching materials that consider students' needs and a more focused teaching approach on developing critical and analytical thinking skills is essential to improving the quality of learning in this course.

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REFERENCES

Agrawal, R., Gollapudi, S., Kannan, A., & Kenthapadi, K. (2011). Enriching Education through Data Mining (pp. 1–2). https://doi.org/10.1007/978-3-642-21786-9_1

Allred, J. B., & Murphy, C. A. (2019). Interactive electronic textbook use in higher education: grades, engagement, and student perceptions. International Journal of Innovation and Learning, 25(3), 296. https://doi.org/10.1504/IJIL.2019.098895

Ayas, I. (2023). Implementation of Online Teaching and Learning Technology Tools for Effective Learning. In Overcoming Challenges in Online Learning (pp. 107–119). Routledge. https://doi.org/10.4324/9781003342335-13

Bekaulova, Z., Duzbayev, N., Mamatova, G., Bersugir, M., & Bekaulov, N. (2024). Adaptive Learning Model and Analysis of Existing Systems. CEUR Workshop Proceedings, 3680.

Budiman, E., Parassa, Y., Haerullah, H., Moeis, D., Soekarta, R., & Jamil, M. (2018). The Effect of Mobile Learning Media on Student Learning Motivation in Data Structure Courses. 2018 3rd International Conference on Information Technology, Information System and

Electrical Engineering (ICITISEE), 60–64. https://doi.org/10.1109/ICITISEE.2018.8720963

Busquets, T., Silva, M., & Larrosa, P. (2016). Reflexiones sobre el aprendizaje de las ciencias naturales: Nuevas aproximaciones y desafíos. Estudios Pedagógicos (Valdivia), 42(especial), 117–135. https://doi.org/10.4067/S0718-07052016000300010

Caiko, J., Kintonova, A., Mussina, G., Kurmanbayeva, A., & Nazarmatova, B. (2022). Modern Models Of Learning At The University. 2022 IEEE 7th International Energy Conference (ENERGYCON), 1–8. https://doi.org/10.1109/ENERGYCON53164.2022.9830331

Cao, C. D., Phan, L. T., & Nguyen, T. T. (2022). A Study on the Competency-Based Education of Lecturers in Universities of Technology and Education. International Journal of Education and Practice, 10(3), 267–276. https://doi.org/10.18488/61.v10i3.3117

Chen, H., Chen, J., & Chiang, F. (2024). A study on the influence of learning space on students' intrinsic learning motivation. European Journal of Education, 59(3). https://doi.org/10.1111/ejed.12652

Chen, W. (2024). Problem-Solving Skills, Memory Power, and Early Childhood Mathematics: Understanding the Significance of the Early Childhood Mathematics in an Individual's Life. Journal of the Knowledge Economy. https://doi.org/10.1007/s13132-023-01557-6

Creswell, J. W. (2018). Qualitative Inquiry and Research Design: Choosing Among Five Approaches (4rd ed.). SAGE Publications.

Crossley, N. (2024). Pedagogy and the Textbook in Political Science. Journal of Political Science Education, 20(3), 422–439. https://doi.org/10.1080/15512169.2024.2322997

de Vries, M. J. (2014). The Concept–Context Approach to Learning Material Properties in Design(-Related) Education. In Materials Experience (pp. 329–336). Elsevier. https://doi.org/10.1016/B978-0-08-099359-1.00023-0

Diggs, S. N. (2022). Got HIPs? Making student engagement enhancement a core part of program development with high impact practices. Teaching Public Administration, 40(2), 167–180. https://doi.org/10.1177/01447394211013856

Elmunsyah, H., Smaragdina, A. A., Putri, P. R. M., Bin Mahamad, Abd. K., & Kusumadyahdewi. (2023). Development of Interactive Media Learning Basic Computer and Telecommunication Network Techniques for Vocational High School Students. 2023 8th

International Conference on Electrical, Electronics and Information Engineering (ICEEIE), 1–6. https://doi.org/10.1109/ICEEIE59078.2023.10334698

Fowler, F. J. (2014). Survey research methods (5th ed). . Sage publications.

Grewal, S., Manuel, M., & Veettil, R. P. (2024). Principles and Procedures of Material Development in the Evolving ELT Scenario. Salud, Ciencia y Tecnología - Serie de Conferencias, 3, 656. https://doi.org/10.56294/sctconf2024656

Hilton, J. (2016). Open educational resources and college textbook choices: a review of research on efficacy and perceptions. Educational Technology Research and Development, 64(4), 573–590. https://doi.org/10.1007/s11423-016-9434-9

Hilton, J. (2020). Open educational resources, student efficacy, and user perceptions: a synthesis of research published between 2015 and 2018. Educational Technology Research and Development, 68(3), 853–876. https://doi.org/10.1007/s11423-019-09700-4

Huang, R., Hu, Y., & Yang, J. (2015). Improving Learner Experience in the Technology Rich Classrooms (pp. 243–258). https://doi.org/10.1007/978-3-662-44659-1_13

Ivanova, D. H., Goray, O. V., Horbachova, N. I., Krukovska, I. M., & Poplavska, S. D. (2020). The Objectives and Practical Aspects of Quality Assurance System of Higher Education. International Journal of Higher Education, 9(7), 119. https://doi.org/10.5430/ijhe.v9n7p119

Khikmiyah, F., & Midjan, M. (2017). PENGEMBANGAN BUKU AJAR LITERASI MATEMATIKA UNTUK PEMBELAJARAN DI SMP. JURNAL SILOGISME : Kajian Ilmu Matematika Dan Pembelajarannya, 1(2), 15. https://doi.org/10.24269/js.v1i2.275

Kong, C.-K. (2008). Classroom learning experiences and students' perceptions of quality of school life. Learning Environments Research, 11(2), 111–129. https://doi.org/10.1007/s10984-008-9040-9

Krause, S., & Kelly, J. (2011). Teaching, Learning, and Assessment Resources for Introductory Materials Science and Engineering Courses. MRS Proceedings, 1364, mrss11-1364-ss04-09. https://doi.org/10.1557/opl.2011.1184

Krudysz, G. A., & McClellan, J. H. (2011). Web-based platform for problem-centered learning in DSP. 2011 Digital Signal Processing and Signal Processing Education Meeting (DSP/SPE), 402–407. https://doi.org/10.1109/DSP-SPE.2011.5739248

Kul, Ü., Çelik, S., & Aksu, Z. (2018a). The Impact of Educational Material Use on Mathematics Achievement: A Meta-Analysis. International Journal of Instruction, 11(4), 303–324. https://doi.org/10.12973/iji.2018.11420a

Kul, Ü., Çelik, S., & Aksu, Z. (2018b). The Impact of Educational Material Use on Mathematics Achievement: A Meta-Analysis. International Journal of Instruction, 11(4), 303–324. https://doi.org/10.12973/iji.2018.11420a

Lee, W. O., & Manzon, M. (2014). The Issue of Equity and Quality of Education in Hong Kong. The Asia-Pacific Education Researcher, 23(4), 823–833. https://doi.org/10.1007/s40299-014-0214-1

Lipkovski, A., Muzika Dizdarević, M., & Odžak, A. (2024). Measuring conceptual knowledge of basic algebraic concepts. THE TEACHING OF MATHEMATICS. https://doi.org/10.57016/TM-NYKZ1813

Mandernach, B. J. (2009). Effect of Instructor-Personalized Multimedia in the Online Classroom. The International Review of Research in Open and Distributed Learning, 10(3). https://doi.org/10.19173/irrodl.v10i3.606

Mayer, I. (2015). QUALITATIVE RESEARCH WITH A FOCUS ON QUALITATIVE DATA ANALYSIS. International Journal of Sales, Retailing and Marketing, 4–9. https://www.circleinternational.co.uk/wp-content/uploads/2021/01/IJSRM4-9.pdf#page=57

McDaniel, M. A., & Einstein, G. O. (2020). Training Learning Strategies to Promote Self-Regulation and Transfer: The Knowledge, Belief, Commitment, and Planning Framework. Perspectives on Psychological Science, 15(6), 1363–1381. https://doi.org/10.1177/1745691620920723

McDaniel, M. A., Einstein, G. O., & Een, E. (2021). Training College Students to Use Learning Strategies: A Framework and Pilot Course. Psychology Learning & Teaching, 20(3), 364–382. https://doi.org/10.1177/1475725721989489

Modén, M. U., Tallvid, M., & Lundin, J. (2023). Exploring the role of digital textbooks in education. In Digitalization and Digital Competence in Educational Contexts (pp. 133–145). Routledge. https://doi.org/10.4324/9781003355694-14

Moreira, G. (2020). Towards language-friendly higher education: language policy development at the University of Aveiro, Portugal. Revista Lusófona de Educação, 47, 115–127. https://doi.org/10.24140/issn.1645-7250.rle47.08

Moses, K. M. (2016). Improving the quality and competence of technical vocational education and training output through vocational school cooperation with industry: A case study of Uganda. 030060. https://doi.org/10.1063/1.4965794

Moussa, N. (2008). Quality of education in developing countries. In Higher Education in the Twenty-First Century (pp. 125–128). CRC Press. https://doi.org/10.1201/9780203885772-22

Murdiyanto, E. (2020). Penelitian Kualitatif. Lembaga Penelitian dan Pengabdian Pada Masyarakat UPN "Veteran" Yogyakarta Press.

Palilonis, J., Butler, D., & Leidig-Farmen, P. (2013). Design Interactive: A Nonlinear, Multimedia Approach to Teaching Introduction to Visual Communication and Principles of Design. Journal of Educational Multimedia and Hypermedia, 22(1), 63–79.

Pandey, S. (2006). Para-teacher scheme and quality education for all in India: policy perspectives and challenges for school effectiveness. Journal of Education for Teaching, 32(3), 319–334. https://doi.org/10.1080/02607470600782468

Pisha, B., & Stahl, S. (2005). The Promise of New Learning Environments for Students With Disabilities. Intervention in School and Clinic, 41(2), 67–75. https://doi.org/10.1177/10534512050410020601

Pow, J., & Li, S. C. (2015). The effect of students' perceptions of Internet information quality on their use of Internet information in inquiry-based learning. Australasian Journal of Educational Technology, 31(4). https://doi.org/10.14742/ajet.1936

Poznič, A., & Pečjak, S. (2017). The effect of the teacher's instructions on the academic achievement of high school students in learning with e-textbooks. Psychological Horizons, 26, 101–110. https://doi.org/10.20419/2017.26.474

Prawira, I., Rizkiansyah, M., Ahdareni, R. J., Ariestyani, A., & Mettadewi, A. (2023). The Impact of Interactive Features on Broadcasting Virtual Laboratory on Vocational Students' Learning Motivation; Study at SMKN 1 Bangil and SMKN 1 Sragen, East Java, Indonesia. E3S Web of Conferences, 388, 04042. https://doi.org/10.1051/e3sconf/202338804042

Prediger, S., Fischer, C., Selter, C., & Schöber, C. (2019). Combining material- and community-based implementation strategies for scaling up: the case of supporting low-achieving middle school students. Educational Studies in Mathematics, 102(3), 361–378. https://doi.org/10.1007/s10649-018-9835-2

Ramadani, R., Hamzah, Y. A., & Mangerengi, A. A. (2021). Indonesia's Legal Policy During COVID-19 Pandemic: Between the Right to Education and Public Health. Journal of Indonesian Legal Studies, 6(1), 125–156. https://doi.org/10.15294/jils.v6i1.43555

Ramdhani, S. (2018). Kemampuan generalisasi mahasiswa pada perkuliahan kapita selekta matematika sma. Jurnal Analisa, 4(2), 83–89. https://doi.org/10.15575/ja.v4i2.3926

Rusiman, M. S., Mohamad, M., Him, N. C., Kamardan, M. G., Othaman, S., Shamshuddin, M. H., Samah, M., & Aziz, N. (2017). The use of concrete material in teaching and learning mathematics. Journal of Engineering and Applied Sciences, 12(8), 2170–2174.

Schweisfurth, M. (2023). The Development Discourse of "Quality Teachers": Implications for Teacher Professional Development. In The Palgrave Handbook of Teacher Education Research (pp. 1337–1351). Springer International Publishing. https://doi.org/10.1007/978-3-031-16193-3_67

Simanjuntak, E., Hutabarat, H. D. M., & Purba, G. I. D. (2022). The effect size of mathematics practicum teaching materials assisted by video tutorials to improve mathematical creative thinking skills. 100018. https://doi.org/10.1063/5.0113784

Simon, M. A. (2022). Understanding the nature of arithmetical concepts–important content for the education of primary mathematics teachers. Mathematical Thinking and Learning, 1–14. https://doi.org/10.1080/10986065.2022.2139101

Solani, S., Thakkar, B., Shah, R., & Katre, N. (2022). Philomath: Intelligent Tutoring System for Mathematics. 2022 5th International Conference on Advances in Science and Technology (ICAST), 318–323. https://doi.org/10.1109/ICAST55766.2022.10039623

Stickels, P. R. (2019). Using projects in a quantitative reasoning course. Mathematics Teaching-Research Journal, 11(12), 4–12.

Tarrayo, V. N., & Anudin, A. G. (2023). Materials development in flexible learning amid the pandemic: perspectives from English language teachers in a Philippine state university. Innovation in Language Learning and Teaching, 17(1), 102–113. https://doi.org/10.1080/17501229.2021.1939703

Thufailah, N., & Rejeki, S. (2024). Profile of junior high school mathematics book based on horizontal and vertical analysis: Indonesian context. 020066. https://doi.org/10.1063/5.0183358

Tirosh, D. (2013). 11 Improving Prospective Early Childhood Teachers' Content Knowledge and Attitudes Toward Mathematics. In Transforming Children's Mathematics Education (pp. 427–435). Routledge. https://doi.org/10.4324/9780203052372-57

Wang, S., & Hartsell, T. (2017). Perceived Factors Influencing Instructors' Use of E-Textbooks in Higher Education. International Journal of Information and Communication Technology Education, 13(4), 87–97. https://doi.org/10.4018/IJICTE.2017100107

Weber, D. J. (2006). The linguistic example. Studies in Language, 30(2), 445–460. https://doi.org/10.1075/sl.30.2.12web

Wlekły, P., & Piwowarski, M. (2022). The usability of eye tracking in the design of digital training materials. Procedia Computer Science, 207, 4180–4189. https://doi.org/10.1016/j.procs.2022.09.481

Wolfe, K. (2005). Course Materials—Syllabus and Textbooks. Journal of Teaching in Travel & Tourism, 4(4), 55–60. https://doi.org/10.1300/J172v04n04_05

Wulandari, S., & Gusteti, M. U. (2021). Defragmentation of Preservice Teacher's Thinking Structures in Solving Higher Order Mathematics Problem. Journal of Physics: Conference Series, 1940(1). https://doi.org/10.1088/1742-6596/1940/1/012099

Wynter, L., Burgess, A., Kalman, E., Heron, J. E., & Bleasel, J. (2019). Medical students: what educational resources are they using? BMC Medical Education, 19(1), 36. https://doi.org/10.1186/s12909-019-1462-9