



Exercise Therapy Videos Development as Alternative Physiotherapy Learning Media

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Abstract

Physiotherapy is one of the compulsory courses organized by the Sports Science study program. The observation results on learning facilities show that the media used for Physiotherapy courses is still very limited. This development research aims to produce a learning product in the form of learning videos and several quality theories that are suitable to use and can be an alternative learning media in Physiotherapy courses. The method used in this research is the Research & Development (R&D), which refers to the 4D model consisting of 4 stages includes define, design, develop, and disseminate. The results of this research are in the form of video-based learning media, which have advantages such as presenting the material and making applications that can be downloaded on the Android system. The validity test results obtained a score of 93% from the expert validators. The effectiveness aspects of learning outcomes obtain good criteria based on the results of learning tests with the 83% completeness percentage, so it can be concluded that the developed video-based learning media in exercise therapy has a good effect on students' learning outcomes. Overall, the percentage of students' completeness tests reached a score of > 75%.

How to Cite

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INTRODUCTION

Facing the technological era of industrial generation 4.0, every university has a graduate learning achievement that has also experienced significant changes by emphasizing four aspects applied by existing laws, namely attitudes, knowledge, general skills, and special skills. One of them is that sports injury treatment and therapy skills have an important role.

To optimize learning achievement in the aspect of Special Skills, one of the supports is the use of creative and innovative media and learning strategies, so the learning objectives and achievements are achieved. In addition, the authors surveyed in August 2021 regarding the selection of the most easily understood type of learning media, and it was found that 87% of respondents chose audio-visual learning media, 11% of respondents chose visual learning media, and 2% chose audio learning media.

Starting from that, this research aims to produce a product in the form of a video learning of exercise therapy method that can specifically improve students' learning outcomes and skills, and in general can be used by all sports performers (athletes, coaches, therapist, referees, and sports teachers). This research will produce a learning video product with certain specifications. In terms of form, the cover is designed as attractive as possible to attract the viewers. In terms of content, this video contains a learning study structure starting from indicators to learning outcomes. This video will be equipped with muscle anatomy pictures to clarify the sports injuries scope from minor to severe injuries and how to overcome them using exercise therapy methods. The products developed will provide value for students and the general public.

According to (Fauzan & Rahdiyanta, 2017), learning media is anything that can be used to transmit messages from the sender to the recipient so it can stimulate the thoughts, feelings, concerns, and interests of students so the learning process can occur. Learning media has a significant role in the teaching and learning process because it can create an attractive learning atmosphere that can foster interest and motivation to learn. Learning media consists of various types, among others, visual media such as pictures and posters, audio media such as sound recordings, and audiovisual media, such as films, videos, animations, and others. movements that involve the act of controlling an object using hands and feet (manipulative) so each of them can do their activities well because these move-

ments are fundamental movements that will continue to be used in everyday life (Ali et al., 2020)

Multimedia can be described as combination of various digital media types, such as text, images, sound and video, into an integrated multisensory interactive application or presentation to convey a message or information to an audience. As multimedia technology has the advantages of integrating multiple types of information into an interactive interface and enabling users to communicate with computers in real time through multiple senses, increasingly scholars are committed to multimedia research (Lu, Y., et al., 2022).

Interactive multimedia is a delivery media system that presents documented video material with computer control to viewers who not only hear and see the video and sound but also provide an active response, that responses determine the speed and sequence of presentation (Sugiarto, et al., 2020). Thus, it can be concluded that multimedia utilization in learning is much more effective in increasing retention and achievement of students' learning outcomes compared to using only one media component.

In sports, injuries are a common thing. Sports activities involving physical contact between individuals, excessive muscle contraction, and overload are one of the many factors that cause injury. Sports injuries are all forms of abnormalities and damage that occur in the body, both in the structure and function of the body that causes pain, caused by physical movement activities and sports that happen directly or indirectly (Simatupang, 2016).

Sports injuries are injuries that occur during exercise or training. Walker (2013) defines sports injury as a type of injury, pain, or physical damage as a result of sports. Thus, sports injuries can be interpreted simply as the types of injuries that occur during sports, both in training and competing sessions, which cause pain and physical damage. It concluded that Injury is physical damage due to an accident or excessive exercise during sports.

Generally, two types of injuries that are often experienced by athletes are acute trauma and overuse syndrome. Acute trauma is a severe injury that occurs suddenly, such as torn ligaments, muscles, tendons or sprains, or even broken bones. Acute injuries usually require professional help. Overuse syndrome is often experienced by athletes, starting from the presence of slightly excessive strength, but persists over a long period. This syndrome sometimes responds poorly to self-medication (Candra, O., et al., 2021; Aryadana, F. W., & Supriyono, S., 2022).

In general, sports injuries are divided into three levels based on their severity, namely minor, moderate, and severe injuries. Minor-type injuries are defined as an injury only experiencing pain and swelling that do not affect sports performance. Moderate-type injuries are experiencing pain and swelling that results in limitation of activity. There is a swollen part in the injured area that is soft to the touch. Severe-type injuries limit exercise performance and daily activities (Dorney et al., 2020). Deformation in soft injuries is swollen and pale in color. Sports injuries affect all the structures that make up the musculoskeletal system and include muscles, bones, tendons, ligaments, and cartilage. Seeing from the type of bleeding is divided into several injuries based on the damaged blood vessels, namely a) capillary bleeding, originating from a continuous but slow wound. This bleeding is the most common and the easiest to control; b) venous bleeding are flowing continuously due to low-pressure venous bleeding does not spurt and is easier to control; and c) Arterial bleeding is bleeding that occurs along with the heart rate in large quantities and is difficult to control (Luiggi & Griffet, 2019; Sanusi, R., et al., 2020).

Exercise therapy is one of the treatment efforts in physiotherapy whose implementation uses body movement exercises, both actively and passively. The purpose of exercise therapy is rehabilitation to overcome impaired function and movement, prevent complications, reduce pain and edema, and train functional activities due to surgery. Rehabilitation treatment for injured athletes includes physical therapy, which consists of various types of exercises, one of which is muscle isometric exercises and active and passive ROM (Range of Motion) exercises. ROM (Range of Motion) is a movement that under normal circumstances can be performed by specific joints. The purpose of ROM is to maintain or increase muscle strength and flexibility, maintain cardio-respiratory function, and prevent contractures and stiffness in joints. ROM exercises include passive and active ROM exercises. The causes of sports injuries in general are: 1) Lack of warm-up; 2) Lack of preparation; 3) Too tired; 4) The training load is too heavy; 5) Lack of training discipline; 6) Violating the rules; 7) Friends and opponents; 8) Field conditions or the training ground does not fulfill the requirements; 9) Climate/temperature; 10) Technical errors; 11) Lack of knowledge about sports injuries; 12) Training arrangements or errors in training; 13) Sports training equipment and clothing; 14) Impaired condition and coordination (Y. Setiawan et al., 2018).

Strategies for preventing sports injuries in the 21st century, the influential components to decrease youth sports injuries include player, parent, and coach education changes in sport-specific technique and access to certified athletic trainers (Dorney et al., 2020). Exercise therapy is a physiotherapy technique to restore and improve the condition of muscles, bones, heart, and lungs to be better, and a necessary factor that affects the effectiveness of the exercise therapy program is education and active patient involvement in the programmed treatment plan. The provision of exercise therapy both actively and passively, using tools and without using tools, can have the effect of increasing adaptation to the restoration of tendon and ligament strength, and can increase muscle strength, as to maintain joint stability and increase joint range of motion, other benefits of exercise therapy is helpful for the injuries recovery such as muscle contractions, sprains, joint shifts, tendon ruptures, and fractures so they can return to activities without experiencing muscle pain and stiffness (Satia et al., 2012). Some guidelines for doing exercise therapy according to (Shephard & Balady, 1999) include: (1) exercise therapy is carried out gradually; (2) do not proceed to the next step or the previous step if you still feel pain; (3) exercise therapy is carried out within limits pain. Doing exercises has various benefits, both directly and indirectly (improves the patient as a whole). The immediate benefits are increasing joint mobility, strengthening the muscles that support and protect the joints, and reducing joint pain and stiffness. The benefits of exercise namely 1) an increase in the ability of the circulatory system and heart work, 2) an increase in strength and other components of physical condition, 3) an increase in the effectiveness and efficiency of movement towards a better direction, 4) a faster recovery time, and 5) motion response will be faster if needed (Ambardini, 2016). From the description of exercise therapy definition, can be concluded that exercise therapy is an attempt to restore one's health through a movement activities program that is conducted programmatically to lead to predetermined targets. Exercise therapy is usually given in 2 stages namely, exercise without using loading and exercise using loading.

ROM is a movement under normal circumstances that can be performed by the joint concerned (Pranata et al., n.d.). ROM is the range of motion of the human body's joints. ROM is measured by the number of degrees from the initial to the final position with the maximum movement of joint movements, ROM is a base

technique used to assess the final and initial movements in a therapy program. The movement can be seen in bones moved by muscles or other external forces in their range of motion through joints. When a movement occurs, all the structures found in the joint will be affected, including muscles, joint surfaces, joints capsule, fascia, blood vessels, and nerves. Each segment must be moved in its space periodically to maintain normal ROM. Factors that can reduce ROM, namely systemic, joint, neurological, or muscle diseases, due to the injury or surgery influence, and inactivity or immobility. ROM activities are given to maintain joint and soft tissue mobility to minimize loss of tissue flexibility and contracture formation. ROM techniques do not include stretches intended to extend the joint range of motion (Lucky Angkawidjaja, 2009).

METHODS

This research is a research and development (R&D) type that refers to the 4-D model developed by Thiagarajan, Semmel, & Semmel (Nuryadin et al., 2021). The development procedure of the 4D model includes four stages, define, design, develop, and disseminate. The description of the four stages is as follows:

Define

Defining is the initial stage of development research. This stage consists of two activity steps, the analysis of learning components and the characteristics analysis of the students of the sports science study program. Analysis of learning components is conducted by analyzing things related to learning, such as reviewing the curriculum and Semester Learning Plans (RPS), teaching materials, and learning resources, as well as observing supporting facilities and infrastructure in Physiotherapy and exercise therapy courses. While the analysis of students' characteristics is conducted by observing 4 meetings of the lecture activities process to find out the student's learning styles and patterns.

Design

Design is the second stage in research development which also consists of:

The formulation of test standards is a step that connects the defining stage with the design stage. The test standards formulation is based on the analysis results of the learning objectives specification and the students' analysis. From

this, the learning outcomes test instrument was compiled. The test is adjusted to students' cognitive abilities, and the scoring of the test results uses an evaluation guide that contains a scoring guide and an answer key to the questions.

The format choices in the development of learning media aim to formulate the design of learning media, and the selection of strategies, approaches, methods, and learning resources.

Mention that the initial design is the overall design of the learning device that must be done before the trial is conducted. This design includes varied structured learning activities and the practice of different learning abilities through teaching practices.

Develop

Development is an advanced stage after the design stage. Activities carried out at this stage include the experts' appraisal, a technique for obtaining suggestions for material improvement. By conducting experts' assessments and getting suggestions to improve the learning devices developed, then the product is revised according to experts' advice. The assessments are expected to make learning tools more precise, effective, tested, and have high technique. This stage validates the prototype of the developed product to 3 media experts and 3 material experts to determine the quality of the developed media both from the media and material aspects. The validation results from media and material experts will be analyzed. If there is a revision, the results of this analysis will be used as a guide in improving the parts that need to be revised. Furthermore, the results of revised product development based on suggestions and input from media and material experts will be tested in small groups of 21 students. The trial results of this stage will then be re-analyzed and revised if there are suggestions and inputs. Next, the revised product developed will be tested on a large group to determine its effectiveness. The trial result of this stage will then be revised according to the given suggestions and inputs. The final result of this stage is the final product that is ready to be disseminated.

Disseminate

The dissemination stage is the final stage of the research development. At this stage, the researchers socialize the final product as a result of development through wider scale distribution. The dissemination stage is planned to be performed in several study programs that provide Physiotherapy and exercise therapy courses.

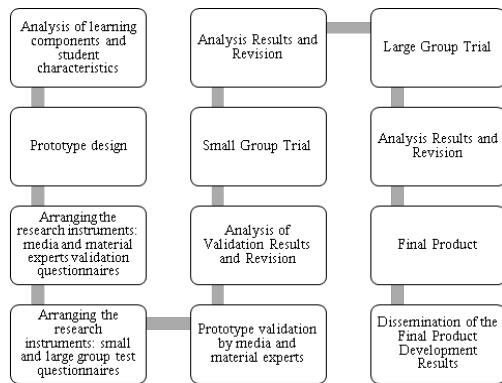


Figure 1. 4D Model Research Development Scheme

The subjects in this research were the students who received exercise therapy or physiotherapy courses. The data collection started at the development stage by recapitulating and analyzing the results of the prototype product validation from 3 media experts and material experts. After that, it was continued by recapping and analyzing the trial results in small and large groups.

The data obtained through the test assessment instrument were analyzed using qualitative descriptive statistics. This analysis is intended to describe the data characteristics of each data variable. In this way, it is expected can facilitate understanding of the data for the subsequent analysis process. The results of data analysis are used as the basis to revise the developed media product.

The quantitative data analysis technique in this research uses statistical analysis. After the product is declared valid, practical, and has a good effect on students' learning outcomes, the product can be mass-produced. The descriptive data presentation of animated video-based learning media products in the form of very poor, poor, enough, good, and very good statements is converted into quantitative data on a scale of 4, with a score from 1 to 4. The steps in data analysis include: a) collecting rough data; b) scoring; c) converting the scores obtained to a scale of 5 using the conversion reference from Sukarjo quoted by (Fauzan & Rahdiyanta, 2017) in the following **Table 1**.

Table 1. Score Description

Score	Description	Calculation
4	Very Good	76 – 100
3	Good	56 – 75
2	Fair	26 – 55
1	Poor	0 – 25

RESULTS AND DISCUSSION

The feasibility of exercise therapy learning media in physiotherapy courses is at the validation stage by material and media experts, as well as the sports science students' assessment from the feasibility aspect, with the following results **Table 2**.

Table 2. The assessment results of each aspect by material experts

Aspects	Percentage	Classification
Introduction	98%	Very Good
Content	95%	Very Good
Video Material	93%	Very Good
Average	95%	Very Good

The results of the media feasibility percentage obtained an average of 95%, with a very good classification, and can be concluded that this media is declared feasible or can be used for the learning process.

The feasibility assessment of the exercise therapy learning media by media experts was assessed based on four aspects, namely the aspects of visual, design, language and typography, and programming. The following are the assessment results of the media seen in the **Table 3** below:

Table 3. The assessment results of each aspect by media experts

Aspects	%	Classification
Visual	89%	Very Good
Design	80%	Good
Language & Typography	95%	Very Good
Programming	90%	Very Good
Average	89%	Very Good

The results of the media experts' assessment for all aspects obtained 89%, with a very good classification, and concluded that the exercise therapy learning media is declared feasible and can be used for the learning process.

After the product is declared valid, practical, and has a good effects on students' learning outcomes, the product can be mass-produced. Mass production of video-based learning media products on exercise therapy materials is conducted in the form of applications. The following are the effectiveness test results on students of the Sports Science study program at Sultan Ageng Tirtayasa University:

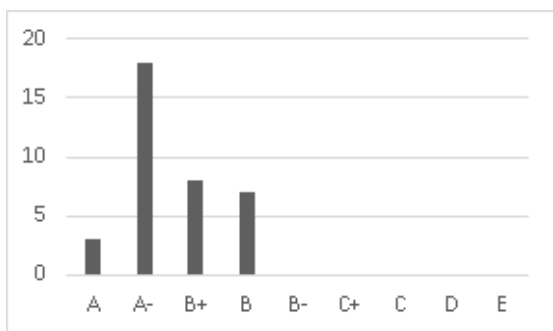


Figure 2. Students' Test Results

Based on the results in the **Figure 2** above, by looking at the percentage of completeness of all students at 100%, it can be concluded that the exercise therapy video-based learning media developed has a good effect on learning outcomes because the overall mastery percentage is above 75%.

After the product is declared valid, practical, and has good effects on the learning outcomes, the product can be mass-produced by uploading it to the Google Store application.



Figure 3. Application Display

The final result **Figure 3** of this development research is in the form of video learning media on exercise therapy material. Based on the results obtained, can be concluded that the product validity is categorized as very valid with a validation result of 92% so the learning media can be used or implemented. This result correspondent with Akhmadan's (2017) statement that

the validity score is reflected in the results of the validators' assessment which states that all aspects are declared good.

Furthermore, the practicality level of exercise therapy learning media products is stated to be very practical to use because it obtains an overall percentage score of 86%. Rochimah's research (2019) also found that the learning media in the form of videos correspond with the student's interests and needs with a percentage that reached 93%.

For the effectiveness score, by seeing the completeness percentage of all students of 82%, it can be concluded that the developed video-based learning media in exercise therapy has a good effect on students' learning outcomes because the overall percentage of student test completeness reaches a score of > 75%. These results are in line with Ayu Rahayu's (2021) research on Scuba Diving materials development, the use of video learning media is effective in improving students' learning outcomes as indicated by the average score of student learning outcomes reaching 83.52. Besides able to increase the number of students' completeness in learning outcomes, video media can also reduce students' boredom while studying. In line with that, the research by Arianti, Indrawati, and Wicaksono (2020) Therefore, using multimedia to deliver instructional information helps learners organize and encode the meaning of received information and in turn eases the delivery of this information to the long-term memory; thorough and deep processing of the received information enhances learning performance. When new information is learned through watching dynamic videos, viewing relevant exhibitions, and observing the instructions shown, retention of learning will occur (Kao & Luo, 2020).

CONCLUSION

Based on the problems and objectives of this exercise therapy video development research, it can be concluded that the product in the form of exercise therapy videos as an alternative to physiotherapy learning developed is said to be very valid by the validator; very practical as shown based on the student response questionnaire results and has good effectiveness on student learning outcomes, shown based on the results of the average student completeness assessment in the trial. So, this exercise therapy video-based learning media is feasible to be used in both online and face-to-face learning activities.

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