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Research Article

The development of a circuit training model based on articulate storyline for grassroot age in soccer games

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ABSTRACT
Background: The field of training, particularly soccer, has been driven to integrate technology into the training process due to growing demands in the digital era. Objective: The aim of this study was to develop a circuit training product for grassroots soccer players. This product was presented in the form of interactive media using an articulate storyline. Methods: The research method employed in this study is an adaptation of the research and development method model initially introduced by Lee & Owens in 2004. It comprises the stages of needs analysis and initial to final analysis, design planning, product development, implementation of development results, and evaluation of the achievement of development goals. Results: Moreover, it could be concluded that this articulate storyline-based circuit training product met very excellent criteria and is appropriate for usage by athletes in the training process after it underwent validation by a coaching expert, a soccer expert, small group trials, and field testing. Conclusion: It was intended that this development would serve as a guide for soccer coaches in mentoring athletes, particularly those at grassroot age.

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Soccer; circuit training; learning media; grassroot.

Introduction

Sport accomplishments at the Southeast Asia and Asia levels indicate a significant increase in Indonesia's development of soccer accomplishments (Hidayat et al., 2019). Moreover, the curriculum developed by FIFA and applied in the field is being systematically integrated into the coaching that is carried out in Indonesia, and it has begun to make an impact (PSSI, 2017a; Setiawan, 2021). Despite the process being difficult and time-consuming, Indonesian football accomplishments obtained a positive impact from having a well-functioning coaching system. Innovation is crucial to fostering accomplishments considering technology's rapid advancement, and the sophisticated tools utilized in sports development will simplify the process of creating and analyzing an athlete's development (Sutisna, 2018).

In the world of soccer, coaching begins at an early age, or grassroots, and the goals and needs for training differ from those of older ages. Furthermore, the development of athlete skills, physicality, tactics, and playing vision in the future will all be significantly impacted by the strengthening of the foundation being established at this time (Ridwan, 2020). In accordance with the LTAD (long-term athlete development) stage, this age in soccer sport is entering a multilateral development stage, in which the aspects that must be achieved are very broad (Balyi et al., 2013). Aspects or training objectives that must be fulfilled at this stage include all the biomotor components needed in the sport of soccer related to good movement coordination because this sport is acyclical; SAQ (speed, agility, quickness) components; strength components capable of supporting all biomotor components with light loads and high repetitions; the cardiovascular component, which must be developed from an early age to

ensure that the possibility of obesity occurring is very minimal; the psychological component, particularly good behavior and self-training; sportsmanship; and other positive things, develop at that age (Balyi & Hamilton, 2004).

Football is a popular sport requiring a practical learning approach so players can develop optimally (Wahyudi, 2020). In an era where technology is increasingly penetrating almost every aspect of life, the application of education is becoming increasingly important, especially in developing teaching tools that can support football training. Therefore, teachers or trainers need to consider improving learning tools that are more efficient and up to date. They need a conducive and enjoyable learning environment as part of professionalism in providing training (Hartono, 2019; Primasoni, 2017). Therefore, Articulate Storyline, as an e-learning content development tool, offers great potential to improve the learning experience of football players with an interactive and multimedia-based approach. Previous research conducted by Gunawan et al. (2021) shows that multimedia-based interactive learning media for soccer training is feasible and reliable. At the same time, using this product development makes it easier for athletes to access soccer training material through the application provided. Other research also states that the results of developing football game learning media based on an articulated storyline can be widely used (Irfani & Kurniawan, 2022). According to students, this product has many advantages, such as clear explanations of material through pictures and videos, easy access to various places, and increasing motivation and interest in learning football.

Many studies focus on articulate storyline media to increase students' understanding of football. However, most research focuses more on learning in the classroom than outside the classroom. The application content is also relatively simple (Chandra et al., 2022; Gunawan et al., 2021; Irfani & Kurniawan, 2022; Khasanah, 2022). Therefore, researchers-initiated steps to develop specific soccer training media, especially for developing a circuit training exercise model in children involved in grassroots soccer. This topic has yet to be widely researched and developed by several researchers. In its development, increasingly advanced technology has made it easier for students to understand information related to training material and outside of training situations, which has become essential to support current achievements. Researchers also added several new elements to the Articulate Storyline media that will be developed, such as demonstration videos and detailed explanations and preparations required when carrying out the training method. It is in line with the primary function of interactive media, namely helping students focus on understanding and applying the material taught by their teacher or trainer because this media presents images, videos, and animations (Widiawati et al., 2023). In addition, the author uses the results of this research to develop interactive media based on a clear storyline to help improve the performance of soccer players. This research was prepared by lecturers experienced in national scale strength and conditioning training, soccer course instructors and practitioners, and master students as data processors for this research.

Method

Research Design

To develop innovative products and providing solutions, the steps involved in the product development process must be well-structured. Furthermore, this study employed the research and development model proposed by Lee & Owens (2004), which includes multiple stages: needs analysis, front-end analysis, design planning, product development, implementation of development outcomes, and evaluation as a means of accomplishing development goals.

Participants

The subjects of this study consisted of 40 grassroots-age soccer players in NZR Sumbersari. Moreover, collaborators were involved in the product planning and development stage. These

collaborators include training experts with at least a master's degree and a soccer coach with at least national-level qualification, as evidenced by their certifications. In addition, the subjects were divided into two groups at the application stage of the product development results: a small group consisting of ten athletes and a large group consisting of thirty athletes.

Research Instrument

The data collection for this study employed a qualitative and quantitative approach using questionnaires. Furthermore, to determine the percentage of product feasibility, questionnaires were employed in analysis of needs, expert evaluation, small group trials, and large group trials to gather both qualitative and quantitative data.

Data Analyzed

The process of calculating the total score acquired, dividing it by the total maximum score, and multiplying the result by 100% yields the percentage of product feasibility. The product feasibility criteria are explained in Table 1.

Table 1. Feasibility criteria

No	Percentage (%)	Category
1	0 - 20%	Very low
2	21% - 40%	Low
3	41% - 60 %	Average
4	61% - 80 %	Good
5	81 % - 100 %	Very good

Results and Discussion

Result

The initial stage in the needs analysis process was to observe soccer training at Gajayana Stadium. According to observation data, the majority of athletes used Android smartphones, although they were not fully utilized. They tended to use instant messaging and gaming apps on their smartphones, which might make training less engaging and effective. Moreover, interest in reading printed books remains low, even though they are still the primary source of information. This analysis is the basis for developing mobile-based training media that are better, more diverse, effective, interesting, and comfortable. Therefore, making an offline app is a solution to enable athletes to use their smartphones to study whenever and wherever they are without requiring an internet connection.

In the planning and product development stages, a training expert and a licensed soccer coach were involved. They validated the designs developed by the authors, provided input for improvement through conceptual analysis, and the results were revised. Moreover, expert judgment was also involved in this study to obtain input regarding the product design of an articulate storyline-based circuit training method for the grassroots age in soccer. The evaluation was carried out by showing the product design of the application for the development of an articulate storyline-based circuit training method for the grassroots age in soccer, which was integrated with an expert evaluation sheet. The evaluation sheet contains learning criteria, a material presentation, as well as suggestions and comments regarding the development of an articulate storyline-based circuit training model for the grassroots age in the soccer game.

The development of an articulate storyline-based circuit training model product for the grassroots age in soccer games was validated by a sports coaching expert based on four primary aspects: attractiveness, accuracy, clarity, and relevance.

Table 2. Sports coaching validity test results

Aspect	Ideal Score	Actual Score	Feasibility Percentage	Category
Attractiveness	20	18	90 %	Very High
Accuracy	15	14	93.3 %	Very High
Clarity	7	7	100 %	Very High
Relevance	8	7	87.5 %	Very High
Total	50	46	92%	Very High

In the validity test (Table 2), a sports coaching expert gave an assessment with a total score of 46 out of a maximum of 50, equivalent to 92%. In addition, the score fell into the "Very Good" category according to the established criteria, indicating that it may be developed further and used as a training tool.

Table 3. Media validation test results

Aspect	Ideal Score	Actual Score	Feasibility Percentage	Category
Material	15	15	100 %	Very High
Material Presentation	15	15	100 %	Very High
Accuracy	10	9	90 %	Very High
Total	40	39	97.5 %	Very High

The subsequent validation test (Table 3), conducted by a licensed soccer expert, revealed a validation score of 39 out of a maximum of 40, or 97.5%, suggesting that this product met the standards and needs of the NZR Sumbersari football club.

Discussion

The following step involved implementing the results of this product development in small groups with ten grassroots age soccer athletes from NZR Sumbersari. This step aimed to guarantee that athletes, as end users, were able to use the developed product design appropriately and easily. Moreover, questionnaires and observation were used to gather data, which was then descriptively analyzed. The results of small group trials revealed an assessment score of 625 out of a maximum score of 650. In addition, this product has a 96.15% overall assessment, implying that it was considered very good and did not require further revision.

Field trials, or large group trials, were the next step after the implementation and revision stages of the articulate storyline-based circuit training model product for the grassroots age in the soccer game on a small scale. Thirty grassroots-age soccer athletes from NZR Sumbersari participated in field trials. According to the assessment results from this large group trial, the articulate storyline-based circuit training model product for grassroots age in soccer games obtained a total score of 1,870 out of a maximum of 1,950, or equivalent to 95.89%. Furthermore, based on the athlete's assessment, this product fell into the "Very Good" category overall and did not require further revision. Figure 1 presents the results of the final product implementation stage.

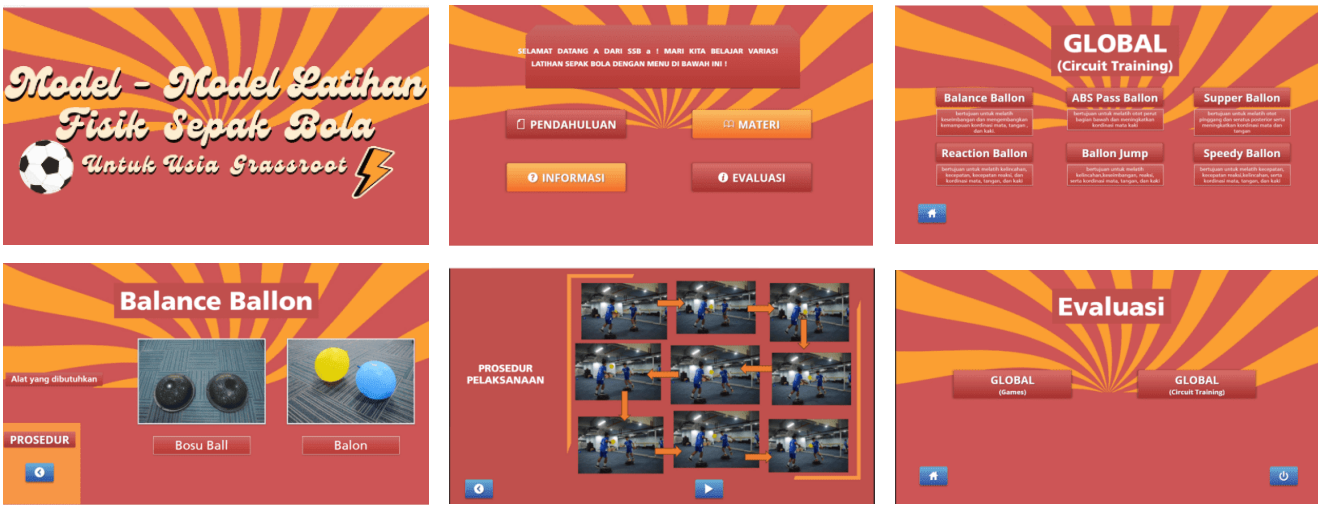

Figure 1. Final display of the development product of an articulate storyline-based circuit training method for the grassroots age in soccer

The primary goal of this research and development was to create more innovative and high-quality soccer training and learning media. In order to increase the efficiency and smoothness of the training and learning process, interactive media is used in soccer training (Al Munawar & Hendrawan, 2019a; Cahyaningtias & Ridwan, 2022). The media is expected to improve the quality of training and learning efficiently. In addition, the development of this training application was supported by the advancement of mobile technology over the past several decades and a reduction in the cost of mobile devices.

New opportunities in the field of training known as mobile learning (m-learning) were created by society's growing usage of mobile devices (Lim & Churchill, 2016). Athletes may access training and learning materials through mobile-based learning and training without being constrained by time or place. Moreover, the use of technology on mobile devices enables athletes to gain access to learning materials anytime and anywhere. However, it is imperative to be mindful that m-learning does not have a purpose to replace electronic learning (e-learning) or face-to-face learning in the field. In contrast, m-learning serves as a complement that enables athletes to deepen their knowledge at any place and time, complementing existing learning (Malik et al., 2019).

In the context of this product development, an articulate storyline-based circuit training application has been created for the grassroots age in the soccer game. Athletes may easily learn and exercise whenever and wherever they are using this application because it was designed to be accessed via Android-based mobile devices.

An information and communication technology-based learning approach is referred to as mobile learning (Lim & Churchill, 2016). Several advantages are associated with the mobile learning approach, including the availability of readily available training materials and visually attractive material presentations, and it is imperative to be mindful that not all learning materials are suitable for learning or training via mobile devices (Grant, 2019). Additionally, the main menus of this application are an introduction, information (regarding soccer training and grassroots-age athletes), materials, and evaluation.

The "Introduction" menu explains the background for creating an articulate storyline-based circuit training model application for the grassroots age in the soccer game (Figure 2).

Figure 2. The display of the "introduction" menu in the development product of articulate storyline-based circuit training methods for the grassroots age in soccer

The "Information" menu provides coaches with important knowledge about training grassroots athletes, including the physical aspects that need to be emphasized according to the athlete's needs at that stage (Figure 3).

Figure 3. The display of the "information" menu in the development product of articulate storyline-based circuit training methods for the grassroots age in soccer

The "Materials" menu includes two main options: games and circuit training. In this menu, users can find complete exercise recommendations with a list of necessary equipment, execution procedures, and very detailed exercise demonstration videos (Figure 4).

Figure 4. The display of the "materials" menu in the development product of articulate storyline-based circuit training methods for the grassroots age in soccer

Lastly, the "Evaluation" menu contains questions to measure the user's understanding of the materials, which is divided into 2 menus: Global Question Evaluation (Games) and Global Question Evaluation (Circuit Training) (Figure 5).

Figure 5. The display of the "evaluation" menu in the development product of articulate storyline-based circuit training methods for the grassroots age in soccer

The availability of these various menus, which enable users to select the content that most interests them, is in accordance with several criteria that contribute to the effectiveness of mobile learning (Criollo-C et al., 2021; Klimova, 2019; Talan, 2020). Moreover, a significant advancement in the field of sports training has been made with the development of a circuit training model that uses an articulate storyline-based approach for grassroots age in the context of the soccer game. Within the context of sports, "grassroots" refers to the initial learning phase, during which trainees—typically children or those who have just started the sport—develop the fundamentals of essential skills (Emral & Yudi, 2021; PSSI, 2017b).

In addition to providing different training routines, this model carefully integrates an interactive multimedia technology approach known as articulate storyline with the circuit training methodology, which has been shown to be effective (Al Munawar & Hendrawan, 2019b; Widiawati et al., 2023; Windiartha, 2017). With this approach, coaches may use interactive visual and video elements to present training material more effectively and engagingly while also creating a structured and engaging training environment.

By integrating technology into the training model, the goal is no longer only to teach technical soccer skills to trainees; it is also to foster an environment that encourages motivation, engagement, and better comprehension. Thus, this approach has great potential to improve learning outcomes as well as increase trainee interest and persistence in achieving their progress in the field. It is imperative

to be mindful that the effectiveness of this training approach also depends on how coaches apply this tool in the context of soccer learning for grassroot age. The application developed in this study can only be used on Android-based mobile devices. Therefore, it was expected that similar applications that would be able to run on various operating systems and learning materials would be developed. The development of mobile-based learning and training applications was expected to boost the benefits of mobile devices in the context of soccer training and encourage players to train. The availability of such applications provides coaches and players with a novel and exceptional learning and training experience.

Conslusions

This product's development resulted in the creation of an Android-based circuit training application that improves affordability and comprehension of the training material while additionally providing grassroots soccer players with an engaging and interactive learning experience. Moreover, this product was expected to be considered an excellent training tool because of its interactive features, clear content presentation, appropriate and attractive audio-visual presence, and ongoing evaluation. In addition, with the help of this application, it was expected that young soccer players would enhance their movement skills and knowledge, preparing them for future accomplishments.

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Authors' contributions

PW is responsible for data compilation and analysis, article conception, writing, and revision. FA, MH, DAP, YNH, and IMS are responsible for article conceptualization as well as strict and critically revised manuscripts. All authors read and approved the final manuscript.

Competing interests

The authors declare no competing interests.

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