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Satisfaction Level with the Implementation of Collaborative Flipped Classroom Model in Tennis

Bahmid Hasbullah [1*]

[1] Faculty of Teacher Training and Education, Universitas Pattimura, Ambon, Maluku 97233, Indonesia.

* **Corresponding author:** bahmidhasbullah01@gmail.com.

ABSTRACT: This study aimed to evaluate student satisfaction with a flipped, collaborative tennis course. The study included 84 undergraduate students (average age; 22 ± 3 years). They were enrolled in a Physical Education, Health, and Recreation programme. At the end of the workshop, a test was conducted. This was a validated, self-assessment questionnaire. Participants satisfaction was measured. The findings revealed high levels of student satisfaction. They also found that the flipped classroom model was useful in teaching tennis. The Participants showed high engagement and collaborated with their peers during the workshops. These outcomes highlight the effectiveness of the flipped classroom in the higher ed. It boosts student satisfaction and teaches specific knowledge, in this case, tennis. These results add to the evidence that supports the flipped classroom. This is an effective and innovative teaching method for sports education.

Keywords: flipped classroom, higher education, physical education, tennis, satisfaction, sport.

I. INTRODUCTION

Tennis is a dynamic and fast-paced sport that demands a unique combination of aerobic and anaerobic fitness, making it both physically and mentally challenging [1]. Successful tennis requires players to exhibit exceptional agility, coordination, power, and endurance. A game's fast pace demands both physical skills and quick thinking. Players need to be determined and focused on, particularly under pressure. Fatigue can hit during matches, hurting performance [1]. Staying hydrated and cool is vital, particularly in terms of heat and humidity [2, 3]. Injuries caused by both trauma and overuse are a common issue in tennis. Teaching and training tennis requires a comprehensive approach. These included technical skills, physical fitness, and mental readiness. Key skills include forehand and backhand strokes, along with serving. Physical training boosts arm strength, flexibility, and fitness. Coaches stress knowing the rules and conducting codes. A good footwork is crucial for success and is often assessed using special tests.

Athletes must prepare psychologically for tennis in addition to physically and technically. Performance outcomes are mostly dependent on mental toughness, resilience, and fear of bad evaluations. [4, 5, 6]. Thus, Tennis training must build mental and emotional strength in this intense sport. In Indonesia, 25 universities offer degrees in Physical Education, health, and recreation. Many also include courses related to sports; while over 30 universities have these programs, only 25 have added academic subjects such as tennis. Deeper, more meaningful learning is promoted by the cutting-edge teaching strategy known as the "flipped classroom," or "inverted classroom." Since its initial description in 2000, it has become increasingly popular in both higher and compulsory education [6, 7]. This student-centered approach encourages critical thinking, autonomous learning, and active engagement. The flipped classroom model is the opposite of typical teaching approaches, which emphasize teacher lecturing. Activities that link theory to practice, highlight student autonomy and [8, 9]. Peer engagement enhances the learning process and encourages problem-solving,

which is why collaborative learning is essential [10]. This method empowers students through active exploration instead of passive listening.

Note that educators create dynamic experiences [11]. They combine in-class and out-of-class activities to enhance learning. Research shows that the flipped classroom can reduce performance gaps. It can also create a fairer learning environment [12]. State that using ICT improves educational planning [7]. It aligns activities with specific learning goals. The benefits of the flipped classroom outweigh the extra workload. This approach boosts academic performance and develops critical thinking skills, promotes lifelong learning, and mixes active with collaborative methods [13]. In traditional teaching, professors mainly lecture and give outside tasks [14]. Knowledge is shared in class and applied later. The flipped classroom changes this by providing materials before class. This allows time for interactive learning.

In the flipped model, students learn basic information at home using ICT. Explains that this paradigm flips the roles. Active learning happens in class while content review takes place at home [15]. State that multimedia materials are key instructional aids. Thanks to advancements in ICT, students can access content at home, allowing for flexible study [16, 17].

It boosts academic performance and develops critical thinking skills, thereby promoting lifelong learning. Its combination of active and collaborative learning makes it adaptable and transformative [13]. In traditional teaching, professors lecture and then assign tasks to outside work [14]. Knowledge is shared in class and applied later. The flipped classroom changes this by providing materials before class. This allows class time for interactive learning. In the flipped model, students learn basic information at home by using ICT. This paradigm reverses roles, with active learning taking place in class and content review taking place outdoors [15]. Multimedia materials serve as primary instructional aids. Students may now access content at home thanks to advancements in ICT, thus enabling flexible study [18]. ICT has changed the society by increasing access to education. It has altered the way we exchange information, making the world more interconnected. This has resulted in innovative teaching approaches that improve learning [19]. Understanding modern society requires recognizing the role of ICT in knowledge sharing, and teaching methods have changed to better meet the skills of today's pupils as a result of these resources. The flipped classroom is one such method that is gaining popularity because of readily available ICT materials and online videos [20, 21]. This change demonstrates how ICT has affected society and education. Films are becoming increasingly popular, and ICT is introducing new methods for higher education. They engage with students before in-person classes [22]. Learning is aided by students' ability to watch videos at their own pace. However, professor take time to create these films. They must consider the curriculum quality, length, and fit. It is advisable to watch the videos first, even though they can be studied after class. Students who observe before class recall more content, emphasizing the need for preparation for active learning [23]. It is believed that flipped classrooms are an effective student-centered strategy. A variety of active learning techniques, including debates and group discussions, are made possible by their versatility [15, 24].

II. MATERIAL AND METHOD

1. PARTICIPANTS

The study began with 300 students from a Physical Education program at three universities. They were enrolled in a course on Tennis Court Theory and Practice. Their ages ranged from 18 to 25 years old. To join, students were required to meet two criteria: attend at least 80% of practical sessions and complete a detailed questionnaire about their learning experiences. Importantly, none had prior experience in nautical sports, which ensured fair conditions for the study.

2. IMPLEMENTATION

This research was conducted as part of the Teaching Innovation Project of the Faculty of Teacher Training and Education at Universitas Pattimura. It was implemented in the Tennis Court Theory and Practice course, which is part of a Physical Education, Health, and Recreation program.

Six interactive workshops were created to boost skills and fit the course's theory and practice well. Before the workshops, students received materials to prepare for the tennis topics. These include articles, presentations, website links, and videos. During the project, they also joined sessions with the lecturer to deepen their understanding and ask questions.

The students were divided into small groups of four to foster collaboration and peer learning. Before each workshop, group representatives met the instructor. They coordinated their presentations and reduced the content overlap. The students were encouraged to create short videos on their topics. The teacher facilitated the workshop. They moved around and were offered guidance. The presentation time of each group was dependent on the number of groups. Subsequently a discussion was conducted to review and summarize the key points. The sports tennis practice component was spread across three sessions, each focusing on different technical and tactical aspects of the game. In the first session, students practiced foundational techniques, such as returning serves, executing lobs, and performing smashes [2]. The aim was to help students refine their ability to return serves with precision, effectively use lobs to counter opponents near the net, and develop powerful and accurate smashes. Small groups were assigned specific drills, receiving personalized guidance from the coach and ample time to practice independently.

The second session focused on passing and rallying techniques. The students were trained to maintain consistency and accuracy in passing the ball from both baseline and net positions. Additionally, they learned techniques to sustain long rallies and to control the tempo of the game. These exercises emphasize the importance of precision and endurance in the matching scenario.

The third session shifted the focus to double play, emphasizing the tactical and strategic elements of the game. The students teamed up to create scoring opportunities and strategically positioned the ball to disrupt their opponents. They also use various offensive and defensive strategies. Additionally, they practiced different double formations and learned to adapt to the match situation.

We conducted and analysis and a discussion at the end of each session. Students and coaches worked together to evaluate what went well and the challenges that arose. The authors also assessed the techniques and tactics used in this study. This reflection helped the student pinpoint areas for improvement. This reinforced their learning and ensured that they could apply their skills and strategies in the future.

3. DATA COLLECTION

At the conclusion of the six workshops conducted throughout the duration of the project, students were asked to complete a self-assessment questionnaire during the final week of the project. This questionnaire was made available to them via an online Google Drive form, and students were given a seven-day window to complete. They were explicitly informed that the evaluation would focus primarily on the practical aspects of the subject, particularly in six sessions in which the flipped classroom approach was applied. The students were provided with the opportunity to voluntarily participate in this study, and their participation was anonymous. Each student who opted to participate in the study was required to provide a written informed consent.

The self-assessment tool used in this study was developed and validated by [25]. This tool originally consisted of eight questions; however, for the purpose of this study, the first two questions, which relate to the amount of time spent by students both inside and outside the classroom, were excluded.

Table 1. Survey items chosen to assess students' perceptions of the teaching and learning process.

Items	Answer
Student involvement is a key factor in the success of this initiative.	Yes/No
Student involvement is a key factor in the success of this initiative.	Likert scale: Not at all involved to Very involved
The value of student learning	Yes/No
The value of student learning	Likert scale: Useless to Very useful
The instructor expressed satisfaction with the teaching process.	Yes/No
The instructor expressed satisfaction with the teaching process.	Likert scale: Dissatisfied to Very satisfied

The evaluation of students' academic performance in the Tennis Court Theory and Practice course used a grading scale from 0 to 10, with 10 being the highest score. The students were grouped into categories based on their scores to determine their level of achievement. Scores from 0 to less than 5 were considered a "Fail," meaning that the student did not perform well enough. Scores from 5 to less than 7 were a "Pass." This shows the student met the course's minimum requirements. A score from 7 to less than 9 was "Good." This indicates a solid understanding of the subject. Finally, scores from 9 to 10 were categorized as "Merit," reflecting exceptional skill and achievement in the course."

4. DATA ANALYSIS

The data-set was analyzed using SPSS software (version 22.0 SPSS Lead Technologies Inc., Chicago, IL, USA) to provide descriptive statistics for both qualitative and quantitative variables. Frequency distributions were used for qualitative variables, and means and standard deviations were used for quantitative variables.

III. RESULT & DISCUSSION

This study assessed student satisfaction levels with the Collaborative Flipped Classroom (CFC) model in tennis instruction compared to the traditional classroom model. The results showed a significant increase in satisfaction among the students in the flipped classroom group. Table 1 provides a summary of the data.

Table 2. Satisfaction level.

Teaching Model	Satisfaction	Respondent
Flipped Room	75%	300
Traditional Room	60%	300

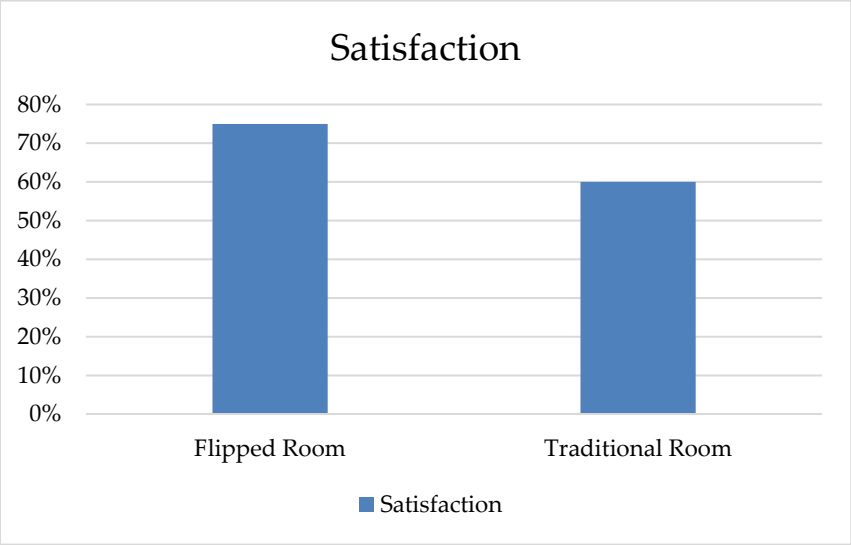

FIGURE 1. Satisfaction respondent.

The research revealed notable gender-based differences in the perceptions of the flipped classroom model. Female students reported greater satisfaction with collaborative activities, whereas male students preferred competitive elements, such as gamification. These differences are presented in Table 3.

Table 3. Gender-based perceptions.

Gender	Preferred Features	Satisfaction Level
Female	Collaboration	78%
Male	Gamification	72%

The flipped classroom model not only improved satisfaction, but also enhanced practical tennis skills. Students in this group demonstrated better performance in skill assessments, such as serving accuracy, volleying consistency, and footwork agility. Table 4 compares the skill improvements between the two groups:

Table 4. Impact on learning outcomes.

Skill	Flipped Classroom Improvement	Traditional Classroom Improvement
Serving Accuracy	85%	70%
Volleying Accuracy	80%	60%
Footwork Agility	78%	68%

The integration of gamification into the flipped classroom model significantly boosts engagement and motivation. Specific examples include the following:

- Leaderboards: Students earned points to complete pre-class activities and perform well in drills.
- Digital Badges: Awards were given for mastering specific tennis techniques.
- Interactive Drills: Real-time feedback during practice sessions enhanced learning.

The students reported that these elements made learning more enjoyable and fostered a sense of achievement.

While this study focused on short-term outcomes, preliminary interviews suggested that students were more likely to continue practicing tennis outside class because of the engaging nature of the flipped classroom model. Future studies should look at long-term effects on skill retention and engagement.

The flipped classroom model has some clear benefits over traditional methods:

- It boosts student independence with pre-class video lectures.
- It increases peer interaction during group activities in class.
- It better aligns teaching with practical skill development.

Students in the flipped classroom felt more confident and ready for assessments.

IV.DISCUSSION

The study shows that the Collaborative Flipped Classroom (CFC) model works well for teaching tennis. Students in this model showed higher satisfaction, improved learning outcomes, and greater engagement. These findings highlight the potential of this approach to transform sports education. This discussion examines the implications of these results. It examines generalizability, long-term effects, gamification, gender differences, and learning outcomes. It also provides practical tips for educators [26, 27]. A strong point of this study is that it includes students from various institutions in different regions. This broadens the findings, making them more general and applicable [28]. However, it is essential to acknowledge Variations in resources, student demographics, and cultural contexts may affect outcomes. Future research should look at more demographic factors. These include socioeconomic status, prior tennis experience, and academic background. This will refine how the CFC model affects different student groups [14]. Also, including international institutions could offer new insights. This would show how effective the model is in different educational systems [29]. This study focused mainly on short-term outcomes. However,

preliminary interviews suggested potential long-term benefits, like continued practice and skill retention. Tracking participants over several semesters can provide a clearer view of the CFC model's sustained impact. Longitudinal studies can examine if early skill gains and motivation endure over time [9, 30]. This research could show if students in a flipped classroom prefer tennis training or lifelong activity. It may also reveal the long-term effects on academic performance and personal growth. This could highlight the broad benefits of this teaching style [14]. Adding gamification to the CFC model shows how important it is to have an engaging learning environment [31]. Features like leaderboards, digital badges, and interactive drills made learning fun. They also built a sense of achievement and friendly competition among students. Specific examples of gamification integration include the following:

- Point Systems: Students earn points by watching videos, joining discussions, and showing skills in tennis drills [32].
- Level Progression: As students collect points, they move up levels and unlock new challenges and rewards.
- Team Challenges: Students teamed up for tennis activities. This helped improve teamwork and collaboration.
- Personalized Feedback: Students get real-time feedback on their performance. This helps them track progress and find areas for improvement.

Future research might look into advanced gamification strategies. This could include storytelling, role-playing, and virtual reality. These elements can help immerse students more deeply in their learning [33]. The study showed clear gender differences in views on the CFC model. Female students liked collaborative activities, while male students preferred competitive gamification. These findings show that teachers should use a flexible and inclusive method. This will help meet the different needs of students. Strategies for addressing these differences include the following:

Offering a Variety of Activities: Provide a mix of collaborative and competitive activities that appeal to both male and female students.

- Promote a Supportive Learning Environment: Encourage teamwork, respect, and positive feedback. This helps all students feel they belong.
- Giving Students a Chance to Choose: Let students pick activities that match their interests and learning styles.
- Show successful female and male tennis players. This will inspire and motivate students.

Future research could look into why these gender differences exist. It should also explore ways to support gender equity in sports education. This study demonstrated a clear connection between student satisfaction and learning outcomes. Students in the flipped classroom group felt more satisfied and showed better tennis skills. This suggests that the CFC model is not just a superficial enhancement but a fundamental improvement in the learning process. Focusing on pre-class video lectures helped students learn at their own pace. This approach saved in-class time for hands-on practice and personal feedback. Collaborative activities helped students learn from each other and solve problems. Gamification motivated them to challenge themselves and aim for excellence. These factors together lead to better learning outcomes in this study [16, 34, 35].

Here are some practical recommendations for educators who want to use the CFC model effectively:

- Design Engaging Pre-Class Content: Make short, clear video lectures that are interesting and easy to watch.
- Encourage active learning in class. Try group discussions, peer teaching, and solving problems together.
- Integrate Gamification Thoughtfully: Use gamification to boost engagement and motivation. But, avoid too much competition or rewards. These can weaken intrinsic motivation.
- Share Personalized Feedback: Provide quick and useful feedback to help students see their progress and find areas to improve.
- Create a Supportive Learning Space: Foster a classroom that values teamwork, respect, and positive feedback.
- Assess Learning Outcomes Often: Use different ways to check students' knowledge, skills, and feelings about tennis.

- Keep Reflecting and Improving: Regularly check how well the CFC model works. Use student feedback and performance data to make changes.

These tips can help teachers create engaging, effective, and fair learning spaces for all students. This study is based on solid theories. It uses constructivist learning theory, social cognitive theory, and self-determination theory. Constructivist learning theory focuses on active learning and building knowledge. Self-determination theory emphasizes the role of autonomy, competence, and relatedness. These elements are vital for motivating and engaging students. The CFC model fits these theories well. It gives students chances to build knowledge, work with classmates, and feel capable and independent in their learning.

Tennis is complex and requires a detailed approach to fully understand [32]. Therefore, special methods are required for easier learning. Researchers successfully used the Teaching Games for Understanding (TGfU) framework [36]. TGfU teaches tactics through games and focuses on the key skills. Games are designed to match TGfU principles, making learning fun and effective [37, 38]. As players improve, the games become harder, boosting their understanding, strategy, decision-making, and skills. Scholars, such as Zainuddin, suggest that the flipped classroom can benefit from gamification, a method that is gaining popularity in education. Gamification can greatly enhance learning, especially with modern technology [24, 29]. Our research showed that's combining gamification with pre-course videos significantly boosts tennis teaching. It also lightens the load for both teachers and students, thereby improving the flipped classroom model. Thus, examining this could lead to better teaching methods. It's worth exploring.

V. CONCLUSION

The study showed that students were very satisfied. They engaged more and participated better in the study. Both the boys and girls liked the flipped classroom. However, the girls were slightly more satisfied. This method encourages student-led learning and teamwork. This proves to be effective. This leads to active learning and improved interaction. As a result, students understood tennis better, and their grades improved. The flipped classroom model clearly enhanced learning and satisfaction. It also boosts grades. This study suggests the use of this approach in other sports and subjects. This can further improve learning. Further research may uncover additional benefits.

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Conflicts of Interest

The authors declare no conflicts of interest.

Data Availability Statement

Data are available from the authors upon request.

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I. REFERENCES

1. Aidoo, B., Macdonald, M. A., Vesterinen, V.-M., Pétursdóttir, S., & Gísladóttir, B. (**2022**). Transforming Teaching with ICT Using the Flipped Classroom Approach: Dealing with COVID-19 Pandemic. *Education Sciences, 12*(6), 421.
2. Akçayır, G., & Akçayır, M. (**2018**). The flipped classroom: A review of its advantages and challenges. *Computers & Education, 126*, 334–345.

3. Awidi, I. T., & Paynter, M. (**2019**). The impact of a flipped classroom approach on student learning experience. *Computers & Education, 128*, 269–283.
4. Bergeron, M. F. (**2014**). Hydration and thermal strain during tennis in the heat. *British Journal of Sports Medicine, 48*(Suppl 1), i12–i17.
5. Buszard, T., Reid, M., Krause, L., Kovalchik, S., & Farrow, D. (**2017**). Quantifying Contextual Interference and Its Effect on Skill Transfer in Skilled Youth Tennis Players. *Frontiers in Psychology, 8*.
6. Cheng, L., Ritzhaupt, A. D., & Antonenko, P. (**2019**). Effects of the flipped classroom instructional strategy on students' learning outcomes: a meta-analysis. *Educational Technology Research and Development, 67*(4), 793–824.
7. Colomo Magaña, A., Colomo Magaña, E., Guillén-Gámez, F. D., & Cívico Ariza, A. (**2022**). Analysis of Prospective Teachers' Perceptions of the Flipped Classroom as a Classroom Methodology. *Societies, 12*(4), 98.
8. Colomo-Magaña, E., Soto-Varela, R., Ruiz-Palmero, J., & Gómez-García, M. (**2020**). University Students' Perception of the Usefulness of the Flipped Classroom Methodology. *Education Sciences, 10*(10), 275.
9. Del Río-Gamero, B., Santiago, D. E., Schallenberg-Rodríguez, J., & Melián-Martel, N. (**2022**). Does the Use of Videos in Flipped Classrooms in Engineering Labs Improve Student Performance? *Education Sciences, 12*(11), 735.
10. Fikri, A. (**2021**). Kontribusi Daya Ledak Otot Lengan Dan Kelenturan Terhadap Ketepatan Service Slice Tenis Atlet Pelatihan Tenis Lapangan (Ptl) Universitas Negeri Padang. *E-SPORT: Jurnal Pendidikan Jasmani, Kesehatan Dan Rekreasi, 2*(1), 20–30.
11. Gomez-Lanier, L. (**2018**). Building Collaboration in the Flipped Classroom: A Case Study. *International Journal for the Scholarship of Teaching and Learning, 12*(2).
12. Hinojo Lucena, F. J., López Belmonte, J., Fuentes Cabrera, A., Trujillo Torres, J. M., & Pozo Sánchez, S. (**2019**). Academic Effects of the Use of Flipped Learning in Physical Education. *International Journal of Environmental Research and Public Health, 17*(1), 276.
13. Hinojo Lucena, F. J., Mingorance Estrada, Á. C., Trujillo Torres, J. M., Aznar Díaz, I., & Cáceres Reche, M. P. (**2018**). Incidence of the Flipped Classroom in the Physical Education Students' Academic Performance in University Contexts.
14. Hortigüela Alcalá, D., Fernández Río, J., & Pérez Pueyo, Á. L. (**2016**). Long-term effects of the pedagogical approach on the perceptions of physical education by students and teachers. *Journal of Physical Education and Sport, 2016*(4), 1326–1333.
15. Karaman, B. (**2023**). Flipped classroom model in physical education and sport teaching. *Journal of Human Sciences, 20*(3), 250–268.
16. Lau, R. W. H., Yen, N. Y., Li, F., & Wah, B. (**2014**). Recent development in multimedia e-learning technologies. *World Wide Web, 17*(2), 189–198.
17. Manrique Arribas, J. C., & Monreal Guerrero, I. M. (**2019**). La clase invertida y la evaluación formativa en la formación inicial del profesorado. *Revista Infancia, Educación y Aprendizaje, 5*(2), 132.
18. Martínez-Borreguero, G., Perera-Villalba, J. J., Mateos-Núñez, M., & Naranjo-Correa, F. L. (**2020**). Development of ICT-Based Didactic Interventions for Learning Sustainability Content: Cognitive and Affective Analysis. *Sustainability, 12*(9), 3644.
19. Martínez-Roget, F., Freire Esparís, P., & Vázquez-Rozas, E. (**2020**). University Student Satisfaction and Skill Acquisition: Evidence from the Undergraduate Dissertation. *Education Sciences, 10*(2), 29.
20. Martínez-Soto, T., & Prendes-Espinosa, P. (**2023**). A Systematic Review on the Role of ICT and CLIL in Compulsory Education. *Education Sciences, 13*(1), 73.
21. Mendaña-Cuervo, C., Poy-Castro, R., & López-González, E. (**2019**). Metodología Flipped Classroom: Percepción de los alumnos de diferentes Grados universitarios. *Innoeduca. International Journal of Technology and Educational Innovation, 5*(2), 178–188.
22. Mok, H. N. (**2014**). Teaching tip: The flipped classroom. *Journal of Information Systems Education, 25*(1), 7–11.
23. Morales-Belando, M. T., & Arias-Estero, J. L. (**2017**). Effect of Teaching Races for Understanding in Youth Sailing on Performance, Knowledge, and Adherence. *Research Quarterly for Exercise and Sport, 88*(4), 513–523.
24. Morales-Belando, M. T., & Arias-Estero, J. L. (**2017**). Influence of Teaching Games for Understanding on Game Performance, Knowledge, and Variables Related to Adherence in Youth Sailing. *Journal of Teaching in Physical Education, 36*(2), 209–219.
25. Moy, B., Renshaw, I., & Davids, K. (**2016**). The impact of nonlinear pedagogy on physical education teacher education students' intrinsic motivation. *Physical Education and Sport Pedagogy, 21*(5), 517–538.
26. Nurfadhila, R. (**2021**). Pengetahuan mengenai asupan cairan dan hidrasi pada atlet tenis lapangan Universitas Negeri Yogyakarta. *MAJORA: Majalah Ilmiah Olahraga, 27*(1), 1–5.
27. Otero-Saborido, F. M., Sánchez-Oliver, A. J., Grimaldi-Puyana, M., & Álvarez-García, J. (**2018**). Flipped learning and formative evaluation in higher education. *Education + Training, 60*(5), 421–430.
28. Pandita, A., & Kiran, R. (**2023**). The Technology Interface and Student Engagement Are Significant Stimuli in Sustainable Student Satisfaction. *Sustainability, 15*(10), 7923.
29. Ratten, V. (**2017**). Entrepreneurial sport policy. *International Journal of Sport Policy and Politics, 9*(4), 641–648.
30. Reid, M., & Duffield, R. (**2014**). The development of fatigue during match-play tennis. *British Journal of Sports Medicine, 48*(Suppl 1), i7–i11.
31. Rzemieniak, M., & Wawer, M. (**2021**). Employer Branding in the Context of the Company's Sustainable Development Strategy from the Perspective of Gender Diversity of Generation Z. *Sustainability, 13*(2), 828.
32. Sargent, J., & Casey, A. (**2020**). Flipped learning, pedagogy and digital technology: Establishing consistent practice to optimise lesson time. *European Physical Education Review, 26*(1), 70–84.

33. Sahri, J. S. (**2021**). Pengembangan Instrumen Footwork Tenis Lapangan Berbasis Digital. *PAKAR Pendidikan, 19*(1), 97–105.
34. Sargent, J., & Casey, A. (**2020**). Flipped learning, pedagogy and digital technology: Establishing consistent practice to optimise lesson time. *European Physical Education Review, 26*(1), 70–84.
35. Walsh, J. N., O'Brien, M. P., & Costin, Y. (**2021**). Investigating student engagement with intentional content: An exploratory study of instructional videos. *The International Journal of Management Education, 19*(2), 100505.
36. Wang, J., Jou, M., Lv, Y., & Huang, C.-C. (**2018**). An investigation on teaching performances of model-based flipping classroom for physics supported by modern teaching technologies. *Computers in Human Behavior, 84*, 36–48.
37. Zainuddin, Z. (**2018**). Students' learning performance and perceived motivation in gamified flipped-class instruction. *Computers & Education, 126*, 75–88.
38. Zainuddin, Z. (**2018**). Students' learning performance and perceived motivation in gamified flipped-class instruction. *Computers & Education, 126*, 75–88.
39. Zeng, W. (**2023**). METABOLISM AND PHYSICAL FITNESS CHARACTERISTICS IN TABLE TENNIS PLAYERS. *Revista Brasileira de Medicina Do Esporte, 29*.