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A DEVELOPMENT OF PREVENTION AND TREATMENT OF ANTERIOR CRUCIATE LIGAMENT INJURIES: AN INNOVATIVE ELECTRONIC EDUCATION MODEL

Syella Martha Bipu Zukirman[1], Junaidi[2], Wahyuningtyas Puspitorini[3], Kuswahyudi[4]

[1,2,3,4]*Sport Science Faculty, State University of Jakarta, Indonesia*

Correspondiing author. Email**:** syellamartha@gmail.com

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Abstract In Indonesia, exercise therapy is limited often in availability and accessibility. This study aims to develop an educational application for the prevention and treatment of ACL injuries, the application was developed with the hope of becoming a solution for ACL injury treatment. The Application was named ACL FRIEND. The content of this application consists are: ACL injury education and ACL grade 2 injury exercise programs. This research was conducted using a research and development method, from the ADDIE model. The research procedure consisted of five stages: Stage 1. Preliminary study (Analysis); Stage 2. Application design; Stage 3. Application development; Stage 4. Implementation; Stage 5. Evaluation. The model evaluated and validated by experts from the exercise therapy lecturer and experts from the sports medicine doctor. From the product feasibility testing results, the final percentage analysis of the ACL FRIEND application falls within the 84% range, indicating that the ACL FRIEND application is categorized as Very Good to used. The application ACL FRIEND can get on Google Playstore with free access.

Keywords: Sport Injury, Anterior Cruciate Ligament, Electronic Education

INTRODUCTION

The limitations of knowledge about sports injuries and exercise therapy, the availability of sports healthcare facilities (James W, Elston D, 2012), the high cost of sports injury treatment, and the shortage of sports healthcare support personnel are among the causes of the high risk of sports injuries (Nurhayati & Cahyani, 2023). Therefore, a collective effort is needed from all activists in the field of Sports Medicine to provide a solution that can help address these issues.

In this era of advancing technology, such as the present, it is a golden moment to create a solution that can make the branch of exercise therapy more effective and efficient (Leelayuwat, 2017)(Almeida et al., 2016). ACL injuries are a significant issue in society, especially among individuals aged between 20 and 40 years old (James W, Elston D, 2012)(Syafaat, 2019). The long-term impact of these injuries can lead to issues such as knee instability, meniscus tears, cartilage injuries, and the risk of osteoarthritis if not rehabilitated properly (Okta Arya Prabowo & Rohman Hakim, 2023)(Jannah et al., 2023). ACL injury cases can account for up to 50% of all injury cases. Every year, more than 200,000 patients are diagnosed with ACL disorders, and approximately 150,000 ACL surgeries are performed (Sanusi et al., 2020)(McKeon et al., 2009). Exercise therapy is one of the recommended therapy methods as a rehabilitation medium for injuries, including ACL injuries. With exercise therapy, injuries can improve, and patients can return to training and activities as before. The level of understanding of Indonesian society about exercise therapy can vary depending on education level, culture, and information received by individuals. It is important to note that public understanding of exercise therapy can develop over time with increasing information and education. The more information about the health and fitness benefits provided to the public, the better their understanding of the importance of exercise therapy in maintaining health (Fredianto & Noor, 2021)(Wijayanti & Munzirin, 2021).

METHOD

Research Design

This research was conducted using the research and development method. The research procedure employed the ADDIE method, which

consists of five stages: Stage 1. Preliminary study; Stage 2. Application design; Stage 3. Application development; Stage 4. Implementation; Stage 5. Evaluation (Putri Permadi & Hidayatulloh, 2023; Ridho & Siregar, 2023).

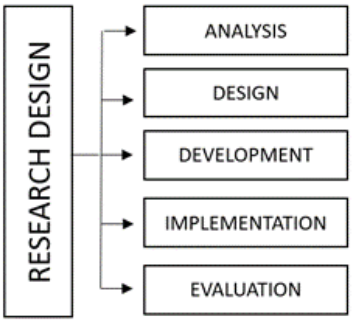

Figure 1. Flowchart Research Design

Participants

In the model validation stage, there was one expert participant of the exercise therapy and two experts of the sports medicine.

Table 1. Research Participants

Phase	Description	Total
Model validation	Lecturer	1
	Sport Medicine	2

Data Collection

The data collection technique regarding the level of validation with product feasibility percentage analysis (Weldami & Yogica, 2023)(Setiawan, 2021).

Table 2. product feasibility percentage analysis

Percentage	Categories	Description
80-100 %	Very Good	Can used without revision
61-80%	Good	Can used with a litle revision
41-60%	Enough	Not suitble for use, recommended not to use
21-40%	Not Enough Good	Can not to used
0-20%	Not Good	Can not to use

Data Analysis

The data analysis technique used is quantitative descriptive analysis and qualitative analysis (Pramana, 2020).

RESULT AND DISCUSSION

Before develop the ACL FRIEND application, several initial stages have been conducted, namely the preliminary study stage and the model

development phase. Here is the sequence of the stages:

Stage 1. Preliminary Study (Analysis). In the preliminary study, they conducted a theoretical mapping (Khaeroni & Hariyanto, 2022) related to ACL injury education using Biometric Analysis Technique. Several theoretical foundations were obtained to develop an ACL injury education model that could enhance knowledge of ACL injuries. Out of the 60 related articles obtained, none explained ACL exercise therapy education using technology. The current methods of ACL injury education are still conventional, such as brochures, booklets, leaflets, and PowerPoint presentations through socialization. Data from phase 1 were used to build an ACL injury education model in the form of an application.

Stage 2. Design. Researchers determined the objectives, decisions, and detailed specifications of the product model components that corresponded to the analysis conducted earlier. The application will available on Google Playstore "ACL FRIEND" and free accsess to get it.

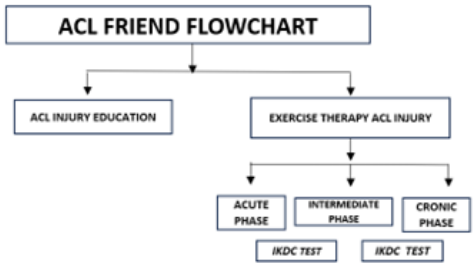

Figure 2. Flowchart Model

Stage 3. Development. The application used Indonesia Language, main topic in this application is "ACL Education" and "Exercise Therapy Program for ACL Injuries Degree 1". The application look:

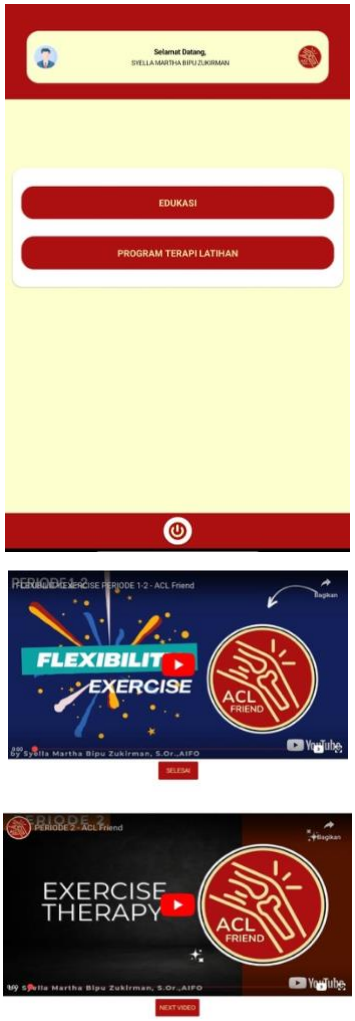

Figure 3. ACL FRIEND Apps

Stage 4. Implementation. The model will be evaluated and validated by experts from the exercise therapy faculty and experts from the sports medicine faculty. From the product feasibility testing results, the final percentage analysis of the ACL FRIEND application falls within the 84% range, indicating that the ACL FRIEND application is categorized as Very Good (Ridho & Siregar, 2023).

Table 3. Percentage Results of Product Feasibility Test

No.	Aspect	Percentage	Characteristics
1	Effectiveness Product	82%	Can be used without revision
2	Product function	97%	Can be used without revision
3	Product Design	73%	Can be used with minor revisions

Stage 5. Evaluation

From the product feasibility testing results, thats mean the application can used without revision.

CONCLUSION

The developed ACL FRIEND application can be used as an very good media for ACL injury prevention and treatment education. The ACL FRIEND application can get on Google Playstore with free access.

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