Enhancing Sports Education in Resource-Limited: Usability and Scalability of a Novel Street Tennis Module

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ABSTRACT

This study focuses on the third phase of Design and Development Research (DDR), evaluating the usability of the street tennis module designed to address resource limitations in Malaysian primary schools. The usability evaluation employed the Nominal Group Technique (NGT), involving 20 primary school teachers with foundational tennis knowledge and four field experts. Findings revealed exceptionally high usability scores, ranging from 96.42% to 98.57%. The module incorporates cost-effective equipment and flexible implementation strategies, ensuring accessibility for schools lacking traditional tennis facilities. Grounded in frameworks such as Teaching Games for Understanding (TGFU) and the Stages of Learning Theory, the module effectively enhances student engagement, skill development, and holistic growth. Additionally, the module demonstrates scalability and adaptability across diverse educational contexts, addressing the gaps in access to quality physical education. This study underscores the module's potential to bridge disparities in resource-limited settings and its ability to serve as a foundation for future research and policy initiatives. The findings offer actionable insights for policymakers and educators seeking innovative solutions to improve sports education equity in under-resourced schools.

Keywords: Street Tennis, Usability Evaluation, Primary School, Tennis Module, Design and Development Research (DDR)

INTRODUCTION

Tennis, as a sport, has long been recognized for its contributions to physical, mental, and social development. However, the accessibility of tennis education remains a significant challenge in many regions, including Malaysia, where infrastructural limitations such as the lack of tennis courts, limited equipment, and a shortage of trained coaches prevail (Rahman, Shariff & Hizan, 2024). These constraints are pervasive across schools, regardless of location, and significantly hinder the implementation of tennis programs. Past studies (e.g., Moon, & Lee (2022); Morales-Belando, Kirk & Arias-Estero (2022) have highlighted the potential benefits of integrating tennis into primary school curricula. Similar adaptive programs, such as QuickStart Tennis in the United States and Hot Shots Tennis in Australia, have also proven effective in addressing accessibility challenges in under-resourced schools (Flick, 2020). These examples further emphasize the significance of developing inclusive and scalable modules tailored to diverse educational needs. Yet, many of these initiatives fail to address the contextual realities faced by resource-limited schools, particularly in rural areas.

Existing approaches to sports education often emphasize standardized frameworks that require dedicated facilities, specialized equipment, and significant funding, rendering them impractical for widespread implementation, particularly in schools facing resource limitations. For instance, Bantham, Ross, Sebastião, and Hall (2021) critiqued the heavy reliance on conventional sports modules that are not only cost-intensive but also ill-suited for schools lacking access to essential facilities and trained personnel. Similarly, Karamani, Makopoulou, Mansfield, and Herold (2024) highlighted that, while physical education policies often advocate for inclusivity and equitable access, they frequently lack concrete and actionable strategies to address persistent logistical and infrastructural barriers. Furthermore, these policies tend to overlook the contextual realities faced by schools, where resource constraints limit the feasibility of implementing standard sports programs. These limitations emphasize the urgent need for innovative and adaptive solutions that cater to the

unique constraints of diverse educational environments. By incorporating cost-effective resources, flexible implementation strategies, and context-specific frameworks, such solutions can help bridge the gap in access to quality sports education and support the holistic development of students.

The street tennis module was designed by Rahman, Shariff, and Hizan (2025) to bridge these gaps by providing a scalable and adaptable alternative tailored to address the constraints faced by schools. Unlike traditional tennis training programs, which often rely on professional-grade equipment, dedicated courts, and highly trained coaches, this module leverages modified and cost-effective equipment along with flexible implementation guidelines. These features allow the module to be used effectively in non-traditional settings such as schoolyards, multi-purpose halls, or other shared spaces commonly available in schools. The module emphasizes accessibility and inclusivity, ensuring that students, regardless of their school's infrastructural or financial capacity, can participate in engaging and effective tennis training. Grounded in robust pedagogical frameworks such as Teaching Games for Understanding (TGFU) and the Stages of Learning Theory, the street tennis module fosters skill development, student engagement, and holistic growth. Its practical design also accommodates a variety of learning environments, making it an adaptable solution for schools with limited resources.

Figure 1 illustrates the design of the street tennis module, showcasing its innovative and user-friendly structure, which integrates progressive learning strategies to enhance the overall experience for both teachers and students (Rahman et al., 2025). This innovative approach sets the module apart as a significant step forward in promoting equitable access to sports education.
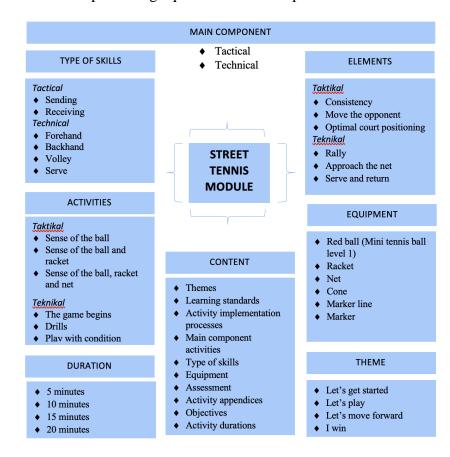

Figure 1: The street tennis module design

By integrating the Teaching Games for Understanding (TGFU) framework, the street tennis module prioritizes student engagement and tactical awareness, creating an interactive learning environment that encourages active participation. This approach aligns with the findings of García-López et al. (2022), who emphasized the effectiveness of game-based learning in fostering a deeper understanding of sports concepts and enhancing overall participation. Unlike traditional methods that focus primarily on technical drills, TGFU shifts the emphasis towards understanding game dynamics and decision-making processes, allowing students to develop both strategic and practical competencies.

Recent studies further validate the efficacy of the TGFU approach in tennis education. Breed, Lindsay, Kittel, and Spittle (2024) demonstrated that TGFU significantly enhances tactical decision-making and strategic thinking among young athletes aged 9–12, surpassing outcomes achieved through conventional technical-focused approaches. Similarly, Cheng, Chan, Cheng, and Chan (2021) found that the TGFU framework improves not only metacognitive knowledge and self-regulation but also overall performance in physical education settings, highlighting its broad applicability across various sports disciplines, including tennis.

Moreover, González-Valero, Ubago-Jiménez, Melguizo-Ibáñez, and Fernández-García (2024) highlighted that incorporating TGFU into tennis coaching enhances game-related awareness and player satisfaction, particularly through its emphasis on interactive and enjoyable sessions. These findings affirm that TGFU is a powerful tool for cultivating both technical and cognitive skills, fostering a more comprehensive understanding of the game. The street tennis module leverages these strengths, ensuring that students develop essential skills while maintaining a high level of engagement and enjoyment throughout the learning process.

In addition, the module incorporates the Stages of Learning Theory (SLT), which emphasizes a progressive and systematic approach to skill acquisition. This approach enables learners to build foundational competencies incrementally while fostering confidence through repeated and structured practice sessions. As highlighted by Moon and Lee (2022), this iterative process is particularly effective in nurturing both competence and motivation among students. To further enhance its relevance and adaptability, the module integrates the Taba Curriculum Model, allowing educators to modify its content and delivery according to the specific needs and contexts of their schools. This alignment ensures that the module remains flexible while maintaining its core educational objectives.

The application of stage learning theories, such as the Fitts and Posner model, strengthens the module's framework by structuring skill acquisition into three distinct stages: cognitive, associative, and autonomous. This structured progression allows educators and coaches to tailor their teaching strategies based on the learner's developmental stage, thereby optimizing both skill development and overall performance (Urhahne & Wijnia, 2023). However, while these traditional models provide valuable guidelines, recent discussions have pointed out their potential limitations in addressing the complexities of real-world learning scenarios. For instance, Petancevski, Inns, Fransen, and Impellizzeri (2022) argued that the linear progression suggested by these models may oversimplify the dynamic and multifaceted nature of skill acquisition, especially in sports education.

To address these limitations, the module incorporates contemporary approaches such as ecological dynamics, which emphasize adaptability, resilience, and non-linear learning processes. By integrating this perspective, the module not only promotes skill acquisition but also encourages learners to develop flexibility and problem-solving abilities in dynamic environments (Sanchez Mencia, Campos-Rius, González Santamaría, & Borrajo Mena, 2024). These insights underline the importance of blending traditional stage learning theories with modern, context-sensitive practices to create a more holistic and effective tennis coaching framework. The street tennis module, therefore, stands as a model of innovation, merging well-established theories with cutting-edge methodologies to meet the diverse needs of students and educators alike.

This study focuses on the usability of the street tennis module through feedback from primary school teachers and experts. Unlike prior research that predominantly centres on theoretical frameworks or isolated case studies, this phase adopts a comprehensive methodology to assess the module's practicality, relevance, and scalability. By addressing gaps in previous studies, the findings aim to provide actionable insights for educators seeking to enhance sports education in resource-constrained settings.

LITERATURE REVIEW

The foundation of sports education in resource-limited settings relies heavily on adaptive frameworks that cater to specific environmental constraints. Among the most influential are the Teaching Games for Understanding (TGFU) and Stages of Learning Theory (SLT). García-López et al. (2022) assert that TGFU fosters tactical awareness and participation through game-based learning, emphasizing adaptability in environments lacking formal infrastructure. However, while TGFU encourages creativity in teaching, it

demands a high level of teacher competency, a challenge amplified in under-resourced schools where professional training opportunities are scarce Moon & Lee (2022). This tension underscores the need for modules like the street tennis module, which simplifies implementation through structured, accessible guidelines.

SLT complements TGFU by emphasizing progressive skill acquisition, allowing students to build confidence and competence incrementally. Peters and Johnson (2020) highlight the relevance of this theory in sports education, noting its focus on iterative practice. Nevertheless, contextual adaptations are crucial to address the diverse needs of students, particularly in rural or underprivileged settings where access to consistent training is limited.

Resource constraints significantly shape the landscape of sports education, as evidenced by Bantham et al. (2021) who critique traditional modules for their dependency on expensive equipment and specialized facilities. Such reliance renders these modules impractical for many schools, creating a gap that the street tennis module aims to fill. Its use of affordable, portable equipment not only makes tennis accessible but also promotes scalability acrosss varied contexts. Despite these advantages, Lee, Milat, Grunseit, Conte, Wolfenden & Bauman (2020) caution that scalability requires rigorous pilot testing to ensure consistent outcomes in diverse settings.

Curriculum design has also evolved to prioritize adaptability and inclusivity. The Taba Curriculum Model, for instance, empowers teachers to modify content based on local needs, fostering ownership and relevance in educational delivery (Dutta, Ranjan, Mishra, Sharma, Hewage, & Iwendi, 2024). The flexibility embedded within the street tennis module reflects these principles, allowing educators to tailor activities to suit their specific environments. However, Patfield, Gore & Harris (2022) argue that such adaptations risk diluting core educational objectives if not carefully monitored, a challenge that requires ongoing teacher support and professional development.

Traditional tennis programs struggle with inclusivity and scalability due to reliance on professional coaches and dedicated courts (Rahman et al., 2024). In contrast, the street tennis module overcomes these barriers with a resource-efficient, game-based approach. However, its long-term success depends on evaluating its adaptability across diverse educational settings, considering cultural and policy factors.

Policy frameworks significantly influence the adoption and effectiveness of educational initiatives. Karamani et al. (2024) highlight a persistent disconnect between national physical education policies and the realities of rural schools, where resource limitations and logistical barriers prevail. Aligning modules like the street tennis module with national standards can bridge this gap, facilitating broader adoption. However, this requires coordinated advocacy efforts and strategic investments in teacher training, infrastructure, and resource allocation.

A critical area for future exploration is the integration of digital tools into adaptive sports education modules. Digital resources, such as video tutorials and interactive platforms, have the potential to enhance engagement and accessibility, particularly in remote areas. García-López et al. (2022) suggest that digital integration can complement traditional teaching methods, offering students a hybrid learning experience that caters to varied learning styles. Moreover, longitudinal studies assessing the module's impact on student outcomes over time could provide valuable insights into its effectiveness and areas for improvement.

Comparative analyses with other adapted sports education modules can also enrich understanding, identifying best practices and potential pitfalls. For instance, Lee et al. (2020), emphasize the importance of benchmarking innovations to establish standards for scalability and sustainability. These studies can inform the development of guidelines for implementing the street tennis module in diverse contexts, ensuring that its benefits are maximized.

The literature highlights the need to bridge theory and practice in sports education. While frameworks like TGFU and SLT offer strong foundations, their effectiveness depends on contextual adaptation. The street tennis module exemplifies this by translating theory into practical strategies for resource-limited schools.

However, sustaining its impact requires a holistic approach, incorporating policy support, teacher training, and community engagement.

METHODOLOGY

Design and Development Research (DDR)

The research utilized the Design and Development Research (DDR) framework as outlined by Richey and Klein (2007). This methodology involves iterative processes to ensure the development and validation of practical educational interventions. The DDR approach was chosen to systematically address the needs, design, development, and evaluation of the street tennis module. This article is focus on the third phase of the study concentrated on evaluating the module's usability using the CIPP (Context, Input, Process, Product) evaluation model.

Participants

Participants were purposively selected to ensure a comprehensive usability evaluation. The study involved:

- 20 primary school teachers: Each with over five years of experience in tennis coaching and knowledge of physical education, ensuring informed feedback.
- Four subject-matter experts: Specialists in tennis training and curriculum design who provided in-depth qualitative insights during interviews.

These participants were independent from earlier phases of the research to maintain objectivity and prevent bias in the evaluation process.

Data Collection

Data collection was conducted using a mixed methods approach to ensure robust and multidimensional insights:

1. Nominal Group Technique (NGT):

   - An adapted NGT session was conducted with the 20 teachers.
   - Participants rated the module's suitability in terms of six key dimensions: activities, themes, objectives, duration, equipment, and implementation processes.
   - Quantitative data were captured using structured questionnaires designed to measure usability metrics.

2. Semi-structured Interviews:

   - Four subject-matter experts were interviewed to gather qualitative feedback on module design and implementation.
   - The interviews explored strengths, weaknesses, and potential enhancements for the module, with discussions recorded and transcribed for analysis.

Data Analysis

The evaluation process incorporated both quantitative and qualitative analyses to provide a comprehensive understanding of the module's usability:

1. Quantitative Analysis:

   - Data from NGT sessions were analysed using descriptive statistics to determine consensus scores and identify areas of agreement among participants (refer to Appendix 7).

- The score of the item must be 70 percent and above.
- Usability metrics, including content suitability and implementation feasibility, were calculated as percentages.

2. Qualitative Analysis:

- Transcriptions from interviews underwent thematic analysis to identify recurring patterns and categories (refer to Appendix 8).
- Experts' suggestions and observations were coded to refine the module further, ensuring alignment with best practices in sports education.

The combination of these methods provided a holistic evaluation, ensuring the module was not only theoretically sound but also practically applicable in real-world settings.

FINDINGS

Suitability of activities, themes, objectives, equipment and duration process in the module

The evaluation of the street tennis module through both quantitative and qualitative approaches provided a comprehensive understanding of its usability and practicality. The quantitative analysis, conducted using the Nominal Group Technique (NGT), revealed consistently high suitability scores across all six dimensions—activities, themes, objectives, duration, equipment, and implementation process—ranging from 95.00% to 100.00%. These results strongly affirm the module's alignment with the pedagogical needs of primary school students and its adaptability to resource-limited environments. Qualitative feedback from experts further corroborated these findings, highlighting the module's engaging activities, motivational themes, clear objectives, and logical implementation process. Experts emphasized how these elements collectively address practical challenges in delivering sports education, reinforcing the validity of the quantitative results. Together, these complementary methods underscore the module's potential as an innovative and scalable solution for primary school sports education.

Table 1: Suitability of activities, themes, objectives, equipment and duration process in the module

No.	Dimension	Number of items evaluated	Min (%)	Max (%)	Overall status
1.	Activities	24	95.71	100.00	Suitable
2.	Themes	8	95.71	98.75	Suitable
3.	Objectives	10	95.0	98.0	Suitable
4.	Duration	24	95.0	97.86	Suitable
5.	Equipment	5	95.0	98.57	Suitable
6.	Implementation process	6	96.42	98.57	Suitable

Quantitative findings revealed that all 24 activities in the module exceeded the 95% satisfaction threshold, with six activities achieving a perfect score of 100% as shown in table 2.

Table 2: Suitability of Module Activities

No.	Activities	Min	(%)	Status
Session 1: Tactical Consistency in Receiving and Sending the Ball				
1	Activity 1: Throw and Catch	6.90	98.57	Suitable
2.	Activity 2: Star Toss	6.90	98.57	Suitable
3.	Activity 3: Precise Catch	6.85	97.86	Suitable
4.	Activity 4: Hand Tennis	7.00	100.00	Suitable
5.	Activity 5: Tennis Hockey	6.9	98.57	Suitable
6.	Activity 6: Start Service	6.9	98.57	Suitable
7.	Activity 7: Start Volley	7.0	100.00	Suitable
8.	Activity 8: We Are the Champions	6.8	97.14	Suitable
Session 2: Tactical Movement and Positioning in Receiving and Sending the Ball				
9.	Activity 1: I'm fast	6.85	97.86	Suitable
10.	Activity 2: Serve and return	6.85	97.86	Suitable
11.	Activity 3: Pop Volley	6.95	99.29	Suitable
12.	Activity 4: Rally together	7.00	100.00	Suitable
Session 3: Technical Forehand Stroke				
13.	Activity 1: Rally with point	6.85	97.86	Suitable
14.	Activity 2: Drills	7.00	100.00	Suitable
15.	Activity 3: Conditional rally	7.00	100.00	Suitable
Session 4: Technical Backhand Stroke				
16.	Activity 1: Rally with point	6.90	98.57	Suitable
17.	Activity 2: Drills	6.85	97.86	Suitable
18.	Activity 3: Conditional rally	6.85	97.14	Suitable
Session 5: Technical Service				
19.	Activity 1: Rally with point	7.00	100.00	Suitable
20.	Activity 2: Drills	6.8	97.14	Suitable

21.	Activity 3: Conditional rally	6.8	97.14	Suitable
Session 6: Technical Volley				
22.	Activity 1: Rally with point	6.75	96.42	Suitable
23.	Activity 2: Drills	6.70	95.72	Suitable
24	Activity 3: Conditional rally	6.75	96.42	Suitable

These results align with prior studies emphasizing the importance of interactive and age-appropriate activities in fostering engagement in physical education (e.g., Kennedy, Sanders, Estabrooks, Smith, Lonsdale, Foster, & Lubans (2021).; Moon & Lee (2022). Experts highlighted the module's progressive structure and child-centric design, with one noting, "The activities transition seamlessly from basic to advanced, enabling students to develop foundational skills incrementally without feeling overwhelmed." This reflects similar findings by Choo, Novak, Impellizzeri, Porter & Fransen (2024), who demonstrated that a well-structured progression enhances skill acquisition and student confidence.

For theme dimension, Thematic elements were equally well-received, garnering ratings between 95.71% and 98.57% as shown in table 3.

Table 3: Suitability of Module Activities

No.	Activities	Min	(%)	Status
Session 1: Tactical Consistency in Receiving and Sending the Ball				
1	Activity 1: Throw and Catch Theme: Let's Play	6.80	97.14	Suitable
2.	Activity 2: Star Toss Theme: Let's Begin	6.80	97.86	Suitable
3.	Activity 3: Precise Catch Theme: Move Forward	6.80	97.14	Suitable
4.	Activity 4: Hand Tennis Theme: I Win	6.80	97.14	Suitable
5.	Activity 5: Tennis Hockey Theme: Let's Play	6.90	98.57	Suitable
6.	Activity 6: Start Service Theme: Let's Begin	6.75	96.42	Suitable
7.	Activity 7: Start Volley Theme: Move Forward	6.80	97.14	Suitable

8.	Activity 8: We are the Champions Theme: I Win	6.75	96.42	Suitable
Session 2: Tactical Movement and Positioning in Receiving and Sending the Ball				
9.	Activity 1: I'm fast Theme: Let's Play	6.70	95.71	Suitable
10.	Activity 2: Serve and return Theme: Let's Begin	6.75	96.42	Suitable
11.	Activity 3: Pop Volley Theme: Move Forward	6.75	96.42	Suitable
12.	Activity 4: Rally together Theme: I Win	6.80	97.14	Suitable
Session 3: Technical Forehand Stroke				
13.	Activity 1: Rally with point Theme: Let's Play	6.80	97.14	Suitable
14.	Activity 2: Drills Theme: Let's Play	6.80	97.14	Suitable
15.	Activity 3: Conditional rally Theme: I Win	6.80	97.14	Suitable
Session 4: Technical Backhand Stroke				
16.	Activity 1: Rally with point Theme: Let's Play	6.75	96.42	Suitable
17.	Activity 2: Drills Theme: Let's Play	6.75	96.42	Suitable
18.	Activity 3: Conditional rally Theme: I Win	6.80	97.14	Suitable
Session 5: Technical Service				
19.	Activity 1: Rally with point Theme: Let's Play	6.75	96.42	Suitable
20.	Activity 2: Drills	6.85	97.85	Suitable

	Theme: Let's Play			
21.	Activity 3: Conditional rally

Theme: I Win | 6.75 | 96.42 | Suitable |
| **Session 6: Technical Volley** | | | | |
| 22. | Activity 1: Rally with point

Theme: Let's Play | 6.75 | 96.42 | Suitable |
| 23. | Activity 2: Drills

Theme: Let's Play | 6.75 | 96.42 | Suitable |
| 24 | Activity 3: Conditional rally

Theme: I Win | 6.75 | 96.42 | Suitable |

Experts praised the motivational and relatable themes such as "Let's Play" and "I Win" for their ability to captivate students and sustain interest throughout lessons. One expert commented, "These themes make learning feel less like a chore and more like an enjoyable experience," echoing conclusions drawn by Tendinha, Alves, Freitas, Appleton, Gonçalves, Ihle & Marques (2021) who emphasized the role of gamification in maintaining student motivation in sports education. Notably, the integration of relatable contexts distinguishes this module from earlier frameworks that often overlooked the importance of cultural and emotional relevance (Giel, Yamashita, Argomand & Hallmann, 2022).

The objectives of the module scored between 95.00% and 98.00% as shown in table 4, confirming their clarity and alignment with pedagogical principles. Experts lauded the achievable and sequential nature of the objectives, with one stating, "The structured progression ensures students gradually build confidence and competence."

Table 4: Suitability of Activity Objectives

No.	Activities	Min	(%)	Status
Session 1: Tactical Consistency in Receiving and Sending the Ball				
1	Activity 1: Throw and Catch

Objective: Students will be able to throw the ball sideways over the net consistently. | 6.70 | 95.71 | Suitable |
| 2. | Activity 2: Star Toss

Objective: Students will be able to throw the ball overhead over the net consistently. | 6.80 | 97.14 | Suitable |
| 3. | Activity 3: Precise Catch

Objective: Students will be able to catch the ball in front of the net consistently. | 6.75 | 96.42 | Suitable |
| 4. | Activity 4: Hand Tennis

Objective: Students will be able to move the opponent | 6.80 | 97.14 | Suitable |

	continuously.			
5.	Activity 5: Tennis Hockey Objective: Students will be able to swing the ball using a racket at the point of impact in front of their current position consistently.	6.85	97.85	Suitable
6.	Activity 6: Start Service Objective: Students will be able to hit the ball using a racket over the net consistently.	6.85	97.85	Suitable
7.	Activity 7: Start Volley Objective: Students will be able to block the ball in front of the net using a racket consistently.	6.75	96.42	Suitable
8.	Activity 8: We are the Champions Objective: Students will be able to swing the racket, hit, and block the ball consistently.	6.75	96.42	Suitable
Session 2: Tactical Movement and Positioning in Receiving and Sending the Ball				
9.	Activity 1: I'm fast Objective: Students will be able to move the opponent continuously.	6.76	96.42	Suitable
10.	Activity 2: Serve and return bjective: Students will be able to perform a serve over the net consistently.	6.75	96.42	Suitable
11.	Activity 3: Pop Volley Objective: Students will be able to block the ball in front of the net using a racket consistently.	6.75	96.42	Suitable
12.	Activity 4: Rally together Objective: Students will be able to hit the ball consistently over the net.	6.80	97.14	Suitable
Session 3: Technical Forehand Stroke				
13.	Activity 1: Rally with point Objective: The teacher will be able to identify technical issues in the students' forehand strokes.	6.85	97.85	Suitable
14.	Activity 2: Drills Objective: Students' forehand strokes become more consistent than before.	6.85	97.85	Suitable
15.	Activity 3: Conditional rally Objective: Students will successfully score points by	6.80	97.14	Suitable

	performing forehand strokes.			
Session 4: Technical Backhand Stroke				
16.	Activity 1: Rally with point Objective: The teacher will be able to identify technical issues in the students' backhand strokes.	6.75	96.42	Suitable
17.	Activity 2: Drills Objective: Students' backhand strokes become more consistent than before.	6.80	97.14	Suitable
18.	Activity 3: Conditional rally Objective: Students will successfully score points by performing backhand strokes.	6.75	96.42	Suitable
Session 5: Technical Service				
19.	Activity 1: Rally with point Objective: The teacher will be able to identify technical issues in the students' service.	6.80	97.14	Suitable
20.	Activity 2: Drills Objective: Students' service become more consistent than before.	6.75	96.42	Suitable
21.	Activity 3: Conditional rally Objective: Students will successfully perform their first service consistently.	6.70	95.71	Suitable
Session 6: Technical Volley				
22.	Activity 1: Rally with point Objective: The teacher will be able to identify technical issues in the students' volley.	6.75	96.42	Suitable
23.	Activity 2: Drills Objective: Students' volley become more consistent than before.	6.75	96.42	Suitable
24	Activity 3: Conditional rally Objective: Students will successfully score points by performing volley.	6.75	96.42	Suitable

This aligns with observations by Hastie (2023), who emphasized that clear, tiered objectives enhance both teacher effectiveness and student outcomes in physical education. The explicit connection to frameworks such as Teaching Games for Understanding (TGFU) reinforces the module's pedagogical rigor, a characteristic that has been a cornerstone of successful sports modules in recent research (Menezes-Fagundes, Ribas, Salas-Santandreu & Lavega-Burgués, 2021).

In addition, Duration, scoring between 95.00% and 97.86% as shown in table 5 was deemed appropriate by both experts and participants. The one-hour session was highlighted as ideal for maintaining focus while allowing sufficient practice and reflection. One expert remarked, "This duration strikes a balance between engagement and practicality, though incorporating warm-up and cool-down activities could further enhance its effectiveness."

Table 5: Suitability of Duration Activities in the Module

No.	Activities	Min	(%)	Status
Session 1: Tactical Consistency in Receiving and Sending the Ball				
1	Activity 1: Throw and Catch Duration: 5 Minutes	6.80	97.14	Suitable
2.	Activity 2: Star Toss Duration: 5 Minutes	6.85	97.86	Suitable
3.	Activity 3: Precise Catch Duration: 5 Minutes	6.80	97.14	Suitable
4.	Activity 4: Hand Tennis Duration: 5 Minutes	6.85	97.86	Suitable
5.	Activity 5: Tennis Hockey Duration: 5 Minutes	6.85	97.14	Suitable
6.	Activity 6: Start Service Duration: 5 Minutes	6.80	97.14	Suitable
7.	Activity 7: Start Volley Duration: 5 Minutes	6.70	95.71	Suitable
8.	Activity 8: We are the Champions Duration: 5 Minutes	6.70	95.71	Suitable
Session 2: Tactical Movement and Positioning in Receiving and Sending the Ball				
9.	Activity 1: I'm fast Duration: 10 Minutes	6.75	95.71	Suitable
10.	Activity 2: Serve and return Duration: 10 Minutes	6.75	95.71	Suitable
11.	Activity 3: Pop Volley Duration: 10 Miniutes	6.75	95.71	Suitable

12.	Activity 4: Rally together Duration: 10 Minutes	6.75	95.71	Suitable
Session 3: Technical Forehand Stroke				
13.	Activity 1: Rally with point Duration: 5 Minutes	6.70	95.71	Suitable
14.	Activity 2: Drills Duration: 20 Minutes	6.75	96.42	Suitable
15.	Activity 3: Conditional rally Duration: 15 Minutes	6.80	97.14	Suitable
Session 4: Technical Backhand Stroke				
16.	Activity 1: Rally with point Duration: 5 Minutes	6.80	97.14	Suitable
17.	Activity 2: Drills Duration: 20 Minutes	6.75	96.42	Suitable
18.	Activity 3: Conditional rally Duration: 15 Minutes	6.75	96.42	Suitable
Session 5: Technical Service				
19.	Activity 1: Rally with point Duration: 5 Minutes	6.65	95.00	Suitable
20.	Activity 2: Drills Duration: 20 Minutes	6.75	96.42	Suitable
21.	Activity 3: Conditional rally Duration: 15 Minutes	6.75	96.42	Suitable
Session 6: Technical Volley				
22.	Activity 1: Rally with point Duration: 5 Minutes	6.80	97.14	Suitable
23.	Activity 2: Drills Duration: 20 Minutes	6.65	95.00	Suitable
24	Activity 3: Conditional rally Duration: 15 Minutes	6.65	95.00	Suitable

Similar findings by García-Hermoso, Ramírez-Vélez, Lubans & Izquierdo (2021) indicate that time-efficient sessions not only optimize student learning but also accommodate the logistical constraints faced by resource-limited schools.

The equipment used in the module scored highly, with ratings ranging from 95.00% to 98.57% as shown in table 6 reflecting its practicality, affordability, and inclusiveness. Experts noted, "The use of simple, cost-effective materials ensures accessibility across various school settings, a critical factor in bridging resource disparities."

Table 6: Suitability of Equipment in the Module

No.	Activities	Min	(%)	Status
Session 1: Tactical Consistency in Receiving and Sending the Ball				
1	Activity 1: Throw and Catch Equipment: Level 1 tennis ball, net, and markers/cones	6.80	97.14	Suitable
2.	Activity 2: Star Toss Equipment: Level 1 tennis ball, net, and markers/cones	6.80	97.14	Suitable
3.	Activity 3: Precise Catch Equipment: Level 1 tennis ball, net, and markers/cones	6.80	97.14	Suitable
4.	Activity 4: Hand Tennis Equipment: Level 1 tennis ball and net	6.85	97.85	Suitable
5.	Activity 5: Tennis Hockey Equipment: Level 1 tennis ball, racket, and marking lines	6.90	98.57	Suitable
6.	Activity 6: Start Service Equipment: Level 1 tennis ball, racket, net, and markers/cones	6.75	96.42	Suitable
7.	Activity 7: Start Volley Equipment: Level 1 tennis ball, racket, net, and markers/cones	6.75	96.42	Suitable
8.	Activity 8: We are the Champions Equipment: Level 1 tennis ball, racket, net, and markers/cones	6.85	97.85	Suitable
Session 2: Tactical Movement and Positioning in Receiving and Sending the Ball				
9.	Activity 1: I'm fast Equipment: Level 1 tennis ball, racket, and markers/cones	6.70	95.71	Suitable
10.	Activity 2: Serve and return Equipment: Level 1 tennis ball, racket, net, and markers/cones	6.75	96.42	Suitable

11.	Activity 3: Pop Volley Equipment: Level 1 tennis ball, racket, net, and markers/cones	6.70	95.71	Suitable
12.	Activity 4: Rally together Equipment: Level 1 tennis ball, racket, and net	6.75	96.42	Suitable
Session 3: Technical Forehand Stroke				
13.	Activity 1: Rally with point Level 1 tennis ball, racket, net, and markers/cones.	6.75	96.42	Suitable
14.	Activity 2: Drills Level 1 tennis ball, racket, net, and markers/cones.	6.80	97.14	Suitable
15.	Activity 3: Conditional rally Level 1 tennis ball, racket, net, and markers/cones.	6.80	97.14	Suitable
Session 4: Technical Backhand Stroke				
16.	Activity 1: Rally with point Level 1 tennis ball, racket, net, and markers/cones.	6.75	96.42	Suitable
17.	Activity 2: Drills Level 1 tennis ball, racket, net, and markers/cones.	6.70	95.71	Suitable
18.	Activity 3: Conditional rally Level 1 tennis ball, racket, net, and markers/cones.	6.85	97.85	Suitable
Session 5: Technical Service				
19.	Activity 1: Rally with point Level 1 tennis ball, racket, net, and markers/cones.	6.80	97.14	Suitable
20.	Activity 2: Drills Level 1 tennis ball, racket, net, and markers/cones.	6.85	97.85	Suitable
21.	Activity 3: Conditional rally Level 1 tennis ball, racket, net, and markers/cones.	6.85	97.85	Suitable
Session 6: Technical Volley				
22.	Activity 1: Rally with point Level 1 tennis ball, racket, net, and markers/cones.	6.70	95.71	Suitable

23.	Activity 2: Drills Level 1 tennis ball, racket, net, and markers/cones.	6.80	97.14	Suitable
24	Activity 3: Conditional rally Level 1 tennis ball, racket, net, and markers/cones.	6.75	96.45	Suitable

This aligns with global trends in adaptive sports programs, such as those reported by Isidoro-Cabanas, Soto-Rodriguez, Morales-Rodriguez & Perez-Marmol (2023) which emphasize the importance of resource scalability in enhancing program adoption.

Finally, the implementation process achieved exceptional ratings between 96.42% and 98.57% as shown in table 7. Experts praised the logical, hourglass-shaped sequence of activities, beginning with demonstrations, transitioning into guided practice, and culminating in competitive play. One expert highlighted, "This structure effectively sustains student engagement while reinforcing skill application in a meaningful context."

Table 7: Suitability of Implementation Process in the Module

No.	Activities	Score	(%)	Status
	Session 1: Tactical Consistency in Receiving and Sending the Ball			
1	Activity 1: Throw and Catch Implementation Process: The teacher demonstrates how to throw the ball from the left and right sides of the waist. Students pair up and work together to throw the ball from the waist level and catch it using their dominant hand after just one bounce. The pair with the longest rally wins. The rally will end if: The ball bounces twice. The ball does not cross the net. A student catches the ball without a bounce. The ball goes out of the designated area. The ball is thrown overhead.	6.80	97.14	Suitable
2.	Activity 2: Star Toss Implementation Process: The teacher demonstrates how to throw the ball overhead. Students pair up and work together to throw the ball overhead. Students catch the ball thrown by their partner with a maximum of one	6.75	96.42	Suitable

	bounce.			
	The pair with the longest rally wins.			
	The rally will end if:			
	The ball bounces twice.			
	The ball does not cross the net.			
	A student catches the ball without a bounce.			
	The ball goes out of the designated area.			
	The ball is thrown from the side of the waist.			
3.	Activity 3: Precise Catch Implementation Process: Students position themselves near the net. The teacher demonstrates throwing the ball from the side of the waist and catching it with one hand without any bounce. Students pair up and work together, with one throwing the ball from the side of the waist and the other catching it with one hand without any bounce. The pair with the longest rally wins. The rally will end if: The ball bounces. The ball does not cross the net. The ball goes out of the designated area. A student catches the ball using both hands.	6.80	97.14	Suitable
4.	Activity 4: Hand Tennis Implementation Process: Students start the game with an overhead throw within the designated area. The opposing player must catch the ball with only one bounce and then throw it back from the side of the waist into the designated area. The game continues with all throws being made from the side of the waist only. Students must stay active and move to score points. A point ends when: The ball bounces twice. The ball does not cross the net.	6.85	97.85	Suitable

	The ball goes out of the designated area.			
	A student catches the ball without a bounce.			
5.	Activity 5: Tennis Hockey	6.90	98.57	Suitable
	Implementation Process:			
	The teacher demonstrates how to push the ball along the floor using a racket.			
	Students pair up and work together to push the ball along the floor using their rackets.			
	The student who achieves the longest rally wins.			
	Students must move actively to score points. A point ends when:			
	The receiver fails to control the ball.			
	The ball goes out of the designated area.			
6.	Activity 6: Start Service	6.85	97.85	Suitable
	Implementation Process:			
	The teacher demonstrates an underhand serve by bouncing the ball first before hitting it over the net.			
	The first student must bounce the ball before hitting it over the net.			
	The second student must catch the ball using one hand with a maximum of one bounce.			
	The caught ball must then be bounced in the current area before the second student hits it back over the net.			
	A student earns 1 point for completing the rally successfully.			
	Students switch roles after accumulating 2 points.			
	Students must move actively to return the served ball. A point ends when:			
	The ball bounces more than once before being caught.			
	The ball goes out of the designated area.			
7.	Activity 7: Start Volley	6.85	97.85	Suitable
	Implementation Process:			
	The teacher demonstrates how to block the ball without letting it bounce in front of the net.			
	The first student starts the activity by throwing the ball from the side of their waist toward the second student positioned in front of the net.			
	The second student, positioned in front of the net, blocks the ball thrown by the first student using a racket.			
	A student earns 1 point if they successfully block the ball and return it			

	over the net.			
	Students switch roles after accumulating 5 points.			
	Students must move actively to earn points. Points are earned when:			
	The student successfully blocks the ball and sends it over the net.			
8.	Activity 8: We are the Champions Implementation Process: The teacher divides students into 3 stations as follows: Station 1: Tennis Hockey (Activity 5) Station 2: Start Volley (Activity 7) Station 3: Start Service (Activity 6) Scoring follows the rules of Activities 5, 6, and 7. Students switch roles after completing 5 attempts. Students rotate to the next station after completing their role-switching. The winner is determined by the total points accumulated across all stations.	6.80	97.14	Suitable
	Session 2: Tactical Movement and Positioning in Receiving and Sending the Ball			
9.	Activity 1: I'm fast Implementation Process: The teacher places a marker on the right side of the court for the first student and two markers on the right and left sides of the court for the second student. The first student will push the ball along the floor horizontally and straight toward the target, while the second student will block the ball using a racket and push it back toward the target of the first student. The rally ends when: The ball cannot be intercepted by the receiver. The ball goes out of the designated area. The student with the longest rally is declared the winner.	6.80	97.14	Suitable
10.	Activity 2: Serve and return Implementation Process: The teacher demonstrates an underhand serve by bouncing the ball first before hitting it over the net. The first student must stand at the baseline and bounce the ball before performing an underhand serve over the net.	6.80	97.14	Suitable

	The second student must catch the ball using their dominant hand, with a maximum of one bounce. The ball caught by the second student must be bounced within the designated area and hit back over the net to the first student. The first student must catch the returned ball and repeat the same activity with the second student. The activity will continue until: A student fails to catch the ball within one bounce. The ball hit does not go over the net. The ball goes out of the designated area.			
11.	**Activity 3: Pop Volley** **Implementation Process:** The teacher demonstrates how to intercept a ball without letting it bounce in front of the net. The first student begins the activity by bouncing the ball and hitting it from waist level toward the second student positioned in front of the net. The second student in front of the net will intercept the ball hit by the first student. The intercepted ball must be returned over the net to the opposing court. A student earns 1 point for successfully completing the rally. Students will switch roles after accumulating 3 points. Students need to move actively to win points. Points are awarded when: The second student successfully intercepts and returns the ball over the net	6.80	97.14	Suitable
12.	**Activity 4: Rally together** **Implementation Process:** The teacher demonstrates a rally, where the ball is hit after its first bounce. The student initiates the game with an underhand serve, bouncing the ball first and sending it over the net from the baseline. The second student returns the ball by hitting it after its first bounce without catching it. The first student then repeats the same action as the second student. The activity continues until: The opponent hits the ball outside the designated area.	6.80	97.14	Suitable

	The opponent's ball gets stuck in the net.			
	The opponent fails to serve the ball into the student's court within two attempts.			
	The student with the highest score is declared the winner.			
Session 3: Technical Forehand Stroke				
13.	Activity 1: Rally with point

Implementation Process:

The student initiates the game by bouncing the ball before hitting it.

The ball must pass over the net to ensure the rally activity is successful.

The student receiving the ball will return it, and the rally begins.

The rally ends when:

The ball gets stuck in the net.

The ball goes out of the designated area.

The student with the longest rally is declared the winner. | 6.85 | 97.85 | Suitable |
| 14. | Activity 2: Drills

Implementation Process:

The teacher demonstrates the correct forehand stroke technique.

The teacher delivers the ball to the student's forehand stroke zone, and the student will hit the ball after it bounces, sending it over the net.

The second student prepares to receive the ball and returns it using a forehand stroke over the net to the designated target.

After 5 or 10 balls, students will take turns switching roles.

The teacher delivers the ball through three stages as follows:

Using their hand.

Using a racket near the student's stroke zone.

Using a racket from the opposite side of the student's court. | 6.85 | 97.85 | Suitable |
| 15. | Activity 3: Conditional rally

Implementation Process:

The student starts the game by bouncing the ball before hitting it.

The ball must pass over the net to successfully initiate the rally activity.

The student receiving the ball will return it, and the rally begins.

The rally ends when: | 6.85 | 97.85 | Suitable |

	The ball gets stuck in the net.			
	The ball goes out of the designated area.			
	Students who use a forehand stroke to score a point will receive double points.			
Session 4: Technical Backhand Stroke				
16.	Activity 1: Rally with point Implementation Process: The student initiates the game by bouncing the ball before hitting it. The ball must pass over the net to ensure the rally activity is successful. The student receiving the ball will return it, and the rally begins. The rally ends when: The ball gets stuck in the net. The ball goes out of the designated area. The student with the longest rally is declared the winner.	6.80	97.14	Suitable
17.	Activity 2: Drills Implementation Process: The teacher demonstrates the correct backhand stroke technique. The teacher delivers the ball to the student's backhand stroke zone, and the student will hit the ball after it bounces, sending it over the net. The second student prepares to receive the ball and returns it using a backhand stroke over the net to the designated target. After 5 or 10 balls, students will take turns switching roles. The teacher delivers the ball through three stages as follows: Using their hand. Using a racket near the student's stroke zone. Using a racket from the opposite side of the student's court.	6.80	97.14	Suitable
18.	Activity 3: Conditional rally Implementation Process: The student starts the game by bouncing the ball before hitting it. The ball must pass over the net to successfully initiate the rally activity.	6.80	97.14	Suitable

	The student receiving the ball will return it, and the rally begins.			
	The rally ends when:			
	The ball gets stuck in the net.			
	The ball goes out of the designated area.			
	Students who use a forehand stroke to score a point will receive double points.			
Session 5: Technical Service				
19.	Activity 1: Rally with point Implementation Process: The student starts the game with either a waist-level side serve by bouncing the ball before hitting or an overhead serve. The ball must pass over the net to successfully initiate the rally activity. The student receiving the ball will return it, and the rally begins. The rally ends when: The ball gets stuck in the net. The ball goes out of the designated area. The student with the longest rally is declared the winner.	6.80	97.14	Suitable
20.	Activity 2: Drills Implementation Process: The teacher demonstrates the correct serving technique. Students practice serving using the proper technique. The second student prepares to receive the ball and returns it using either a flat stroke or a backhand stroke, sending it over the net to the designated target. After 5 or 10 balls, students take turns switching roles. The serving positions for the students are based on the following three stages: In front of the net. At the center of the court. At the baseline of the court.	6.85	97.85	Suitable
21.	Activity 3: Conditional rally Implementation Process: The student initiates the game with an overhead serve.	6.85	97.85	Suitable

	The ball must pass over the net to successfully start the rally activity.			
	The student is allowed two attempts to serve in order to initiate the rally.			
	The student receiving the ball will return it, and the rally begins.			
	The rally ends when:			
	The ball gets stuck in the net.			
	The ball goes out of the designated area.			
	Double points are awarded if the student successfully starts the rally with their first serve.			
Session 6: Technical Volley				
22.	Activity 1: Rally with point Implementation Process: The student starts the game by performing a serve. The ball must pass over the net to successfully initiate the rally activity. The student receiving the ball will return it, and the rally begins. The rally ends when: The ball gets stuck in the net. The ball goes out of the designated area. The student who ends the rally with the most successful volley at the net is declared the winner.	6.75	96.42	Suitable
23.	Activity 2: Drills Implementation Process: The teacher demonstrates the correct volley technique. The teacher delivers the ball to the student's volley zone, and the student performs a volley to send the ball over the net. The second student prepares to receive the ball and returns it using a backhand stroke, sending it over the net to the designated target. After 5 or 10 balls, students take turns switching roles. The teacher delivers the ball through three stages as follows: Using their hand. Using a racket near the student's stroke zone. Using a racket from the opposite side of the student's court.	6.75	96.42	Suitable
24	Activity 3: Conditional rally Implementation Process:	6.75	96.42	Suitable

The student starts the game by performing a serve. The ball must pass over the net to successfully initiate the rally activity. The student receiving the ball will return it, and the rally begins. The rally ends when: The ball gets stuck in the net. The ball goes out of the designated area. Students who score points using a volley will receive double points.			

This approach parallels findings by Silva, Farias, Ramos & Mesquita (2021 who argued that structured, progressive implementation strategies are critical for maintaining student interest and fostering long-term skill retention.

Overall, these findings underscore the module's innovative design and its alignment with contemporary best practices in physical education research. By integrating cost-effective solutions, relatable themes, and pedagogically sound structures, this module not only addresses existing gaps in Malaysian primary schools but also sets a benchmark for future developments in adaptive sports education.

Overall Suitability of the Street Tennis Modul

The Overall Suitability of the Street Tennis Modul were validated by experts, with items achieving a consensus value exceeding 70% deemed appropriate for inclusion. Table 8 shows the assessment status of Overall Suitability of the Street Tennis Modul.

Table 8: Overall suitability of the street tennis module

No.	Activities	Min	(%)	Status
1	The content of the street tennis module meets the teaching objectives.	6.80	97.14	Suitable
2.	The content of the street tennis module can be implemented effectively without a tennis court.	6.80	97.14	Suitable
3.	The content of the street tennis module is suitable for the allocated time.	6.75	96.42	Suitable
4.	The content of the street tennis module can assist teachers in developing the basic tennis skills of primary school students without a tennis court.	6.85	97.85	Suitable
5.	The content of the street tennis module provides both theoretical and practical exposure to the methods of playing tennis.	6.80	97.14	Suitable
6.	This module is very practical for use by primary school teachers in introducing and training tennis in primary schools without a tennis court.	6.85	97.85	Suitable
7.	This module has the potential to serve as a guide for primary school teachers in planning tennis	6.75	96.42	Suitable

	training structures without a tennis court.			
8.	This module clearly shows primary school teachers the training themes and integration of basic tennis elements for primary school students.	6.80	97.14	Suitable
9.	This module clearly shows primary school teachers the process of implementing basic tennis skill training based on street tennis.	6.90	98.57	Suitable
10.	This module clearly shows primary school teachers how to integrate the basic elements of playing tennis for primary school students.	6.90	98.57	Suitable

Table 8 highlights that the street tennis module aligns well with teaching objectives and can be implemented without tennis courts. The module effectively utilizes allocated time, supports skill development, and provides theoretical and practical exposure to tennis techniques. It serves as a practical guide for teachers to plan structured training and introduce tennis fundamentals in schools.

Qualitative interviews highlighted several strengths, including its suitability for various age groups, engaging graphics, and clear instructional processes. Experts commended its structured sessions, enjoyable activities, and the emphasis on the Teaching Games for Understanding (TGFU) approach, which effectively integrates play and learning. Additional suggestions to enhance the module included incorporating warm-up activities that focus on agility and coordination, visual aids such as demonstration videos, and detailed appendices to further support equipment and activity guidelines.

Inconclusion, the module is highly suitable for introducing tennis in primary schools, especially in settings without tennis courts. While quantitative evaluation showed strong expert consensus, qualitative feedback emphasized its practical design, effective structure, and engaging content. Addressing the suggested improvements will enhance its usability and comprehensiveness, ensuring greater impact and ease of implementation for teachers.

DISCUSSION

The findings of this study affirm the effectiveness of the street tennis module as a practical solution for enhancing sports education in primary schools. Similar efforts have been made in countries such as the United States and Australia, where adaptive sports programs like QuickStart Tennis and Hot Shots Tennis have successfully addressed accessibility barriers in under-resourced schools. Drawing parallels between these initiatives and the street tennis module highlights the shared emphasis on affordability, scalability, and student engagement. Future iterations of the module can benefit from incorporating lessons learned from these programs, particularly in terms of digital integration, teacher training models, and monitoring systems.

Aligning with recent research, the module addresses logistical and infrastructural challenges, ensuring accessibility and engagement among young learners. The high usability scores across multiple dimensions echo findings by recent studies such as Kang, Meng & Su (2024) which emphasized the importance of modified sports programs in overcoming barriers in under-resourced schools.

In addition, this study strengthens the theoretical foundations underpinning the module by integrating well-established pedagogical frameworks. The application of the Teaching Games for Understanding (TGFU) model is consistent with the findings of García-López et al. (2022), who demonstrated its efficacy in fostering tactical awareness and enhancing decision-making skills among learners. Similarly, adaptive frameworks, such as Australia's Hot Shots program, effectively utilize game-based learning to promote active student engagement and cultivate higher-order strategic thinking (Sanchez et al. 2024). Furthermore, the progressive

skill acquisition approach, as outlined in the Stages of Learning Theory (SLT), aligns with recent insights from Moon & Lee (2022), which highlight its critical role in building learner confidence and competence through iterative and structured practice.

From a practical standpoint, this study demonstrates how tailored educational modules can create meaningful learning experiences despite resource constraints. The use of affordable equipment and simplified implementation guidelines echoes recommendations by Bantham et al. (2021) who stressed the need for adaptable solutions in sports education. Additionally, the thematic approach of the module aligns with findings by Marougkas, Troussas, Krouska, & Sgouropoulou (2023) which highlighted the role of creativity in engaging young learners.

The findings of this study also hold significant implications for policymakers and educators. By promoting inclusive access to sports education, the module contributes to broader educational equity goals, as highlighted by Karamani et al. (2024). Incorporating the module into national physical education standards could enhance its scalability and impact, ensuring that more students benefit from structured and engaging tennis training programs.

While this study provides strong evidence for the effectiveness of the street tennis module, several limitations should be acknowledged:

1. **Sample Representation** – The study was conducted within a specific geographical and educational context, limiting the generalizability of its findings. Future research should include a more diverse sample of schools to ensure broader applicability.
2. **Teacher Training Variability** – The effectiveness of the module may be influenced by the varying levels of expertise and training among teachers. Additional research is needed to develop standardized teacher training programs that ensure consistent implementation.
3. **Short-Term Evaluation** – The current evaluation focuses primarily on immediate usability and acceptance among educators. Longitudinal studies are necessary to assess the long-term impact on student learning outcomes and overall engagement with tennis.
4. **Resource Constraints** – While the module is designed to be cost-effective, variations in resource availability across schools may affect its implementation. Further research should explore strategies to provide financial and logistical support for under-resourced schools adopting the module.

By addressing these limitations and expanding the scope of research, the street tennis module can be further refined to maximize its impact and effectiveness in diverse educational settings. Future research should continue to explore innovative solutions that enhance its adaptability, ensuring that all students, regardless of their background, can benefit from structured and engaging sports education.

RECOMMENDATIONS AND FUTURE RESEARCH DIRECTIONS

To elevate the effectiveness of the module, several key recommendations and future research avenues should be considered:

1. **Longitudinal Studies** – Tracking the long-term impact of the street tennis module on students' physical skills, cognitive development, and overall engagement with sports education can provide deeper insights into its effectiveness. Longitudinal research can also assess how sustained exposure to the module influences students' interest in tennis and their continued participation in sports.
2. **Comparative Analyses** – Investigating how the street tennis module compares with other adaptive sports programs globally, such as QuickStart Tennis in the United States or Hot Shots Tennis in Australia, can offer valuable benchmarks for refinement. These comparisons can highlight best practices, contextual challenges, and potential improvements.

3. **Digital Integration** – The incorporation of digital tools such as interactive tutorials, video demonstrations, and augmented reality coaching should be explored. These technological enhancements can increase accessibility and engagement, particularly in remote areas where professional coaching support is limited.

4. **Scalability Assessments** – Future studies should evaluate the scalability of the module by piloting it in multiple regions, including low-income schools, high-performance academies, and community-based sports initiatives. These assessments can provide insights into the module's feasibility across a broad spectrum of educational environments.

5. **Teacher Training Programs** – Central to the module's success is the role of teachers, whose preparedness directly impacts its effectiveness. Comprehensive teacher training programs should be developed to equip educators with practical skills, pedagogical strategies, and confidence to implement the module effectively. By empowering teachers, the training ensures that the module's potential is fully realized, creating a positive ripple effect on student engagement and learning outcomes.

6. **Integration into National Physical Education Policies** – Aligning the module with national curriculum standards will enhance its scalability and ensure broader adoption. Policy support would facilitate structured implementation, secure necessary funding, and institutionalize the module as part of formal sports education initiatives.

7. **Adaptation to Other Sports** – The structured design of this module offers significant potential for adaptation to other sports, broadening its impact within physical education curricula. Similar initiatives could be developed to introduce additional sports at the primary school level, promoting lifelong engagement in physical activities.

CONCLUSION

The Street Tennis Module for primary schools exemplifies a transformative and innovative approach to overcoming barriers in sports education, particularly in resource-limited settings. By integrating cost-effective equipment, adaptable implementation strategies, and progressive learning methodologies, the module bridges the longstanding gap between access and quality in physical education. Its grounding in robust pedagogical frameworks such as Teaching Games for Understanding (TGFU) and the Stages of Learning Theory amplifies its effectiveness, fostering student engagement, skill acquisition, and holistic development. The findings of this study underscore the module's exceptional usability and practicality, with strong consensus among educators and experts affirming its relevance and impact. The structured design and comprehensive content enable educators to seamlessly introduce tennis into school curriculums, even in the absence of specialized facilities such as courts. This adaptability ensures the module's effectiveness across diverse educational environments, promoting inclusivity and equity in physical education. Notably, the module stands as a benchmark for innovative sports education programs, showcasing how thoughtful design and pedagogical precision can overcome infrastructural and logistical challenges. Its ability to deliver meaningful learning experiences while addressing systemic disparities in education highlights its transformative potential. This study not only enriches the field of sports education but also demonstrates the critical importance of adaptable and accessible teaching modules in creating a more equitable educational landscape.

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