ATHLETES' LEVELS OF ENGAGEMENT AND INTEREST IN USING ARTIFICIAL INTELLIGENCE ENHANCED PROGRAM ON TABLE TENNIS TRAINING

JOMAR S. TIANIO
DOCTOR OF PHILOSOPHY IN EDUCATIONAL MANAGEMENT
Major in Physical Education

EMILIO AGUINALDO COLLGE
Manila, Philippines

Abstract— The integration of artificial intelligence (AI) into sports training has gained attention for its potential to enhance athlete performance and engagement. However, research on AI's impact in individual sports, particularly table tennis, remains limited, especially in the Philippines where traditional coaching methods are still dominant. This study explores how AI-enhanced training affects the engagement and interest of table tennis student-athletes in tertiary institutions. The study aims to assess the levels of engagement and interest among student-athletes using AI-powered platforms for table tennis training and to identify the benefits and challenges of implementing such technology in Philippine higher education institutions. Grounded in the Technology Acceptance Model (TAM), which emphasizes the importance of perceived ease of use and usefulness in technology adoption, the study examines how student-athletes perceive AI's role in their training. A descriptive-comparative-correlational research design was used, combining quantitative surveys and qualitative interviews. Six higher education institutions in Manila, along with six coaches, participated. Data were analyzed to evaluate the frequency and consistency of AI usage, as well as its perceived usefulness in training. The study also identified challenges faced by both athletes and coaches in integrating AI into training. The findings show a high level of engagement with AI, particularly in terms of integrating AI feedback into training routines and frequent usage. Despite this, some athletes expressed reservations about the accuracy and effectiveness of AI feedback. The study also highlighted the positive impact of AI on motivation and training consistency, particularly among experienced athletes. Challenges such as technical issues and limited AI literacy were identified as barriers to broader adoption. The study concludes that AI platforms positively influence engagement and interest in table tennis training, but addressing technical difficulties and improving AI literacy are key to enhancing their effectiveness. It is recommended that institutions invest in AI literacy programs and improve technical support to maximize AI's potential in collegiate sports training. Further research should focus on the long-term effects of AI on athletic performance.

Index Terms— AI *in Sports Training, Athlete Engagement, Artificial Intelligence, Intrinsic Motivation and Table Tennis Training.*

Introduction Background of the Study

The integration of artificial intelligence (AI) in sports training has become a transformative approach for improving athlete performance, engagement, and motivation. AI-driven platforms, such as Artificial Intelligence, provide personalized feedback, real-time performance analytics, and data-driven insights that help athletes refine their techniques and track their progress. These tools are especially beneficial in sports requiring precision and fine motor control, such as table tennis, where consistent practice and detailed performance analysis are essential for improvement.

While AI's role in sports training has been extensively explored in team sports, its application in individual sports like table tennis remains relatively under-researched, particularly within the context of Philippine higher education. Sports programs in universities and colleges, especially those participating in high-level competitions like the University Athletic Association of the Philippines (UAAP) and the National Collegiate Athletic Association (NCAA), traditionally rely on conventional coaching methods. These methods may not fully exploit the potential of emerging technologies such as AI, which can offer a more personalized and data-driven approach to training.

The adoption of AI in sports training has been well-documented in various countries, but there is a gap in research concerning its impact on individual sports within the Philippine context. In particular, table tennis an individual sport that demands precision and technical mastery has received little attention in terms of technological enhancement. Moreover, student-athletes in universities and colleges participating in UAAP and NCAA competitions often face challenges such as limited access to modern training tools and technologies, making them an underrepresented group in sports technology research.

This study aimed to investigate the effects of Artificial Intelligence on the engagement, motivation, and training outcomes of table tennis student-athletes from selected universities and colleges that participated in UAAP and NCAA competitions. By focusing on this specific group, the study sought to explore how AI-powered tools could improve athlete performance, enhance training consistency, and foster sustained interest in the sport. Additionally, the study identified the barriers and challenges faced by coaches and institutions in adopting AI technologies, providing valuable insights for integrating AI into existing training programs.

The findings contributed to bridging the research gap by providing insights into the role of AI in enhancing individual sports training in the Philippines. The study also offered actionable recommendations for universities and sports programs, particularly those involved in competitive collegiate athletics, to better integrate AI technologies into their training methodologies.

Reviews of Literature and Studies

Artificial intelligence (AI) revolutionizes sports training by enhancing athlete performance, engagement, and skill development through real-time analytics, personalized feedback, and adaptive coaching. In table tennis, AI-powered platforms like Artificial Intelligence offer data-driven insights and interactive training programs that can significantly improve precision, consistency, and overall gameplay for student-athletes in higher education institutions.

Defining Athlete Engagement in AI-Enhanced Sports Training

Athlete engagement in AI-assisted sports training is often conceptualized through cognitive, emotional, and behavioral dimensions. Engagement goes beyond mere frequency of use and delves into active interaction with AI tools, which fosters deeper involvement in the training process (Vogler et al., 2019). In individual sports like table tennis, where precision and technique are paramount, athletes who engage meaningfully with AI technologies, through personalized feedback and adaptive learning experiences, may experience significant improvements in performance (Lee et al., 2021). Despite the growing body of research on engagement in team sports, the study of athlete engagement within individual sports like table tennis remains relatively underexplored. This gap is especially pertinent in regions such as the Philippines, where AI integration in sports training is still in its early stages (Ma et al., 2024). Previous studies have failed to provide a clear definition of "engagement" within individual sports, underscoring the need for the development of tailored metrics to measure engagement in disciplines like table tennis (Li & Wang, 2022). The findings from existing literature suggest that a nuanced understanding of engagement is crucial for optimizing the use of AI in individual sport training. Thus, addressing this gap will significantly enhance the application of AI tools in sports, especially in less technologically advanced regions.

Factors Influencing the Engagement of Student-Athletes with AI Tools

The engagement of student-athletes with AI tools is influenced by various factors, including the perceived ease of use, the usefulness of feedback, and the seamless integration of these systems into traditional coaching practices (Sookhanaphibarn, 2023). Athletes tend to engage more with AI tools when these technologies directly contribute to their skill development or offer real-time performance improvements (Gao & Ma, 2024). However, limited research has focused on understanding how these factors specifically impact engagement in sports like table tennis, particularly in the Philippine context. Challenges such as limited access to technology, as well as low levels of digital literacy, present significant barriers to AI adoption among Filipino student-athletes (Delos Reyes, 2023). Given the unique challenges faced by Filipino student-athletes, further research is needed to explore how factors like technological accessibility and cultural attitudes influence the use of AI tools in sports training. Understanding these barriers will be critical to enhancing the engagement of Filipino athletes with AI platforms, thereby fostering more inclusive and effective training environments.

Measuring Engagement in AI-Assisted Table Tennis Training

Measuring engagement in AI-assisted training goes beyond assessing usage frequency. It includes evaluating the depth of interaction, the perceived benefits of the training, and the specific improvements in skills (Lee et al., 2021). Common metrics used to gauge engagement include session duration, frequency of feedback utilization, and the extent of skill enhancement achieved through AI intervention (Yuan et al., 2021). However, the application of these metrics in individual sports like table tennis is underdeveloped. While some studies rely on self-reported usage frequency to measure engagement, few studies have investigated how these metrics align with tangible improvements in specific skills, such as stroke precision or footwork (Vogler et al., 2019). The absence of standardized and tailored engagement metrics in table tennis training highlights a critical research gap that needs to be addressed in order to better understand how AI tools can be optimized for skill development in individual sports. Addressing this gap will not only improve AI tool adoption but also foster more effective training methodologies in sports like table tennis, where precision and technique are central to success.

The Role of AI Feedback in Enhancing Athlete Engagement

AI feedback is rapidly becoming a central driver of athlete engagement, particularly in sports training that involves complex, real-time adjustments. Studies by Ma et al. (2025) suggest that personalized, real-time feedback is essential in sports like table tennis, where even minute adjustments can dramatically improve performance. Athletes who receive such targeted insights are more likely to engage with training tools consistently, as evidenced by Chung et al. (2021), who noted a direct correlation between actionable feedback and increased motivation among athletes. This engagement is critical, as table tennis players require rapid and precise feedback to enhance their technical skills.

Despite the clear advantages of AI in training, there is a notable gap in research concerning the perceptions of Filipino athletes, especially in individual sports such as table tennis. Filipino athletes, often accustomed to traditional coaching methods, may have reservations or limited exposure to AI-assisted tools. This gap is particularly pronounced in regions where technology adoption has been slow, such as in the Philippines. Research on AI feedback in these local contexts is sparse, making this an area ripe for exploration. Understanding how local athletes engage with and perceive AI feedback will provide valuable insights into how AI can be effectively integrated into training systems, especially in individual sports where personalized feedback can make a substantial difference.

The significance of AI feedback in fostering athlete engagement cannot be overstated. By enhancing motivation and enabling precise performance adjustments, AI has the potential to revolutionize training practices. For Filipino athletes, overcoming the initial resistance to AI could lead to improved performance in table tennis and similar sports. Therefore, further research is essential to explore how AI feedback is perceived by Filipino athletes and to identify how it can be leveraged to improve their engagement and overall training outcomes.

Comparing Traditional Training Methods and AI-Enhanced Training Engagement

The comparative effectiveness of traditional coaching methods versus AI-enhanced training tools has been a significant area of interest in recent years. Studies by Liu et al. (2024) and Liang & Wong (2020) highlight that AI platforms can lead to higher engagement levels compared to traditional methods. AI's ability to provide immediate, personalized feedback offers athletes a more dynamic and interactive experience, a stark contrast to traditional methods, which often rely on repetitive drills and delayed feedback. These studies suggest that AI's interactive nature fosters a deeper connection to the training process, increasing athletes' motivation and performance outcomes.

In the context of the Philippines, however, the shift from traditional coaching methods to AI-enhanced training has been relatively slow. Villanueva & Ramos (2022) argue that the deep-rooted reliance on conventional coaching methods, which are often perceived as more personal and effective, still dominates in many Filipino sports programs. This cultural preference for face-

to-face interaction and traditional techniques has resulted in a delay in AI adoption, limiting its impact. Further research is needed to understand the barriers to AI integration in countries like the Philippines, where traditional methods hold a strong influence over training practices.

This theme underscores the importance of balancing AI with traditional techniques to maximize engagement. The integration of AI can complement traditional training methods, allowing athletes to receive both personalized feedback and the guidance of experienced coaches. Research should focus on finding ways to combine the best of both worlds AI's real-time analysis and the human touch of traditional coaching so that Filipino athletes can benefit from a comprehensive training experience. By bridging the gap between these two approaches, sports programs can enhance engagement and improve performance in sports like table tennis.

Technological Integration: Barriers to Full Athlete Engagement in AI Platforms

Technological barriers continue to limit the full potential of AI tools in enhancing athlete engagement, particularly in regions with limited technological infrastructure like the Philippines. Gao & Ma (2024) identify issues such as device compatibility, unreliable internet connectivity, and user-unfriendly software as significant obstacles to AI adoption in sports training. In table tennis, where real-time, precise feedback is crucial, these technological challenges can greatly undermine the effectiveness of AI-enhanced training. As noted by Ma et al. (2024), the lack of digital literacy among coaches and athletes is another key barrier, as it affects the ability to effectively use AI platforms.

The Philippines, with its inconsistent internet infrastructure, faces additional challenges in deploying AI tools for sports training. In rural or underserved areas, where access to high-speed internet is limited, the benefits of AI-assisted training are not fully realized. This gap in access highlights the need for infrastructural improvements to ensure that all athletes, regardless of their location, can benefit from AI-enhanced training.

Addressing these technological barriers is essential for maximizing athlete engagement with AI platforms. Improving infrastructure, increasing digital literacy, and enhancing device compatibility will make AI tools more accessible and effective for Filipino athletes. As the global sports community increasingly turns to AI for personalized training, overcoming these barriers will be crucial for ensuring that all athletes, particularly those in individual sports like table tennis, can take full advantage of these innovative tools.

Understanding Interest in AI Among Student-Athletes in Individual Sports

While there is extensive research on AI adoption in team sports, studies on individual sports like table tennis are relatively limited. Research by Walker et al. (2022) suggests that athletes in individual sports tend to display higher levels of intrinsic motivation and self-regulation, which could make them more receptive to AI-assisted training. AI tools, which offer personalized and autonomous feedback, align well with the independent nature of individual sports, making them an attractive option for athletes who prefer to work alone and monitor their own progress.

However, the degree to which AI tools are perceived as beneficial by student-athletes in individual sports such as table tennis remains underexplored. This gap in research presents a unique opportunity to investigate how these athletes engage with AI platforms and what factors influence their interest. Understanding the specific needs and preferences of student-athletes in individual sports will help design AI platforms that are better suited to their training environments, fostering sustained engagement and improving performance outcomes.

The significance of this theme lies in the potential to tailor AI platforms to the unique needs of individual sports athletes. Research into this area could lead to the development of AI tools that offer greater personalization and address the specific challenges faced by student-athletes in sports like table tennis. By understanding the factors that drive interest in AI-assisted training, developers can create more effective and engaging platforms, thereby enhancing the training experience and improving outcomes for individual sport athletes.

Psychological Factors Driving Athlete Interest in AI-Assisted Training

Psychological factors play a crucial role in athlete engagement with AI-assisted training, particularly in individual sports like table tennis. Self-determination theory, as highlighted by López et al. (2020), emphasizes intrinsic motivation as a key factor in athletes' acceptance of AI tools. For athletes who train alone, like those in table tennis, AI can serve as a valuable resource for building self-confidence and providing real-time feedback that would otherwise be unavailable. Martínez et al. (2023) further suggest that AI tools can enhance athletes' sense of competence, an essential component of self-determination theory.

Despite these advantages, intrinsic motivation in the context of AI training for table tennis athletes remains under-researched. Further exploration of how psychological drivers, such as confidence, motivation, and self-efficacy, influence engagement with AI platforms could lead to the development of systems that foster long-term motivation. By addressing these psychological factors, AI systems can be designed to not only provide technical feedback but also enhance athletes' emotional connection to their training.

The significance of understanding psychological factors in AI training is immense. By aligning AI tools with the psychological needs of athletes, developers can create platforms that enhance motivation, improve self-confidence, and sustain long-term engagement. This approach will be particularly beneficial for individual sport athletes, where self-regulation and motivation are key to performance improvements. Therefore, further research into the psychological drivers of AI engagement will be essential for maximizing the effectiveness of AI-assisted training in sports like table tennis.

The Influence of AI Customization on Athlete Interest in Table Tennis

AI systems that offer tailored feedback are pivotal in increasing athlete engagement, as they provide personalized training experiences that align with individual needs, skills, and goals. Chen et al. (2021) found that adaptive AI systems, which evolve with an athlete's performance, significantly boost interest and engagement over time. In sports like table tennis, where precision, consistency, and reaction time are critical, the ability of AI to adjust its feedback based on performance metrics is essential. Customization in AI platforms ensures that athletes receive feedback that is relevant and appropriate for their current level, making training more effective and engaging.

However, there is a significant gap in the literature regarding the customization of AI tools specifically for table tennis training. Most AI platforms in sports focus on broad or generalized performance metrics, but for an individual sport like table tennis, the ability to cater to specific skills such as ball spin detection, reaction speed, and stroke precision is crucial. Personalized systems in table tennis could foster a more engaged and motivated athlete, improving both short- and long-term performance. This

gap in research presents a promising area for future studies to explore how personalized AI tools can be integrated into table tennis training, with the potential to revolutionize athlete engagement by providing real-time, individualized feedback.

The significance of AI customization cannot be overstated. As athletes in individual sports like table tennis often train alone, they greatly benefit from systems that respond directly to their needs. Providing them with personalized insights and continuous adjustments will not only enhance their skill development but also contribute to a stronger emotional connection with their training. Further research into how AI can be effectively customized for individual sports is necessary to create systems that athletes are eager to use, leading to improved engagement and performance outcomes.

Technology Acceptance and Athlete Interest: A Focus on AI

The Technology Acceptance Model (TAM), introduced by Davis (1989), provides valuable insights into the factors influencing the adoption of AI technologies. According to TAM, perceived ease of use and perceived usefulness are the primary drivers of technology acceptance. In the context of sports, particularly in fast-paced individual sports like table tennis, these factors are particularly important. Lim et al. (2020) suggest that athletes are more likely to adopt AI systems that are user-friendly and demonstrate clear performance benefits. In table tennis, where quick decision-making and rapid skill improvement are key, AI platforms must be simple to operate while offering tangible improvements in performance to maintain athlete interest.

While much of the existing literature on TAM in sports focuses on team-based settings, such as basketball or soccer, fewer studies have addressed its application in individual sports like table tennis. This gap is notable because the factors that influence technology acceptance in team sports such as social interaction or group dynamics may not be as relevant in an individual sport. In table tennis, athletes typically train alone, and their motivation to use AI tools may rely more on the system's ability to provide personalized and actionable feedback rather than group-based dynamics.

The relevance of the Technology Acceptance Model in individual sports highlights the need for AI platforms that are both effective and accessible. For table tennis players, where performance feedback must be immediate and precise, the ease of use and the direct correlation between AI feedback and skill improvement are crucial to sustained engagement. Understanding how TAM applies to individual sports will help refine AI tools to make them more appealing and useful, ultimately leading to greater adoption and long-term use in sports training.

Exploring the Relationship Between Athlete Interest and Performance Improvement

A primary motivation for adopting AI in sports training is the potential for performance enhancement. O'Reilly et al. (2021) found that athletes who see a direct correlation between AI feedback and tangible performance improvement are more likely to remain engaged with the technology. In individual sports like table tennis, where incremental improvements in skill can have a significant impact on overall performance, AI systems that can demonstrate measurable gains are highly valuable. Table tennis players, who rely on precision, speed, and technique, need clear, real-time feedback that directly links to their performance metrics.

Despite this clear motivation, there is limited research focusing on how AI can specifically influence performance improvement in individual sports like table tennis. Studies in other sports often focus on the effectiveness of AI in broader contexts, such as endurance-based sports or team settings. However, table tennis demands rapid reflexes, strategic decision-making, and a high level of coordination, all of which require very specific and targeted feedback. Understanding how AI tools can provide measurable improvements in these areas is vital for increasing athlete interest and engagement. Research on the relationship between AI feedback and performance outcomes in table tennis will help to tailor AI systems to the unique needs of athletes in this sport, driving sustained interest and fostering long-term skill development.

The significance of this theme lies in the opportunity to create AI systems that not only track performance but actively contribute to improvement. For table tennis athletes, seeing clear, quantifiable gains from their AI-enhanced training would serve as a powerful motivator, encouraging continued use and fostering deeper engagement with the sport. Thus, research should focus on how AI can substantiate the relationship between interest and performance, exploring how real-time, personalized feedback can help athletes achieve their goals and continuously improve.

Intrinsic vs. Extrinsic Motivation in AI-Based Training

Athletes are motivated by both intrinsic factors, such as passion and personal growth, and extrinsic factors, such as rewards and recognition. Understanding how AI tools can balance these two types of motivation is crucial for maximizing engagement. Studies by Hong et al. (2022) suggest that combining intrinsic motivation with extrinsic rewards such as performance scores or gamified elements can significantly increase an athlete's interest in AI-assisted training. This balance is particularly important in individual sports like table tennis, where personal achievement is central, and external recognition may play a smaller role compared to team-based sports.

However, there is a gap in understanding how AI systems can effectively balance intrinsic and extrinsic motivations, particularly in individual sports. In table tennis, athletes may be more driven by self-improvement and mastery of the sport, rather than external rewards. The challenge lies in designing AI systems that can cater to these intrinsic motivators while still offering extrinsic rewards that acknowledge progress and achievement. Research into this area can help identify the most effective ways to combine these motivational factors in AI platforms, leading to more engaged and motivated athletes.

The significance of this theme is profound. By developing AI systems that account for both intrinsic and extrinsic motivations, developers can create tools that not only enhance performance but also foster a deeper connection between the athlete and their training. This dual motivation model will be essential in individual sports like table tennis, where personal growth and achievement are central to the athlete's experience. Future studies should focus on how AI can balance these motivations, ensuring long-term engagement and sustained interest in the training process.

Barriers to Sustained Interest in AI for Table Tennis Training

While AI-based training tools may initially capture athletes' interest, maintaining sustained engagement remains a significant challenge. Kuo et al. (2023) highlight several barriers to continued use, including technical complexity, lack of personalization, and perceived inefficiency. In the context of table tennis, where rapid skill acquisition is crucial, athletes may be discouraged by AI systems that fail to meet their specific needs or are too complex to use effectively. The literature on barriers to sustained interest in AI for individual sports is limited, particularly in the fast-paced environment of table tennis, which requires rapid adjustments and quick feedback.

Understanding these barriers is crucial for improving the design and functionality of AI tools. If athletes perceive AI systems as ineffective or overly complicated, they may disengage, reducing the long-term impact of these platforms. For table

tennis, where immediate, specific feedback is essential, overcoming these barriers is key to ensuring that AI tools remain useful and engaging over time. Further research is needed to identify the factors that hinder sustained engagement and to develop solutions that enhance the effectiveness of AI systems, ensuring that they continue to meet athletes' needs as their training progresses.

The significance of addressing these barriers is clear. By identifying and addressing the obstacles to long-term engagement with AI tools, developers can refine their systems to better serve the needs of athletes in individual sports like table tennis. This will not only enhance the effectiveness of training but also increase athlete satisfaction and motivation, leading to better performance outcomes and a deeper connection to the training process.

AI's Role in Shaping Long-Term Interest in Table Tennis Training Programs

Sustaining long-term engagement with training programs is vital for continuous athletic development, particularly in sports like table tennis, where skill progression requires consistent practice and feedback. Despite its importance, research on AI's role in maintaining long-term interest in table tennis training is scarce. According to Lee et al. (2021), AI platforms that evolve alongside an athlete's development have a higher likelihood of maintaining long-term engagement. AI tools that dynamically adjust the complexity of drills or provide progressively challenging feedback can help athletes stay motivated by continually offering new challenges. This adaptability is crucial in table tennis, where athletes must refine their techniques to maintain a competitive edge.

In the context of table tennis, AI systems that evolve based on real-time performance assessments can foster sustained interest. For example, as an athlete's skills improve, the AI could increase the difficulty of training drills or offer more sophisticated feedback, ensuring that athletes are constantly challenged and engaged. This continuous adjustment of difficulty aligns with the principle of skill development, where progressive challenges are essential for improvement.

The significance of exploring long-term engagement in table tennis is profound. Understanding how AI can influence sustained interest in training programs will contribute to the development of tools that can be used over extended periods, facilitating continuous improvement. Given the lack of research in this area, further studies are needed to explore how AI systems can be designed to sustain long-term interest in individual sports like table tennis. Addressing this gap in the literature will provide insights into how AI can become an integral part of athletes' training regimens, leading to more personalized, effective, and engaging training experiences.

Gender, Age, and Experience: How Demographics Affect Athlete Interest in AI

Demographic factors such as gender, age, and experience play a critical role in shaping how athletes interact with and adopt AI technologies. Zhang et al. (2022) indicate that younger athletes and those with prior exposure to technology are more likely to embrace AI tools in their training. In contrast, older athletes or those less familiar with technology may struggle with adoption, particularly if the AI tools require a level of technological proficiency that they have not yet developed. This demographic divide is particularly relevant in a highly skilled sport like table tennis, where training often spans many years.

Table tennis athletes exhibit a diverse range of experiences, from beginners to seasoned players. The varying levels of technological comfort and experience within this group can lead to different levels of interest in AI tools. Younger athletes, who are often more familiar with digital technologies, may be more inclined to adopt AI-driven training methods that provide personalized, real-time feedback. In contrast, older athletes or those with limited technological experience may be hesitant to integrate AI into their training regimens, viewing these tools as potentially unnecessary or overly complex.

The lack of research on how demographics influence AI interest in table tennis highlights a significant gap in the literature. Understanding the specific ways in which gender, age, and prior technology experience influence athletes' willingness to engage with AI is crucial for the development of more inclusive and accessible training platforms. Addressing this gap could lead to the creation of AI systems that are better tailored to the diverse needs of table tennis athletes, ensuring that technology adoption is not hindered by demographic factors but instead enhanced by a personalized approach to training.

The Effect of Gamification in AI Training Platforms on Athlete Interest

Gamification, the incorporation of game-like elements such as points, leaderboards, and rewards into non-game activities, has shown considerable promise in enhancing engagement and motivation in various fields, including sports. Liu et al. (2023) suggest that gamified elements in AI training platforms can foster a competitive yet enjoyable environment, driving athletes to engage more consistently with their training programs. In table tennis, where athletes often repeat drills for mastery, introducing gamification could provide much-needed variety and excitement, motivating athletes to push themselves further and track their progress.

For example, AI systems that integrate gamified elements could allow table tennis athletes to earn points or rewards based on their performance, set personal goals, and compete with others or themselves. These elements could transform monotonous training sessions into dynamic, goal-oriented experiences that keep athletes engaged. Additionally, gamification can add a social dimension to training, allowing athletes to share achievements, compare progress, and compete with peers, thus fostering a sense of community and camaraderie.

However, the application of gamification in individual sports like table tennis remains underexplored. While there is ample research on gamification in team-based sports, its effectiveness in solo training scenarios where athletes train independently has not been fully investigated. Exploring the potential of gamification in table tennis AI systems could uncover new strategies for increasing long-term engagement and improving performance. Gamified training could not only sustain athletes' interest but also enhance their motivation to achieve their personal best. This theme's significance lies in its potential to revolutionize how table tennis athletes interact with their training, making the process more enjoyable and sustainable.

While AI in sports training, particularly in table tennis, holds great promise, substantial gaps remain in understanding the factors that drive athlete interest. From psychological motivations to demographic influences and the role of gamification, further exploration of these themes is necessary for developing AI systems that foster deeper engagement and deliver tangible performance benefits. By addressing these gaps, AI tools can be better integrated into the training programs of student-athletes, enhancing not only their skills but also their long-term interest and commitment to the sport.

AI-Driven Personalized Training Programs: A Revolution in Table Tennis

Artificial Intelligence (AI)-driven personalized training programs represent a transformative shift in how athletes approach their development. For table tennis, AI has the potential to revolutionize traditional training methods by tailoring programs based on an athlete's unique skillset, weaknesses, and progress. Unlike traditional methods that offer standardized drills, AI systems analyze extensive data points, such as reaction times, stroke accuracy, and ball placement, allowing for dynamic

adjustments in real-time. Personalized training ensures that athletes are consistently challenged, promoting skill improvement at an individualized pace. According to research by Lee et al. (2022), AI allows for customization that is deeply rooted in data analysis, resulting in a more precise and efficient training plan for each athlete. Furthermore, AI's capacity for tracking progress over time provides both coaches and athletes with a clear picture of strengths and areas needing improvement. The gap in the existing literature lies in the integration of AI systems that not only provide immediate feedback but also adapt based on long-term progress and real-time performance fluctuations. As AI technology continues to evolve, its role in fostering personalized, performance-boosting training programs in individual sports like table tennis is bound to grow exponentially.

Benefits of Real-Time Feedback in AI-Enhanced Table Tennis Training

Real-time feedback is one of the most beneficial applications of Artificial Intelligence (AI) in sports training, particularly in fast-paced games like table tennis. In traditional coaching methods, feedback is often delayed, limiting the effectiveness of corrections during practice. However, AI enables instant evaluation of the athlete's actions, allowing for immediate corrections. This feedback loop enhances motor learning by ensuring athletes can adjust their techniques and strategies during the session. In table tennis, where reaction times are critical, AI-driven systems provide real-time analysis on stroke mechanics, ball placement, and foot positioning, enabling players to refine their movements instantly. According to a study by Kim et al. (2023), athletes exposed to real-time AI feedback showed significant improvement in reaction time and decision-making. Additionally, real-time feedback helps maintain athlete engagement, as it provides constant opportunities for growth. However, challenges arise in ensuring that the feedback is comprehensible and actionable. Too much data can overwhelm athletes, especially those in lower skill brackets. Therefore, further research is needed to determine the optimal amount and type of feedback that athletes require to facilitate improvement without overwhelming them. Despite these challenges, the potential of real-time AI feedback to enhance precision and consistency in table tennis is immense.

AI and Skill Acquisition

AI technology has shown remarkable potential in improving skill acquisition in sports, including table tennis. In a sport where precision and consistency are paramount, AI platforms can provide invaluable insights into an athlete's performance by identifying subtle flaws in technique. For example, AI systems can analyze the angle of the paddle, the speed of the ball, and the player's reaction time during rallies, providing feedback on how slight adjustments can improve consistency and accuracy. According to Chen et al. (2022), AI's role in skill acquisition is twofold: it not only pinpoints areas of inefficiency but also provides tailored drills that target these specific aspects. AI also allows athletes to train smarter by offering dynamic drills that evolve as their skill levels improve. In table tennis, where the ability to react and execute strokes within milliseconds can determine the outcome of a match, AI helps athletes develop the muscle memory needed for rapid execution. However, the challenge remains in ensuring that the AI-driven drills are appropriately matched to the athlete's developmental stage. Further research is needed to examine how AI can seamlessly integrate skill improvement with the athlete's existing strengths, creating a balanced approach to training that fosters long-term development.

Adaptive Learning in AI Platforms

Adaptive learning powered by Artificial Intelligence (AI) is one of the most promising advancements in personalized training, particularly in table tennis. Adaptive learning systems leverage AI to modify the difficulty level of training drills in real-time based on an athlete's performance. This ensures that the training program evolves with the athlete's capabilities, neither overwhelming them nor stalling their progress. AI algorithms analyze data such as stroke accuracy, reaction time, and game statistics, adjusting the complexity of exercises accordingly. As athletes progress, the AI system increases the challenge, pushing them to continuously develop their skills. According to Zhang et al. (2022), such systems ensure that athletes are consistently working within their optimal challenge zone, a principle based on the theory of *flow* that is essential for skill acquisition and motivation. The adaptability of these systems makes them suitable for athletes at all levels, from beginners to elite professionals. However, challenges exist in ensuring that adaptive learning systems are flexible enough to cater to varying learning styles and that the AI system's adjustments align with an athlete's unique needs. More research is needed on how these systems can be fine-tuned to offer a balance between personalization and the need for uniformity in training for all athletes.

Enhancing Performance Through AI-Powered Video Analysis in Table Tennis

AI-powered video analysis is becoming an essential tool in modern sports training, offering insights that were previously difficult to obtain through traditional methods. In table tennis, where fast reflexes and precision are critical, AI-powered video analysis allows for a detailed breakdown of an athlete's movements during training or matches. Through high-definition cameras and motion tracking software, AI can assess key elements such as stroke technique, footwork, and overall positioning. This technology provides athletes with the ability to visualize their actions in slow motion, enabling them to detect flaws that are otherwise difficult to observe in real time. A study by Agha et al. (2023) found that AI-powered video analysis not only enhances athlete performance but also allows coaches to provide data-driven feedback, improving training efficiency. Furthermore, video analysis helps athletes recognize patterns in their play and strategize accordingly. However, challenges exist in terms of integrating this technology in real-time during competitive play, where immediate feedback is crucial. Additionally, while AI can provide precise video analysis, it still requires skilled coaches to interpret the data effectively. Thus, further research is needed to optimize the integration of AI video analysis systems in high-pressure environments like competitive table tennis.

Integration of Biomechanics and AI in Training Programs for Table Tennis

The integration of biomechanics with Artificial Intelligence (AI) offers a powerful approach to optimizing athletic performance, particularly in sports like table tennis, where technique and movement efficiency play a significant role in success. AI-powered biomechanics systems utilize motion capture technology to analyze the athlete's movements in three-dimensional space, examining factors like posture, joint angles, and kinetic chain efficiency. In table tennis, where small adjustments in posture or foot positioning can make a big difference, AI's ability to detect inefficiencies in movement patterns can result in major improvements in performance. Research by Fang et al. (2021) suggests that AI-driven biomechanical feedback can correct errors in an athlete's stroke mechanics, thus enhancing overall performance. Moreover, these systems provide detailed data that athletes can use to optimize their movements for both performance enhancement and injury prevention. However, the challenge lies in the complexity of integrating these systems into routine training. The technology requires expensive equipment and expertise, which may not be accessible in all training environments. Therefore, research is needed to develop more cost-effective and user-friendly biomechanics-AI systems that can be used widely, particularly in collegiate sports programs.

AI in Monitoring and Tracking Athlete Progress

AI has significantly enhanced the ability to monitor and track athlete progress over time, offering coaches valuable insights into an athlete's development. In table tennis, where precision and consistency are key, AI-driven tracking systems can continuously monitor metrics such as reaction time, shot accuracy, and footwork patterns. By collecting and analyzing this data, AI provides a detailed report on an athlete's strengths and areas for improvement, allowing coaches to adjust training plans accordingly. AI systems can also track performance trends over time, identifying areas where an athlete may plateau and offering recommendations for targeted drills. According to Kim et al. (2021), this data-driven approach to coaching improves the quality and effectiveness of training by providing both coaches and athletes with objective feedback. However, one of the main challenges is ensuring that the data collected is actionable and not overwhelming. Coaches may find it difficult to interpret large volumes of data without proper tools or training, and the effectiveness of the system depends on how well the data aligns with the athlete's training goals. Further research is needed to explore how AI-driven progress tracking can be seamlessly integrated into daily training routines and used effectively by coaches at all levels.

Evaluating the Impact of AI on Tactical Decision-Making in Table Tennis

AI's potential to enhance tactical decision-making in sports is increasingly recognized, particularly in fast-paced games like table tennis. By analyzing an athlete's performance during practice sessions or matches, AI systems can offer insights into optimal shot selection, serving strategies, and positioning on the table. For instance, AI can assess the opponent's weaknesses and recommend adjustments in real-time to exploit these vulnerabilities. Agha et al. (2023) highlighted how AI-driven tactical advice can help athletes make better decisions during high-pressure situations, ultimately improving their strategic play. In table tennis, where split-second decisions can determine the outcome of a match, AI has the potential to provide an edge by offering data-driven insights into match strategy. However, challenges persist in integrating real-time tactical decision-making during actual competitions. The effectiveness of AI recommendations must be tested in competitive environments where athletes may face greater mental pressure and where real-time decision-making is crucial. More research is needed to evaluate how AI can influence in-the-moment tactical decision-making and whether its recommendations lead to long-term performance improvements.

Gamification in AI Platforms

Gamification is an innovative approach that integrates game-like elements, such as points, leaderboards, and rewards, into training programs to increase engagement and motivation. In table tennis, where repetitive practice is necessary to master skills, gamification has the potential to make training sessions more enjoyable and rewarding. AI-powered platforms can incorporate gamified elements to track an athlete's progress, reward improvements, and add an element of fun to training sessions. Anderson et al. (2021) found that athletes who engaged with gamified training systems showed higher motivation levels and improved performance. For table tennis, gamification could include scoring systems based on reaction times, shot accuracy, or rally consistency, rewarding athletes as they achieve milestones. However, challenges remain in ensuring that gamification does not overshadow the primary goal of skill development. Further research is needed to assess how gamification can be balanced with performance-based training to ensure that athletes remain focused on improving their skills while enjoying the process.

Challenges and Opportunities in Implementing AI-Based Training Programs in Collegiate Sports

The integration of AI-based training programs in collegiate sports presents significant opportunities for enhancing athlete performance, yet it also faces several challenges. A primary hurdle is the cost and infrastructure required to implement AI systems. Many collegiate sports programs, especially in less-funded institutions, may not have the financial resources to invest in advanced AI technology, limiting its accessibility (Zhang et al., 2021). Furthermore, the need for high-tech equipment, including wearable devices and sensors, adds to the financial burden. Consequently, widespread adoption of AI-driven training systems may be slow unless universities allocate substantial budgets or explore cost-effective alternatives.

Resistance from coaches and athletes is another significant challenge in implementing AI-based training programs. Coaches, who are often entrenched in traditional training methods, may struggle to interpret AI-generated data effectively unless they are adequately trained. Zhang et al. (2021) emphasized the importance of equipping coaches with the knowledge to use AI tools, suggesting that professional development programs should focus on data literacy and AI integration to improve coaching effectiveness. Athletes, too, may be skeptical of new technologies, especially if they are unfamiliar with their potential benefits. For AI to be truly effective in sports training, athletes must feel comfortable and confident in using these tools. This psychological barrier can be overcome by demonstrating how AI can enhance their performance through personalized, actionable feedback.

Despite these challenges, there are numerous opportunities that AI can offer in collegiate sports. AI platforms provide personalized training that adjusts according to each athlete's skill level, goals, and progress, which can significantly improve performance and engagement. AI's capacity to track an athlete's development over time allows coaches to make data-driven decisions about training plans, optimizing efficiency and effectiveness. AI can also automate aspects of training, providing consistent and objective performance evaluations, which are often challenging to achieve through traditional methods. The use of AI can lead to better insights into an athlete's strengths and areas of improvement, allowing for more targeted interventions.

The implementation of AI in collegiate sports training is still in its nascent stages, and further research is crucial to overcoming these barriers. Studies focused on understanding how AI adoption can be facilitated at the collegiate level, particularly in terms of infrastructure and user acceptance, will help ensure that AI can make a lasting impact on athlete performance. Investigating the long-term effects of AI-based training on athletes' progression and engagement in sports is essential for refining AI platforms and their integration into collegiate sports programs.

AI-Enhanced Chatbot Coaching and Peer Learning

AI-powered chatbots, such as "PingPongGPT," are rapidly emerging as a powerful tool for enhancing learning and training in sports, offering immediate, context-aware feedback and providing personalized responses to athletes' queries. According to López & Tan (2024), chatbots operationalize conversational learning theories by scaffolding technical queries and delivering on-demand explanatory feedback. The 85% user satisfaction rate and 20% faster error correction observed in studies suggest that AI-driven chatbots can complement coach-led sessions by providing real-time guidance (López & Tan, 2024). These systems allow athletes to get instant feedback, which can be particularly useful in fast-paced sports like table tennis, where split-second adjustments are necessary.

Further research by Calderón et al. (2025) demonstrated the effectiveness of AI in peer-review workflows, showing a 16% improvement in the quality of corrective feedback when integrated with AI prompts. This improvement in feedback quality can help enhance peer learning and build stronger social bonds among athletes, aligning with the principles of Self-Determination

Theory (Deci & Ryan, 2000). By promoting collaboration and mutual learning, AI-driven platforms can create a more supportive and engaging environment for athletes, encouraging them to take ownership of their progress.

However, challenges remain in fully integrating chatbots into sports training, particularly in handling multi-modal inputs, such as real-time video analysis or complex tactical discussions. While chatbots excel in providing immediate textual feedback, their ability to analyze and respond to visual inputs (e.g., players' stroke techniques) and nuanced strategic insights remains limited. Integrating vision-language models could address this issue but would raise additional challenges related to computation power and data privacy. Furthermore, the cultural context of the athlete's environment must be considered to ensure that AI-driven feedback is pedagogically sound and culturally relevant, particularly for Filipino student-athletes who may have unique learning preferences.

Future research should explore hybrid models that combine automated chat responses with human coach moderation. This approach could ensure that the feedback is both accurate and tailored to the athlete's specific training needs, while also ensuring that cultural nuances are respected. By leveraging the strengths of both AI and human coaches, these systems could offer a balanced and effective training environment for athletes, especially in individual sports like table tennis, where personalized feedback is critical for skill development.

Artificial Intelligence in Sports Training

AI is revolutionizing sports training by providing athletes with tools that enhance their performance, engagement, and skill development. AI-powered platforms utilize data analytics, real-time feedback, and machine learning algorithms to deliver customized training programs tailored to an athlete's specific needs. Morrison and Liu (2021) highlight how AI applications in sports have led to significant improvements in decision-making, reaction time, and technical precision. Their study found that athletes using AI-integrated platforms were able to improve their skill accuracy and consistency faster than those using traditional training methods. This personalized approach not only accelerates skill development but also keeps athletes more engaged by offering relevant and actionable feedback that directly impacts their performance.

In addition to skill enhancement, AI systems have transformed sports analytics and performance evaluation. For example, Wang and Lee (2020) demonstrated how AI-assisted video analysis helps coaches identify movement patterns and tactical inefficiencies in athletes, enabling more targeted training interventions. These data-driven insights help coaches make more informed decisions, leading to better performance outcomes. In table tennis, where small adjustments in technique and timing can have a substantial impact on performance, AI systems can provide athletes with detailed feedback on their strokes, positioning, and overall strategy. This ability to fine-tune an athlete's technique based on precise data not only improves performance but also boosts confidence and motivation.

AI platforms are also enhancing motivation and self-efficacy by offering athletes customized training plans that cater to their individual needs. Liang et al. (2024) found that athletes who used AI-based platforms reported higher levels of motivation and self-efficacy, as the platforms were able to provide a more engaging and tailored experience. This personalized training approach, combined with real-time feedback, has the potential to transform how athletes in sports like table tennis approach their training and development. The ability to track progress over time and receive data-driven insights motivates athletes to continue improving and striving for better performance.

AI-Driven Wearable Technologies in Racket Sports

Wearable technologies, particularly inertial measurement unit (IMU) sensors, are becoming increasingly integral in racket sports training. These devices convert complex biomechanical movements into quantifiable data, enabling performance monitoring in real-world settings beyond laboratory conditions. Johnson et al. (2024) demonstrated that wearable IMU sensors could classify stroke types with 92% accuracy, allowing athletes to receive detailed feedback on their technique. This real-time, data-driven approach aligns with motor learning theories, particularly Schmidt's Schema Theory (Schmidt & Lee, 2011), by providing athletes with immediate feedback that refines their internal movement schemas through error-based correction.

Further research by Patel et al. (2025) highlighted the effectiveness of haptic feedback in wearable devices. By delivering alerts when an athlete's movement deviates from their personalized baseline, these devices helped athletes improve rally consistency by 18% over six weeks of training. This error-based, just-in-time feedback accelerates skill consolidation, allowing athletes to quickly correct their movements and enhance their performance. Such technologies are particularly beneficial in fast-paced sports like table tennis, where precise, consistent movements are crucial for success.

However, the studies conducted by Johnson et al. (2024) and Patel et al. (2025) relied on relatively small sample sizes and short intervention periods, which limits the generalizability of their findings. Future research should employ larger, randomized controlled trials involving diverse Filipino cohorts to assess the long-term retention and transferability of skills learned through wearable technologies. Understanding how these devices impact performance in real-world competition settings, particularly for individual sports like table tennis, will provide valuable insights into their potential for widespread adoption in sports training.

AI in Racket Sports Performance

The integration of AI into racket sports, including tennis and table tennis, has led to notable improvements in athletes' performance, particularly in terms of accuracy, consistency, and strategic decision-making. In a study by Denisova et al. (2019), AI-driven training programs for tennis players resulted in a 14% increase in shot precision and a 21% improvement in reaction speed. This improvement was largely attributed to AI-generated feedback that allowed players to address technical flaws more efficiently than with traditional coaching methods alone. The study highlights the advantages of AI in providing immediate, data-driven insights that accelerate learning and correct mistakes in real-time.

Similarly, Liao and Lee (2023) explored the impact of AI-powered training programs on table tennis athletes, noting that players who used AI systems experienced faster improvements in stroke accuracy and footwork. AI platforms provided real-time analytics that enabled athletes to identify weaknesses and make immediate corrections, leading to consistent performance growth. This ability to receive personalized, actionable feedback is crucial in a fast-paced sport like table tennis, where precision and reaction time are essential for success.

Tsai et al. (2017) further investigated the effects of AI coaching apps on table tennis players, finding that those who received AI-generated insights showed greater consistency in their serves and improved rally performance. These athletes were able to refine their techniques and adapt their strategies more effectively due to the immediate feedback AI provided. This highlights AI's potential in helping Filipino table tennis athletes, particularly those participating in higher education competitions, enhance their precision and tactical execution.

The significance of AI in racket sports, especially in individual sports like table tennis, lies in its ability to provide personalized, real-time feedback that directly contributes to skill improvement. By identifying weaknesses and offering immediate corrections, AI-powered platforms can foster consistent growth in athletes, which is particularly beneficial for sports that demand rapid adjustments and high levels of technical skill. Further research into AI's application in table tennis could enhance the development of training tools that support Filipino athletes, making them more competitive in both local and international arenas.

AI and Athlete Engagement

AI-powered training platforms are increasingly being recognized for their role in enhancing athlete engagement by making training sessions more interactive, personalized, and dynamic. García et al. (2021) found that athletes who received personalized feedback through AI platforms showed greater commitment and motivation during training. This was due to AI's ability to track an athlete's progress, highlight strengths, and suggest areas for improvement, ensuring that athletes remained engaged in their development. Such feedback not only promotes skill progression but also fosters a sense of achievement and continuous improvement.

Martinez and Torres (2020) corroborated these findings, concluding that student-athletes using AI systems reported higher satisfaction and enjoyment in their training sessions compared to those using traditional coaching methods. The interactive features of AI platforms, such as performance charts, skill heatmaps, and personalized progress reports, kept athletes motivated and encouraged them to strive for better performance. These features, which make training more visually engaging and goal-oriented, are essential in maintaining athlete interest over time.

Hand and Wang (2023) further emphasized that AI-enhanced training platforms could significantly improve an athlete's focus and consistency. By providing real-time feedback on errors and offering insights into areas for improvement, AI systems reinforced positive training behaviors and ensured that athletes stayed focused on their goals. The continuous, data-driven reinforcement provided by AI platforms helps athletes track their progress in real-time, which in turn boosts their engagement and commitment to training.

For table tennis athletes, where precision and consistency are key, these AI-driven features can prove invaluable in maintaining sustained engagement. The ability to track performance over time, make immediate corrections, and stay motivated through personalized feedback makes AI training tools highly effective in fostering long-term athlete engagement. AI platforms offer a promising solution to the challenge of keeping athletes consistently engaged in training, which is crucial for sports like table tennis where continuous skill development is essential for success.

AI and Interest in Sports Training

Incorporating AI into sports training programs has been shown to significantly increase athletes' interest and enjoyment, particularly by offering interactive and goal-driven features. Tsou et al. (2024) found that athletes who used AI-powered platforms were 27% more likely to continue regular training sessions due to the platform's ability to generate adaptive drills and personalized performance reports. This constant adjustment and feedback kept athletes interested by offering new challenges and measurable progress. The interactive nature of these platforms ensures that athletes remain engaged and motivated, as the training never becomes repetitive or monotonous.

Similarly, Wang et al. (2023) highlighted the role of gamification in AI training systems, which can make training more enjoyable and motivating. By incorporating elements such as performance badges, ranking systems, and goal-setting challenges, AI platforms transform training into a more competitive and enjoyable experience. This approach not only enhances motivation but also provides athletes with clear, quantifiable goals that keep them engaged in their development. The ability to earn rewards and track progress through gamified features adds an element of fun and challenge, making the training process more exciting.

In the context of table tennis, Elferink-Gemser et al. (2018) found that athletes who used AI-based coaching platforms exhibited higher levels of enthusiasm and satisfaction during practice sessions. The instant feedback and skill progression metrics provided by AI systems made training more engaging and encouraging, motivating athletes to participate consistently. These findings suggest that AI-powered training tools could significantly increase the interest of Filipino table tennis athletes by making training sessions more interactive, personalized, and goal-oriented.

The integration of AI into sports training offers a unique opportunity to increase athletes' interest in their training routines. By providing personalized feedback, adaptive drills, and gamified elements, AI platforms create an engaging training environment that encourages athletes to persist and improve. For table tennis athletes, particularly those in the collegiate setting, AI tools can be instrumental in maintaining interest and ensuring long-term commitment to their training and skill development.

AI and Skill Acquisition in Table Tennis

AI-based platforms have shown significant potential in enhancing skill acquisition and technical proficiency, particularly in individual sports like table tennis. Liu and Huang (2020) demonstrated that AI-driven training programs could accelerate stroke refinement and movement efficiency by offering real-time biomechanical feedback. Athletes using AI platforms were able to correct technical flaws 40% faster than those relying on traditional methods. This accelerated correction process is especially valuable in table tennis, where precision and speed are essential, and small technical adjustments can lead to substantial improvements in performance.

Similarly, Park and Choi (2022) found that AI-based motion analysis enhanced stroke consistency and reaction speed in table tennis, resulting in more strategically sound gameplay. These findings suggest that AI's ability to provide real-time feedback allows athletes to make quicker adjustments during training, which is crucial in a fast-paced sport where reaction times can make or break a game. By identifying and addressing weaknesses immediately, AI systems enable athletes to refine their techniques more effectively and consistently.

Further, Thompson et al. (2023) explored how AI-powered platforms could enhance situational awareness and tactical decision-making in table tennis. By simulating match scenarios and offering data-driven strategic suggestions, AI platforms helped athletes develop a deeper understanding of the game and improve their decision-making in real-time. This ability to simulate game situations and offer targeted advice is particularly beneficial in developing tactical acumen, which is crucial for success in competitive table tennis.

For Filipino table tennis athletes, AI could provide a comprehensive approach to skill acquisition by combining biomechanical feedback, motion analysis, and strategic insights into one platform. This personalized feedback would not only help athletes refine their technique but also improve their ability to adapt tactically during competition. As AI becomes more integrated

into training, its role in shaping skilled, strategically aware athletes will likely grow, offering substantial benefits for Filipino athletes aiming to excel in both national and international competitions.

AI Adoption in Philippine Collegiate Sports

The adoption of AI in Philippine collegiate sports is gradually gaining momentum, particularly in institutions competing in regional and national tournaments. Delos Reyes (2023) found that universities in Manila are increasingly integrating AI analytics and performance-tracking systems into their sports programs. The study indicated that these AI platforms significantly improved athlete retention and performance consistency by offering personalized and adaptive coaching, which kept athletes engaged and motivated. AI's ability to track progress over time and tailor training programs to individual needs allows coaches to make data-driven decisions that optimize training efficiency and results.

platform over time.

These findings are consistent with the Technology Acceptance Model (TAM), which asserts that the perceived ease of use and to understand the usefulness of technology are key drivers of its adoption and sustained use. Research by Li (2023) and Krausman (2023) supports this view, highlighting that AI-based systems are more readily embraced when athletes perceive them as both easy to operate and beneficial to their skill development. Overall, the data suggests that student-athletes not only accept AI but view it as an essential and valuable tool for enhancing their training, aligning with broader trends in the adoption of technology in sports training.

Table 14
Summary of Level of Interest of the Student-Athletes in Utilizing Artificial Intelligence in Table Tennis Training

Variables	Mean	SD	Interpretation	Description	Rank
Intrinsic motivation	3.66	0.55	Strongly Agree	Highly Interested	1.5
Perceived usefulness	3.58	0.52	Strongly Agree	Highly Interested	3
Sustained interest	3.66	0.50	Strongly Agree	Highly Interested	1.5
Technology acceptance	3.57	0.62	Strongly Agree	Highly Interested	4
Composite Mean	*3.77*	*0.29*	*Strongly Agree*	*Highly Interested*	

Legend: 4.00 – 3.51 Strongly Agree (SA); 3.50-2.51 Agree (A); 2.50-1.51 Disagree (DA);
1.49-1.0 Strongly Disagree (SDA)

In Table 14, the data summarizes the level of interest of student-athletes in utilizing Artificial Intelligence (AI) for their table tennis training, particularly in terms of their confidence in using the platform. The composite mean score of 3.77 (SD = 0.29) suggests a high level of agreement, indicating strong interest and confidence in the AI platform across various factors, including motivation, usefulness, sustained interest, and technology acceptance.

The highest mean score was observed for intrinsic motivation (M = 3.66, SD = 0.55), indicating that the athletes experienced a strong intrinsic drive, driven by genuine concentration and enjoyment in improving their table tennis skills using AI. This was followed by sustained interest (M = 3.66, SD = 0.50), which reflects those athletes maintained consistent motivation and engagement over time while utilizing AI for their training.

In terms of technology acceptance (M = 3.57, SD = 0.62) and perceived usefulness (M = 3.58, SD = 0.52), both factors received strong ratings, indicating that athletes acknowledged the value and benefits of the AI platform. While the perceived usefulness score was slightly lower than the other factors, it remained in the "strongly agree" range, suggesting that athletes firmly believed that AI contributed significantly to their training effectiveness.

The consistency in the responses, reflected in the low standard deviations across most indicators, demonstrates that the athletes shared a unified view of AI's impact on their motivation and training. This finding suggests that AI not only supports short-term training outcomes but also fosters sustained interest and skill development over time. Coaches, particularly Coach 3, noted that athletes were generally enthusiastic and committed to integrating AI into their training routines, emphasizing its role in both skill improvement and maintaining engagement over extended periods.

These findings align with existing research in technology adoption, particularly regarding the importance of perceived usefulness and intrinsic motivation as key factors influencing the acceptance of new training tools like AI. Studies by Li (2023) and Krausman (2023) reinforce the notion that when athletes find a technology both useful and intrinsically motivating, they are more likely to adopt and sustain its use over time. Additionally, the results suggest that the integration of AI into training routines is seen as a critical factor in enhancing long-term performance, reinforcing its value in modern sports training contexts.

5. SIGNIFICANT DIFFERENCE IN THE LEVEL OF INTEREST OF THE STUDENT-ATHLETES IN UTILIZING ARTIFICIAL INTELLIGENCE IN TABLE TENNIS TRAINING WHEN GROUPED ACCORDING TO THEIR PROFILE

Table 15
Significant Difference in the Level of Interest of the Student-Athletes in Utilizing Artificial Intelligence in Table Tennis Training

In Table 15, the data presented the significant differences in the level of interest of student-athletes in utilizing Artificial Intelligence (AI) for table tennis training, categorized by sex, age, year level, and years of experience. The composite mean score of 3.77 (SD = 0.29) indicates that overall, student-athletes showed a strong level of interest in AI. However, significant differences were observed in certain factors, particularly when grouped by age and year level, while others, such as sex and years of experience, did not yield statistically significant results. The highest indicator was intrinsic motivation and sustained interest (M = 3.66, SD = 0.55), indicating that athletes displayed high motivation and maintained strong interest in using AI during their training sessions.

Variable	Group	Mean	SD	F value	sig	Decision of H0	Interpretation
Intrinsic motivation	Male	3.65	0.18	0.48	0.50	Accepted	Not Significant
	Female	3.67	0.15				
Perceived usefulness	Male	3.58	0.19	2.16	0.15	Accepted	Not Significant
	Female	3.59	0.16				
Sustained interest	Male	3.68	0.19	0.90	0.34	Accepted	Not Significant
	Female	3.63	0.22				
Technology acceptance	Male	3.55	0.215	0.89	0.35	Accepted	Not Significant
	Female	3.58	0.229				
Overall	**Male**	*3.615*	*0.193*	**1.107**	**0.335**	**Accepted**	**Not Significant**
	Female	*3.617*	*0.189*				
Intrinsic motivation	18-19	3.67	0.14	3.52	0.01	Rejected	Significant
	20-21	3.72	0.16				
	22-23	3.59	0.16				
	24-25	3.68	0.19				
Perceived usefulness	18-19	3.58	0.13	0.33	0.80	Accepted	Not Significant
	20-21	3.59	0.17				
	22-23	3.60	0.20				
	24-25	3.54	0.19				
Sustained interest	18-19	3.66	0.19	0.60	0.62	Accepted	Not Significant
	20-21	3.70	0.18				
	22-23	3.64	0.23				
	24-25	3.62	0.21				
Technology acceptance	18-19	3.67	0.17	2.74	0.05	Rejected	Significant
	20-21	3.55	0.20				
	22-23	3.50	0.25				
	24-25	3.58	0.19				
Overall	**18-19**	*3.65*	*0.16*	*1.80*	*0.37*	**Accepted**	**Not Significant**
	20-21	*3.64*	*0.18*				
	22-23	*3.58*	*0.21*				
	24-25	*3.61*	*0.20*				
Intrinsic motivation	First year	3.67	0.14	3.25	0.02	Rejected	Significant
	Second year	3.72	0.16				
	Third Year	3.59	0.16				
	Fourth Year	3.76	0.11				
	Fifth year and above	3.63	0.20				
Perceived usefulness	First year	3.58	0.13	0.34	0.85	Accepted	Not Significant
	Second year	3.59	0.17				
	Third Year	3.60	0.20				
	Fourth Year	3.50	0.16				
	Fifth year and above	3.56	0.21				
Sustained interest	First year	3.66	0.19	0.44	0.77	Accepted	Not Significant
	Second year	3.70	0.18				
	Third Year	3.64	0.23				
	Fourth Year	3.62	0.27				
	Fifth year and above	3.61	0.18				
Technology acceptance	First year	3.67	0.17	2.05	0.10	Accepted	Not Significant
	Second year	3.55	0.20				
	Third Year	3.50	0.25				
	Fourth Year	3.60	0.20				
	Fifth year and above	3.58	0.20				
Overall	First year	**3.65**	**0.16**	**1.52**	**0.44**	**Accepted**	**Not Significant**
	Second year	**3.64**	**0.18**				
	Third Year	**3.58**	**0.21**				

	Fourth Year	**3.62**	**0.19**				
	Fifth year and above	**3.60**	**0.20**				
Intrinsic motivation	Less than 3 years	3.64	0.20	0.10	0.96	Accepted	Not Significant
	4-6 years	3.70	0.14				
	5-7 years	3.66	0.16				
	More than 8 years	3.66	0.17				
Perceived usefulness	Less than 3 years	3.60	0.16	1.59	0.20	Accepted	Not Significant
	4-6 years	3.72	0.31				
	5-7 years	3.61	0.18				
	More than 8 years	3.55	0.16				
Sustained interest	Less than 3 years	3.66	0.23	0.21	0.89	Accepted	Not Significant
	4-6 years	3.68	0.05				
	5-7 years	3.63	0.22				
	More than 8 years	3.67	0.20				
Technology acceptance	Less than 3 years	3.53	0.36	1.12	0.35	Accepted	Not Significant
	4-6 years	3.40	0.24				
	5-7 years	3.60	0.21				
	More than 8 years	3.56	0.19				
Overall	**Less than 3 years**	**3.61**	**0.28**	**0.76**	**0.60**	**Accepted**	**Not Significant**
	4-6 years	**3.63**	**0.16**				
	5-7 years	**3.63**	**0.21**				
	More than 8 years	**3.61**	**0.19**				

Legend: Significant @ 0.05

The lowest indicator was technology acceptance (M = 3.57, SD = 0.62), suggesting that while athletes accepted AI technology, their confidence in fully adopting and utilizing its features was slightly lower compared to other factors. The results revealed that younger athletes (ages 18-19) reported significantly higher intrinsic motivation and technology acceptance, with p-values of 0.01 and 0.05, respectively, suggesting that younger athletes tend to be more inclined to engage with AI-powered tools than their older counterparts.

From the coaches' responses, Coach 1 and Coach 5 highlighted that younger athletes, particularly first-year students, exhibited higher levels of interest in AI. They suggested that personalized AI feedback could enhance engagement, especially for first-year athletes, who are more open to adopting new technologies. Coach 2 and Coach 3 emphasized that while younger athletes were generally more enthusiastic, they still required guidance on how to effectively translate AI feedback into actionable training strategies. These coaches pointed out that technological education could be beneficial in ensuring that athletes not only adopt AI but also maximize its utility in improving performance. This aligns with previous research by Seçkin, Ateş, and Seçkin (2023), which found that younger athletes are generally more engaged with technological tools, likely due to their familiarity with and openness to new technologies.

Regarding sex, the analysis showed no significant differences, as p-values for all factors were greater than 0.05, suggesting that male and female athletes had similar levels of interest in AI-powered training tools. This is consistent with findings from Pun et al. (2022) and Blanche et al. (2019), which argued that while sex might influence some aspects of technology use, it was not a major determinant in this study's context. Similarly, years of experience did not significantly affect the level of interest in AI, as the p-values for all comparisons were greater than 0.05. This aligns with research by Himeur et al. (2022), which suggested that factors such as familiarity with the technology and perceived usefulness played a more significant role in influencing interest than demographic factors like experience.

Overall, the study's findings reinforce that personal motivation, openness to technology, and intrinsic motivation were key factors in determining the level of interest in AI. While demographic factors like sex and years of experience did not have a significant impact, age and year level showed that younger and first-year athletes were more inclined to engage with AI-based tools for training. This suggests that as AI technology becomes more integrated into training routines, continued education and personalized support will be essential for sustaining athlete engagement and maximizing performance improvements.

6. SIGNIFICANT RELATIONSHIP BETWEEN THE LEVEL OF ENGAGEMENT AND THE LEVEL OF INTEREST OF THE STUDENT-ATHLETES IN UTILIZING ARTIFICIAL INTELLIGENCE IN TABLE TENNIS TRAINING?

Table 16
Significant Relationship Between Level of Engagement and Level of Interest in utilizing Artificial Intelligence in Table Tennis Training

In Table 16, the Pearson correlation analysis examined the relationship between the level of engagement and the level of interest of student-athletes in utilizing Artificial Intelligence (AI) during their table tennis training. The composite mean score of -0.15 (p = 0.40) suggested a weak, non-significant correlation between engagement and overall interest, indicating that increased engagement with AI did not necessarily lead to a heightened level of interest.

Variable	Profile	Computed R	Sig	Decision on H0	Interpretation
Frequency of Artificial Intelligence usage during training	Intrinsic motivation	-0.33	0.76	Accepted	Not Significant
	Perceived usefulness	-0.70	0.52	Accepted	Not Significant
	Sustained interest	0.55	0.00	Rejected	Significant
	Technology acceptance	-0.11	0.30	Accepted	Not Significant
	Total	**-0.15**	**0.40**	**Accepted**	**Not Significant**
Consistency of Artificial Intelligence integration into training routines	Intrinsic motivation	0.17	0.13	Accepted	Not Significant
	Perceived usefulness	-0.12	0.92	Accepted	Not Significant
	Sustained interest	-0.30	0.006	Rejected	Significant
	Technology acceptance	-0.09	0.41	Accepted	Not Significant
	Total	**-0.09**	**0.37**	**Accepted**	**Not Significant**
Duration of training sessions using Artificial Intelligence	Intrinsic motivation	0.36	0.00	Rejected	Significant
	Perceived usefulness	-0.04	0.70	Accepted	Not Significant
	Sustained interest	0.01	0.91	Accepted	Not Significant
	Technology acceptance	-0.04	0.71	Accepted	Not Significant
	Total	**0.07**	**0.58**	**Accepted**	**Not Significant**
Adaptability used	Intrinsic motivation	0.25	0.02	Rejected	Significant
	Perceived usefulness	0.15	0.17	Accepted	Not Significant
	Sustained interest	0.38	0.00	Rejected	Significant
	Technology acceptance	-0.01	0.86	Accepted	Not Significant
	Total	**0.19**	**0.26**	**Accepted**	**Not Significant**
Integration in training routine	Intrinsic motivation	0.11	0.34	Accepted	Not Significant
	Perceived usefulness	-0.11	0.32	Accepted	Not Significant
	Sustained interest	-0.25	0.02	Rejected	Significant
	Technology acceptance	0.10	0.39	Accepted	Not Significant
	Total	**-0.04**	**0.27**	**Accepted**	**Not Significant**
Confidence in using Artificial Intelligence for skill enhancement	Intrinsic motivation	0.21	0.05	Rejected	Significant
	Perceived usefulness	0.13	0.25	Accepted	Not Significant
	Sustained interest	0.29	0.00	Rejected	Significant
	Technology acceptance	-0.05	0.66	Accepted	Not Significant
	Total	**0.15**	**0.24**	**Accepted**	**Not Significant**

Legend: Significant @ 0.05

This suggests that engagement and interest may be influenced by factors beyond just interaction frequency, possibly involving external factors such as personal preferences or familiarity with the platform, aligning with the findings of Dwivedi et al. (2021), who noted that understanding the usefulness does not always guarantee engagement with a digital platform.

The lowest correlation was observed between perceived usefulness (r = -0.11, p = 0.30), which was not significant, indicating that while athletes acknowledged the value of AI, it did not have a substantial effect on their level of engagement. This finding is consistent with research by Li (2023), which suggested that the perceived usefulness of a technology does not always directly correlate with sustained interaction, especially if external motivators or technology familiarity play a larger role.

Conversely, the highest significant correlation was found between engagement and intrinsic motivation (r = -0.33, p = 0.76), showing a negative relationship, meaning that while athletes engaged with AI, their intrinsic motivation to use the tool decreased. This decline in self-initiated motivation is reflective of the idea that while AI can stimulate initial interest, continuous engagement with the tool may reduce personal drive, aligning with Dempere et al. (2023), who discussed how sustained interaction with AI tools can sometimes lead to fatigue or diminishing intrinsic motivation over time.

However, engagement showed moderate positive significant correlations with sustained interest (r = 0.55, p < 0.001) and technology acceptance (r = 0.362, p < 0.001), suggesting that greater engagement led to more consistent interest and a higher level of acceptance of AI's technological features. This indicates that engagement played a complex role: it might lower intrinsic motivation but simultaneously enhance long-term interest and the acceptance of AI, consistent with findings from Li (2023) and Dempere et al. (2023), who emphasized that engagement with AI tools could improve user experience and overall acceptance, even if it affects internal motivation.

From the coaches' responses, Coach 1 and Coach 5 noted that while engagement was consistently high, especially among younger athletes, the decline in intrinsic motivation as engagement increased was a concern. They suggested that athletes,

particularly in their first years of training, may be more enthusiastic at first but then rely too heavily on AI feedback, which could lead to less personal initiative. Coach 2 also pointed out that while AI contributed to sustained interest over time, some athletes seemed to lose sight of self-driven goals as they grew more reliant on the AI system. These responses indicated the need for balancing technology with traditional coaching to maintain both motivation and personal development.

The results underscore the importance of creating AI tools that balance engagement with intrinsic motivation while fostering sustained interest and acceptance. Despite to perceived usefulness not significantly influencing engagement, maintaining a focus on personalization and continuous support for the athletes suggested by the coaches could help improve both engagement and long-term interest in AI-based training tools. The complex relationship between engagement and motivation, as highlighted by both the data and coach feedback, suggests that designing more adaptive AI systems could help mitigate motivational declines, leading to better, more sustained athlete performance.

7. THE CHALLENGES THAT THE COACHES ENCOUNTERED IN UTILIZING ARTIFICIAL INTELLIGENCE DURING TABLE TENNIS TRAINING

Table 17
Challenges of Coaches Utilizing Artificial Intelligence

Themes	Sample Transcript	Participants
Integration of AI with Existing Training Programs	*"Although my athletes are highly motivated and engaged with Artificial Intelligence, one significant **challenge we encounter is aligning** the app's **suggestions with our current training schedule**. The app sometimes **recommends drills** or **progressions** that do not fit into our **structured cycles**, especially during **peak competition seasons**. **Customizing the AI's feedback** to align with our coaching plan requires **time and effort**, which isn't always feasible given our **tight schedules**. I also wish there was more **flexibility** in the platform for coaches to **drive the customization**, allowing it to **complement our existing strategies** instead of conflicting with them."* *"While the enthusiasm for AI is high, one issue is that the feedback often **conflicts with the pre-set drills** and **schedules** we have in place for certain periods of training. We have to **spend time adjusting** the AI's recommendations to **fit into our practice framework**. A more **coach-driven customization feature** would make it more seamless to **integrate** into our existing programs."*	Coach 1, and 5
Technological Barriers and Overreliance on AI	*"Our players' **enthusiasm** for the AI tool is great, but a significant **issue** we face is the **availability** of the necessary **devices** and **reliable internet**. While many athletes' own smartphones, not all of them have **high-end devices** capable of smoothly running the app. Moreover, **internet connectivity issues** or app **lags** during practice sessions can **disrupt the flow of training**. For **consistent use**, we also need **better infrastructure** to support the AI's **integration** into every practice session."* *"A notable **challenge** is the **risk of overreliance** on the AI. Many of our players are so excited by the app that they begin to **depend too heavily on its feedback** rather than using their **game instincts** or responding to **live coaching**. I've had to constantly remind them that the AI is just a **supplementary tool** and cannot replace the **adaptability** and **decision-making** required in real games. Finding the **balance** between **technology use** and **real-time intuition** has been a crucial **learning curve** for both our athletes and coaches."*	Coach 2, Coach 4
Accuracy and Personalization of AI Feedback	*"AI presents a lot of promise, and our athletes' **engagement** with it demonstrates its potential. However, we **struggle with interpreting** and **validating** the feedback it provides. Some of the **metrics**, like **paddle angle** or **spin speed**, don't always seem **accurate**, particularly in environments with **non-standard lighting**. As a result, I am hesitant to fully **trust the data** without **cross-checking** it manually. For now, I still need to **validate** much of the feedback myself."* *"While the AI engages our athletes, it still falls short when it comes to offering **personalized corrections**. The app provides **general feedback**, but **advanced players** often require very **specific adjustments** in their strokes, footwork, and timing. These **finer details** are often missed by the AI. To address this, we've made it a rule that **AI feedback must always be discussed with a coach** before it's implemented to avoid forming **incorrect habits**. This **additional layer of supervision** adds extra **responsibility** for the coaching staff."*	Coach 3, Coach 6

In table 17 shown the thematic analysis of responses from the coaches reveals several recurring themes focused on significant challenges encountered when incorporating Artificial Intelligence (AI) into table tennis training. These challenges include difficulties with integration into existing training programs, technological barriers, and the accuracy and personalization of AI feedback. The analysis also identifies strategies to address these challenges, emphasizing the need for a balance between technology and traditional coaching methods.

Integration of AI with Existing Training Programs

Coach 1 and Coach 5 highlighted the challenge of integrating AI with pre-established training structures. As Coach 1 noted, *"Although my athletes are highly motivated and engaged with Artificial Intelligence, one significant challenge we encounter is aligning the app's suggestions with our current training schedule. The app sometimes recommends drills or progressions that do not fit into our structured cycles, especially during peak competition seasons."* This statement emphasizes how AI's rigid recommendations can clash with existing coaching schedules, particularly when coaches are under time constraints.

Coach 5 further elaborated, *"While the enthusiasm for AI is high, one issue is that the feedback often conflicts with the pre-set drills and schedules we have in place for certain periods of training. We have to spend time adjusting the AI's recommendations to fit into our practice framework."* These insights reflect a broader issue in AI integration: the lack of flexibility within AI tools. The desire for coach-driven customization underscores the need for AI systems that allow for greater adaptability, so that coaches don't have to constantly modify their routines to accommodate technology. This challenge has been identified in previous studies, which highlight the need for greater flexibility in AI tools to ensure they complement existing training structures (Schools et al., 2020).

Technological Barriers and Overreliance on AI

Coach 2 and Coach 4 discussed the technological barriers that hinder AI's seamless use in training. As Coach 2 noted, *"Our players' enthusiasm for the AI tool is great, but a significant issue we face is the availability of the necessary devices and reliable internet. While many athletes' own smartphones, not all of them have high-end devices capable of running the app smoothly. Moreover, internet connectivity issues or app lags during practice sessions can disrupt the flow of training."* This highlights a fundamental problem: technological infrastructure is still insufficient to support consistent AI use across all athletes. This has been discussed in previous literature, emphasizing the importance of reliable technological infrastructure (Milroy et al., 2019).

Coach 4 also brought attention to the issue of overreliance on AI, stating, *"A notable challenge is the risk of overreliance on the AI. Many of our players are so excited by the app that they begin to depend too heavily on its feedback rather than using their game instincts or responding to live coaching."* This quote suggests that while the enthusiasm for AI is high, athletes need to be reminded that AI is a supplementary tool, not a substitute for the human elements of training, such as adaptability and real-time decision-making. Coaches, therefore, must emphasize critical reflection after training to help athletes balance AI assistance with their own game sense, ensuring that technology supplements not replace their natural instincts and decision-making (Tiberi et al., 2024).

Accuracy and Personalization of AI Feedback

Coach 3 and Coach 6 expressed concerns regarding the accuracy and personalization of AI feedback. As Coach 3 observed, *"AI presents a lot of promise, and our athletes' engagement with it demonstrates its potential. However, we struggle with interpreting and validating the feedback it provides. Some of the metrics, like paddle angle or spin speed, don't always seem accurate, particularly in environments with non-standard lighting."* This highlights a critical issue in AI adoption: the accuracy of data generated by AI tools is often compromised under certain conditions, such as poor lighting, which can undermine the effectiveness of the feedback provided to athletes. Accuracy in AI systems is crucial for them to be effective in sports training (Sarmiento et al., 2014).

Coach 6 further elaborated on the personalization challenge, saying, *"While the AI engages our athletes, it still falls short when it comes to offering personalized corrections. The app provides general feedback, but advanced players often require very specific adjustments in their strokes, footwork, and timing. These finer details are often missed by the AI."* This insight underscores the need for more precise, personalized feedback from AI systems, especially for advanced players who require micro-level adjustments to their techniques. Without this level of personalized correction, AI may not be fully effective in supporting the development of elite athletes. As highlighted in prior studies, personalized coaching remains a crucial element that AI cannot fully replace (Tiberi et al., 2024).

As Coach 6 pointed out, *"We've made it a rule that AI feedback must always be discussed with a coach before it's implemented to avoid forming incorrect habits."* This extra step reflects the importance of maintaining human supervision in the AI-driven training process to ensure that athletes don't inadvertently develop bad habits due to inaccurate or overly generalized feedback.

The challenges faced by coaches in utilizing AI for table tennis training point to significant areas that require improvement for AI to be effectively integrated. The integration of AI with existing training programs, technological barriers such as device and connectivity limitations, and the need for more personalized and accurate AI feedback are key hurdles that need to be addressed. Coaches have emphasized the necessity of customizable AI tools that allow for greater flexibility and coach-driven control over training content. Additionally, the need for better technological infrastructure and the balance between AI and traditional coaching were highlighted as critical to maximizing AI's benefits.

Moving forward, AI should be designed to enhance, not replace, traditional coaching methods. Coaches will continue to play a vital role in interpreting AI feedback and ensuring that it complements the athletes' natural instincts and real-time decision-making. Addressing these challenges will ensure that AI tools become a valuable addition to training programs, fostering greater engagement, skill development, and performance improvement in table tennis and other sports.

8. COUNTERMEASURES DID THE COACHES APPLY TO OVERCOME THE CHALLENGES THEY ENCOUNTERED

Table 18
Coaches Countermeasures to Overcome the Challenges Encountered

Themes	Sample Transcript	Participants
Hybrid Training Models and Critical Reflection	*"To address the conflict between our training cycles and the app's preset routines, we created a **hybrid training model**. I collaborated with my assistant coaches and athletes to **align Artificial Intelligence drills** with our **tactical and periodization plans**. We also designated certain days as 'AI days' where the app leads, while other sessions remain purely **coach-led**. This helped us strike a **healthy balance**."* *"To reduce **overreliance** on the app, I introduced **reflective debriefs** after every AI-assisted session. Athletes had to report what they learned and how they planned to apply it in **real match situations**. This method encouraged **critical thinking** and helped them differentiate between digital advice and **in-game realities**. We also incorporated more **game-based simulations** to develop **instinctive decision-making**."*	*Coach 1, and 4*
Technological Enhancements and Policies for Technical Adjustments	*"Since **connectivity** and **device limitations** were affecting performance, we partnered with our **IT office** and **school administration** to provide **stronger Wi-Fi access** in training areas. For athletes who lacked **compatible gadgets**, we implemented a **shared-device setup**, assigning a team tablet or spare phones where two athletes could train alternately. This kept everyone included without disrupting sessions."* *"We made it a **policy** that any **technical adjustments** suggested by Artificial Intelligence must be **reviewed with the coaching staff** first before athletes could apply them. This ensured that no one implemented changes that could negatively affect form or strategy. We also encouraged athletes to write short 'training journals' reflecting on both coach feedback and AI analytics, which helped merge tech with traditional training wisdom."*	Coach 2, and 6
Data Verification Methods and Educational Workshops	*"We addressed the issue of **inaccurate data** by **cross-verifying** app metrics with **video analysis** and live observation. For instance, if the app reported unusual racket angles, we reviewed **slow-motion videos** to confirm and correct the issue. We also trained a couple of student-athletes to assist in basic **data checks**, creating a **peer-review style learning culture**."* *"Recognizing our team's limitations in tech, we conducted a **basic AI tech workshop** for both coaches and players. It was just an hour-long session, but it helped everyone become more **confident** in using Artificial Intelligence. We also created a simple printed guide with **screenshots** and step-by-step instructions, which the players appreciated, especially the first-timers with sports tech."*	Coach 3, and 5

In table 18 The coaches' responses highlight several effective countermeasures developed to address the challenges they encountered while incorporating Artificial Intelligence (AI) into their table tennis training practices. Through strategic interventions, coaches worked to mitigate obstacles such as integrating technology with existing training structures, ensuring technological accessibility, validating AI-generated data, reducing overreliance on AI, and enhancing technological proficiency among the coaching staff. These strategies demonstrate how AI can complement traditional coaching methods rather than disrupt them.

Hybrid Training Models and Critical Reflection

Coach 1 described the implementation of a hybrid training model to reconcile the conflict between traditional training cycles and AI's preset routines. As Coach 1 noted, *"To address the conflict between our training cycles and the app's preset routines, we created a hybrid training model. I collaborated with my assistant coaches and athletes to align Artificial Intelligence drills with our tactical and periodization plans. We also designated certain days as 'AI days' where the app leads, while other sessions remain purely coach-led. This helped us strike a healthy balance."* This statement emphasizes how coaches customized AI drills to align with their tactical plans, demonstrating a pragmatic approach to integrating AI without disrupting core training principles. By designating certain days as 'AI days', coaches ensured that AI remained a supplementary tool, enhancing the overall training process without over-relying on it.

Coach 4 further elaborated on this approach, saying, *"To reduce overreliance on the app, I introduced reflective debriefs after every AI-assisted session. Athletes had to report what they learned and how they planned to apply it in real match situations. This method encouraged critical thinking and helped them differentiate between digital advice and in-game realities. We also incorporated more game-based simulations to develop instinctive decision-making."* This critical reflection practice allowed athletes to process and internalize AI feedback, ensuring they could apply it in real-game scenarios while maintaining their autonomous decision-making skills. These countermeasures underscore how coaches balance technology with traditional methods to maintain cognitive independence while using AI to enhance training (Smith, 2021; Anderson & Williams, 2022).

Technological Enhancements and Policies for Technical Adjustments

Coach 2 addressed the technological barriers posed by device compatibility and internet connectivity. As Coach 2 explained, *"Since connectivity and device limitations were affecting performance, we partnered with our IT office and school administration to provide stronger Wi-Fi access in training areas. For athletes who lacked compatible gadgets, we implemented*

a shared-device setup, assigning a team tablet or spare phones where two athletes could train alternately. This kept everyone included without disrupting sessions." This response highlights the proactive approach taken to ensure equitable access to AI tools by improving the technological infrastructure and creating a shared-device system for athletes with limited access to compatible devices. These adjustments reflect a commitment to overcoming technological barriers (Jones, 2020).

Coach 6 also implemented policies for technical adjustments, stating, *"We made it a policy that any technical adjustments suggested by Artificial Intelligence must be reviewed with the coaching staff first before athletes could apply them. This ensured that no one implemented changes that could negatively affect form or strategy. We also encouraged athletes to write short 'training journals' reflecting on both coach feedback and AI analytics, which helped merge tech with traditional training wisdom."* This practice of pre-approval for AI-driven changes ensured that AI feedback was aligned with the coaches' strategies and didn't conflict with established techniques. The introduction of training journals further helped integrate technology with traditional wisdom, ensuring that AI feedback was used as a complementary tool rather than a replacement for human expertise (Mitchell, 2021).

Data Verification Methods and Educational Workshops

Coach 3 employed data verification methods to address concerns about the accuracy of AI-generated metrics, such as paddle angle and spin speed, which were sometimes inaccurate under certain lighting conditions. As Coach 3 shared, *"We addressed the issue of inaccurate data by cross-verifying app metrics with video analysis and live observation. For instance, if the app reported unusual racket angles, we reviewed slow-motion videos to confirm and correct the issue. We also trained a couple of student-athletes to assist in basic data checks, creating a peer-review style learning culture."* This cross-verification process highlights the importance of validating AI data using manual checks and video analysis to ensure its accuracy. The introduction of peer-review learning fostered a collaborative environment, where athletes played an active role in maintaining data integrity, enhancing their understanding of both AI and performance analysis (Thompson, 2022).

In a similar vein, Coach 5 recognized the technological proficiency gap among coaching staff and organized educational workshops to familiarize both coaches and players with AI tools. Coach 5 mentioned, *"Recognizing our team's limitations in tech, we conducted a basic AI tech workshop for both coaches and players. It was just an hour-long session, but it helped everyone become more confident in using Artificial Intelligence. We also created a simple printed guide with screenshots and step-by-step instructions, which the players appreciated, especially the first-timers with sports tech."* This initiative shows how educational efforts helped bridge the technological gap between coaches, athletes, and the AI system, promoting greater confidence in using the tool. The printed guides also made the technology more accessible to first-time users, addressing the learning curve that often accompanies new technological integrations (Davis, 2023).

The countermeasures implemented by coaches to address the challenges of utilizing Artificial Intelligence in table tennis training reflect a proactive and balanced approach to technological integration. By employing hybrid training models, enhancing technological infrastructure, implementing data verification methods, promoting critical reflection practices, offering educational workshops, and establishing policies for technical adjustments, coaches have successfully navigated the obstacles associated with AI. These strategies demonstrate how AI can serve as a valuable tool for enhancing training while maintaining the core principles of coaching.

The findings suggest that for AI to be fully effective, it must complement traditional coaching practices, ensuring that technology supports rather than replaces the human element of training. Ongoing education and support for coaching staff will be essential in helping them maximize the potential of AI, overcoming any technological barriers that may arise. Future research should continue to focus on improving the accuracy and personalization of AI-generated data, ensuring that these tools can be seamlessly integrated into diverse training environments. Moreover, workshops and guides for new users should be expanded to build a more tech-savvy coaching staff, ensuring that AI continues to enhance performance and skill development.

DISCUSSIONS

This section contains the summary of the findings obtained through the conduct of this research. It also includes the conclusions and recommendations formulated by the researcher, which were based on the gathered and analyzed data.

Summary of Findings

1. **Demographic Profile**

The demographic profile of the student-athletes using Artificial Intelligence (AI) for table tennis training revealed that the sample includes participants from different age groups, ranging from 18 to 25 years old. The majority of participants were between the ages of 20 and 23 (63%). There was a slight male majority, with 53.5% male and 46.5% female participants. The year levels of the student-athletes varied, with the largest groups being second-year (30.2%) and third-year (32.6%) students, comprising 62.8% of the sample. Regarding the years of experience in table tennis, most participants reported having more than 8 years of experience (52.3%), followed by those with 5-7 years (34.9%). This indicates a majority of seasoned players well-versed in the sport.

2. **Level of Engagement of the Student-Athletes**

The study found a high level of engagement with AI, as evidenced by usage frequency, integration into training routines, and confidence in skill enhancement. Student-athletes frequently utilized AI during their training sessions, demonstrating a high degree of consistency in incorporating AI into their routines. The Composite Mean engagement score was 3.67 (SD = 0.53), indicating that athletes showed strong agreement with their confidence in using the platform to enhance their skills. This shows a strong belief in AI's role in improving their table tennis training, especially in terms of training consistency and progress tracking.

3. **Significant Differences in Engagement Based on Demographic Profile**

Using t-tests and ANOVA, the study examined whether engagement levels varied significantly across different demographic characteristics. The findings revealed no significant differences in the level of engagement based on age, year level, or years of experience in table tennis. The p-values for all tests were above the 0.05 threshold, suggesting that these demographic factors did not significantly influence the athletes' engagement with the AI tool. This implies that the AI tool's effectiveness in engaging student-athletes is consistent across these demographic groups.

4. Level of Interest of the Student-Athletes

The student-athletes demonstrated high levels of interest in AI, with a composite mean score of 3.77 (SD = 0.29). This reflected strong intrinsic motivation, with athletes expressing a genuine enjoyment of using AI for improving their table tennis skills. The findings indicated that AI was seen as both an enjoyable and motivating tool. However, there was some variability in athletes' perceptions of the effectiveness of AI in setting realistic training goals, suggesting room for improvement in how AI supports goal-setting for skill development.

5. Significant Differences in Interest Based on Demographic Profile

The study examined whether there were significant differences in the level of interest based on demographic factors. The t-test analysis revealed a significant difference between male and female athletes, with male athletes reporting higher levels of interest in using AI for table tennis training. The p-value of 0.0001 indicated that gender plays a role in shaping interest in AI-powered training tools, with males possibly being more engaged or motivated by the novelty and data-driven nature of the technology.

However, no significant differences were observed based on age, year level, or years of experience, which aligns with the findings related to engagement. This suggests that while gender may influence how athletes interact with the technology, factors like age, academic progression, or experience do not significantly affect the level of interest in using AI. This underscores the importance of understanding the specific needs and preferences of different athlete groups to tailor AI tools more effectively

6. Relationship Between Engagement and Interest

The relationship between engagement and interest revealed that greater engagement with AI positively influenced sustained interest and technology acceptance. While there was a negative correlation between engagement and intrinsic motivation, suggesting that more engagement may reduce self-driven motivation over time, the findings showed that frequent and adaptable AI usage led to higher sustained interest. However, perceptions of AI's usefulness did not significantly correlate with engagement, highlighting that engagement and interest may be driven more by external factors such as familiarity with the platform and personal preferences.

7. Challenges Faced by Coaches

Coaches encountered several challenges in utilizing AI, including difficulties with integration into existing training schedules, issues with device compatibility, internet connectivity, and concerns about overreliance on AI. Additionally, coaches noted issues with the accuracy of AI feedback, especially regarding advanced skills like stroke mechanics. Despite these challenges, coaches acknowledged AI's potential value in enhancing training, though they emphasized the need for improved infrastructure and more customization options.

8. Countermeasures Implemented by Coaches

To address these challenges, coaches implemented hybrid training models, combining AI-driven sessions with traditional coach-led training. They worked to improve technological access by providing shared devices for athletes without compatible technology and ensured data accuracy through methods like cross-referencing AI feedback with video analysis. Coaches also encouraged critical reflection practices to mitigate overreliance on AI and organized workshops to enhance technological proficiency among both athletes and coaches.

Conclusion

This study examined the levels of engagement and interest of student-athletes in using Artificial Intelligence (AI) tools, specifically Betterplay.AI, in table tennis training within higher education institutions in the Philippines. The results indicated that AI integration positively impacted both the engagement and interest of student-athletes. Personalized feedback, real-time performance analytics, and interactive learning experiences provided by the AI tool significantly contributed to enhancing motivation and skill development among athletes. While both male and female athletes demonstrated strong engagement, male athletes showed slightly higher levels of interest in AI-powered training programs. However, this difference was mainly influenced by familiarity with technology and the novelty of AI tools rather than inherent gender-based preferences. This finding emphasizes the importance of ensuring that AI platforms cater to the diverse needs of athletes, regardless of gender, by offering a more personalized and adaptive training experience. AI-powered platforms such as Betterplay.AI hold the potential to revolutionize training methodologies by fostering deeper engagement, providing continuous feedback, and promoting consistent improvement in technical skills. However, it is crucial for future developments to continue focusing on creating inclusive, accessible, and dynamic AI tools that cater to athletes' varied needs. Given these insights, it is essential for coaches, developers, and educational institutions to prioritize the design of AI-powered platforms that enhance athlete engagement, support skill development, and ensure that all athletes, irrespective of their gender or background, can benefit from a personalized, adaptive training experience. Continued efforts should focus on further improving the accessibility, usability, and effectiveness of AI in sports training to maximize its potential in the development of student-athletes across all levels.

Recommendations

1. It is recommended that Artificial Intelligence platforms be adapted to address the specific needs of different demographic groups, with a focus on personalizing training based on the athletes' age, sex, and experience level. Future versions of the platform could include features that allow coaches to tailor AI feedback based on these factors to improve engagement and interest. For instance, athletes with less experience could receive more foundational training, while advanced athletes could be provided with more complex drills and strategic insights, ensuring that all athletes, regardless of their background, are fully engaged in the training process.

2. To further enhance engagement, it is recommended that Artificial Intelligence provide more interactive features, such as personalized training sessions or real-time feedback on performance. These features would not only help athletes track their progress but also allow for immediate adjustments to training techniques, providing more targeted feedback. Real-time feedback could be used to adjust the intensity or focus of the training sessions based on an athlete's performance, helping them stay motivated and engaged in their development. This will maximize the potential for skill improvement by offering a more tailored and responsive training environment.

3. Since demographic factors did not show significant differences in engagement, the focus should be on improving engagement uniformly across all demographic groups. Future iterations of Artificial Intelligence could include adaptive learning algorithms that can detect varying levels of engagement and adjust the platform's features accordingly to maintain interest among athletes from all backgrounds. This could involve adjusting the difficulty of tasks, offering varying levels of complexity based on usage patterns, and ensuring that the training experience remains relevant for both new and experienced athletes.

4. To maintain high levels of interest, it is recommended that Artificial Intelligence incorporate gamification elements, such as leaderboards, achievements, or rewards. These features would provide athletes with measurable milestones that encourage consistent use of the platform. Leaderboards could foster friendly competition among athletes, while achievements and rewards could serve as tangible recognition of progress, keeping athletes motivated and engaged. The gamification approach also makes the training process more enjoyable and rewarding, ultimately increasing the likelihood of continuous use and long-term engagement.

5. Given the observed difference in interest between male and female athletes, it is recommended that Artificial Intelligence develop sex-specific customization options to cater to the preferences and training needs of male and female athletes. These customized features could include personalized training schedules, feedback preferences, and performance metrics tailored to each gender's unique training characteristics. By addressing these specific needs, AI tools can help balance the interest levels between male and female athletes, creating a more inclusive and equitable training environment.

6. The Pearson correlation analysis showed a weak, non-significant relationship between engagement and overall interest. However, a strong negative correlation was found between engagement and intrinsic motivation, indicating that higher engagement may reduce internal motivation. Conversely, engagement was positively correlated with sustained interest and technology acceptance, suggesting that greater engagement leads to increased long-term interest and acceptance of the technology. These findings highlight the importance of balancing engagement to maintain intrinsic motivation while fostering sustained interest and technology adoption.

7. To address the challenges identified by coaches in utilizing AI, it is recommended that Artificial Intelligence provide enhanced integration features, allowing coaches to customize AI's suggestions to better fit existing training programs. This would enable coaches to tailor AI recommendations to align with their coaching styles and the specific needs of their athletes. Furthermore, investing in improved infrastructure to support stable connectivity and providing shared devices for athletes without access to high-spec devices will ensure that Artificial Intelligence can be used consistently across all training sessions, regardless of technical limitations.

8. As a long-term solution, it is recommended that Artificial Intelligence develop a comprehensive support system for coaches, including training resources, user guides, and online support to help them integrate the platform into their coaching practices more effectively. This support system should focus on offering step-by-step guides on how to interpret AI feedback, adapt training drills, and troubleshoot any technical issues. Additionally, integrating real-time data analysis and feedback systems would allow coaches to make adjustments on the fly, ensuring that athletes are receiving the best possible training without over-relying on AI technology.

OUTPUT OF THE STUDY
PROPOSED INTERVENTION PROGRAM TO ENHANCE THE TABLE TENNIS TRAINING
Rationale

The integration of Artificial Intelligence into table tennis training offers a unique opportunity to enhance athlete performance through personalized feedback and data-driven insights. However, several challenges need to be addressed to maximize the benefits of this technology. This proposal aims to overcome these challenges through a series of targeted interventions, each focusing on key areas such as technological integration, accessibility, data accuracy, overreliance on AI, coaching proficiency, and personalized feedback for elite athletes.

Each intervention is designed to support the effective use of Artificial Intelligence in training environments by addressing current obstacles, ensuring smooth integration into established practices, and providing support to both athletes and coaches. These interventions are grounded in the study's findings and are designed to directly enhance the experience of both coaches and athletes while improving performance outcomes.

General Objectives:

1. To enhance the integration of Artificial Intelligence into the training routines of table tennis athletes, ensuring a seamless and effective use of AI technology in their development.
2. To improve the technological proficiency of both coaches and athletes to fully maximize the features and capabilities of Artificial Intelligence, ensuring its optimal utilization.
3. To ensure the accuracy and reliability of data generated by Artificial Intelligence, enabling athletes and coaches to make informed decisions based on data-driven insights.

PROPOSED INTERVENTION PROGRAM TO ENHANCE THE TABLE TENNIS TRAINING

KRA (Key Result Area)	Specific Objectives	Activities /Strategies/ Intervention Program	Persons Involved	Time Frame	Success Indicator	Budget	Justification
1. Integration of Artificial Intelligence into Training	To ensure the seamless integration of Artificial Intelligence into the athletes' training routines.	- Organize workshops for coaches to enhance understanding of Artificial Intelligence features and integration. - Introduce a hybrid training model that combines traditional methods with Artificial Intelligence. - Provide hands-on training sessions for athletes on how to use Artificial Intelligence effectively.	Coaches, Trainers, Athletes	1-3 months	- Increased frequency of Artificial Intelligence usage in training - Positive feedback from athletes and coaches on tool integration - Consistent incorporation of AI feedback into practice routines	**Php. 100,00**	**Costs include:** Trainer fees for workshops, venue rental for training, materials for AI tool integration, and hands-on sessions for athletes.
2. Enhancement of Technological Proficiency	To improve coaches' and athletes' technological proficiency to maximize the benefits of Artificial Intelligence.	- Organize regular training sessions on AI literacy for both coaches and athletes. - Develop and distribute user manuals and video tutorials for Artificial Intelligence.	Coaches, Trainers, Athletes	1-2 months	- Improved competency in using Artificial Intelligence - Increased confidence in handling AI features by coaches and athletes - Reduction in technical issues during training sessions	**Php. 75,000**	**Costs include:** Facilitator fees for training sessions, creation and distribution of user manuals, and video tutorials for effective AI tool usage.
3. Data Accuracy and Feedback Utilization	To ensure accurate data collection and effective utilization of feedback provided by Artificial Intelligence.	- Establish data verification protocols (e.g., peer reviews, video analysis) to ensure accuracy of AI-generated feedback. - Create a feedback review process with coaches before implementing adjustments.	Coaches, Data Analysts, Trainers	Ongoing	- Improved accuracy of training data - Increased athlete satisfaction with the feedback provided - More consistent performance improvements based on feedback	**Php. 60,000**	**Costs include:** Tools for video analysis and software for cross-verification, as well as resources for training athletes in peer reviews and feedback verification.
4. Athlete Engagement and Motivation	To enhance athlete engagement and motivation through interactive and personalized training with Artificial Intelligence.	- Organize gamified training sessions where athletes earn points/badges for achieving specific training goals using Artificial Intelligence. - Use AI to track progress and set personalized challenges for athletes.	Coaches, Athletes, Sports Psychologists	2-4 months	- Increased athlete participation and enthusiasm in training sessions - Higher intrinsic motivation levels - More consistent training participation	**Php. 85,000**	**Costs include:** Gamification tools, AI subscription fees for tracking progress, and incentives/rewards (e.g., points, badges) for athlete achievements.
5. Overcoming Technological Challenges	To overcome technological challenges such as device compatibility, internet connectivity, and overdependence on AI.	- Provide shared devices for athletes who do not have access to compatible technology. - Set up a reliable internet infrastructure to support AI tools during training. - Introduce critical reflection practices to reduce overreliance on AI tools.	Coaches, IT Support, Athletes	1-2 months	- Smooth integration of technology with minimal connectivity issues - Reduced overreliance on AI, with athletes balancing AI feedback with traditional training methods	**Php. 120,000**	**Costs include:** Purchase of shared devices (tablets, phones), infrastructure setup for reliable internet access, and resources for reflection sessions to ensure a balanced use of AI.
6. Continuous Monitoring and Evaluation	To ensure continuous monitoring and evaluation of the effectiveness of Artificial Intelligence in enhancing athlete performance.	- Implement regular performance assessments using Artificial Intelligence data. - Create a feedback loop where athletes and coaches evaluate the effectiveness of the AI platform after each session. - Conduct surveys and interviews to gather feedback from athletes on their training experience.	Coaches, Athletes, Trainers, Researchers	Ongoing	- Consistent tracking of performance improvements - Positive changes in athlete performance metrics over time - Actionable insights for future training sessions	**Php. 80,000**	**Costs include:** AI performance monitoring tools, surveys and interview tools, and data analysis resources for feedback collection and tracking athlete progress.

The Proposed Intervention Program to Enhance Table Tennis Training will be implemented through a series of well-defined phases, starting with Preparation and Planning. In this initial phase, a project team will be formed, including coaches, IT support, and administrative staff, who will be responsible for managing the program. This phase also includes the development and finalization of training materials, such as user manuals and video tutorials, and setting up the necessary infrastructure, including AI tools, shared devices, and reliable internet access. The goal is to ensure that all resources are in place and that coaches and athletes are familiar with the technology before starting the actual training.

The second phase, Training and Integration, will focus on introducing AI into the training routines of both coaches and athletes. This phase will begin with workshops for coaches, where they will learn how to integrate AI into their existing training cycles. The hybrid training model will be introduced, with specific "AI days" incorporated into the training schedule, allowing coaches to balance AI-driven drills with traditional methods. Additionally, hands-on sessions for athletes will ensure they are well-equipped to use the AI tools effectively. Monitoring of athlete performance and feedback will be ongoing during this phase to make necessary adjustments.

In the Technological Proficiency and Gamification phase, the program will focus on improving the technological skills of both coaches and athletes. Regular training sessions will be conducted to increase AI literacy, ensuring that everyone involved is proficient in using the AI tools. This phase will also introduce gamified training sessions, where athletes can earn rewards such

as points or badges for meeting specific training goals. AI will be used to track their progress and provide personalized challenges to enhance engagement and motivation. Increased participation and enthusiasm are expected as a result of these gamification strategies.

The Overcoming Technological Challenges and Reflection phase will address potential obstacles such as device compatibility and internet connectivity issues. Shared devices (e.g., tablets and smartphones) will be provided for athletes who lack access to compatible technology. At the same time, the program will focus on reducing overreliance on AI by introducing critical reflection practices, where athletes reflect on the AI feedback and compare it with their instinctive gameplay decisions. This phase will also ensure that athletes continue to use AI as a complementary tool rather than a substitute for traditional training methods.

The final phase, Continuous Monitoring and Evaluation, will ensure the ongoing success of the program. Performance assessments using AI data will be conducted regularly, and surveys and interviews will be used to gather feedback from both athletes and coaches. This feedback will help to evaluate the effectiveness of the AI tools and training strategies, providing valuable insights for future improvements. Ongoing data analysis will track athlete performance, identify areas for improvement, and ensure that the program remains adaptable to the evolving needs of the athletes and coaches.

The implementation timeline is spread over multiple phases, with the first two phases (Preparation and Planning, and Training and Integration) taking 1-3 months. The subsequent phases, Technological Proficiency & Gamification and Overcoming Technological Challenges & Reflection, will last 2-4 months, while Continuous Monitoring and Evaluation will be an ongoing process throughout the program.

The overall intervention program aims to seamlessly integrate AI into table tennis training, focusing on athlete performance, engagement, and technological proficiency. Through structured phases of implementation, the program will address both technological and human factors, ensuring that AI tools complement traditional coaching methods and enhance the overall training experience. Continuous evaluation and adaptation will guarantee the program's long-term success, benefiting both coaches and athletes alike.

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