

NEED ANALYSIS OF THE CAPITA SELECTA MATHEMATICS 2 COURSE AT THE MATHEMATICS EDUCATION DEPARTMENT UNIVERSITAS MUHAMMADIYAH SORONG

M FATHURRAHMAN¹, SYAMSU QAMAR BADU², NURHAYATI ABBAS³, ISMAIL DJAKARIA⁴ and NOVIANTY DJAFRI⁵

^{1, 2, 3, 4, 5} Education Department, Universitas Negeri Gorontalo, Gorontalo City.

¹Email: fathurrahmanm848@gmail.com

Abstract

Teaching materials in a lesson are important things for lecturers to have in the implementation of learning, in the Capita Selecta Mathematics 2 Course in Mathematics Education, Muhammadiyah University of Sorong, teaching materials are not yet available that are in accordance with the goals and indicators of student completeness in the course, so in research This requires an analysis of the needs of teaching materials needed by lecturers and students. The method used in this study is a qualitative descriptive research method, where data collection is carried out by means of interviews and distributing questionnaires. The research results obtained that lecturers and students need a variety of teaching materials, and there are various learning media in them to be able to support learning. Based on the results of this research, it can be concluded that it is necessary to develop textbooks that are systematic, contain various variations of learning resources, have various types of media (audio and visual), refer to the competencies that must be achieved by students, and are compiled based on learning theory.

Keywords: Needs Analysis, Development, Teaching Materials, Mathematics

1. INTRODUCTION

A developed nation is indicated by its education quality (Kurniawati, 2022). Promoting quality education will scale up the sustaining aspects of national development, e.g., economy, technological industries, and others (Fonna, 2019). Indonesia, itching to augment its education quality, declares that education is the right of all nations in the Preamble of the Constitution of 1945, the fourth paragraph (Indonesia, 2002). The declaration suggests that all Indonesian people have rights and responsibilities related to education and teaching delivery to all Indonesian children.

Lecturers and teachers, as instrumental actors in education, have to be more creative in delivering learning to bring about successful education-elevating efforts. Classroom learning is expected to give more student learning experiences (Degeng, 1989). It is hence incumbent upon lecturers and teachers as educators to bring on creative learning (Samani, 2012). They must apply many different learning methods and wield various learning resources to create a good learning atmosphere. Developing effective learning for children is necessary to realize successful learning and achieve optimum learning outcomes (Suparman, 2012). Learning without a clear learning model will likely come with adverse results (Tanjung, 2018) or run ineffectively and inefficiently (Abbas, 2000).

Mathematics education is a noteworthy discipline to build the knowledge bases and logical thinking skills of students. Capita Selecta Mathematics 2 is a course part of the Mathematics Education program delivered at Universitas Muhammadiyah Sorong. This course plays a paramount role in enriching student knowledge of a range of mathematic concepts and applications. Nonetheless, students and lecturers have been confronting several challenges in the learning process, e.g., difficulties in understanding materials and the need for more systematic and various learning materials.

Evidence suggests that the learning of the Capita Selecta Mathematics 2 course at Universitas Muhammadiyah Sorong was still ineffective and inefficient. As presented by the indicators of the learning objective achievement for the course, some students did not attain targets when they were expected to understand and master the main concepts of Mathematics 2 and solve problems related to mathematics learning difficulties among junior high school students.

There are no learning materials in good agreement with the learning objectives of the Capita Selecta Mathematics 2 course available at Universitas Muhammadiyah Sorong. Lecturers are usually contingent on learning material references available on the internet, such as books, modules, and separately provided video references. The references bedevil students in learning. It will be better if lecturers provide learning materials or media which can deliver messages from the course which they are responsible for (Hasiru, 2021). Students can thus learn in a systematic and oriented way and acquire learning materials in accordance with the course objectives. The latest research on mathematics learning demonstrates how it is of crucial importance to use systematic and various learning materials in the learning process (Cummings, 2023; Tarrayo, 2023). This research exhibits that using good learning materials in conforming to student needs can enhance student understanding of materials and escalate learning motivation. This research hence emphasizes the great importance of developing innovative and effective learning materials to facilitate a better learning process.

This research focuses on identifying difficulties students and lecturers are facing in the learning process and developing more systematic, various, and effective learning materials to fulfill their needs. It aims to answer inquiries concerning difficulties students and lecturers are facing off in the learning process of the Capita Selecta Mathematics 2 course and the development of systematic and various learning materials which can help them. The research methods were questionnaire distribution and interviews with students and lecturers. This research is expected to improve the quality of the learning process related to the course and provide recommendations related to developing more effective and innovative learning materials.

2. LITERATURE REVIEW

2.1 Learning Book

A learning book serves as the main learning source in education, including mathematics education (Puspasari, 2019). It guides lecturers and students to do learning activities (Irawati, 2018). A good learning book should be made in correspondence with the applicable curriculum, relevant learning theories, and student needs (Darma, 2012). Additionally, it has to use

understandable language and refers to the completeness indicators students must achieve in a course (Irawati, 2018).

Within a Mathematics Education context, an effective mathematic learning book should encompass a range of aspects, such as the use of many different examples and exercises, systematic and clear-cut concept explanations, and attractive and interactive material presentation (Kosasih, 2021). Some research on mathematic learning books exhibits how the quality of learning books greatly inflects the conceptual understanding and thinking skills of students (Khikmiyah, 2017; Bulu, 2020).

The need for effective and relevant learning books is a special concern in the education world, especially because learning materials are the main information sources for the bulk of students (Budiyono, 2020). Learning needs identification and analysis by involving stakeholders, e.g., lecturers, students, and educating practitioners, are therefore needed to meet the need (Arikunto, 2017). A need identification may include analyses of the curriculum, learning objectives, learning strategies, student preferences, and student knowledge background. The results are then can be used as the fundamentals to develop learning books in conforming with a specific learning context and need (Febrianto, 2020).

2.2 Capita Selecta Mathematics

The Capita Selecta Mathematics for Junior High Schools course is targeted for Mathematics Education students keen to deepen their understanding of mathematic concepts and applications at a junior high school level. This course addresses many different ranges of topics, from algebra, geometry, to statistics, and effective learning and assessment methods within the context of mathematics for junior high schools (Kumalasari, 2015).

Research on Capita Selecta Mathematics for junior high schools demonstrate that students often find difficulties in understanding materials, specifically in light of a lack of mathematic knowledge background (Ramdhani, 2018). An innovative and effective learning approach is thus required to help students cope with difficulties (Gultom, 2015). Some other research shows how systematic, various, and interactive learning materials can increase student understanding of materials and learning motivation (Tamu, 2020; Cahyadi, 2019).

Developing learning books in correspondence with lecturer and student needs becomes pivotal to promoting the learning process of Capita Selecta Mathematics for junior high schools. Effective learning books have to cover systematic materials, a variety of learning sources, and a range of media, e.g., texts, pictures, audio media, and videos (Tamu, 2020). Learning books must also refer to the competencies which students should achieve and must be made by relevant learning theories (Cahyadi, 2019).

Regarding Mathematics Education, research on learning books and Capita Selecta Mathematics for junior high schools is of importance to endorse successful mathematic learning at a junior high school level (Oktavia, 2019). Developing systematic, various, and interactive learning books allows lecturers and students to deal with difficulties in understanding materials and augmenting their learning motivation (Abidin, 2017; Affriani,

2017). Furthermore, in terms of integrated technology and collaboration between parties in learning book development, they can elevate the quality and relevance of the presented materials (Hasibuan, 2022) and manifest efficient learning and assessment processes.

3. METHOD

This descriptive-qualitative research used a survey method executed at the Mathematics Education Department Faculty of Teacher Training and Education (FKIP) Universitas Muhammadiyah Sorong. It was performed on lecturers of the Capita Selecta Mathematics 2 course and Mathematics Education students taking their fifth semester.

Data collection techniques were interviews and questionnaires. Data collection instruments were structured interview sheets and questionnaire sheets. Interview sheets were used to gain learning implementation information from lecturers and learning needs. Questionnaire sheets were used to collect information on student needs to participate in the Capita Selecta Mathematics 2 learning.

4. RESULTS AND DISCUSSION

We distributed questionnaires to fifth-semester Mathematics Education students at Universitas Muhammadiyah Sorong to identify their difficulties in studying Capita Selecta Mathematics 2. The results exhibited 45% of students experienced difficulties, and 55% did not.

Apakah Anda mengalami kesulitan dalam mempelajari materi pada mata kuliah kapita selekta matematika SMP?
20 responses

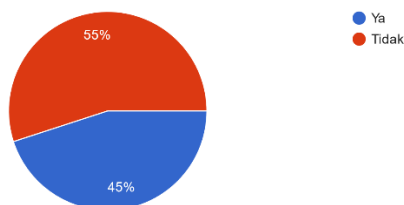


Figure 1: Student difficulties in the Capita Selecta Mathematics 2 course

Learning materials lecturers used for the Capita Selecta Mathematics 2 course were books (71.4%), modules (52.4%), journal articles (42.9%), and other learning materials.

Bahan ajar apa yang digunakan dosen Anda pada prodi Pendidikan Matematika? (pilihan bisa lebih dari satu)

21 responses

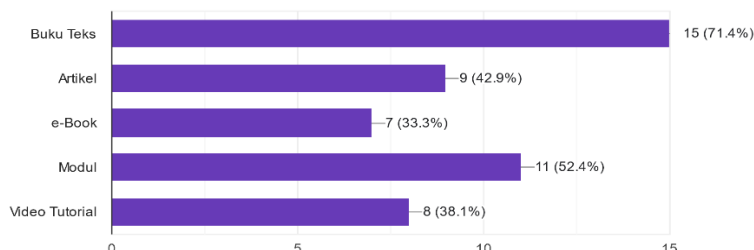


Figure 2: A variety of learning materials for the capita Selecta Mathematics 2 course

90.5% of students felt happy when learning using textbooks, modules, or learning materials to understand learning materials (Figure 3). 71.4% of students felt happy when learning using audio, visual, or audiovisual media (Figure 4). 90.5% of students expected the Capita Selecta Mathematics 2 course to be presented using many different learning sources (Figure 5). 81% of students argued that the Capita Selecta Mathematics 2 course was more understandable if delivered using systematic learning materials and various media (Figure 6). 90.5% of students conveyed that using media which showed procedures, pictures, videos, or materials in a more detailed way would likely bring about interesting learning (Figure 7).

Saya senang, belajar hanya dengan menggunakan buku teks, modul, atau buku ajar untuk memahami materi kuliah

21 responses

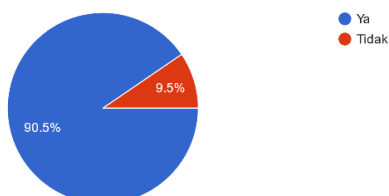


Figure 3: Students preferred learning using textbooks, modules, and others

Saya senang, belajar dengan menggunakan media lainnya (audio, visual, atau audia visual)

21 responses

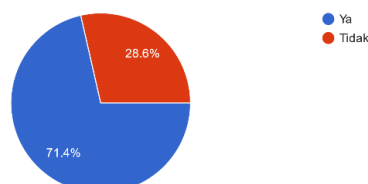


Figure 4: Students preferred learning using audio, visual, and audiovisual media

Saya senang, jika perkuliahan kuliah Kapita Selekt Matematika SMP disajikan dengan menggunakan sumber belajar yang bervariasi.

21 responses

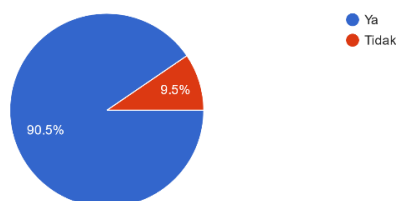


Figure 5: Students preferred various learning materials

Menurut saya, materi kuliah Kapita Selekt Matematika SMP akan lebih mudah dipahami dengan menggunakan bahan ajar yang sistematis dan media yang bervariasi.

21 responses

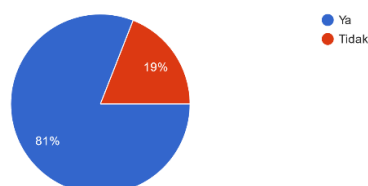


Figure 6: Systematic and various learning materials would likely be more understandable for students

Menurut saya, belajar dengan menggunakan media yang bisa menunjukkan cara kerja, gambar atau video, atau materi secara lebih mendetail/real menarik bagi saya

21 responses

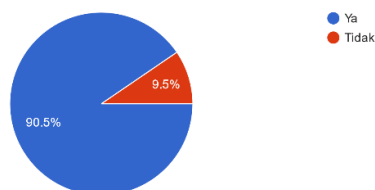


Figure 7: The use of pictorial or video media in learning was very attractive

Interviews with the lecturers of the Capita Selecta Mathematics 2 course disclosed the enthusiasm of students in following and paying attention to what lecturers delivered during the classroom learning process and completing tasks lecturers gave. And yet, as notable during the learning implementation, several students understood but some others found difficulties (Figure 1). The causing factor of the difficulties was commonly students being unable to recall basic mathematic materials for junior high schools they had acquired. Lecturers typically used a substantial number of diverse learning materials, e.g., mathematic books for junior high schools, mathematic learning videos for junior high schools from YouTube, and journal articles

discussing mathematic learning issues in junior high schools (Figure 2) as supporting learning materials for the Capita Selecta Mathematics 2 course. Students felt happy with the materials lecturers delivered using various learning materials, as demonstrated by questionnaire data (Figures 3, 4, and 5). However, in terms of the Capita Selecta Mathematics for Junior High School course, lecturers perceived the need for certain learning materials containing a range of learning sources and a variety of media in keeping with the learning objectives of the course delivered at the Mathematics Education Department Universitas Muhammadiyah Sorong. Figures 6 and 7 exhibit that students perceived the need for systematic learning materials with more diverse media, e.g., texts, pictures, audio media, and video (Tamu, 2020). The interviewed lecturers also expressed similar arguments, that various and systematically compiled learning materials were of utmost importance to espouse better learning. Learning books as learning materials could assist students and lecturers in learning activity implementation (Irawati, 2018). Learning books had to be compiled in line with the curriculum, learning theories, and student needs using understandable language (Darma, 2012) and referred to the indicators of completeness students should achieve in a course.

The analysis of the questionnaire and interview results concerning lecturer and student needs relating to the Capita Selecta Mathematics 2 course in the Mathematic Education Department Universitas Muhammadiyah Sorong revealed the needs for (1) systematic learning materials, (b) learning materials containing many different learning sources, (c) learning materials with various types of media (audio and visual), (d) learning materials based on the competencies students had to attain, and (e) learning materials building on learning theories (Cahyadi, 2019).

5. CONCLUSION AND SUGGESTIONS

To sum up, among the challenges regarding the Capita Selecta Mathematics 2 course were no learning materials in reasonable agreement with the course learning objective when learning books played a requisite role in the learning process and student difficulties in understanding materials. The latter challenge confirmed the significance of developing systematic, various, and interactive learning books.

Integrating technology, e.g., e-books, animation, and learning videos, could augment student conceptual understanding, interest, and motivation. Besides, technology allowed lecturers to deliver materials easily and assess student understanding. Lecturers were hence expected to develop learning materials which kept pace with the course objectives and lecturer and student needs. The developed learning materials were expected to be grounded on learning theories, bringing about more structured and systematic ones.

It was expected that systematic, various, and interactive learning books of the Capita Selecta Mathematics 2 for Junior High School course developed by integrating technology and engaging lecturers, students, and educational practitioners in collaboration could elevate learning process quality, enable students to mitigate difficulties in understanding materials, and enhance their learning motivation.

References

1. Abbas, N. (2000). Pengembangan Perangkat Pembelajaran Matematika Berorientasi Model Pembelajaran Berdasarkan Masalah (Problem Based-Instruction). Surabaya: PPs Universitas Negeri Surabaya.
2. Abidin, Z., & El Walida, S. (2017). Pengembangan e-modul interaktif berbasis case (creative, active, systematic, effective) sebagai alternatif media pembelajaran geometri transformasi untuk mendukung kemandirian belajar dan kompetensi mahasiswa.
3. Alfiriani, A., Hutabri, E., & Pratama, A. (2017). Analisis Kebutuhan Belajar Mahasiswa pada Mata Kuliah Strategi Pembelajaran TI. In Seminar Nasional Pendidikan IPA 2017 (Vol. 2).
4. Arikunto, S. (2017). Pengembangan instrumen penelitian dan penilaian program. Yogyakarta: Pustaka Pelajar.
5. Budiyo, B. (2020). Inovasi Pemanfaatan Teknologi sebagai Media Pembelajaran di Era Revolusi 4.0. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran dan Pembelajaran*, 6(2), 300-309.
6. Bulu, V. R., & Nahak, R. L. (2020). Pengembangan Buku Ajar Matematika Dasar untuk Meningkatkan Kemampuan Pemecahan Masalah Matematika. *Jurnal Kependidikan: Jurnal Hasil Penelitian dan Kajian Kepustakaan di Bidang Pendidikan, Pengajaran, dan Pembelajaran*, 6(1), 88-96.
7. Cahyadi, R. A. H. (2019). Pengembangan bahan ajar berbasis ADDIE model. *Halaqa: Islamic Education Journal*, 3(1), 35-42.
8. Cummings, R. (2023). Post-pandemic digital writing instruction will be resilient, open, and inclusive. *Journal of University Teaching and Learning Practice*, 20(2). <https://doi.org/10.53761/1.20.02.11>
9. Darma, I. K. (2012). Analisis Kebutuhan Pengembangan Buku Ajar Matematika Terapan untuk Mahasiswa Politeknik. *Jurnal Teknodik*, 338-352.
10. Degeng, I. N. S., & Sudana, N. (1989). Ilmu Pembelajaran: Taksonomi Variabel. Jakarta: Dirjen Dikti.
11. Febrianto, R., & Puspitaningsih, F. (2020). Pengembangan buku ajar evaluasi pembelajaran. *Education Journal: Journal Educational Research and Development*, 4(1), 1-18.
12. Fonna, N. (2019). Pengembangan revolusi industri 4.0 dalam berbagai bidang. Guepedia.
13. Gultom, E. (2015). Pengembangan bahan ajar inovatif dan interaktif melalui pendekatan saintifik pada pengajaran termokimia (Doctoral dissertation, UNIMED).
14. Hasibuan, F. A., Subakti, H., Harizahayu, H., Salamun, S., Siallagan, T., Saftari, M., & Chamidah, D. (2022). Pengembangan Media dan Teknologi Pembelajaran. Yayasan Kita Menulis.
15. Hasiru, D., Badu, S. Q., & Uno, H. B. (2021). Media-media pembelajaran efektif dalam membantu pembelajaran matematika jarak jauh. *Jambura Journal of Mathematics Education*, 2(2), 59-69.
16. Indonesia, R. (2002). Undang-undang dasar negara republik indonesia tahun 1945 (pp. 67-80). Sekretariat Jenderal MPR RI.
17. Irawati, H., & Saifuddin, M. F. (2018). Analisis kebutuhan pengembangan bahan ajar mata kuliah pengantar profesi guru biologi di pendidikan biologi universitas ahmad dahlan yogyakarta. *BIO-PEDAGOGI*, 7(2), 96-99.
18. Khikmiyah, F., & Midjan, M. (2017). Pengembangan buku ajar literasi matematika untuk pembelajaran di SMP. *Jurnal Silogisme: Kajian ilmu matematika dan pembelajarannya*, 1(2), 15-26.
19. Kosasih, E. (2021). Pengembangan bahan ajar. Bumi Aksara.

20. Kumalasari, A., & Sugiman, S. (2015). Analisis kesulitan belajar mahasiswa pada mata kuliah kapita selekta matematika sekolah menengah. *Jurnal Riset Pendidikan Matematika*, 2(1), 16-27.
21. Kurniawati, F. N. A. (2022). Meninjau Permasalahan Rendahnya Kualitas Pendidikan Di Indonesia Dan Solusi. *Academy of Education Journal*, 13(1), 1-13.
22. Oktavia, R. (2019). Bahan ajar berbasis science, technology, engineering, mathematics (stem) untuk mendukung pembelajaran ipa terpadu. *Semesta: Journal of Science Education and Teaching*, 2(1), 32-36.
23. Puspasari, R., & Suryaningsih, T. (2019). Pengembangan Buku Ajar Teori Graf untuk Mahasiswa Pendidikan Matematika. *Jurnal Tadris Matematika*, 2(1), 85-100.
24. Ramdhani, S. (2018). Kemampuan generalisasi mahasiswa pada perkuliahan kapita selekta matematika sma. *Jurnal Analisa*, 4(2), 83-89.
25. Samani, M. (2012). *Profesionalisasi Pendidikan*. Unesa University Press.
26. Suparman, A. (2012). *Desain instruksional modern: panduan para pengajar dan inovator pendidikan*.
27. Tamu, S. D., Hulukati, E., & Djakaria, I. (2020). Pengembangan Modul dan Video Pembelajaran Matematika Persiapan Ujian Nasional pada Materi Dimensi Tiga. *Jambura Journal of Mathematics Education*, 1(1), 21-31.
28. Tanjung, H. S., & Nababan, S. A. (2018). Pengembangan perangkat pembelajaran matematika berorientasi model pembelajaran berbasis masalah (pbm) untuk meningkatkan kemampuan berpikir kritis siswa SMA Se-Kuala Nagan Raya Aceh. *Genta Mulia: Jurnal Ilmiah Pendidikan*, 9(2).
29. 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>