

Enhancing soccer performance through targeted training programs for university students: A case study at Thai Nguyen University of Technology

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Abstract

This study assesses the effectiveness of a 10-week soccer training program for students at Thai Nguyen University of Technology, focusing on technical skills and physical fitness. Thirty-six students participated in the quasi-experiment design, and before and after the intervention measured dribbling speed, handover movement, accuracy shooting, VO2 maximum, sprint speed, and mobility. The program includes 150 minutes of weekly sessions, integrated regular skill exercises, and physical condition. The results showed significant improvements in all results measured with large effect sizes (Cohen D > 0.8). Qualitative survey data showed high levels of satisfaction for students, indicating improved trust and improved team coaching. These results highlight the potential of programs that improve the physical education curriculum at universities and promote overall student development. This study provides a replicable model for resource-related institutions committed to structured soccer training to support wells in health and society. Future research should examine longer interventions and multicenter attitudes.

Keywords: soccer training, physical education, university students, technical skills, physical fitness

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I. Introduction

Football is one of the world-wide sports and is a unique position that promotes physical fitness, teamwork and intellectual resistance among participants. In an educational setting, especially within university scientists (PE) programs (PE), soccer serves as a dynamic tool to promote overall student development. At Thai Nu Nguyen University of Technology (TNUT), Vietnam, soccer is the foundation of the PE curriculum, which includes students in both leisure and competitive formats. However, the lack of a structured evidence-based training program tailored to the needs of university students limits the potential benefits of football to improve technical skills and physical condition. This study addresses this gap by designing and evaluating targeted soccer training programs for TNUT students to improve soccer skills and fitness in general.

The importance of soccer in the formation of Colleges goes beyond physical activity. Participation in team sports such as soccer was associated with improved mental health, social cohesion and academic appearance among students (Bailey, 2018). In Vietnam, where faster urbanization and academic pressures often reduce the likelihood of physical activity, university PE programs play an important role in combating sedentary lifestyles. The leading technical institution, TNUT has incorporated a diverse student body, many different football experiences. Although the university's PE curriculum includes soccer, training methods often rely on traditional, professional approaches that do not meet the specific development needs of young adults. This raises an important research question:

As part of the university's PE environment, how can a structured soccer training program improve technical skills and fitness? The main goal of this study is to assess the effectiveness of a 10-week soccer training program for TNUT students.

The program focuses on developing core specialist knowledge, including dribbling, passing, shooting, and more, improving physical fitness components such as endurance, mobility, and strength. This study sets out two important research questions.

(1)How do targeted training programs improve college students' soccer skills? (2) What are the measurable effects on physical fitness and team dynamics? By answering these questions, this study aims to provide insights that can be implemented for education educators and to contribute to the expansion of the literature on sports training in university education.

The importance of this study lies in the potential to inform PE curriculum design not only in TNUT, but also in other universities in Vietnam and Southeast Asia. By demonstrating the benefits of a structured football training program, this study aims to address the integration of evidence-based sports training into university

training. Furthermore, this study addresses global health initiatives and highlights the role of physical activity in preventing non-communicable diseases and the promotion of wellness in young adults (World Health Organization, 2020). Through a case study approach at TNUT, this study provides a local perspective on how soccer can be used to improve student development in a university of technology setting.

The literature on soccer training in an educational setting shows a variety of benefits, including physical, psychological and social aspects. Football training programs are well documented to improve participants' cardiovascular fitness, muscle presentation, and mobility (Krustrup et al., 2010). In the university context, these programs are particularly valuable to consider the decline in physical activity that is often observed during the transition from adolescence to adulthood. Research shows that structured sports participation can reduce stress and improve mental health. This is extremely important for students navigating academic and social pressures (Eime et al., 2013). However, most existing research focuses on competitive athletes or younger age groups, and leisure football training for university students has been observed only in non-Western contexts such as Vietnam.

Soccer training methods usually emphasize a combination of technical, tactical and physical components. Technical skills such as dribbling, passing, and shooting form the basis of soccer knowledge and require repeated, intentional practice (Ford et al., 2012). Tactical training, including decision-making and game recognition, is often introduced at a sophisticated level, but beginners can benefit from simplified exercises. Health, including endurance, speed and mobility, is extremely important to maintain performance during the game. Periodization, a training approach that cycles the intensity and quantity of performance to optimize performance, is widespread in professional soccer, but is less common in educational settings (Issurin, 2010). This study adapts the principle of cyclicalization to the design of progressive training programs suitable for students with different skills.

Motor learning theory provides a theoretical framework for understanding soccer skills. According to Schmidt and Wrisberg (2008), motor learning involves the development of motor patterns through practice and feedback. For university students who may have limited soccer experience, training programs should harmonize repetition of skills with motivational elements in order to maintain commitment. Feedback from trainers, combined with self-assessment, improves the storage and performance of your skills. This study includes the principles of motor learning through structural exercises that go beyond simple tasks to complex tasks and ensure that students build trust and competence.

The physical fitness benefits of Football are well-established. Regular soccer participation improves aerobic capacity measured with VO₂ Max, and improves anaerobic performance such as Sprint Speed and Mobility (Bangsbo et al., 2014). For students, these improvements improve general health and reduce the risk of obesity. Research by Krustrup et al. (2010) found that after 12 weeks of training, leisure football players showed significant benefits in cardiovascular fitness and muscle strength. This indicates that similar outcomes can be achieved in educational settings. However, the intensity and duration of training should be adjusted to avoid overexertion, especially in non-athletes.

Despite the robust literature on soccer training, there are several gaps. First, most studies focus on competition or youth soccer where research into leisure programs for students is limited. Second, there is a lack of research into soccer training in Southeast Asia, with cultural and ecological factors likely to influence program design and outcomes. For example, Vietnam is gaining interest in soccer, but the training model based on educational institutions (Nguyen & Tran, 2019) is missing. Third, research examining the interaction between technical skills and team dynamics in leisure environments is an area with special relevance to university PE programs that emphasize collaboration.

In TNUT, soccer is a popular activity within the PE curriculum, but training methods often lack structure and scientific evidence. The population, mainly ages 18-22, includes both beginners and intermediate students who need a flexible training approach. Previous research on sports at the University of Vietnam highlights the need for programs that harmonize joy and skill development to maintain participation (Le & Pham, 2021). This study addresses these needs by designing programs that integrate technical exercises, physical conditions, and team building activities tailored to the TNUT context.

In theory, this study contributes to the use of motor learning and cyclicalization in noncompetitive sports environments. In practice, it provides PE teachers with a reproducible model to improve their soccer training. Because of its focus on TNUT, this study provides case studies that may affect policies and practice in similar institutions. The integration of quantitative (skills and fitness metrics) and qualitative data (student feedback) ensures a comprehensive assessment of the effectiveness of the training program.

In summary, this literature highlights the value of football in promoting physical and social health, but highlights the need for a tailor-made program in a university setting. This study is based on existing research findings by providing a structured approach to soccer training that addresses the special needs of TNUT students and serves as a model for other institutions.

II. Methodology

This study uses a semi-experimental research design to assess the effectiveness of a 10 week soccer training program for students at Thai Nu Nguyen University of Technology (TNUT). This design includes pre- and post-reviews of interventions to measure improvements in soccer skills and fitness, supplemented by qualitative data for perception of students. This approach allows a comprehensive analysis of the program's impact and practical limitations of the PE university environment.

This study consists of 36 students (24 males, 12 females ages 18 to 22) enrolled in soccer classes within the TNUT PE curriculum. Participants are selected in convenience sampling to ensure a mix of beginner and intermediate actors to reflect the various skills typical of university settings. Exclusion criteria include students with medical conditions that prevent physical activity from being banned or unable to tackle a full training period. The declaration of consent is made by all participants and ethical approval is obtained from the institutional review board by TNUT.

The 10-week training program aims to improve technical football ability (dribbling, passing, photography) and physical fitness (endurance, agility, strength). Training courses are held twice a week for 90 minutes each and are managed by a researcher who is a qualified PE instructor, with the support of a trained trainer. This program follows a periodic structure that exceeds 5-8 (e.g., shooting accuracy, agility-based drills, etc.) from the basic exercises of 1-4 weeks (e.g., small games) (e.g., basic dribbling, short passes). Physical condition is integrated with warm-ups, sprint intervals and strength exercises tailored to football requirements. The program highlights the principles of motor learning with repetitive practice, immediate feedback and progressive complexity to optimize competency acquisition.

Data Collection

Data are collected before and after the intervention to assess changes in performance. Soccer skills are evaluated in standardized tests: dribbling speed (time to complete a 20-meter slalom course), accuracy (number of successful passes to one target), firefight (goals from defined distance). Physical fitness is measured in three tests:

VO2 Max (estimated in a 12-minute Cooper test), sprint speed (20-meter fitting board), and mobility (T-test). All tests are performed under consistent conditions on the TNUT soccer field. Additionally, the intervention study uses a 5-point Likert scale and open questions to collect qualitative data on student perceptions related to training effectiveness, fun, and team coaching.

Data Analysis

Quantitative data are analyzed using paired t-tests to set the statistical significance of $P < 0.05$ by comparing pre- and post-reviews of skill and fitness metric interventions. Effect size (Cohens D) is calculated to quantify the size of the improvement. Qualitative survey responses are thematically analyzed to identify repetitive patterns of student feedback, such as perceived skills and social benefits. A combination of statistical and thematic analysis ensures a robust assessment of program results.

Limitations

The focus and moderate sample size of the study may limit generalizability. However, detailed methodologies and standardized measures improve research reproducibility and provide the basis for future research in a similar context.

III. Results And Discussion

The 10-week soccer training program at Thai Nu Nguyen University of Technology (TNUT) brought about significant improvements in both technical football ability and physical fitness among 36 participants (24 men, 12 women, ages 18 to 22). Semi-experimental design with pre- and post-intervention reviews provided robust data on program efficacy. Qualitative survey responses continued to recognize perceptions of training experience.

Quantitative Findings

Soccer Skills:

- **Dribbling Speed:** The time to complete a 20-meter slalom course decreased from a mean of 12.8 seconds ($SD = 1.9$) pre-intervention to 10.9 seconds ($SD = 1.5$) post-intervention ($t(35) = 6.72$, $p < 0.001$, Cohen's $d = 1.12$). This indicates a substantial improvement in dribbling efficiency.
- **Passing Accuracy:** The number of successful passes to a target (out of 10 attempts) increased from a mean of 6.4 ($SD = 1.6$) to 8.2 ($SD = 1.2$) ($t(35) = 7.19$, $p < 0.001$, Cohen's $d = 1.27$). Participants demonstrated enhanced precision in ball control.

- **Shooting Precision:** Goals scored from set distances (out of 10 attempts) rose from a mean of 4.7 (SD = 1.8) to 6.5 (SD = 1.4) ($t(35) = 5.88$, $p < 0.001$, Cohen's $d = 1.09$). This reflects improved shooting accuracy and power.

Physical Fitness:

- **VO2 Max (Cooper Test):** Estimated aerobic capacity improved from a mean of 42.3 mL/kg/min (SD = 4.5) to 46.1 mL/kg/min (SD = 4.1) ($t(35) = 6.05$, $p < 0.001$, Cohen's $d = 0.89$). This suggests enhanced endurance, critical for sustained soccer performance.
- **Sprint Speed (20-meter Dash):** Sprint times decreased from a mean of 3.9 seconds (SD = 0.4) to 3.6 seconds (SD = 0.3) ($t(35) = 5.12$, $p < 0.001$, Cohen's $d = 0.83$). Participants exhibited faster linear speed.
- **Agility (T-test):** Agility test times reduced from a mean of 10.2 seconds (SD = 1.1) to 9.3 seconds (SD = 0.9) ($t(35) = 5.67$, $p < 0.001$, Cohen's $d = 0.90$). This indicates improved ability to change direction rapidly. All quantitative results showed statistically significant improvements with large effect sizes (Cohen's $d > 0.8$), underscoring the program's efficacy in enhancing both technical and physical outcomes.

Qualitative Findings

The post-intervention survey (response rate: 100%) provided insights into student perceptions. On a 5-point Likert scale (1 = strongly disagree, 5 = strongly agree), participants rated the training program highly:

- **Effectiveness:** Mean score of 4.6 (SD = 0.5) for "The training improved my soccer skills."
- **Enjoyment:** Mean score of 4.7 (SD = 0.4) for "I enjoyed participating in the training sessions."
- **Team Cohesion:** Mean score of 4.5 (SD = 0.6) for "The training enhanced my sense of teamwork."

Theme analysis of open responses identified three important topics:

Skill Trust:

Students often noticed an increased trust in dribbling, passing and shooting with comments such as "I feel that controlling the ball is much better."

Physical improvement:

Many people have shown that they feel "more fitter" and "more energetic" due to conditioning drilling.

Social Benefits:

Participants emphasized the loyalty of the stronger team, with comments such as "Together the game came closer to us as a group."

Quantitative data confirmed significant improvements in soccer skills and fitness, but qualitative feedback highlighted the positive effects of the programme on student trust, enjoyment and teamwork. These results suggest that a 10-week, 150-minute weekly training program is effective in achieving your goals.

The results of this study show that a structured 10-week soccer training programme significantly improves technical skills and physical fitness among TNUT university students. The accuracy of dribbling speed improvement, handover and engine learning corresponds to motor learning theory, which allows intentional practice and feedback (Schmidt & Wrisberg, 2008). The cyclical structure of programs beyond basic to complex exercises may have contributed to these results by allowing students to create basic skills before reaching more demanding tasks. The large effect size (Cohen D in the range of 0.83-1.27) shows a robust improvement, especially considering only weekly sessions in the 150-minute program.

Improve your fitness - Improvement VO2 Max, Sprint Speed, Mobility - In line with previous research on leisure football training. Krstrup et al. (2010) reported similar improvements in aerobic capacity and speed after 12 weeks of training. This shows that short interventions, such as the last 10-week program, can achieve the benefits of wise fitness. The integration of sprint intervals and strength exercises may have facilitated these improvements in terms of perhaps the most important physical requirements of soccer. These results are particularly relevant for university students who are often exposed to reduced levels of physical activity during their academic year (Eime et al., 2013).

Qualitative data enriches the results and shows a high degree of satisfaction with students and perceived benefits. A strong review of effectiveness and pleasure suggests that the program has received good reviews, perhaps due to the balance of specialized exercises and engaging activities such as Little Games. The emphasis on team cohesion corresponds to the role of football in promoting social connection (Bailey, 2018). In the Vietnamese context where collectivism is culturally important, these social benefits can improve the appeal and sustainability of the programme in the TNUT PE curriculum.

Compared to existing studies, this study closes the literature gaps in the relaxation football training for students in Southeast Asia. While the majority of global research is on competitive athletes or young population groups, this study shows that non-competitive university programs with limited weekly training times can achieve important results. The results also progress from studies by Nguyen and Tran (2019), who found inconsistent training structures at universities in Vietnam. By using the principles of cyclicalization and motor learning, this program offers a more systematic approach and may serve as a model for other institutions.

Results have practical implications for PE educators. The success of the programme in a 150-minute session suggests that resource-related universities can implement effective soccer training without the need for extensive time obligations. PE instructors can start with basic exercises and take over the regular structure to create trust among beginners and then create play-based scenarios to maintain their commitment. Including physical conditioning in the meeting ensures overall development and address both skill and fitness goals. Furthermore, positive feedback from students highlights how important it is to create a comfortable and socially rewarding training environment to maintain participation.

needs to find some limitations. The focus of research at TNUT limits its generalizability. This is because institutional factors (institutions, student demographics, etc.) may differ elsewhere. Medium sample size ($n = 36$) is sufficient for statistical analysis, but may not fully record the diversity of student experiences. Though ten weeks periods and individual weekly sessions are practical, they may be limited in practice compared to longer, more frequent or frequent interventions. Finally, it can be inserted into fitness data with a dependency on estimated VO2 maximum via Cooper tests and with mild inaccuracy rather than direct measurements.

Future research can address these limitations by including several universities to improve generalization. An increased intervention period or an increased frequency of meetings can lead to higher improvements, particularly due to advanced skills. The inclusion of portable technologies such as heart rate monitors and GPS trackers can provide more accurate fitness data and insight into training intensity. Longitudinal studies pursuing student soccer participation after the intervention can also assess the long-term impact of the program on physical activity habits and team dynamics.

The 10-week soccer training program has significantly improved the technical skills, physical fitness and social cohesion of TNUT students. These results highlight the potential for structured, evidence-based training to improve the university's PE curriculum. By providing a replicable model, this study encourages educators to integrate similar programs and promote student health and commitment through football.

IV. Conclusion

This study shows that a 10-week soccer training program with a 150-minute session improves team technical skills, physical fitness and cohesion among students at Thai Nguyen University of Technology. Quantitative results showed significant improvements in dribbling speed, handover movement, shooting accuracy, aerobic capacity, sprint speed, and mobility. Qualitative feedback showed a high level of student satisfaction, increased trust, strengthened social connections, and confirmed the overall benefits of the program. These findings address the principles of motor learning and cyclicalization and provide a structured, evidence-based approach for soccer training in a university setting. In practice, the program provides a replicable model for sports teachers to integrate into the curriculum and promote student health and commitment with minimal resource requirements. Despite limitations such as individual institutional focus and moderate sample size, this study forms the basis for future research and examines longer interventions or multi-parliamentary contexts. By presenting the possibilities of football to promote physical and social development, this study supports this study for prioritization in the formation of universities and encourages universities to take similar initiatives to support student wells.

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