

Development of a Sports Training Program Planning Information System (SIPRENPOL)

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ABSTRACT

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This study aimed to develop a Sports Training Program Planning Information System (SIPRENPOL) to aid sports trainers in the creation of structured and systematic training programs. The study employed a research and development process. The methodologies used followed the research and development framework. The data analysis included both quantitative and qualitative descriptive techniques to assess and ascertain the viability of the created items. The study involved 75 students, with 15 participating in small-scale trials and 60 in large-scale trials, all from the Sports Coaching Education (PKO) program at the Faculty of Sports Science (FIK), Medan State University. Instruments and data gathering methods employ media assessment surveys for subject matter experts, media specialists, and students. The findings indicated that the SIPRENPOL enhanced planning efficiency, transparency, and communication in the administration of training programs. This integration demonstrates the advantageous impacts of information technology on sports management. The system can function as a prototype for more sports, enhancing training efficacy and personal growth. Its successful deployment relies on users' comprehension and preparedness to utilize the technology effectively.

KEYWORDS

Development; Planning; Program; Exercise; Sport

1. INTRODUCTION

Current advances in science and technology have had a very beneficial influence in the field of sports, affecting athletes and coaches. One prominent feature is the availability of various instruments and technologies that can enhance athletic performance. Technology has become very important in the training process, allowing coaches to develop more effective and efficient training regimens. The utilization of training applications allows coaches to track athletes' progress in real-time and provide quick and precise feedback (Wahadi et al., 2023).

Technology-based training is becoming significant. Coaches can use a variety of technologyassisted training approaches to improve athletes' abilities and physical fitness. Research shows that technological training methods, such as exercise program monitoring programs, can improve understanding of exercise monitoring among coaches and players (Wahadi et al., 2023). This suggests that technology not only improves the training process, but also increases athletes' understanding and recognition of the importance of structured training. In addition, technology contributes to the advancement of sports approaches and plans. The utilization of video analysis tools such as Kinovea allows coaches to carefully assess athletes' techniques, thus providing more accurate recommendations for improvement (Jariono et al., 2020). As a result, athletes can implement important technique modifications to improve their competitive performance. In addition, the technology allows coaches to conduct comprehensive data analysis, facilitating the development of more effective strategies to deal with opponents (Wahadi et al., 2023).

Technological advances offer advantages to athletes in terms of injury recovery and prevention. Training that emphasizes injury prevention and post-injury rehabilitation is increasingly important, especially in high-risk sports (Aqobah et al., 2023). Effective training allows athletes to understand the maintenance of their physical health and minimize the likelihood of injuries that could hinder their careers. Training that emphasizes injury prevention allows athletes to train more safely and effectively. In addition, technology increases the accessibility of information for athletes and coaches. The internet and digital platforms provide access to a wide array of resources, such as video tutorials, articles, and discussion forums, which facilitate the improvement of skills and knowledge (Wahadi et al., 2023). This fosters an interactive and collaborative learning environment, allowing athletes and coaches to exchange experiences and knowledge. Technology significantly affects motivation. Innovative training methods, such as brain jogging, have shown to increase athletes' motivation (Komarudin, 2018). Integrating engaging and fun elements into the training process can

increase athletes' motivation to train and compete. This is particularly important in competitive sports, where motivation can be a determinant of success.

Technology significantly affects the training process of athletes, both individually and in teams. The utilization of training apps allows athletes to monitor their progress, set goals, and receive prompt feedback from coaches. These apps increase athletes' engagement in training while equipping them with tools to improve self-management of their training regimen (Alif et al., 2021). As a result, athletes can engage in more purposeful and measurable training, leading to improved performance in a competitive environment. In addition, science and technology contribute to the advancement of tools and devices that facilitate training. Technology-based test tools, such as volleyball serve test tools that use microcontrollers, allow coaches to measure and analyze athletes' performance more accurately (Giartama et al., 2020). The data obtained from these tools allows coaches to provide specific and targeted feedback to athletes, thereby facilitating the necessary improvements in their playing techniques and strategies.

The importance of science and technology in performance sports is undeniable. Technology serves as a major factor in achieving high performance. In certain sports, video analysis technology allows coaches and athletes to examine the techniques and strategies of opponents, facilitating the development of more effective tactics for competition. Although specific references to support this statement are absent from the list, many studies show that video analysis has emerged as a significant tool in athlete training (Alif et al., 2021). In addition, science and technology contribute to injury prevention and athlete recovery. Health and fitness monitoring technologies allow coaches to detect potential injury risks before they occur and develop safer training programs for athletes. Although specific references to this claim are missing from the list, many studies suggest that monitoring technologies can contribute to injury prevention (Rahmat et al., 2017). In addition, advanced rehabilitation technologies facilitate the athlete's recovery process post-injury, enabling a faster and safer return to training and competition. Technology contributes significantly to motivation. Digital platforms facilitate interaction among athletes, allowing them to share experiences and provide mutual motivation and support in achieving training and competition goals (Dharmadi, 2022). This fosters a positive and supportive community, which is crucial in the competitive sports sphere.

Coaching refers to the process by which an individual, known as the coach, provides guidance and support to another person, often referred to as the coachee, to improve their skills, performance and personal development. This relationship usually involves goal setting, identification Science education in higher education plays an important role in developing graduates who are skilled and knowledgeable in the field of coaching. Students in this program are required to take an exercise program planning course. This course aims to equip students with the knowledge and skills necessary to design effective training programs, thereby facilitating the development of athletes who excel in various sports (Pasaribu & Yudhaprawira, 2020). Planning an exercise program is important in coaching, as an effective program will facilitate athletes in achieving goals more efficiently. Students are required to understand the various elements of exercise planning, which include the purpose, type, duration, intensity, and frequency of exercise. Graduates are expected to be able to design exercise programs tailored to the specific needs of athletes, both individually and collectively, based on a comprehensive understanding of the relevant aspects (Pasaribu, 2022). An example of exercise program planning can be seen in the training of badminton athletes. A study by Yudhaprawira showed that well-structured strength and conditioning training significantly improved the performance of badminton athletes (Pasaribu & Yudhaprawira, 2020). This shows that careful and data-based planning can provide optimal results in athlete development. The importance of coaching education is evident in the physical condition of athletes in preparation for major events such as the National Sports Week (PON). Research shows that universities are responsible for implementing structured coaching and training, particularly in sports that are important for policing education (Pasaribu, 2022). This indicates that coaching education emphasizes technical skills and the physical and mental development of athletes.

Students in sports coaching are instructed on the application of technology to the development of training programs. Technological advances allow coaches to use a variety of apps and software to design and monitor training programs. Fitness monitoring apps allow coaches and athletes to monitor training progress in real-time, making it easier to adjust training programs in a timely manner. However, no references supporting this claim were identified in the current reference list. Coaching education includes an understanding of exercise physiology. Exercise physiology examines bodily functions during physical activity, providing coaches with important insights in the development of effective training programs. Research shows that exercise physiology training improves coaches' understanding of the body's response to exercise, allowing them to develop more effective programs for their athletes (Fitrianto, 2022). Coaches can reduce the risk of injury to athletes by developing balanced training programs and emphasizing recovery strategies. Evidence suggests that strategically designed training programs can improve athletes' endurance and movement stability, ultimately reducing the risk of injury (Dhanireksa et al., 2023). This suggests that effective coaching education should include knowledge about designing exercise programs that ensure efficacy and safety for

athletes. The students are instructed to assess and modify the designed exercise program. These evaluations are essential to maintain the relevance and effectiveness of the exercise program in achieving the set goals. Regular evaluations allow coaches to identify areas in need of improvement and implement the necessary adjustments to improve exercise outcomes (Rahman et al., 2023).

The development of exercise program planning systems is increasingly relevant in sports coaching education. Although some research examines specific elements of exercise planning, there are still significant opportunities for further research and development in this area. A relevant study has been conducted that developed a defense training program in badminton for high school students. This study showed that a structured training program can improve athletes' skills in the game (Jehadun et al., 2024). Adapting training methods to suit the characteristics of athletes is a significant challenge in training program planning. Research shows that the development of a training model for table tennis forehand strokes can be achieved through a series of systematic steps, which include examining existing products and testing designs (Afendi et al., 2021). This suggests that a research and development approach can be used to formulate more effective training programs. Further research is needed to build a comprehensive and integrated planning system. Therefore, this research is essential for the development of a Sports Exercise Program Planning Information System (SIPRENPOL) to facilitate the creation of structured and systematic exercise programs for sports coaches.

2. METHODS

2.1. Participants

This study was designed using the research and development method (Research and Development R & D). This research is used by researchers to produce products in the form of developing a sports training program planning system so that it can facilitate sports trainers in making training programs in a structured and systematic manner. The steps taken in this study refer to the development research model (Borg & Gall, 2023) which consists of 10 general steps, as described below: 1) Research and information gathering, 2) Planning, 3) Developing initial product, 4) Initial field trial, 5) Main product revision, 6) Main field trial, 7) Operational product revision, 8) Operational field trial, 9) Final product revision, and 10) Dissemination and implementation.

The test subjects in study amounted to 75 students with details on small-scale trials totaling 15 students, while on large-scale trials totaling 60 students of Sports Coaching Education (PKO) Faculty of Sports Science (FIK) Medan State University.

2.2. Instruments and Data Collection Techniques

Research and development of a sports training program planning system so that it can facilitate sports trainers to make training programs in a structured and systematic manner is carried out through several stages. Data collection techniques and instruments used in this research and development are: (a) expert judgment; (b) small group trial; (c) field trial. However, due to time and cost constraints, the application is adjusted to the needs of the researcher, so that the outline of the research and development steps is simplified according to the needs of research in the field.

2.3. Steps of Research and Development

- 1. Preliminary Study (Needs Analysis)
 - a. Conducting research and data collection for initial research or needs analysis (need easement) on 30 PKO FIK Unimed students who have passed the training program planning course.
 - a. Conduct development planning by defining the objectives, limiting the scope, and preparing a pilot test plan.
- 2. Product Design

Based on the results of the needs analysis, at this stage an initial product draft was designed, which was then evaluated by 4 coaching science experts.

3. Small Scale Trial and Revision

The small group trial, using the subject 15 students of Sports Coaching Education FIK Unimed who have passed the training program planning course. The next step is to revise the product (according to the results of the analysis on the small group trial).

4. Large Scale Trial and Revision

The field trial (large group) used 60 subjects of FIK Unimed Sports Coaching Education students who had passed the training program planning course. If in the research recommended by Borg and Gall, at this stage a large-scale (macro) trial is required, which includes at least 30 subjects or more in 200 schools, but in this study with consideration of time and cost, it will be limited to one place, namely in the Department of Sports Coaching Education (PKO), Faculty of Sport Science (FIK), Medan State University with 60 respondents. The next step is to revise the product according to the results of the large group trial.

5. Effectiveness Test

Conduct operational trials to determine the effectiveness of the product.

The stages of research and development of the Sports Training Program Planning Information System (SIPRENPOL) which has the potential to facilitate sports trainers in making training programs in a structured and systematic manner as can be seen in Figure 1:



Figure 1. Research flowchart of sports training program planning information system development

2.4. Data Analysis

The data analysis technique used is quantitative and qualitative descriptive analysis techniques to assess and conclude the results of the feasibility of the products developed. The Statistical Package for the Social Sciences (SPSS) was used for the analyses and p<0.05 was established as the statistical significance level.

3. RESULTS

Potential and Problems

This research highlights potential issues related to advances in science and technology, as well as the increasing prospects for professional coaches. However, graduates of Unimed's Sport

Coaching Education program have not shown competitive abilities compared to graduates from other universities, especially in the field of coaching, particularly in developing training programs for physical trainers (Strength and Conditioning). This application aims to overcome the existing problems, facilitating Sports Coaching Education graduates in developing training programs.

Information gathering

In addressing potential problems, the next step is to seek information from the community, especially from provincial sports administrators. Current financial observations show a lack of applications in sports training program development and planning through websites, PC applications, or Android platforms. Researchers aim to develop a web-based application for sports training program planning.

Product Design

The planning of the application is done through a website that outlines the steps of developing an exercise program based on book sources. This application has a simple appearance with intuitive menus, thus facilitating accessibility and ease of use for users. The application product for sports training program planning was named "SIPRENPOL". The next result relates to the front page of the application created:



Figure 2. SIPRENPOL Home View







Figure 4. Periodization view on SIPrenPoL

Expert Validation Results

The products of this study were evaluated by experts or experts who have the experience to assess new products designed to determine their weaknesses and strengths. This development research obtained design validation by two experts, namely:

a. Material Expert Validation Results

Material experts are sports lecturers who are tasked with assessing the suitability of the application developed with relevant regulations. Material experts evaluate the feasibility of the tool to assess the quality of the material and the completeness of the training program planning. The results of the material test conducted are presented in the table below:

Table 1. Material expert leasibility test results					
Name	Total	Value	Value	Feasibility	
	Grains	obtained	Ideal	Percentage	
Material expert 1	13	42	52	81%	
Material expert 2	13	45	52	87%	

Table 1 Material arrest fassibility test manults

Based on the results of the feasibility test with the two material experts, from the 13 questions given, the percentage for the first material expert was 81% and the second material expert was 87%. After obtaining the feasibility percentage, it is then consulted with the predetermined feasibility category table. With these results, it is stated that the Exercise Program Planning Application is declared very feasible to use.

b. Media Expert Validation Results

The media expert in question is an expert who can handle the creation and development of applications. Media experts assess physical aspects in the form of appearance and grammar. The results of the media expert feasibility test can be seen in Table 2:

Table 2. Media expert feasibility test results				
Name	Number of Items	Values that obtained	Ideal Value	Percentage Feasibility
Media expert 1	12	37	48	77%
Media expert 2	12	40	48	83%

Based on the results of the feasibility test with the two media experts, from the 12 questions given, the percentage for the first media expert was 77% and the second media expert was 83%. After obtaining the feasibility percentage, it is then consulted with the predetermined feasibility category table. With these results, it is stated that the Exercise Program Planning Application is declared very feasible to use.

Design Revision

After the product design is validated through discussions with experts and experts, the weaknesses of the product will be known. Furthermore, improvements are made to minimize product weaknesses. The results of the validation test from material experts and media experts, the suggestions given, the researchers revised the products used.

Small Group Trial

The small group trial was conducted with PKO Unimed students who had passed the Exercise Program Planning course. In this small trial, respondents assessed the feasibility of the application and provided suggestions for later improvement by researchers. The results of the small group trial were 15 respondents. A description of the results of research on the development of sports training program planning applications can be seen in the table below:

No.	Interval	Predicate	Frequency	Percentage (%)
1	81%-100%	Value	9	60
2	61%-80%	Decent Enough	4	27
3	41%-60%	Less Feasible	2	13
4	<40%	Not Feasible	0	0
	Tot	al	15	100

Table 3. Results of small group trial of exercise program planning application development

Based on the results of the small group trial, out of 15 respondents, 60% (9 students) stated that it was feasible, 27% (4 students) stated that it was quite feasible, 13% (2 students) stated that it was less feasible and no students stated that it was not feasible.

Product Revision Small Group Trial

After conducting product trials in small groups, the existing shortcomings will be known, then further product revisions are made to improve the feasibility and quality of the application to be used and accessed.

Large Group Trial

Product testing in large groups is carried out similarly to the small group test. This is intended to determine the feasibility of the application developed. Large group trials were conducted on 60 respondents. The results of the development of sports training program planning applications can be seen in the table below:

No.	Interval	Predicate	Frequency	Percentage (%)
1	81%-100%	Value	42	70
2	61%-80%	Decent Enough	15	25
3	41%-60%	Less Feasible	3	5
4	<40%	Not Feasible	0	0
	Total		60	100

Table 4. Results of the large group trial of exercise program planning application development

Based on the results of the large group trial, out of 60 respondents, 70% (42 students) stated that it was feasible, 25% (15 students) stated that it was quite feasible, 5% (3 students) stated that it was less feasible and there were no students who stated that it was not feasible.

Product Revision Large Group Trial

After conducting product trials in large groups, the existing shortcomings will be known, then further product revisions are made to improve the feasibility and quality of the application to be used and accessed.

Bulk Usage

The final product of this research is a sports training program planning application. This development will support the quality of trainers, especially sports physical trainers to design and design training programs. Furthermore, if this research has been improved from the results of input and evaluation, then this product can be introduced to related parties, both the Indonesian National Sports Committee (KONI) and the Provincial Management (Pengprov) of sports.

4. DISCUSSION

The results of the research on the development of SIPRENPOL (Sports Training Program Planning Information System) show that this application is very feasible to use to assist trainers in compiling and managing sports training programs, especially for physical trainers. The validation results from material experts show that this application is very feasible to use, with a feasibility percentage of 81% and 87% from two different experts. The validation results from media experts corroborated this, with feasibility levels of 77% and 83%. These findings indicate that the app meets the required standards regarding content, appearance and language use for a practical app. The small group trial with 15 students showed that 60% of respondents rated the app as feasible, 27% as moderately feasible, and 13% as less feasible. No respondents stated that the app was not feasible. The pilot test with 60 respondents gave comparable results, with 70% rating the app as feasible and 25% as moderately feasible. These results indicate that the SIPRENPOL application generally received good feedback from potential users. The results showed high feasibility; however, feedback was obtained during the validation and pilot testing process. Revisions to the product were implemented to address identified weaknesses in the design and functionality of the application.

The creation of the Sports Training Program Planning Information System represents a significant advance in improving the effectiveness of sports training, particularly for physical trainers. The study showed that the developed application demonstrated strong feasibility as a resource for coaches in structuring and managing training programs. Findings show that the application of information technology in various domains, such as education and sports, significantly improves the performance and effectiveness of processes already (Shodiq, 2021; Suherman & Indra, 2023). Information systems serve as a tool to structure training programs and as a platform for coaches to manage athlete data, monitor progress, and conduct periodic evaluations. The system allows coaches to effectively design training programs tailored to athletes' individual needs and abilities. Previous research suggests that the application of information technology in education and training management can improve the interaction between coaches and athletes and increase access to necessary resources (Shodiq, 2021; Suherman & Indra, 2023). This application is anticipated to increase athletes' motivation to participate in training programs. Research shows that information technology can increase students' learning motivation, a concept that can also be applied to athletes in their training programs (Paende et al., 2022). The use of interactive and informative applications can increase athlete engagement in the training process, thereby improving program effectiveness. This information system is designed to facilitate the management of training schedules and monitoring of training outcomes. Effective time management is essential to achieve optimal training goals. Research shows that effective management in education and training improves the quality of outcomes achieved (Subadre et al., 2023). This application serves as a tool and system that improves decision-making for trainers.

The Sports Training Program Planning Information System offers several important advantages in the management and implementation of training programs. The system allows coaches to create more organized and systematic training programs. The information system allows coaches to access pertinent data regarding the needs and abilities of athletes, thus enabling adjustments to the training program to suit the physical condition and goals of each athlete. This is in line with research showing that management information systems improve organizational performance by providing precise and accurate information for decision making (Anugrah et al., 2024). Secondly, this information system facilitates the monitoring of athletes' progress by coaches. Integrated monitoring features allow coaches to track athletes' progress over time, including the achievement of training goals and performance assessments. Research shows that effective monitoring can increase athlete motivation and assist coaches in providing constructive feedback (Nugroho & Zuhdi, 2017). This

information system serves as a tool and mechanism to improve the interaction between coaches and athletes.

In addition, the sports training program planning information system improves time efficiency and resource management. An integrated system allows trainers to efficiently organize training schedules, manage equipment inventory, and plan training sessions. Research shows that effective management in the context of education and training can improve the quality of outcomes achieved (Latifah et al., 2023). This information system is anticipated to reduce administrative time, so that coaches can concentrate more on athlete development. This information system can serve as a platform for the exchange of knowledge and experience among coaches. The collaboration feature allows coaches to share information regarding training techniques, strategies, and experiences in the management of training programs. Collaboration among coaches can improve the quality of training and accelerate the learning process (Andika et al., 2024). This information system benefits individuals and improves the overall quality of training. Fifth, sports training program planning information systems facilitate better decision-making. Accurate data and comprehensive analysis allow coaches to make informed decisions about training programs, technique selection and strategy implementation. Evidence suggests that data-driven decision making can improve program effectiveness and outcomes (Sonhaji, 2017). This information system is anticipated to be a valuable resource for improving decision-making in sports training.

This information system increases transparency and accountability in training program management. An integrated system allows all stakeholders, including athletes, coaches and management, to access uniform information regarding training programs and athletes' progress. Research shows that transparency in management increases trust among coaches and athletes, as well as between coaches and management (Bratakusuma & Ma'arifah, 2023). These information systems can improve the training environment, making it more positive and productive. Seventh, sports training program planning information systems can serve as a mechanism for continuous evaluation and improvement. Integrated evaluation features allow trainers to analyze training program quality and outcomes (Syafarudin & Hertati, 2020). This information system is anticipated to facilitate continuous improvement of training program management. This information system can help develop athletes' talent and potential. Accurate data on athletes' abilities and progress allows coaches to develop training programs tailored to individual needs. Research shows that personalized training

approaches can improve athletes' motivation and performance outcomes (Hery et al., 2022). This information system can enhance the development of athletes' talent and potential.

The implementation of a sports training program planning information system improves information accessibility for all stakeholders involved. Coaches and athletes can access information regarding training programs at any time and from any location through web-based systems or mobile applications. Research shows that effective information accessibility can increase athlete engagement and participation in training programs (Novianto et al., 2023). This information system is anticipated to increase athlete engagement in the training process. This information system can serve as a tool to improve communication between coaches and athletes. The integrated communication features of allow coaches to relay information and feedback directly to athletes while considering athlete input regarding the training program. Research shows that effective communication between coaches and athletes can improve cooperative relationships and outcomes (Rahmansyah et al., 2021). Thus, this information system can improve communication in the realm of sports training. The advantages of a Sports Training Program Planning Information System are varied and substantial. Trainers can improve the design, management and evaluation of training programs through the application of information technology. This will improve the quality of training and contribute to the overall development of athletes. The application of this information system is highly recommended for sports training program management.

The development of this information system is in line with global trends in the use of information technology to improve efficiency and effectiveness in various sectors, including sports. Research shows that information technology significantly improves the quality of service and management in various domains, including the administration of sports training programs (Shodiq, 2021; Suherman & Indra, 2023). Therefore, the implementation of this information system is anticipated to serve as a model for the development of similar systems in other sports domains. The successful implementation of this information system depends on the training and understanding of its users, particularly coaches and athletes. Research shows that a strong understanding of information technology increases its effectiveness in education and training environments (Shodiq, 2021; Suherman & Indra, 2023). Therefore, training programs for coaches and athletes must be structured to maximize the effectiveness of this information system. The development of the Sports Training Program Planning Information System has significant potential to improve the effectiveness of sports training. It facilitates the development and management of training programs for coaches while increasing athlete motivation and engagement in the training process. Effective implementation

of this system relies heavily on user training and understanding, as well as ongoing support from all relevant stakeholders.

5. CONCLUSIONS

The results of the research and development of the Sports Training Program Planning Information System (SIPRENPOL) showed strong feasibility as a tool for designing and managing sports training programs, especially for physical trainers. Validation by material and media experts, as well as the results of small and large group trials, showed that this application was positively received by potential users, with most respondents giving a favorable evaluation. Revisions after the trial optimized this application to meet the needs of coaches and athletes. The results of this study are in line with previous research which indicates that the use of information technology in training management can improve the effectiveness and efficiency of training programs. Previous research suggests that effectively designed information systems can improve the quality of interaction between coaches and athletes, thereby increasing athlete engagement in training programs. In addition, previous studies have shown that information technology significantly improves transparency, accountability and decision-making in sports education and training. The SIPRENPOL application enhances the planning process while improving efficiency, transparency and communication in the management of training programs. These findings support the assertion that integrating information technology into sports training management can significantly improve outcomes. The implementation of SIPRENPOL is expected to serve as a model for the development of similar systems in other sports, improving the quality of sports training and facilitating the overall progress of athletes. Effective implementation of SIPRENPOL depends on users' understanding and readiness to utilize this technology efficiently.

6. REFERENCES

- Afendi, F., Wani, B., & Rewo, J. M. (2021). Development of a Table Tennis Forehand Stroke Training Model as a PJOK Learning Activity for Junior High School Students. *Journal of Sports Image Education*, 1(3), 198-205. <u>https://doi.org/10.38048/jor.v1i3.497</u>
- 2. Alif, M. N., Sudirjo, E., & Rasydiq, H. (2021). KARATE SCORING SYSTEM: Android-based scoring application. *Jorpres*, *17*(1), 11-18. <u>https://doi.org/10.21831/jorpres.v17i1.33425</u>
- Andika, I., Lim, S., Nevile, S., Satya, R., & Farisi, A. (2024). Information System Management Project Analysis: A Systematic Literature Review. *Journal of Informatics Engineering and Information Systems*, 11(1), 1-56. <u>https://doi.org/10.35957/jatisi.v11i1.7006</u>
- 4. Anugrah, R., Nugroho, D., & Nuche, A. (2024). The Effect of Management Information Systems in Shaping the Performance of Business Organizations in Indonesia. *Mentari Journal of*

Education Management and Information Technology, 2(2), 134-141. <u>https://doi.org/10.33050/mentari.v2i2.480</u>

- Aqobah, Q. J., Nuryadin, A., Triprayogo, R., & Nuradhiani, A. (2023). Training on Prevention, Injury Care and Post-Injury Exercise Therapy for Coaches in Koni Banten. *Jurnal Abmas Negeri*, 4(2), 113-119. <u>https://doi.org/10.36590/jagri.v4i2.74</u>
- 6. Borg, W. R., & Gall, M. D. (2023). Educational Research: An Introduction. Longman Inc.
- Bratakusuma, T., & Ma'arifah, W. (2023). Bolasoft Football School and Competition Management System Using Rapid Application Development Method. *Journal of Business Information Systems*, 14(1), 1-11. <u>https://doi.org/https://doi.org/10.21456/vol14iss1pp1-11</u>
- Dhanireksa, A., Sonjaya, A. R., & Hermawan, I. (2023). The Effect of Interval Training Methods in Improving Endurance and Stability of Movement of Pencak Silat Sports Branch Athletes. *Indonesian Journal of Physical Education and Sports Science*, 2(2), 125-135. <u>https://doi.org/10.52188/ijpess.v2i2.518</u>
- 9. Dharmadi, M. A. (2022). BeFind: A Sports Training Start-Up to Improve the Sports Industry Based on Digital Technology. *Mimbar Ilmu*, 27(2), 333-339. https://doi.org/10.23887/mi.v27i2.52468
- 10. Fitrianto, E. J. (2022). The Effectiveness of Training on Sports Physiology Material on the Level of Knowledge of Sports Physiology Material in DKI Jakarta Sports Branch Coaches. *Scientific Journal of Sport Coaching and Education*, 6(1), 7-13. <u>https://doi.org/10.21009/jsce.06102</u>
- Giartama, G., Destriani, D., Waluyo, W., & Muslimin, M. (2020). Effectiveness of Microcontroller-Based Bolavoli Serving Test Tool. Sportif Journal of Learning Research, 6(2), 499-513. <u>https://doi.org/10.29407/js_unpgri.v6i2.14492</u>
- Hery, Kaheja, A. M., Haryani, C. A., & Widjaja, A. E. (2022). Development and Research of Production Management Information System (Partner: PT. Maju Bersama Persada Dayamu (MBPD) Tangerang). *Giat Teknologi Untuk Masyarakat*, 1(1), 37-47. https://doi.org/10.24002/giat.v1i1.5855
- Jariono, G., Nursubekti, N., Indarto, P., Hendarto, S., Nugroho, H., & Fachrezy, F. (2020). Physical Condition Analysis Using Kinovea Software for Taekwondo Athletes Dojang Mahameru Surakarta. *Transformation Journal of Community Service*, 16(2), 133-144. <u>https://doi.org/10.20414/transformasi.v16i2.2635</u>
- Jehadun, F., Natal, Y. R., & Bile, R. L. (2024). Development of a Defense Training Program in Single Badminton Games for Senior High School Students. *Journal of Sports Image Education*, 4(2), 75-86. <u>https://doi.org/10.38048/jor.v4i2.2260</u>
- 15. Komarudin, K. (2018). Increasing Athlete Motivation Through Brain Jogging Training in Team and Individual Sports. *Journal of Sociotechnology*, *17*(1), 21-29. <u>https://doi.org/10.5614/sostek.itbj.2018.17.1.3</u>
- 16. Latifah, A., Baswardono, W., Ahdan, A. M., & Aisyah, R. (2023). Application of Web Engineering Methods in the Development of a Web-Based Badminton Sports Building Management System. *Algorithm Journal*, 20(2), 364-375. https://doi.org/10.33364/algoritma/v.20-2.1429

- 17. Novianto, E., Ujianto, E. I. H., & Rianto, R. (2023). Information Security on Personnel Management Information System Applications with Defense in Depth. *Journal of Computers and Informatics*, 11(1), 1-6. <u>https://doi.org/10.35508/jicon.v11i1.9139</u>
- Nugroho, A., & Zuhdi, M. (2017). Object-Oriented Learning Management Information System. Jsi Journal of Information Systems (E-Journal),9 (2). https://doi.org/10.36706/jsi.v9i2.7993
- Paende, A., Mewengkang, A., & Batmetan, J. R. (2022). The Effect of Information Technology Use on Learning Motivation of Class X Vocational Students. *Edutik Journal of Information and Communication Technology Education*, 2(5), 715-723. <u>https://doi.org/10.53682/edutik.v2i5.5928</u>
- 20. Pasaribu, A. M. N. (2022). Physical Condition Training for DKI Jakarta PJSI Athletes Towards PON in 2021. *Dharma Raflesia Scientific Journal of Science and Technology Development and Application*, 20(1), 115-122. <u>https://doi.org/10.33369/dr.v20i1.20761</u>
- 21. Pasaribu, A. M. N., & Yudhaprawira, A. (2020). Strength and Conditioning Training for Badminton Athletes at Metland East Jakarta. *Ubj Journal of Community Service*, *3*(2), 163-170. https://doi.org/10.31599/jabdimas.v3i2.204
- 22. Rahman, F., Cahyadi, M. M., Jasmine, S. A., Larasati, Ayu, A. S., & Pristianto, A. (2023). Application of the Plyometric Exercise Model to Improve Agility in the Voodoo Roller Skating Community. *Journal of Pustaka Mitra*, 3(5), 233-237. <u>https://doi.org/10.55382/jurnalpustakamitra.v3i5.627</u>
- 23. Rahmansyah, A. K., Khusniyah, A., & Amrozi, Y. (2021). Analysis of Knowledge Management on Organizational Performance. *Journal of Technology and Management*, 2(2), 59-64. <u>https://doi.org/10.31284/j.jtm.2021.v2i2.1460</u>
- 24. Rahmat, E., Rusdiana, A., & Ruhayati, Y. (2017). Development of Chin Up Test Technology Based on Arduino Uno and Infrared Sensor with LCD Display. *Journal of Applied Sports Science*, 2(1), 1-14. <u>https://doi.org/10.17509/jtikor.v2i1.4961</u>
- 25. Shodiq, S. (2021). The Role of Information Systems and Information Technology in the Learning Process during the Covid-19 Pandemic. *Journal of Education*, 8(1), 270-281. https://doi.org/10.19184/jukasi.v8i1.23968
- 26. Sonhaji, S. (2017). Sharia Management Accounting Information System for Islamic Organizations. *Journal of Multiparadigm Accounting*, 8(1), 1-16. https://doi.org/10.18202/jamal.2017.04.7039
- 27. Subadre, W., Jufri, A. W., & Karta, I. W. (2023). The Effect of Infrastructure Facilities and Utilization of Information Technology in Learning on the Quality of Education in State Junior High Schools in North Lombok Regency in 2022. *Journal of Educational Administration Practitioners*, 7(1), 1-9. <u>https://doi.org/10.29303/jpap.v7i1.504</u>
- 28. Suherman, I., & Indra, H. (2023). The Role of Information Technology in Improving the Effectiveness of Islamic Education Leadership. *Multidisciplinary Scientific Journal*, 1(10), 680-684. <u>https://doi.org/10.57185/mutiara.v1i10.104</u>
- 29. Syafarudin, A., & Hertati, L. (2020). Implementation of Human Capital and its Impact on Service Quality in Management Information Systems. *Accounting Information Systems and Information Technology for Business Companies*, 5(1), 31-45. <u>https://doi.org/10.34010/aisthebest.v5i1.2801</u>

Wahadi, Pratama, R. S., Romadhoni, S., Kriswantoro, Kusumawardhana, B., & Nadzalan, A. M. (2023). Sports Training Program Monitor Training for Petanque Athletes and Coaches in Central Java. *Proficio*, 5(1), 91-97. <u>https://doi.org/10.36728/jpf.v5i1.2928</u>

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CONFLICTS OF INTEREST

The authors declare no conflict of interest.

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