

Analyzing the impact of traditional and sports-based teaching methods on team cohesion and team cognition among college students

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Abstract

This study examines the impact of traditional and sports-based teaching methods on team cohesion, cognition, and stress reduction among college students, guided by a positivist research philosophy. Adopting a comparative correlational design, data were collected from 60 students aged 18–20 at the private higher education in the Philippines through quantitative surveys. Grounded on Social Interdependence Theory and Cognitive Load Theory, the findings reveal that sports-based teaching methods significantly enhance team cohesion, foster cognitive engagement, and reduce stress compared to traditional lecture-based approaches. Statistical analyses, including paired t-tests, Pearson's correlation, and chi-square tests, confirm that the interactive and cooperative elements of sports-based methods promote collaboration, trust, and active participation. In contrast, traditional methods, which emphasize passive learning and individual focus, are associated with lower team cohesion and cognition and higher stress levels. These results highlight the value of integrating sports-based teaching methods into educational curricula to support students' holistic development. The study recommends professional development for educators to implement these strategies effectively and further research to explore long-term benefits and adaptations for diverse learning environments.

Keywords: *team cohesion, sports-based teaching, cognitive engagement, stress reduction, educational curricula*

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1. Introduction

Research on the relationship between mental health, teaching methods, and team dynamics is becoming increasingly important in educational settings (Wilhite et al., 2023). Amid rising concerns over student mental health and cognitive challenges exacerbated by academic pressures and sedentary lifestyles, there is an increasing demand for innovative and holistic teaching methods that address both cognitive and emotional well-being (Bertilles et al., 2019; Castro et al., 2020). Teaching strategies, particularly those that incorporate sports and games, offer potential benefits beyond physical fitness, such as enhanced team cohesion, improved cognitive functioning, and reduced stress (Eather et al., 2023). While traditional teaching methods, often characterized by lecture-based instruction, have been instrumental in delivering structured content and promoting individual academic accountability, they may sometimes provide fewer opportunities for student interaction and collaboration. These methods are valued for their ability to ensure clarity, consistency, and mastery of foundational knowledge, which are essential components of learning (Douglas et al., 2017; Johnson & Johnson, 2018). However, their focus on individual learning may not always optimize team cohesion or cognitive engagement when compared to more interactive approaches. Conversely, sports-based teaching methods integrate learning content with game-based activities, creating dynamic and cooperative environments. By encouraging active participation, team-based challenges, and shared problem-solving tasks, these methods may enhance team cohesion and cognitive engagement (Dyson et al., 2004). Research suggests that such approaches promote interpersonal skills, teamwork, and cognitive competencies through their inherent emphasis on cooperation and interaction (Bidzan-Bluma & Lipowska, 2018).

Incorporating sports-based teaching methods into educational curricula is gaining global recognition for its role in holistic development. According to a World Health Organization (WHO) report, physical activity positively contributes significantly to health and well-being, especially mental health (WHO, 2024). Teaching methods that leverage sports and games may foster team cohesion and cognitive engagement, potentially enhancing students' social integration, self-esteem, and mental resilience. This is especially pertinent in an era when digital and remote learning, while convenient, has often been linked to reduced opportunities for physical interaction and team building.

The European Union's Work Plan for Sport (2024-2027) emphasized sports as a teaching tool for improving social inclusion and mental health by promoting respect,

cooperation, and teamwork (European Commission, 2024). Sports used in educational settings have been shown to reduce depression levels and improve students' mental toughness and social adaptability. Students engaging in regular physical activities, including sports, report significantly lower stress levels than inactive students (Kohl III & Cook, 2013; Liu et al., 2024). However, these benefits may differ based on cultural and institutional contexts, warranting more region-specific investigations into how sports-based teaching methods influence team cohesion and cognition.

Current literature mostly highlights the broad benefits of sports without examining specific teaching methods or the role of team cohesion in cognitive and emotional outcomes (Bailey et al., 2013; Kwon, 2024). This study addresses these gaps by exploring how sports-based teaching methods affect team cohesion, cognition, and stress levels among college students. It also seeks to bridge the divide between the theoretical potential of these methods and their practical application across diverse educational settings. This study aims to inform evidence-based teaching practices that support students' holistic development by examining the interaction between teaching methods and team dynamics. Hence, this study sought to explore how traditional and sports-based teaching methods influence team cohesion, team cognition, and stress levels among college students. By providing insights into the benefits and limitations of both approaches, this research aims to inform evidence-based teaching practices that support holistic student development.

2. Literature Review

Team cohesion, the sense of connectedness and mutual support within a group, has been widely studied in educational and organizational psychology. It is regarded as a critical factor influencing team cognition, which includes shared knowledge, problem-solving, and decision-making abilities among team members (Salas et al., 2018). Research suggests that team cohesion can foster team cognition by promoting clear communication, trust, and collaborative engagement (Carron & Brawley, 2012). In group learning environments, cohesion often acts as a catalyst for improved performance, encouraging mutual accountability and peer learning, which are pivotal in academic and professional success (Zaccaro et al., 2018). However, studies on how specific teaching methods, such as traditional versus sports game-based approaches, impact team cohesion and cognition remain limited.

Traditional methods, which typically rely on lecture-based instruction, may provide fewer opportunities for student interaction and collaboration, potentially limiting team cohesion and cognitive engagement (Johnson & Johnson, 2018). These methods often emphasize individual learning, which may inadvertently foster isolation and hinder the development of shared team dynamics (Kohn, 2020). In contrast, sports-based teaching methods, which integrate learning content with game-based activities, enhance team cohesion by encouraging active participation, team-based challenges, and shared problem-solving tasks (Dyson et al., 2004). Sports activities also create a context where competition and cooperation coexist, allowing students to develop interpersonal skills alongside cognitive competencies (Bidzan-Bluma & Lipowska, 2018). Studies indicate that sports and games improve teamwork skills and cognitive engagement, suggesting a potential link between sports-based activities, team cohesion, and cognition (Qurban et al., 2018). This study examined this relationship more closely to determine whether sports game methods foster higher levels of team cohesion and cognition than traditional approaches.

The interaction between team cohesion and teaching methods in educational contexts is essential for understanding how students engage with each other and the content. Interaction effects have been documented in studies examining cooperative learning approaches, where students are encouraged to work together to achieve academic goals. Cooperative methods, such as sports, require interdependent collaboration, which can amplify the impact of team cohesion on cognitive outcomes (Johnson & Johnson, 2018). Moreover, cooperative settings promote equitable participation and mutual respect, laying the groundwork for stronger team cognition and collective problem-solving (Moustakas & Robrade, 2023). When cohesion is high, students feel more motivated and supported, leading to better retention of information and problem-solving capabilities.

The sports game method, due to its inherent emphasis on teamwork and competition, may foster a type of interaction conducive to higher cohesion and cognitive engagement. Unlike traditional teaching methods, which are typically more individualistic, game-based approaches encourage students to rely on each other, which has been shown to facilitate deeper learning and stronger interpersonal connections (Holt et al., 2020). This approach not only bridges cognitive and social goals but also ensures that learning outcomes are contextualized through practical, experiential methods (Guo & Niu, 2021). The sports game approach, therefore, might enhance team cohesion by providing structured opportunities for cooperation,

mutual support, and active engagement. This study explores whether this interaction varies significantly between traditional and sports game teaching methods, providing further insight into the dynamic relationship between teaching strategies and group dynamics.

The link between teaching methods and student stress is an emerging area of interest, particularly in light of recent findings on the mental health benefits of physical activity and team-based learning. Research suggests that engaging in physical activities, such as sports, can reduce stress by promoting social interaction, releasing endorphins, and providing students with a break from academic pressures (Eime et al., 2013). These physiological and psychological benefits of sports-based methods offer a compelling case for their integration into curricula as a stress-management tool (Bailey et al., 2013). Sports game teaching methods are associated with lower anxiety and stress levels because they allow students to engage physically and socially, offering a more holistic approach to learning.

Traditional teaching methods, often characterized by lecture-based learning and passive engagement, have been linked to higher stress levels in some students due to the lack of physical and social engagement (Douglas et al., 2017; Saiedi et al., 2015). The interaction between teaching methods and stress reduction has also been explored by researchers studying active learning models. Students involved in team-based physical activities experience lower levels of stress than those in passive learning environments, as sports and games encourage movement, social support, and a sense of achievement through collaborative tasks (Miller et al., 2015). These activities provide an outlet for managing academic pressures, fostering a balance between intellectual demands and emotional resilience (Xing & Qi, 2023).

This study investigated the extent to which teaching methods, specifically traditional versus sports game-based approaches, are associated with reduced stress levels in students. It aims to provide evidence for adopting more interactive, movement-based learning strategies as a means to enhance overall student well-being, learning outcomes, and group dynamics in higher education.

3. Theoretical Framework

3.1. Social Interdependence Theory

Social Interdependence Theory, developed by Morton Deutsch (1949) and later expanded by David W. Johnson and Roger T. Johnson (1989), provides a comprehensive framework for understanding how group structures—whether cooperative, competitive, or

individualistic—affect group outcomes. The theory emphasizes that the way interactions are structured within a group determines the level of team cohesion, communication, and overall success. In cooperative settings, group members work toward common goals, fostering increased trust, supportive interactions, and cohesive bonds, which are critical for effective teamwork and shared cognitive processes (Johnson & Johnson, 2009).

Applying this theory to educational settings highlights how instructional strategies influence team dynamics. Sports game teaching methods, rooted in cooperative interdependence, inherently align group members' objectives, encouraging mutual support and joint problem-solving (Mitchell et al., 2020). This cooperative structure contrasts with traditional teaching methods, which often emphasize individual performance and passive learning. As a result, traditional methods may limit opportunities for collaboration, reducing team cohesion and hindering group-based cognitive engagement (Miller et al., 2020).

Moreover, Social Interdependence Theory underscores the potential of cooperative learning environments to alleviate stress. By distributing responsibility and offering peer support, cooperative activities reduce individual pressures, thereby fostering a more engaging and less stressful learning experience. In sports-based methods, this dynamic not only enhances interpersonal bonds but also contributes to a holistic learning process that integrates cognitive, social, and emotional development (Holt et al., 2020).

This study leverages Social Interdependence Theory to explore how the cooperative nature of sports game teaching methods can enhance team cohesion, improve team cognition, and mitigate stress, compared to traditional, more individualistic methods.

3.2. Cognitive Load Theory

Cognitive Load Theory (CLT), developed by John Sweller (1988), focuses on the cognitive processes involved in learning and the impact of instructional design on cognitive load. CLT categorizes cognitive load into three components: intrinsic (related to the inherent complexity of the material), extraneous (stemming from inefficient instructional design), and germane (the mental effort dedicated to meaningful learning). Effective teaching methods minimize extraneous load and optimize germane load, allowing learners to focus on processing and internalizing key concepts (Sweller, 2010).

This theory provides a critical lens for comparing traditional and sports game teaching methods. Traditional methods, often lecture-based, tend to impose higher extraneous cognitive

loads due to their passive nature, which can increase stress and decrease cognitive engagement (Kester & van Merriënboer, 2010; Kirschner et al., 2018). In contrast, sports game teaching methods engage students through experiential and interactive activities, which reduce extraneous load by eliminating redundant or overly complex information (Sweller et al., 2011). The team-based nature of these activities further distributes cognitive responsibilities among members, enabling students to focus more effectively on germane cognitive processes while reducing stress (Hattie, 2015).

By combining the experiential engagement of sports-based activities with shared cognitive efforts, sports game teaching methods address both cognitive and emotional demands. This dual benefit aligns with the goals of CLT, as these methods not only facilitate deeper understanding but also promote stress relief through active participation. Thus, this study applies CLT to assess how sports game teaching methods can optimize cognitive engagement and reduce stress compared to traditional methods.

This theoretical framework integrates Social Interdependence Theory and Cognitive Load Theory to examine the interplay between teaching methods, team cohesion, team cognition, and stress reduction. While Social Interdependence Theory emphasizes the cooperative dynamics that foster team cohesion and shared goals, Cognitive Load Theory highlights the importance of instructional design in reducing cognitive and emotional strain. Together, these theories provide a robust foundation for understanding how sports game teaching methods can holistically enhance educational outcomes.

4. Methodology

The methodology of this study was guided by a positivist research philosophy, which emphasizes objective measurement and analysis of data to understand relationships between variables (Tamminen & Poucher, 2020; Hackfort & Schinke, 2020). A comparative correlational research design was employed to examine the interplay between teaching methods, team cohesion, team cognition, and stress reduction. Quantitative data were collected through structured surveys to ensure reliability and generalizability of findings. The positivist philosophy ensured a systematic and unbiased approach, while the comparative correlational design was suitable for identifying relationships and differences between the variables in the two teaching methods. The use of quantitative surveys allowed for precise measurement of team cohesion, cognition, and stress, ensuring that the results could be statistically validated

and generalized across similar educational contexts. This combination of research philosophy, design, and methods was ideal for addressing the study's objectives, as it provided a robust framework for evaluating the effectiveness of teaching strategies in promoting cognitive, social, and emotional outcomes among student.

4.1. Research Design

This study employed a comparative correlational research design to examine the relationships and interactions between team cohesion, teaching methods, team cognition, and stress reduction. The design enabled the assessment of differences between traditional and sports-based teaching methods and their effects on the variables of interest. Quantitative data was collected through a survey instrument designed to measure team cohesion, team cognition, and stress levels. This approach facilitated the analysis of within-group relationships for each teaching method and between-group comparisons across methods.

4.2. Participants and Sampling

Participants were recruited from two classes taught by one of the researchers, each comprising 30 students aged 18–20 enrolled in public physical education courses. The classes were heterogeneous, including both male and female students. The inclusion criteria required participants to: be at least 18 years old; be actively enrolled in public physical education programs during the 2022 academic year; and have no health restrictions as confirmed by university physicians.

Students with health conditions that restricted participation in physical activities were excluded from the study. These criteria ensured that the participants met the study's criteria and were representative of the target population. Although this study utilized two classes and a total of 60 respondents, which might be considered a modest sample size for generalizing findings to larger populations, the methodology was carefully designed to ensure reliability and validity. The findings are framed within the context of exploratory research (Swedberg, 2020), with a focus on generating insights rather than definitive conclusions. Future studies with larger sample sizes and diverse educational settings are recommended to further validate and expand upon the results.

To address potential issues of bias and researcher influence on the participants, several measures were implemented. First, survey instruments and data collection tools were

standardized and validated to minimize subjective interpretation. Second, an external evaluator was involved in administering surveys and monitoring interactions to ensure objectivity and reduce the potential influence of the researcher's attitudes or beliefs. Finally, participants were explicitly assured of the study's focus on evaluating methods rather than judging individual performance or preferences. These steps helped to mitigate bias and promote the credibility and neutrality of the research findings.

4.3. Instrumentation

The instrument used in this study was a questionnaire adapted from Zhong's (2024) study on sports game teaching methods and their effects on college students' social and mental health. This questionnaire was chosen due to its comprehensive nature, featuring a range of multiple indicators that align closely with the current study's objectives and research measures. The questionnaire comprises multiple indicators aligned with the study's objectives and measures.

Team cohesion focused on the level of connectedness and mutual support among group members, reflecting how well individuals work together and rely on one another. Team cognition assessed shared knowledge, decision-making, and problem-solving abilities within the group, highlighting the extent of collaborative understanding and intellectual synergy. Lastly, stress levels were measured by examining physiological and psychological stress responses, providing insight into the impact of teaching methods on students' mental and emotional well-being.

The instrument was tested for reliability using Cronbach's alpha, ensuring internal consistency across all subscales. Additionally, the tool underwent a pilot test with a small sample to confirm its validity and clarity.

4.4. Data Collection Procedures

Quantitative data collection was conducted during scheduled class sessions. Participants were briefed about the purpose of the study, and surveys were administered after obtaining informed consent. The data collection commenced after the approval from the institutional review board (IRB) to ensure the study adheres to ethical standards. The researchers also secured the permission of the college dean to conduct the study. Prior to the administration of the questionnaire, the participants were briefed about the purpose,

procedures, potential risks and benefits of the study. The researchers also ensured that the participants understood their rights, including the voluntary nature of participation and confidentiality of their responses. The researchers were able to obtain informed consent electronically, before distributing the questionnaire. All students were present during the administration of the questionnaire and they all consented to participate in the study. Using Questionstar (an online application for surveys), the questionnaire was distributed online through the participants' email WeChat and QQ. Since the participants all consented to participate, they all answered the questionnaire. The process ensured minimal disruption to regular academic activities and compliance with ethical standards.

4.5. Data Analysis

Three statistical methods were employed to analyze the data. A paired samples t-test was used to determine if significant differences exist between team cohesion and team cognition under traditional and sports-based teaching methods. A t-test is a statistical test used to determine if there is a significant difference between the means of two groups or between the mean of a group and a known value (Field, 2024). The t-test was used in this study to compare the means of two groups or conditions to determine whether there is a statistically significant difference between them.

To examine the relationship between team cohesion and team cognition within each teaching method, Pearson's correlation was applied, with the results further validated using a t-test for significance. The Pearson correlation coefficient (often denoted as r) is a measure of the strength and direction of the linear relationship between two continuous variables (Dowdy et al., 2011). The Pearson correlation coefficient was used in this study to evaluate the relationship between two continuous variables, such as the effects of sports game teaching methods on college students' mental health and social health.

Additionally, a chi-square test for independence was conducted to assess the association between the type of teaching method and the reduction in stress levels among students. The Chi-square test (denoted as χ^2) is a statistical test used to determine whether there is a significant association between two categorical variables. It compares the observed frequencies of events or categories in the data to the expected frequencies, which are based on a null hypothesis (Field, 2024). By using the Chi-square test, the study was able to determine

whether the observed patterns in categorical data (e.g., students' health outcomes) are likely due to the teaching method or if they could have occurred by random chance.

These statistical techniques enabled a comprehensive analysis of the relationships and differences between the variables. This combination of tests provides a robust framework for exploring the relationships and differences across the variables.

4.6. Ethical Considerations

The study adhered to stringent ethical guidelines to ensure the protection of participant rights and well-being. Research activities must adhere to ethical guidelines (Congiunti, 2023). Ethical considerations in research involve obtaining informed consent, ensuring confidentiality and privacy, and minimizing potential harm to participants (Creswell & Creswell, 2017).

Key ethical measures included obtaining informed consent, where participants were fully briefed on the study's purpose, procedures, risks, and benefits. Voluntary participation was emphasized, assuring students that their involvement was optional, with the freedom to withdraw from the study at any point without facing any negative consequences. Confidentiality was maintained throughout the study, as data was anonymized to protect participant identities, with only aggregate results reported. Furthermore, the study received ethics approval from the university's ethics review board, ensuring that it complied with the necessary research ethics standards for studies involving human subjects.

5. Findings and Discussion

Table 1

Team cohesion and team cognition of the college students in the different teaching methods

	Teaching Methods	Mean	SD	p-value	Interpretation
Team Cohesion	Traditional Teaching	2.87	0.2482	0.001	Significant
	Sports-based Teaching	3.55	0.3963		
Team Cognition	Traditional Teaching	3.00	0.3216	0.001	Significant
	Sports-based Teaching	3.67	0.3753		

Table 1 presents a comparison of team cohesion and team cognition among college students using different teaching methods. The results show that students report stronger team cohesion and cognition in the sports-based teaching method, with significantly higher levels of agreement compared to the traditional method. Specifically, while students tend to agree with the team cohesion and cognition under traditional teaching methods, they strongly agree with these aspects in the sports-based approach. This difference is statistically significant, as indicated by the p-value being less than 0.05, suggesting that sports-based teaching methods have a positive impact on both team cohesion and cognition. These findings highlight the importance of teaching methods in shaping group dynamics and learning outcomes, with sports-based methods yielding more effective results in fostering team cohesion and cognitive engagement.

This observation is consistent with a growing body of research that supports the benefits of active, collaborative teaching methods. Studies have shown that such methods can lead to enhanced social dynamics and greater cognitive alignment within teams (Guo & Niu, 2021; Shen et al., 2022). The interactive and engaging nature of sports-based teaching creates an environment where students are not only learning content but also collaborating with their peers in real-time, reinforcing both cognitive and social learning. The increased opportunities for communication, collaboration, and shared problem-solving tasks that are inherent in sports-based activities seem to foster a stronger sense of connection among team members, which in turn boosts both cognitive engagement and the quality of teamwork.

Furthermore, the findings align with Cognitive Load Theory (CLT), which emphasizes the importance of instructional design in managing cognitive load. Traditional methods, which often rely heavily on passive, lecture-based instruction, may impose a high intrinsic cognitive load on students. In such settings, students are expected to process and retain a large amount of information independently, often without sufficient interaction with peers, which can lead to increased cognitive overload. Research has shown that when students engage in less interactive, individualistic learning environments, it can contribute to higher stress levels and reduced cognitive engagement (Kester & van Merriënboer, 2010).

In contrast, sports-based teaching methods offer a more dynamic learning experience. These methods inherently encourage cooperative learning, which reduces extraneous cognitive load by allowing students to interact with one another, share knowledge, and collaboratively solve problems. The collaborative nature of sports activities allows students to distribute

cognitive tasks among the group, making the learning process less overwhelming for individual participants. Sweller (2010) emphasizes that minimizing extraneous cognitive load is key to improving the learning experience, and this can be achieved through more active, collaborative teaching methods such as those found in sports-based approaches.

Additionally, sports-based teaching methods may help reduce stress by offering students a more holistic learning experience. The physical activity involved in sports games has been shown to release endorphins, which are known to reduce stress and promote a sense of well-being (Bailey et al., 2013). The interaction and physical engagement of sports-based methods provide students with a break from the demands of traditional academic learning, helping them manage stress more effectively. This aligns with research suggesting that physical activity not only promotes physical health but also improves mental resilience and emotional regulation, which is essential for academic success (Eime et al., 2013).

Incorporating sports-based teaching into educational curricula can thus provide students with an environment that encourages both cognitive engagement and emotional well-being. By promoting collaboration, shared problem-solving, and physical activity, sports-based teaching methods enhance team cohesion and cognition while reducing stress levels. This comprehensive approach to learning helps students not only perform better academically but also develop crucial interpersonal and coping skills that will benefit them both inside and outside the classroom.

Table 2

Correlation between team cognition and team cohesion of college students in the different teaching methods

Teaching Method		Correlation Coefficient	Descriptive Equivalent	p-value	Interpretation
Traditional Teaching	Team Cohesion	0.04	Very Weak Correlation	0.821	Not Significant
	Team Cognition				
Sports-based Teaching	Team Cohesion	0.56	Moderate Correlation	0.001	Significant
	Team Cognition				

Table 2 presents the correlation between team cohesion and team cognition across different teaching methods. The results indicate that under the traditional teaching method, the

computed correlation coefficient is very weak and statistically insignificant, suggesting no meaningful relationship between team cohesion and team cognition among college students. This finding supports prior research, which suggests that traditional teaching methods often promote individualistic learning, rather than fostering collaborative group dynamics (Miller et al., 2020; Saiedi et al., 2015). Traditional lecture-based methods generally prioritize individual performance, with students working in isolation on tasks that do not require significant interaction or cooperation with peers. As a result, these teaching methods may limit opportunities for students to build the interpersonal relationships and trust that are essential for developing team cohesion. Michaelsen et al. (2023) also found that learning environments with a focus on individual achievement tend to produce lower levels of group cohesion and shared cognition, which may contribute to less effective teamwork and cognitive engagement within groups.

In contrast, the results for the sports-based teaching method show a moderate, statistically significant correlation between team cohesion and team cognition. This indicates a positive relationship, where higher levels of team cohesion are associated with higher levels of team cognition, and lower levels of cohesion correspond to lower levels of cognition. This finding highlights the importance of team dynamics in enhancing cognitive outcomes in collaborative learning environments. The significant correlation between team cohesion and cognition in sports-based methods is consistent with previous research that underscores the value of interactive and team-oriented learning environments in promoting both social and cognitive development. Studies have shown that when students engage in cooperative activities, they tend to share knowledge more effectively, collaborate on problem-solving, and strengthen their cognitive skills (Michaelsen et al., 2023; Moustakas & Robrade, 2023).

The positive correlation between team cohesion and cognition in sports-based settings also aligns with research by Warsah et al. (2021) and Kao (2019), who found that active, cooperative methods can significantly boost cognitive functions by enhancing team synergy. In these environments, students rely on each other for support, feedback, and idea-sharing, which leads to stronger cognitive engagement and improved problem-solving abilities. The cooperative nature of sports-based teaching fosters communication, mutual trust, and shared goals, all of which contribute to a deeper understanding of the material and more effective teamwork. As a result, students are more likely to engage in meaningful discussions, exchange

diverse perspectives, and collectively approach tasks, which strengthens both their social bonds and cognitive outcomes.

This study further corroborates the notion that active, cooperative learning strategies, such as those found in sports-based methods, provide an optimal environment for promoting team cohesion and cognitive development. The interaction and interdependence fostered by these methods not only enhance students' academic performance but also contribute to the development of critical interpersonal skills such as communication, collaboration, and conflict resolution. Moreover, the strong link between team cohesion and cognition in sports-based methods suggests that fostering cohesive teams can lead to better learning outcomes, as students are more motivated and supported in environments where they feel connected to their peers.

These findings emphasize the need for educators to consider integrating cooperative, interactive teaching methods, like sports-based activities, into their curricula. Such methods not only enhance team cohesion and cognition but also promote a more engaging, supportive, and effective learning experience for students.

Table 3

Association between the type of teaching method employed and reduced stress levels

Reduced Stress Levels	Teaching Method	Frequency	Chi-square Value	p-value	Interpretation
Less Pain	Traditional	9	6.696	0.009	Significant
	Sports-based	19			
Less Headache	Traditional	10	13.303	0.001	Significant
	Sports-based	24			
Less Exhaustion	Traditional	8	31.093	0.001	Significant
	Sports-based	29			
Less Muscle Tension	Traditional	10	15.428	0.001	Significant
	Sports-based	25			
Less Digestive Problems	Traditional	10	13.303	0.001	Significant
	Sports-based	24			

Table 3 illustrates the association between teaching methods and reduced stress levels among college students. The data clearly shows that students report feeling less stressed under the sports-based teaching approach compared to traditional lecture-based methods. This indicates that the type of teaching method employed has a significant impact on students' stress levels. The association between sports-based methods and lower stress levels is statistically significant, reinforcing the idea that teaching methods can greatly influence how students experience and manage stress in academic settings. In particular, sports-based teaching methods seem to create an environment that alleviates stress, suggesting that students' stress levels are closely tied to the structure and nature of the teaching methods they engage with.

These findings support the growing body of research indicating that teaching methods can significantly impact stress levels in college students. Active and collaborative learning approaches, such as those used in sports-based teaching, are often more engaging and supportive compared to traditional lecture-based methods. Studies by Shen et al. (2024) found that sports-based teaching fosters an interactive environment where students are actively involved in both physical and social activities, leading to a reduction in stress levels. This approach contrasts with the passive nature of traditional teaching methods, which often contribute to higher stress levels due to the lack of social engagement and physical activity. The engaging nature of sports-based methods seems to offer students an outlet for stress relief through physical activity, social interaction, and the sense of achievement that comes from participating in team-based challenges.

Further research supports the idea that interactive learning environments, such as those in sports-based teaching, provide significant benefits for stress management. Xing and Qi (2023) found that environments that promote interaction and physical engagement help students manage stress more effectively. By incorporating physical activity, which is known to release endorphins and reduce tension, sports-based methods offer a holistic approach to stress reduction. Additionally, these environments foster social bonding, as students engage in cooperative activities and rely on one another for support. These social interactions are crucial in reducing stress, as they provide emotional support and foster a sense of belonging, both of which contribute to lowering anxiety levels.

The findings also align with research on social interdependence theory, which suggests that cooperative learning structures can help students manage stress more effectively. According to Johnson and Johnson (2009), social interdependence—where students are

encouraged to work together and depend on each other—promotes trust, mutual support, and teamwork. These factors are essential in reducing stress, as students feel more connected to their peers and supported in their academic and personal challenges. The cooperative nature of sports-based teaching, therefore, not only enhances team cohesion and cognition but also plays a critical role in creating a less stressful learning environment.

Thus, the reduced stress levels observed in students using sports-based teaching methods seem to stem from the interactive and interdependent nature of these approaches. By combining physical activity, collaboration, and social support, sports-based methods offer a powerful tool for stress reduction, creating an environment where students can thrive both academically and emotionally. This highlights the importance of considering teaching methods as a key factor in promoting student well-being. Educators should be mindful of how their teaching strategies affect students' stress levels and consider integrating more interactive and collaborative approaches to create a more supportive and less stressful learning experience.

Overall, the evidence from this study supports the idea that teaching methods, particularly those that promote physical activity and social interaction, have a significant impact on students' stress levels. The sports-based teaching approach, with its focus on engagement, cooperation, and physical activity, proves to be a highly effective method for reducing stress among college students. This aligns with broader educational trends that emphasize the benefits of active and collaborative learning environments in fostering better academic performance and overall student well-being. Moving forward, institutions may benefit from incorporating more sports-based and interactive teaching methods to create learning environments that not only improve academic outcomes but also support students' mental and emotional health.

6. Conclusion

This study demonstrates that teaching methods play a crucial role in influencing team cohesion, team cognition, and stress levels among college students. The findings indicate that sports-based teaching methods, compared to traditional lecture-based approaches, lead to significantly higher levels of team cohesion and cognition while also reducing stress. The sports-based approach, with its focus on social interdependence, active participation, and teamwork, creates a collaborative and supportive environment that enhances cognitive engagement and alleviates stress. These results are consistent with Social Interdependence

Theory, which posits that cooperative and interdependent activities improve team dynamics and cognitive outcomes. Moreover, Cognitive Load Theory supports these findings, suggesting that sports-based teaching reduces extraneous cognitive load, allowing students to concentrate on meaningful learning processes without becoming overwhelmed by unnecessary distractions.

Based on these findings, educational institutions should consider incorporating sports-based teaching methods into their curricula to improve team cohesion, enhance cognitive development, and mitigate stress among students. Professional development programs for educators should include strategies for implementing interactive, team-based learning to foster more supportive and engaging classroom environments. These programs can equip educators with the tools needed to create a learning atmosphere that promotes collaboration and reduces anxiety, ultimately benefiting both academic performance and student well-being.

Further research is needed to explore the long-term effects of sports-based learning on cognitive and emotional outcomes. Additionally, investigating the specific elements of sports-based methods—such as the role of competition and physical activity—could provide deeper insights into how these components contribute to student development. Future studies should also examine how different teaching strategies can be integrated to accommodate diverse learning preferences, ensuring that all students benefit from a comprehensive, balanced approach. Combining traditional and sports-based methods may maximize the benefits of each, offering a well-rounded educational experience that addresses both cognitive and emotional needs.

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Institutional Review Board Statement

This study was conducted in accordance with the ethical guidelines set by the University of Baguio. The conduct of this study has been approved and given relative clearance(s) by the Ethics Review Committee of the University of Baguio Research Innovation Extension and Community Outreach (UB RIECO).

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