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Development of a Digital Sport Massage Teaching Material Based on E-Book for Physical Education Students

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ABSTRACT: This study aims to develop and evaluate the feasibility of a digital teaching material in the form of an e-book for sport massage learning among Physical Education students. The research employed a Research and Development (R&D) approach using a modified development model consisting of needs analysis, product design, expert validation, small group trials, and product revision. The participants included students of the Faculty of Sports Science who had taken a sport massage course. Data were collected using questionnaires and analyzed descriptively using percentage techniques. The results showed that the developed e-book achieved a high level of validity based on expert judgment in terms of content, media design, and usability. Furthermore, the small group trial indicated that the product was categorized as "very valid" with an average percentage above 85% in aspects of ease of use, clarity, and practicality. Therefore, the digital sport massage e-book is considered feasible and effective as a learning medium to support student understanding and independent learning.

KEYWORDS: Digital learning, e-book, sport massage, teaching materials, physical education

INTRODUCTION

The advancement of modern sports science has positioned physical recovery and injury prevention as essential components in both sports education and practice. In this context, sport massage plays a significant role as an effective method for reducing muscle fatigue, alleviating post-exercise soreness, accelerating recovery, and enhancing athletic performance (Alpiah et al., 2024). Furthermore, sport massage has been shown to provide positive effects on bodily functions and contribute to injury prevention (Nurz et al., 2023). Therefore, mastery of sport massage skills has become an essential competency for students in Physical Education, Sports, and Health, as well as coaching programs.

In the context of higher education, particularly within faculties of sports science, the learning of sport massage requires the integration of both theoretical knowledge and practical skills. Students are expected not only to understand anatomical and physiological concepts but also to be able to correctly perform massage techniques in accordance with established procedures and ethical standards (Nainggolan et al., 2025). However, the learning process still faces several challenges, including limited practicum time, a lack of relevant instructional media, and the continued use of traditional teaching methods (Tisna et al., 2023). These issues contribute to suboptimal competency achievement and a high level of student dependence on instructor guidance.

Based on a needs analysis conducted among 45 students of the Faculty of Sports Science at Universitas Negeri Malang, 98% of respondents had participated in sport massage courses; however, 45% reported difficulties in understanding the material due to unclear instructional media. Although 84% of students perceived the existing media as somewhat helpful, several limitations were identified, including minimal use of audio-visual elements (40%) and insufficient clarity in lecturers' explanations (33%). Furthermore, 78% of students expressed the need for additional and updated learning materials, while 44% considered the current media to be less engaging. Notably, 96% of students indicated a preference for learning media that can be accessed flexibly via mobile devices. These findings highlight the relevance of developing a sport massage e-book to improve students' comprehension, motivation, and learning flexibility.

Previous studies have demonstrated that digital-based learning, particularly through blended learning approaches, is effective in enhancing the quality of higher education (Arief et al., 2019). This approach is especially relevant for skill-based learning such as sport massage, which requires repeated practice and immediate feedback (Rafiq et al., 2024). In addition, digital media have been shown to improve learner autonomy and increase the efficiency of practicum time (Ahmad et al., 2023), as well as enhance procedural understanding and motor skill acquisition among students (The Impact of Digital Media in PE, 2025).

Development of a Digital Sport Massage Teaching Material Based on E-Book for Physical Education Students

The development of digital learning media, particularly e-books, has been growing rapidly in Indonesia, including in the fields of physical education and coaching. Studies indicate that e-books developed through expert validation and user testing are considered highly valid, practical, and engaging (Suwarno & Olifia, 2019). Similarly, digital-based media such as Android applications have been proven to improve learning outcomes (Fadlila et al., 2025). However, the development of e-books specifically for sport massage courses in higher education—especially at Universitas Negeri Malang—remains limited. Existing studies tend to focus on video tutorials or printed modules, which have not fully maximized interactivity (Nainggolan et al., 2025).

These findings reveal a research gap that needs to be addressed. Although the use of digital media in physical education and coaching has been widely studied, research focusing on the development of practical (psychomotor) skills remains limited and tends to emphasize cognitive aspects (Schmidt & Müller, 2022). Moreover, the digitalization of learning in Indonesia is still relatively general and has not fully adapted to student characteristics and local contexts (Selvani et al., 2024), despite the fact that the effectiveness of e-books strongly depends on the alignment between content design and user needs.

This study is therefore motivated by the need to address the gap in the literature regarding the effectiveness of e-book-based media in supporting practical skill learning. From a practical perspective, this research responds to the real needs of both students and lecturers in the sport massage learning process within higher education. The development of this e-book-based digital teaching material is expected to improve the quality of learning, strengthen students' competencies in both theoretical and practical aspects, and serve as a reference for future innovations in sports education media development.

METHODS

This study employed a Research and Development (R&D) method using the ADDIE model, which consists of five stages: analysis, design, development, implementation, and evaluation. The analysis stage was conducted through observations, interviews, and questionnaires to identify learning needs, student characteristics, and problems encountered in the sport massage course. The design stage included developing the content structure, storyboard, learning strategies, and designing the appearance and interactive features of the e-book based on multimedia learning principles.

The development stage involved producing the e-book using supporting software. Afterward, the product was validated by material experts and media experts to evaluate the feasibility of the content and design. The validation results were used as the basis for revising the product before testing.

Participant

The implementation stage was carried out with students from the Physical Education, Health, and Recreation (PJKR) and Sports Coaching Education (PKO) programs at the Faculty of Sports Science, Universitas Negeri Malang. The product was tested through a small-group trial (n = 45) and a large-group trial (n = 154) to determine the practicality of the e-book in the learning process.

Instrument

The research instruments used in the development of e-book-based digital sports massage teaching materials consist of several types, namely student and lecturer needs analysis sheets, material and media expert validation sheets, small and large scale trial sheets.

Data Analysis Techniques

This study uses two data analysis techniques, namely quantitative descriptive analysis and qualitative descriptive analysis.

RESULT

Expert Validation

Expert validation was conducted by two experts with competencies in sport massage material and instructional media. The results of the material expert validation showed a percentage of 97%, indicating that the developed material was categorized as highly valid. Meanwhile, the media expert validation produced a percentage of 90%, indicating that the developed media was also categorized as highly valid.

Diagram 1. Validation Results Diagram of Material Experts and Media Experts

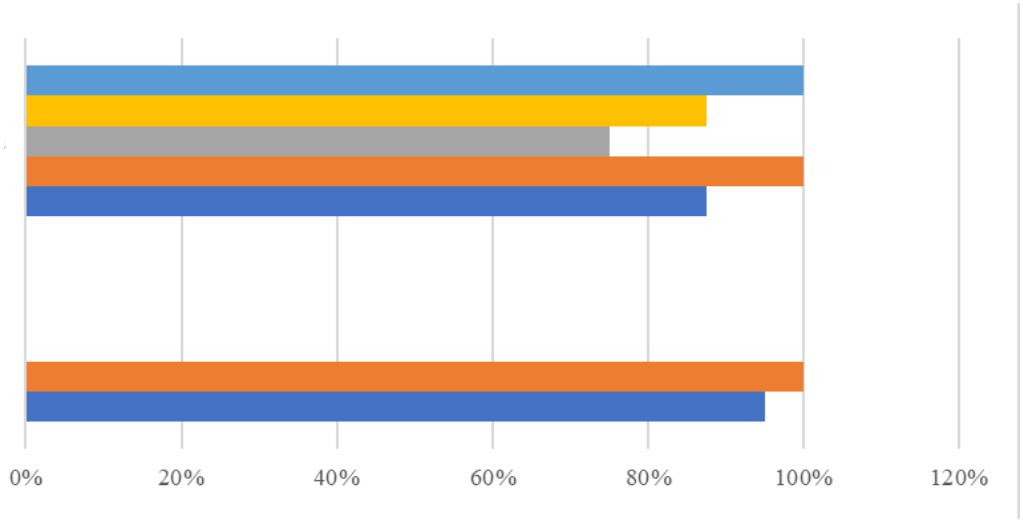
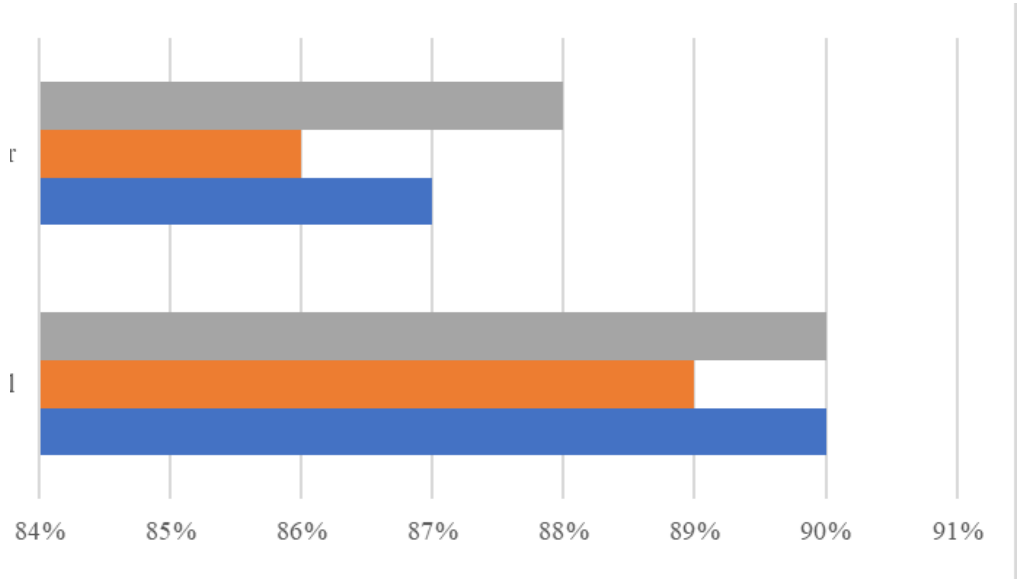


Diagram 2. Diagram of Small and Large Scale Trial Results



Based on the results of the small-scale trial involving 40 students who participated in the sport massage course, the developed e-book teaching material was evaluated using three main indicators: ease of use, clarity, and practicality. The results of the small-scale trial showed a percentage of 90%, indicating that the developed product was categorized as highly valid. Meanwhile, the results of the large-scale trial showed a percentage of 87%, which also indicates that the developed product was highly valid

DISCUSSION

The product developed in this study is an e-book–based digital sport massage teaching material designed as a learning medium for students of the Physical Education, Health, and Recreation (PJKR) and Sports Coaching Education (PKO) programs at Universitas Negeri Malang. The e-book was developed to support the learning process in the sport massage course, making it more effective, engaging, and easier for students to understand. Theoretically, the development of the e-book as a learning medium is based on Mayer's Cognitive Theory of Multimedia Learning. This theory states that learning becomes more meaningful when instructional materials combine verbal text and visual elements appropriately, as this combination supports information processing in working memory and improves students' conceptual understanding. Therefore, presenting sport massage materials in an e-book equipped with illustrations and visualizations of massage techniques is expected to help students better understand both concepts and practical procedures (Mayer, 2021).

This digital teaching material was developed in the form of an interactive e-book that can be accessed through various digital devices. The development of digital teaching materials in this format is aligned with the principles of digital learning in higher education, which emphasize flexibility, accessibility, and student independent learning. Digital teaching materials allow students

to study anytime and anywhere, thereby supporting continuous and self-directed learning processes (Klein, 2023). The development of this e-book was based on the results of a needs analysis involving both students and lecturers. The findings indicated that sport massage learning requires instructional media that not only provide theoretical explanations but also include technique visualizations and systematic practical guidelines. This is consistent with the concept of learner-centered instructional design, which emphasizes the importance of needs analysis as the foundation for developing learning media that align with student characteristics and course demands (Branch, 2009).

The materials presented in the sport massage e-book include the basic concepts of sport massage, the benefits of sport massage in sports, relevant anatomical and physiological principles, massage techniques and movement sequences, as well as safety aspects in the implementation of sport massage. The materials are organized systematically, beginning with fundamental concepts and progressing toward practical applications to facilitate student understanding and implementation of the content. This approach is supported by previous studies showing that sequential and well-structured multimedia presentations significantly improve students' understanding and mastery of procedural skills in higher education (Plummer et al., 2021).

CONCLUSION

Based on the results of the development research on the e-book–based digital sport massage teaching material, the product was declared feasible for use as a learning medium. However, this teaching material still has opportunities for further development in order to enhance its quality and benefits.

Further development is recommended, particularly in terms of expanding the scope of the material. The sport massage content presented in this e-book is still limited to certain topics. Therefore, future studies may include additional materials such as variations of sport massage techniques for specific sports, treatment of minor injuries, and the application of sport massage in sports performance and physical fitness contexts. The addition of these materials is expected to enrich the e-book content and increase its relevance to learning needs.

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