



## Development of Textbooks for Sports Physiology Course in the Department of Physical Education and Health, State University of Malang

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### Abstract

*The aim of this research is to create a product in the form of a sports physiology textbook for physical education and health students at the Faculty of Sports Science, State University of Malang. This research and development method includes: needs analysis, expert evaluation, small and large group product trials. Data analysis in this study used qualitative and descriptive quantitative percentage. The results of the evaluation by subject matter experts 79.6% good category, the results of small group trials 94.6% very good category, the results of large group trials 95.1% very good results. The conclusion obtained is that the sports physiology textbook product is suitable and can be used in courses in the department of physical education and health.*

**Keywords:** *textbook, sports physiology, physical education*

### Introduction

The successful outcome of a society in the future is largely determined by the quality of education. According to Law of the Republic of Indonesia Number 20 of 2003 concerning the National Education System, education is a conscious and planned effort to create a learning atmosphere and learning process so that students actively develop their potential to have religious spiritual strength, self-control, personality, intelligence, noble character, and skills needed by themselves and society. National education aims to develop the potential of students to become human beings who are faithful and devoted to God Almighty, have noble character, are healthy, knowledgeable, capable, creative, independent, and become democratic and responsible citizens.

Institutions that participate in the development of education science include

higher education. Higher education is a continuation of secondary education which includes diploma programs, undergraduate programs, master's programs, doctoral programs and professional programs, as well as specialist programs. Higher education prepares students to become members of society who have academic, or professional abilities that can apply, develop, or create science and technology or art (Decree of the Minister of National Education of the Republic of Indonesia Number 232/U/2000).

Rahyubi (2012) describes learning as the process of student interaction with educators and learning resources in a learning environment. Learning is essentially a process of interaction between teachers and students, both direct interaction such as face-to-face activities and indirectly, namely by using various learning media (Rusman, 2013).

According to Santyasa (2007) in learning, changing the environment and learning resources needs to be done, this is related to the teacher's efforts to facilitate students to mutually relate to the environment and learning resources, for that learning is often interpreted as engineering an activity. Thus learning is an effort to influence students so that learning changes occur and is an effort to teach students through the creation of conducive learning conditions and environments.

Many factors influence to create a good learning atmosphere, such as student motivation, learning media, and teaching materials. Graduate learning outcomes are achieved through a learning process that prioritizes the development of creativity, capacity, personality, and student needs, as well as developing independence in seeking and discovering knowledge (Permenristekdikti Number 44 of 2015 concerning National Higher Education Standards). Students must be encouraged to have motivation within themselves, then work hard to achieve the desired learning outcomes.

The Department of Physical Education and Health at the State University of Malang consists of theoretical and theory / practice courses that lead to competence in the field of physical education and sports learning. Sports physiology is one of the theory courses. Sports physiology according to Brooks, Fahey, & White (1996) is a branch of physiology specific to exercise that depends on the identity of the exercise, duration (length) of exercise, frequency of exercise, environmental conditions and individual physiological status. Given the media and learning activities that support the implementation of lecture activities that lead to the achievement of learning objectives are not adequate and not too much. Therefore, the creativity of a lecturer is needed to develop learning resources for Sports Physiology in the form of theory in the form of textbooks that lead to increased competence in the field of sports physiology.

From the observation data and preliminary interviews that researchers conducted at the Department of Physical Education and Health, State University of Malang on April 24, 2018, information was obtained: (1) sports physiology courses are held 16 times a meeting in one semester with 1 meeting a week, (2) sports physiology courses are compulsory courses in the department of

physical education and health, (3) sports physiology courses given so far have been held in class (4) learning resources used in the course are still relatively minimal. (5) The methods used so far use face-to-face methods with PowerPoint accompanied by discussions and questions and answers, in some materials provided learning videos that can be watched by students. In the application of learning, material regarding the health sector is a difficulty for students, this is due to the lack of student interest in the field of health material and is more interested in the field of practice, especially the lack of interesting and innovative teaching materials. (6) textbooks are needed for learning resources that can be used by students, (7) course supervisors agree if a sports physiology textbook is developed for physical education and health students.

Furthermore, related to the above problems, it is necessary to conduct research on the development of textbooks for sports physiology courses in the department of physical education and health at the State University of Malang, so that this development is expected to lead to an increase in learning atmosphere, fulfillment of learning resource needs. The purpose of this research and development is to produce a product in the form of a sports physiology textbook that students can use as a learning resource.

### **Method**

This research was included in research and development, which is developing products that are valid and practical for use in learning (Mustafa & Angga, 2022). The method used in research and development of sports physiology textbooks for physical and health education students adapted from Borg & Gall (1983) is carried out in several stages, namely: (1) research and information gathering needs analysis using interviews, (2) making initial products in the form of product designs for the development of sports physiology textbooks for physical education and health students, (3) expert evaluation aims to evaluate and refine initial products to make them suitable for use. Sports physiology textbook products are evaluated by sports physiology material experts, namely Dr. Agung Kurniawan, M.Kes (4) small group trials conducted on 6 subjects of physical education and health students who take sports physiology courses. Small group testing aims to find out the responses of some

subjects to the products made by researchers, (5) product revisions are based on evaluations from experts and small group trials. This revision is used to improve the initial product made by researchers, (6) large group trials were conducted on 20 subjects of physical education and health students who took sports physiology courses. The data collected from the large group trial were analyzed for the basis of making the next revision, (7) revision of the final product based on the results of the large group trial. The final product of research and development is a sports physiology textbook for physical education and health students.

Subjects of research and development of physical education and health students who take sports physiology courses. The subject of expert evaluation is 1 expert on sports modification material. The subjects of small group trials were 6 subjects of physical education and health students who took sports physiology courses. The subjects of the large group trial were 20 subjects of physical education and health students who took sports physiology courses.

The two types of data obtained were qualitative and quantitative data. Qualitative data was obtained from expert reviews, suggestions, and evaluations. Quantitative data is obtained through filling out statements on a questionnaire through google forms obtained from: the results of the evaluation of sports physiology material experts and data from observations and interviews, small group trials, and large groups. The goal is to find out the needs of the product developed.

Data analysis techniques used in research and development of sports physiology textbooks for physical education and health students are qualitative and quantitative descriptive analysis techniques. Qualitative data obtained based on expert reviews, suggestions, and evaluations were analyzed by condensing data, presenting data and drawing conclusions (Miles, Huberman, & Saldaña, 2014). Quantitative data was obtained from the results of expert statements aimed at product improvement, as well as data from observations and interviews, small group trials, and large group trials using questionnaires through google forms. Data interpretation techniques using percentage analysis can be seen in the following table.

Table 1. *Percentage Categories*

No.	Percentage (%)	Category
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No.	Percentage (%)	Category
1.	0-20%	Very less
2.	21%-40%	Less
3.	41%-60%	Fair
4.	61%-80%	Good
5.	81%-100%	Very good

(Source: Arikunto & Jabar, 2009)

### **Result and Discussion**

The results of data collection obtained from needs analysis, expert evaluation and trials will be presented in this section. The needs analysis was carried out to formulate the right product specifications in making this sports physiology textbook. Product evaluation was carried out by sports physiology material experts. The trial data consists of small group and large group trials obtained from physical education and health students by filling out a questionnaire through google forms provided by the researcher.

Needs analysis was carried out at the wal stage, because it was to formulate product specifications for sports physiology textbooks. The data obtained from the needs analysis are the lack of reference sources in sports physiology lectures, and lectures are held in the classroom with lecture, presentation, and discussion methods. Data from needs analysis is used to design syllabi and develop materials (Muthmainnah, Atmowardoyo, Saliya, & Asrifan, 2020). In this sports physiology course, it is intended that students are equipped with knowledge about organ systems in the human body and their implications in sports activities. Sports physiology is related to body functions and the impact of exercise for sport that occurs when the body tries to maintain the balance of organ systems due to physical activity during exercise (Kenney, Wilmore, & Costill, 2021). Sports physiology textbooks are prepared based on needs analysis and strive to be able to contribute to training students' higher-level thinking skills, namely evaluating and creating (Lau et al., 2018), because the learning objectives at the student level require critical and creative thinking skills.

Products made in the form of sports physiology textbooks that contain material: (1) the concept of sports physiology, (2) respiratory system, (3) cardiovascular system, (4) muscular system, (5) digestive system, (6) nervous system, (7) reproductive system, (8) exercise system. Expert evaluation of sports physiology textbook products was carried out by 1 sports

physiology material expert, namely a lecturer in the sports physiology course, Dr. Agung Kurniawan, M.Kes. Based on the results of the material expert evaluation after observing and evaluating the product, it can be concluded that the overall score is 86 from the expected score of 108, obtained from 27 questions with a percentage of 79.6% with a good category used to support sports physiology courses for physical and health education students. Material expert suggestions for the results of the development of sports modification textbooks are: (1) the images on the material must be clearer and more detailed, (2) the pages are attempted to be the same in placement. Therefore, the product was revised. Expert evaluation needs to be carried out to validate the content of coursebook products so that it is aligned with learning objectives, because it will get the conceptual content, structure, and procedures for using appropriate teaching materials (Bonanno, Colson, & French, 2021). The content of the textbook needs to be designed by considering the various types of thinking styles of students (Mustafa, 2022) so that the delivery of the material learned can be understood by them.

Small group trials were conducted on 6 respondents from physical education and health students. Based on the results of the small group trial with the sports physiology textbook product getting a score of 477 from the expected score of 504 obtained from 21 questions by getting a percentage of 94.6% with a very good category so that it can be used in the next trial in the large group trial. Large group trials were conducted on 20 respondents from physical education and health students. Based on the results of the large group trial with the sports physiology textbook product getting a score of 1597 from the expected score of 1680 obtained from 21 questions by getting a percentage of 95.1% with a very good category so that it can be used in sports physiology lectures. With the textbook, it can make it easier for students to find valid and practical lecture references, because the teacher has provided material restrictions (Mustafa & Winarno, 2020). The textbook contains at least learning objectives, material, and evaluation (Rodríguez Rodríguez, Álvarez-Seoane, Arufe-Giráldez, Navarro-Patón, & Sanmiguel-Rodríguez, 2022) In this study, the learning objectives of each material have been described, and are equipped with practice

questions at the end of the material. Thus, this physiological textbook has met the minimum content eligibility, so it can be used in lectures.

### Conclusion

The conclusion that was reached after going through several stages above, a final product was produced in the form of a sports physiology textbook for students of physical education and health, faculty of sports science, state university of Malang. The product developed has been evaluated by experts for content correctness then small group and large group trials involving 26 physical education and health students which can be concluded that the sports physiology textbook product has ease and clarity in its content and has the usefulness of percentage analysis in the very good category, can be used as a reference or referral for physical education and health students in sports physiology courses.

In the dissemination of this development product to a wider target, the researcher gives advice, namely before being disseminated to a wider scope, this product should be re-evaluated and adjusted to the intended target both content and packaging. So that the development of this sports physiology textbook is more interesting and useful, especially for students and educators.

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