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Digital-based gymnastics learning media for rolling front round material: Direct and indirect assistance approaches

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ABSTRACT

Digital-based gymnastics learning media is one of the efforts to achieve effective and efficient learning goals, especially in the rolling front round material. Therefore, this study aims to develop digital-based gymnastics learning media on rolling front round material which contains a direct assistance approach and indirect assistance approach. This research is a research and development that aims to produce and test the effectiveness of the product. This research consists of several stages, namely product design, product testing, and product implementation. A total of 45 gymnastics students at the department of sports education, faculty of sports science, Padang State University were used as research samples. 15 of them were used for small group trials, and 30 for large group trials. This research also involves material experts and media experts to validate the products developed. Expert validation results obtained an average of 83.33 or very good (material experts 80.00 and media experts 86.67). Meanwhile, the results of field trials obtained an average of 88.06 or showed a very high level of reliability (small group 88.90 and large group 87.23). In conclusion, this developed media can be used as a tool in learning gymnastics, whether it is used for physical education teachers, students, and athletes to improve round front rolling skills. Future research is needed to involve other materials in gymnastics learning with an attractive design and appearance, as well as a wider sample size.

Keywords: Artistic gymnastics; rolling front round; media; digital; direct assistance approach; indirect assistance approach

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INTRODUCTION

Artistic gymnastics is part of the physical education curriculum, as well as college for sports students. From the motor aspect and movement characteristics, gymnastics can be said to be a suitable physical activity to be used as learning that contributes to physical education (Zulbahri, 2016; Zulbahri & Astuti, 2020, 2021). Gymnastics in learning is used as a physical activity that requires a wide range of motion (Edouard et al., 2018; Pitnawati et al., 2019; Zulbahri, 2016; Zulbahri & Astuti, 2020). Artistic gymnastics requires a high level of anaerobic capacity and flexibility of the body (De Albuquerque & Farinatti, 2007), as well as

depending on the level of physical fitness and complex technical skills (Minganti et al., 2010). It involves several components, such as jumping, explosive power, and skill development of different balances (Bradshaw et al., 2010; Bressel et al., 2007; Gautier et al., 2008; Sleeper et al., 2016).

Thus, in artistic gymnastics, being in excellent physical shape is crucial. Gymnastics in particular need to be stength, flexible, and coordinated in order to perform a range of challenging acrobatic feats (French et al., 2004; Jemni et al., 2000, 2006). Physical conditions like this are also needed in every sport (Ihsan et al., 2022). Bencke et al., reported that gymnastics developed better lower leg strength compared to other sports (e.g., handball, tennis, and swimming) (Bencke et al., 2002). However, depending on the sort of strength index, long-term gymnastics training can have a variety of outcomes (i.e., degree of strength development, maximal, relative, and absolute strength) (Mitchell et al., 2011), as well as certain muscle groups (Dotan et al., 2013; Halin et al., 2002).

Artistic gymnastics learning really requires extra caution to practice the movements (high level of risk of injury), so many students are afraid and anxious to do it (Zulbahri & Astuti, 2021). This is because there is still limited knowledge and artistic gymnastics learning media used by physical education teachers (Zulbahri & Astuti, 2021), so it is difficult to build a sense of courage and motivate students to be confident to do it (Zulbahri & Astuti, 2020). The deficiency of technology-based assistance tools is one of the factors contributing to this issue (Komaini et al., 2021; Rifki et al., 2022a). It is strongly advised to employ technology in the classroom in order to achieve the best learning results. This has long been done by developed countries such as England, Germany, France, the United States, and other countries. They continue to develop interactive learning media (Putra et al., 2021; Tuwoso et al., 2021). Technological developments in learning require an educator to develop more efficient learning media (Doloksaribu & Triwiyono, 2020). This is a big concern, even in physical education and physical training (Brickwood et al., 2019).

Technology-based artistic gymnastics learning media has been discussed in several previous studies, such as the application of transfer technology in improving artistic gymnastics learning for female participants (Vladimir et al., 2018), the development of android-based gymnastic learning media to improve rolling technique skills (Handayani et al., 2022), a module development model in flip book maker-based gymnastics lectures and its effectiveness as a student learning tool (Soenyoto & Darmawan, 2019), and gymnastic learning media based on the android application “GYMBASTECH” (description and tutorial on how to practice techniques, as well as errors related to motion tasks) (Mulyana et al., 2022). However, there are very limited studies examining spherical front rolling materials that contain direct assistance approach and indirect assistance approach.

This study aims to develop digital-based gymnastics learning media on rolling front round material which contains direct assistance approach and indirect assistance approach.This research is expected to be useful as a tool in learning gymnastics, whether it is used for physical education teachers, students, and athletes to improve rolling front round skills.

METHODS

Study Design

This study uses a research and development methodology to create and assess the efficacy of the product (Firdaus & Mario, 2022; Komaini et al., 2021; Rifki et al., 2022a). The product produced in this study is a digital-based gymnastics learning media on rolling front round material which contains a direct assistance approach and indirect assistance approach.

Participant

A total of 45 gymnastics students at the department of sports education, faculty of sports science, Padang State University were used as research samples. 15 of them were used for small group trials, and 30 for large group trials. This research also involves material and media experts to validate the developed product.

Procedure

The process in this study is divided into the following stages: **Stage 1**, needs analysis. This stage is carried out based on a needs analysis, namely the limited digital-based gymnastics learning media, so it is necessary to develop digital-based gymnastics learning media on rolling front round material which contains direct assistance approaches and indirect assistance approaches. The developed product can be used during learning (practice), as well as outside the training schedule. **Stage 2**, product design. This stage is carried out by designing the developed media by compiling materials and other media equipment. **Stage 3**, product testing. After the product is designed, the important thing at this stage is to validate it from the experts before it is implemented in the field. **Stage 4**, product implementation. After the expert validation test results are declared feasible, then a field implementation is carried out which involves small group and large group trials.

Statistic Analysis

Descriptive statistics are used to analyze the results of expert validation and product implementation in the field, namely calculating the percentage level of product feasibility. After the results are obtained, they are converted to qualitative data (Table 1). Results The indicators for each assessment are very good (score 5), good (score 4), moderate (score 3), poor (score 2), and very poor (score 1).

Table 1. Convert Quantitative Data to Qualitative Data

Percentage	Classification
81-100	Very good
61-80	Good
41-60	Moderate
21-40	Poor
0-20	Very poor

RESULTS AND DISCUSSION

Product Validation

The products developed are validated by material and media experts. Material experts aim to check the quality of the learning materials used, such as accuracy and smoothness of movement. While the media expert aims to examine the form of learning media used, such as the quality of videos and images.

Table 2. Results of Material and Media Expert Validation

Expert	Indicator	Score	Percentage	Average indicator
Material expert	Overall movement accuracy	4	80.00	80.00
	Movement phase accuracy	4	80.00	
	The subtlety and beauty of movement	4	80.00	
Media expert	Lighting for media photos and video	4	80.00	86.67
	Clarity of media images and videos	5	100.00	
	Recording side of video and motion pictures	4	80.00	
Maximum Score		5	100.00	100.00
Average		4.29	83.33	83.33

Table 2 shows that the overall average percentage of material and media expert validation is 83.33%. The scoring percentage for material experts is 80.00%, and media experts is 86.67% (Figure 1). Thus, the product developed is feasible for field trials.

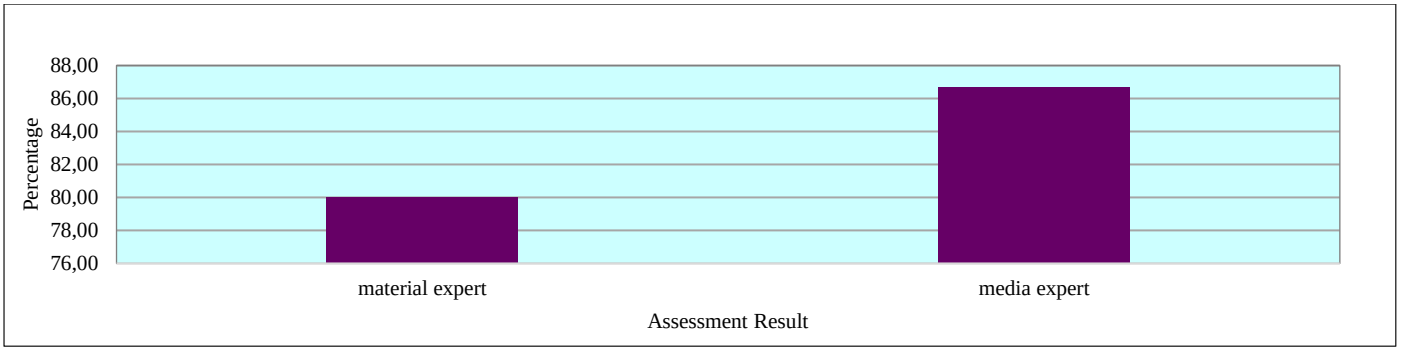


Figure 1. Percentage of Assessment Results of Material and Media Experts

Product Reliability

After the product feasibility test is met, the developed product is tested in the field. This stage is divided into small group and large group trials. The results show a very high percentage between the small group and large group trials (mean 88.06%).

Table 3. Small and Large Group Trials

Test sample	N	Percentage
Small group	15	88.90
Large group	30	87.23
Maximum score		100.00
Average		88.06

Table 3 shows that the percentage of assessment for the small group trial is 88.90%, and the large group is 87.23% (Figure 2). Thus, the developed product has a very high level of reliability.

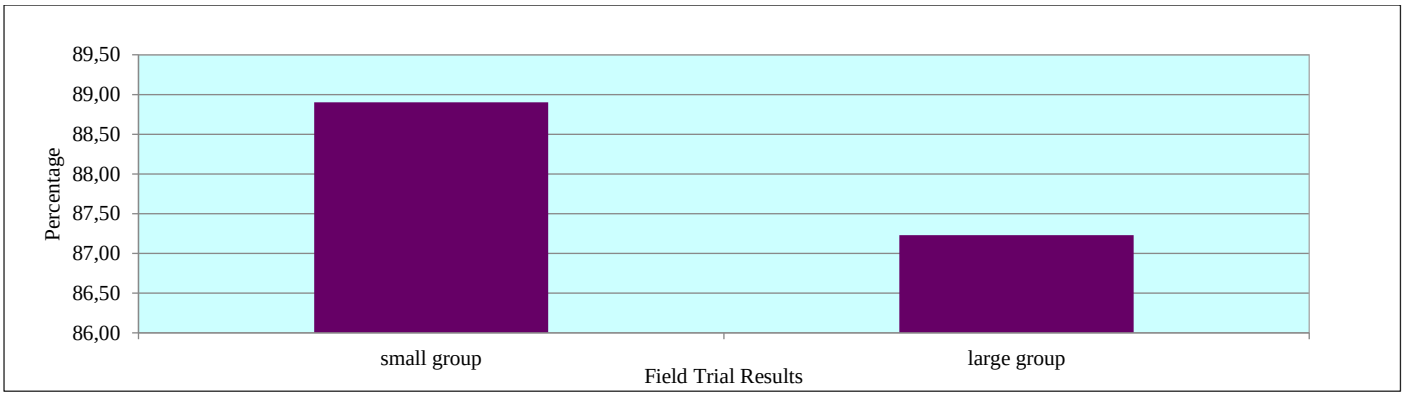
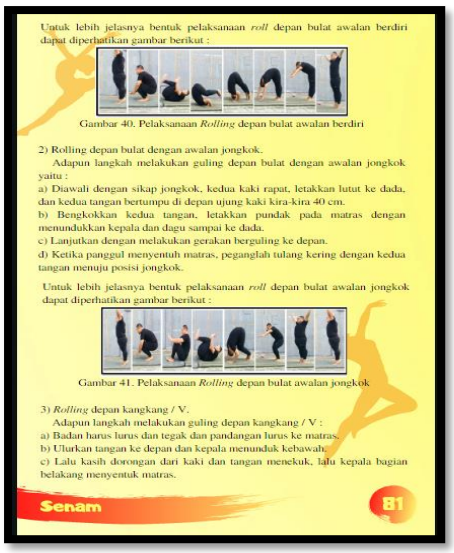


Figure 2. Percentage of Field Trial Results

Final Shape of the Product

Based on the results of the trial, a digital-based gymnastics learning media product was created. Through this product, students will be taught and trained in order to master the rolling front round motion phase with a circular approach direct assistance approach and indirect assistance approach. Figure “3.a” is a rolling front round material shape, and Figure “3.b” digital media.

a) 
Untuk lebih jelasnya bentuk pelaksanaan *roll* depan bulat awalan berdiri dapat diperhatikan gambar berikut :
Gambar 40. Pelaksanaan *Rolling* depan bulat awalan berdiri
2) Rolling depan bulat dengan awalan jongkok.
Adapun langkah melakukan guling depan bulat dengan awalan jongkok yaitu :
a) Diawali dengan sikap jongkok, kedua kaki rapat, letakkan lutut ke dada, dan kedua tangan bertumpu di depan ujung kaki kira-kira 40 cm.
b) Bengkokkan kedua tangan, letakkan pundak pada matras dengan menundukkan kepala dan dagu sampai ke dada.
c) Lanjutkan dengan melakukan gerakan berguling ke depan.
d) Ketika panggul menyentuh matras, peganglah tulang kering dengan kedua tangan menuju posisi jongkok.
Untuk lebih jelasnya bentuk pelaksanaan *roll* depan bulat awalan jongkok dapat diperhatikan gambar berikut :
Gambar 41. Pelaksanaan *Rolling* depan bulat awalan jongkok
3) *Rolling* depan kangkang / V.
Adapun langkah melakukan guling depan kangkang / V :
a) Badan harus lurus dan tegak dan pandangan lurus ke matras.
b) Ulurkan tangan ke depan dan kepala menunduk kebawah.
c) Lalu kasih dorongan dari kaki dan tangan menekuk, lalu kepala bagian belakang menyentuk matras.
Senam 81

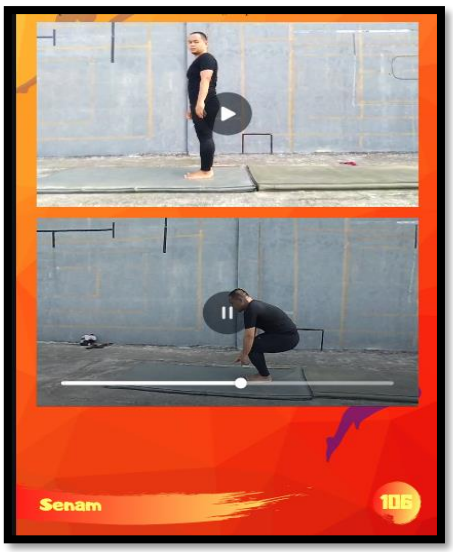
b) 

Figure 3. a) Rolling Front Round Material, b) Illustration of Digital Media

From the results of this study, that expert validation obtained an average of 83.33 or very good (80.00 material experts and 86.67 media experts). Meanwhile, the results of field trials obtained an average of 88.06 or showed a very high level of reliability (small group 88.90 and large group 87.23). The results of this study are consistent with previous studies, which reported that technology in learning is a tool used to assist success in teaching (Shoraevna et al., 2021), change the learning process to be interesting (Burbules et al., 2020), motivating and fun (Gómez-Carrasco et al., 2020; Schmid & Petko, 2019), so that students are actively involved in learning (Ninaus et al., 2019; Oluwajana et al., 2019). It is hard for athletes to perform at their best without technology (Firdaus & Mario, 2022). According to other studies, technology is frequently employed to enhance and facilitate training, as well as to develop both elite and amateur sports (Camomilla et al., 2018; Matsuwaka & Latzka, 2019; Oh et al., 2019).

The learning process is not just teaching in a traditional (conventional) form. A teacher (coach) must be able to keep up with the times that demand learning by utilizing technology, so that learning is more efficient (Hussin, 2018). In addition, a properly structured program will have an impact on what has been intended (Mario et al., 2022a, 2022b). Coaches can have a major influence on athletes well-being through the way they evaluate and respond to sporting activities. Thus, the achievement of athletes (students) cannot be separated from the role of a coach in using effective learning media. There is enough empirical evidence to establish the effect of coaches on a number of athletes psychological characteristics (e.g., satisfaction, commitment, self-esteem, skills possessed by athletes) (Cronin et al., 2015; Stenling & Tafvelin, 2014). Several studies have shown that the interaction between coaches and athletes can affect the relationship between coaches and athletes (Fransen et al., 2018; Stenling et al., 2017). To give a more accurate picture of a successful coach, certain skills can be added such as, planning, programming, creative thinking, visioning, evaluator (Mumford et al., 2017). A coach must believe that he has positive abilities, thereby influencing the learning/training and performance of their athletes (Myers et al., 2017).

The created digital learning materials for this subject include integrated animation and two or more media assets packed in a digital format. This media contains a YouTube link so that it can be quickly accessed, including using an Android, and it makes it simpler for students to learn whenever they want (Syauqye et al., 2020; Zulbahri et al., 2022). Then, the two approaches that exist in the product developed, namely the direct assistance approach or a form of assistance carried out with a process that involves friends to help and support the movement or can also be referred to as a form of pair training (Zulbahri, 2016). Pair training is also an exercise that is done in cooperation. In the direct practice assistance approach that helps their partners, it is also expected to correct and direct those who are assisted in carrying out a movement (Zulbahri, 2016). While indirect assistance approach is an effort in the implementation of learning with an indirect assistance approach or through tools, as well as media. Media can be in the form of visual information, audio, whiteboards, series

of pictures, and so on. While the tools can be walls, Swedish benches, jump crates, and so on (Syauqye et al., 2020; Zulbahri et al., 2022).

This learning media developed is inseparable from several limitations, which need to be validated and refined in future research. There is no comparison instrument. Therefore, we ask for help from experts voluntarily to validate the products developed. The trial sample used was 45 gymnastics college students in the sports department, so it was necessary to involve a wider variety of samples and sample sizes. Then, the content and presentation need to be refined for future research.

CONCLUSION

The conclusion of this research is the creation of digital-based gymnastics learning media on rolling front round material which contains direct assistance approach and indirect assistance approach. This tool has been validated by experts who are competent in their fields with an average of 83.33 or very good (80.00 material experts and 86.67 media experts). Meanwhile, the results of field trials obtained an average of 88.06 or showed a very high level of reliability (small group 88.90 and large group 87.23). This research is expected to be useful as a tool in learning gymnastics, whether it is used for physical education teachers, students, as well as athletes to improve rolling front round skills. Future research is needed to involve other materials in gymnastics learning with an attractive design and appearance, as well as a wider sample size.

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CONFLICT OF INTEREST

The authors declare that there is no conflict of interest

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