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Human Body Anatomy and Physiology Module Using Case Method for Biology Students

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Abstrak

Tujuan penelitian ini untuk mendeskripsikan struktur modul anatomi dan fisiologi manusia berbasis metode kasus yang dikembangkan. mengetahui respon dosen pengampu mata kuliah terhadap modul anatomi dan fisiologi manusia berbasis metode kasus. mengetahui respon mahasiswa terhadap modul anatomi dan fisiologi manusia berbasis metode kasus. Metode penelitian pengembangan merupakan jenis penelitian yang menghasilkan suatu produk bukan menguji suatu teori. Hasil penelitian ini: modul anatomi dan fisiologi manusia berbasis metode kasus yang dikembangkan telah dinyatakan layak (4,35) berdasarkan penilaian ahli materi, ditinjau dari aspek isi dan aspek penyajian materi. dosen pengampu mata kuliah memberikan respon positif terhadap modul anatomi dan fisiologi manusia berbasis metode kasus (4,36), ditinjau dari indikator kemudahan dan efektivitas/manfaat. Mahasiswa program studi biologi FMIPA UNIMED angkatan 2021 memberikan respon positif terhadap modul anatomi dan fisiologi manusia berbasis metode kasus (4.13), ditinjau dari indikator ketertarikan, kemudahan dan efektivitas/manfaat.

***Kata Kunci**; Pengembangan Modul, Anatomi Fisiologi, Case Method.*

Abstract

The purpose of this study was to describe the structure of the developed case-based human anatomy and physiology module. To determine the responses of the lecturers in charge of the course to the case-based human anatomy and physiology module. To determine the students' responses to the case-based human anatomy and physiology module. The development research method is a type of research that produces a product rather than testing a theory. The results of this study: the developed case-based human anatomy and physiology module has been declared feasible (4.35) based on the assessment of material experts, reviewed from the content and presentation aspects of the material. The lecturers in charge of the course gave a positive response to the case-based human anatomy and physiology module (4.36), reviewed from the indicators of ease and effectiveness/benefit. Students of the biology study program, FMIPA UNIMED, class of 2021, gave a positive response to the case-based human anatomy and physiology module (4.13), reviewed from the indicators of interest, ease and effectiveness/benefit.

***Keywords**:* Development Module, Anatomy Physiology, Case Method.

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1. INTRODUCTION

Many approaches exist for pupils to improve their thinking skills in class. Active learning (learning by doing) is important to teach critical thinking. Students alone and in groups research, investigate, and obtain information from numerous sources and books to improve their comprehension (Hasruddin et al., 2018). Case study learning is active learning or student-centered learning (Rahmawati & Ervanto, 2017) that involves students in identifying and analyzing problems, finding and providing solutions to cases, and assisting them in analyzing a case, identified problems and solutions, comparing alternative decisions, and reaching conclusions.Learning by case: Students may add other relevant knowledge to the case before examining it. Students require prior understanding for this method. The issue is current and relevant to the topic (Arpizal et al., 2021).

According to an analysis of 80 Biology Education Study Program student questionnaires from the Class of 2021, 51.3% were uncertain about implementing the case-based learning process for Human Anatomy and Physiology, and 36.3% had difficulties. The requirements study found that 81.3% of Human Anatomy and Physiology students needed more learning resources, 87.5% thought they could improve, and 87.5% supported module development.

Effective and engaging learning approaches or models ensure a memorable student experience and great learning outcomes. Student objectives, material, characteristics, and requirements must be satisfied by each learning technique or model (Edi and Siamora, 2023). Good learning planning is essential for great education and learning in teaching. A learning programme must also consider and communicate several crucial issues to students. Content should not be too much or too little to understand. Important elements must match learning objectives. Learning should promote student interest, drive, and intelligence. All of this is essential for a structured learning approach (Hasruddin et al., 2024).

Successful learning, even at the university level, requires learning resources, including teaching materials. Lecturers must also design resources that stimulate student participation (Panggabean et al., 2022). For pupils to absorb the material fully, its breadth and depth are essential (Hasruddin et al., 2022). Based on the above, researchers recommend Human Anatomy and Physiology learning resources for students. This meets students' and instructors' expectations for rapid production of free learning resources for Human Anatomy and Physiology to improve thinking skills. Open content comes in modules. Modules enable students attain preset goals individually or in groups, like in class (Kibtiah et al., 2020). The modules are case study-based. The Human Anatomy and Physiology Course Practical Standards and Minister of Education and Culture Regulation No. 754 of 2020 use case studies. Innovative textbook modules can improve student learning. Case study-based textbooks or modules can teach students to solve situations according to the autonomous learning curriculum (Hasruddin et al., 2024). Based on the problem description, the researcher decided to build a "Development of a Case-Based Human Anatomy and Physiology Module for Biology Students." Five stages were employed to construct the model. Class of 2021 biology students participated in this project.

2. RESEARCH METHODS

This is developmental research, which produces a product rather than testing a concept. The Case-Based Human Anatomy and Physiology Module for Biology Students is one of the products of this research.This developmental study was conducted at Medan State University, Jl. Williem Iskandar Pasar V, Kenangan Baru, Percut Sei Tuan District, Deli Serdang Regency, North Sumatra, Zip Code 20221. The research was conducted from August 2024 to April 2025. This research involved two professors of Human Anatomy and Physiology, 84 students from the Biology Study Program, Faculty of Mathematics and Natural Sciences, UNIMED, class of 2021, and two expert lecturers who validated the materials, design, language, and learning process.

3. RESULTS AND DISCUSSION

The purpose of this research is to develop a Human Anatomy and Physiology Module Based on the Case Method, a product produced for Biology Department students. The research stage, preparation stage, module creation stage, and module validity testing stage are all included in the model.

Preliminary Investigation

Research and assessment of learning difficulties in Human Anatomy and Physiology in the Biology Department at Medan State University (Unimed) will be conducted as part of the preliminary research phase. To provide students in the Biology Study Program at Unimed with an explanation of this issue, a questionnaire was administered. The questionnaire was linked to existing open-ended material on Human Anatomy and Physiology. Table 1 summarizes the findings obtained from the student questionnaire during the preliminary research phase at the university.

Table 1. Results of the Student Problem and Needs Analysis Questionnaire

No.	Student problems/needs	Amount	Percentage
1	Student Problems/Needs	29	36,3%
2	Difficulties in the learning process of the Human Anatomy and Physiology course	41	51,3%
3	Hesitation regarding the implementation of the Human Anatomy and Physiology learning process based on the case study method.	65	81,3%
4	There is a need for additional learning resources in the Human Anatomy and Physiology course.	70	87,5%

Module Development

The following characteristics are included: self-paced process, autonomy, independence, adaptability, and a user-friendly interface. This module is structured and developed with several components/specifications, including: cover page, foreword, table of contents, list of figures, chapter material with brief descriptions, course learning outcomes (CPMK), learning indicators/objectives, case method syntax, material descriptions, summaries, exercises/assignments, assessments, assessment answer keys, bibliography, and a glossary. The material descriptions in each chapter also include relevant images and cases. The following figure shows several images from the Human Anatomy and Physiology module based on the case method.

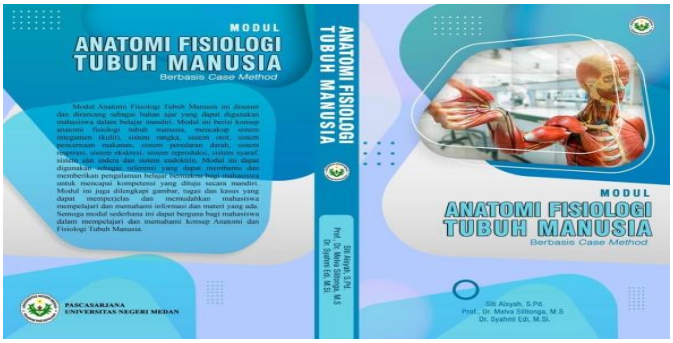

Figure. 1 Module View

Conducting module validity testing

A team of professional validators evaluates case study-based research to determine feasibility. Assessing module feasibility Expert validators—material, design, language, and learning—review a module using a validation sheet. This ensures the specified goals are met. Based on the average score and predetermined criteria, each expert validator's evaluation results will be verified for feasibility statistically (score) and qualitatively (feasibility or infeasibility). Module review also analyzes expert validator input to create a valid

(feasible) module. The results of the validation or evaluation by the material expert team (Lecturer of Biology at Unimed and Lecturer of USU) on the Human Body Anatomy and Physiology Module Based on the Case Method that was developed, are presented in Table 2.

Table 2. Results of module evaluation by material experts

Material Updates	Indicators		Description	Average score		Average score	Category
				I	II		
Contents	Material Compliance with CPMK	1.	Material integrity	5	4	4.5	Eligible
		2.	Material amplitude	4	5	4.5	Eligible
		3.	Material depth	5	4	4.5	Eligible
	Material Accuracy	4.	Accuracy of concepts and definitions	5	4	4.5	Eligible
		5.	Accuracy of data and facts	5	4	4.5	Eligible
		6.	Accuracy of examples and cases	4	4	4.0	Eligible
		Nomor telepon 7.	Accuracy of images, diagrams, and illustrations	4	4	4.0	Eligible
		8.	Accuracy of terms	4	4	4.0	Eligible
	Material Updates	Nomor 9.	Contextual images, diagrams, and illustrations	5	4	4.5	Eligible

Based on Table 2, it can be explained that the results of the evaluation (validation) carried out by the two material validation experts obtained an average score of 4.38 (adequate) for the adequacy of the material content, 4.33 (adequate) for the adequacy of the material presentation and 4.35 (adequate) for the overall adequacy of the material.

DISCUSSION

Product creation, also called learning tools, involves building a learning product from pre-existing ideas. This process uses modules. The development process aims to create a basic product design and methodological guidelines for product design and assessment. To meet learning objectives, successful learning involves meticulous planning. To improve student growth and learning, learning implementation plans must be reviewed and modified. This allows active learning to improve students' knowledge, attitudes, thinking, and problem-solving (Hasruddin et al., 2017).

This project is development research to create a Case-Based Human Anatomy and Physiology Module for Biology Students. This Level 1 program uses a five-stage paradigm in three stages: preliminary research, product creation, and product validity testing. This module has multiple parts and specs. Front cover, foreword, table of contents, list of figures, chapter material, including a brief description, course learning outcomes (CPMK), learning indicators and objectives, case method syntax, material descriptions,

summaries, exercises and assignments, assessments, assessment answer keys, bibliography, and glossary. It has twelve chapters with a single-column layout. The chapters are printed on 21x29.7cm A4 HVS paper. The font is Times New Roman 12-point, and chapters are 1.5 apart. This module uses syntactic phases or a case approach to engage. The module also includes pictures and cases related to each topic. Self-study, independence, adaptability, and usability are examined. Good entertainment module criteria are also considered.

Validity testing evaluates product development modules' viability. Per Government Regulation No. Law No. 32 of 2013 requires the National Education Standards Agency (BSNP) to examine teaching materials for content, language, presentation, and graphics (Nawawi and Samadhy, 2019). (2023, Ningtyas and Rahmawati). The Director of the Education Standards, Curriculum, and Assessment Agency's Regulation 039/H/P/2022 on Educational Book Assessment states that educational books' content and appearance—both printed and e-books—are quality parameters. These books are supplied from standard material, presentation, design, and graphics sources. Educational book procurement and publication require these four quality standards.

The Anatomy and Physiology of the Human Body Based on the Case Method developed in this study will also be evaluated for material (substance and presentation), design (graphics), language, and learning appropriateness. A validation team comprising material science, design (graphics), language, and learning professionals evaluates the module. Module evaluation is done using a pre-made validation sheet. The average score and predetermined criteria will be used to rate and evaluate each expert validator team's assessment results. The module review will also assess validation expert input, resulting in a legitimate (suitable) module. Modules selected by the expert validator team will be assessed by Human Anatomy and Physiology teachers and Biology students who will use them.

4. CONCLUSION

Front Cover, Foreword, Table of Contents, List of Figures, CPMK, Learning Indicators/Objectives, Case Method Syntax, Material Description, Summary, Exercises/Assignments, Assessment, Bibliography, and Glossary make up this module. This module uses Times New Roman 12-point font, 1.5 spacing, and a single-column format on A4 HVS paper (21 cm x 29.7 cm). Based on content and presentation, material experts rate the Human Body Anatomy and Physiology Module Based on the Case Method as practical (4.35). Based on module size, cover design, and content design, design experts consider the Human Body Anatomy and Physiology Module Based on the Case Method viable (4.21). The Human Body Anatomy and Physiology Module Based on the Case Method was deemed feasible (3.83) by language experts based on clarity, communicativeness, dialogicity and interactivity, suitability to student development, and language rule compliance. Learning experts assessed the Human Anatomy and Physiology Module based on the Case Method and found it practicable (4.20) based on material content, construction, and didactic requirements.
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REFERENCE

Aji (2019). Learning to read in the 21st century using exploration-based methods. Ternodika - Journal of Educational Research 17(2):70–84.

Amthari, D. Muhammad, and E. Anggereini (2021). Research-based e-LKPD on the human respiratory system for grade 11 high school students. BIODIKA: Scientific Journal of Biology Education, 07(03), 28–35.

Andayani, E., Mustikowati, R.I., Wahyu, S., Setiyowati, and Firdaus, R.M. (2022). Case Study Method: 21st-century MKKM optimizes critical thinking, creativity, communication, and student participation. Journal of Social Science Research and Education (16(1)): 52–60.

Arpizal (2021). Taxation course, Economics Education Curriculum, Faculty of Teacher Training and Education, University of Jambi, uses case-based learning to improve tax understanding. Proceedings of the UNIMUS National Seminar, 4:665–673.

Azka, HH Al, Setyawati, RD, Albab, IU (2019). Creating a learning module. Imajiner: Journal of Mathematics and Mathematics Education, 1(5), 224–236.

Cahyadi (2019). Development of open materials based on ADDIE. Halaqa Journal of Islamic Education 3(1):35–43.

Cristiana, DI, Anjarini, T., and Purwoko, RY (2021). Development of a contextual elementary school science course on temperature and heat. SITTAH: Journal of Elementary Education, 2(2), 145–160.

Daryanto (2013) Open lecturer training module. Yogyakarta: Gava Media. STI Siamora and S. Edi (2023). Comparison of student learning outcomes using the TGT and STAD cooperative learning models. Pelita Pendidikan Journal 11(1):9–16.

Fatihah, NN Mulyaningsih, and IAD Astuti (2020). A motion dynamics training module based on new discoveries. JPFT 6(2):175–182.

Firdaus and Mukhaiyar, R. (2021). Question manual for basic electricity and electronics subjects in vocational high schools. Journal of Pedagogy and Learning, 4(1), 192–201.

Hadiyanti, AHD (2021). Development of a flipbook-based digital science learning module for online learning in elementary schools. Jurnal Elementaria Edukasi, 4(2), 284–291.

Harahap, EP, and Yusra, H. (2022). Application of case study learning through observation and research as a means of developing dialogic teaching materials in classroom forums. Jurnal Bahasa Indonesia Prima (BIP), 4(1), 26–34.

Harahap, I.H., Restuati, M., and Hasairin, A. (2020). Analysis of students' critical thinking skills, scientific literacy, and scientific attitudes in ecosystems. Proceedings of the 5th Annual International Seminar on Transformative Education and Educational Leadership, 488, 93–96.

Hasruddin, (2019). Innovation in science and biology learning to find solutions to environmental problems and achieve the Sustainable Development Goals. Proceedings of the National Seminar on Biotics, 8–13.

Hasruddin, Aryeni, and Amrizal, (2024). Designing a problem-based biology learning planning textbook. Indonesian Journal of Educational Research, 4 (1), 1–6.

Hasruddin, H., Aryeni, A., Amrizal, A., and Aulia, R. (2024). Developing analytical thinking in biology students through the implementation of biology planning textbooks. Proceedings of the 5th International Conference on Innovation in Education, Science, and Culture, ICIESC 2023, 1–6.

Hasruddin, H., Aryeni, A., & Arwita, W. (2022). The Effectiveness of Using Digital Textbooks in Assessing Biology Learning: A Course on Portfolio Assessment Materials. Bioedukasi, 20 (2), 26–31.

Hasruddin, H. and Aulia, R.N. (2023). Students' Scientific Reasoning Skills Through the RICOSRE Model on Environmental Change. JPBI (Indonesian Journal of Biology Education), 9 (3), 445–451.

Hasruddin, H., Harahap, F., & Mahmud, M. (2017). Developing a Contextual Inquiry Lesson Plan to Enhance Critical Thinking in Microbiology Students. OALib (Open Access Library Journal), 04 (e3943), 1–11.

Hasruddin, Harahap, F., and Mahmud. (2018) The Effectiveness of Applying Contextual Microbiology Tools in Developing Higher-Order Thinking Skills in Biology Students at Unimed. BIOEDUKASI: Journal of Biology Education, 11 (1), 51–54.

Imran, A., Amini, R., and Fitria, Y. (2021). Development of a Science Learning Module Based on the 5E Learning Cycle Model in Elementary Schools. Basicedu Journal, 5 (1), 343–349.

Jamaludin and Alanur, SNS (2021). Developing Civics Knowledge and Information Literacy During the COVID-19 Pandemic Using the Case Method for Pancasila and Citizenship Education Students. Journal of Citizenship Education, 11 (01), 28–36.

Jehan, D. Octaria, and A. Syahbana (2021). Development of a CTL-Based Circular Electricity Module Assisted by Geogebra. Indonesian GeoGebra Journal 1(2):60–67.

Kibtiah, Hilmiyati, and Khaeroni published. A thematic learning module for grade 4 based on contextual character education. Ibtidai Elementary Education Journal 7(2):105–118.