



## Examining the Relationship Between Sports Environments, Teaching Effectiveness, and Learning Engagement in Physical Education

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### Abstract

The growing concerns about declining student engagement and the low effectiveness of instruction in Physical Education subjects highlight the need to explore the impact of a sports setting on teaching quality and learner engagement. Thus, this study examined the relationship among sports environments, teaching efficacy, and student engagement in Physical Education (PE) settings. It used a descriptive-correlational design to collect data from 500 Physical Education students at five universities using an organized survey tool. Three domains were evaluated, including sporting environment (facilities, teaching approaches, motivation, teacher support, and values), teaching effectiveness (clarity, content knowledge, instructional strategies, classroom management, and feedback), and learning engagement (behavioral, cognitive, emotional, and social resilience aspects). The findings showed that the rating of all the dimensions was low, indicating a strong suggestion that the learning environment, pedagogical practices, and student engagement have to be further enhanced. Correlation analysis revealed that the three variables had significant and positive relations with each other, with a weak to very strong scale. In essence, improved teaching and an increase in student engagement are associated with better sporting contexts. This implies that the improvement of sports facilities, reinforcement of instructions, and encouraging learning conditions are fundamentally significant in improving student engagement and the quality of instruction.

**Keywords:** sports environment; teaching effectiveness; learning engagement; physical education; instructional strategies; motivational climate; resilience; educational leadership



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## INTRODUCTION

The 21st-century education goes merely beyond changing the physical educational landscape. It recognizes that learning takes place outside the classroom and in any environment where knowledge is available and how these diverse environments contribute to the accumulation of knowledge. A number of research demonstrate that a variety of physical, social, and motivational contexts are critical to student learning experiences and outcomes (Ryan & Deci, 2020; Bai et al., 2022). In light of this, sports settings become effective educational contexts which promote physical growth, student engagement, and teaching effectiveness. Being into sports fosters self-discipline, teamwork, resilience, and internal

motivation that are closely correlated with authentic learning and effective teaching practices (Ryan & Deci, 2020; Sheng et al., 2024).

The educational value of sports has been strengthened through a system of national policy reforms in China over the last decade. Policies like the 2021 Ministry of Education's issuance on strengthening physical education in K-12 schools and the Healthy China 2030 blueprint highlight sports as a fundamental aspect of students' overall personal development and lifelong learning. Physical education takes on an increasingly important role in a school curriculum that seeks to be fully integrated into the academic mission of schools and colleges instead of peripheral or extracurricular (Ministry of Education of the

PRC, 2021; Gao et al., 2021). As a result, higher education institutions are strongly encouraged to adapt effective instructional approaches, enhance sports facilities, and develop learning environments. These reforms underscore the increasing awareness that sports settings are not just locations for physical training, but they constitute pedagogical spaces that influence students' cognitive, emotional, and behavioral engagement.

Despite significant policy developments, tangible challenges remain to beset Chinese higher education. One of which is a lack of uniformity among sports facilities across higher educational institutions ((Pan et al., 2022; Tang et al., 2022), implementation inconsistencies of innovative teaching approaches (Xin, Saab, Admiraal, 2020), and scarcity of opportunities for professional development. This research adds to the existing literature, highlighting that, even though PE curricula appear well-organized, challenges in the quality of teaching and student engagement remain prevalent in terms of effective delivery. Further, previous studies on the teaching effectiveness in China have mainly emphasized more on subject fields like mathematics, science, and language (Lee et al., 2022; Zhang, 2022). Yet, there is still a dearth of empirical data on the influence of sports environments on teaching effectiveness and student engagement in higher education (HE). Such a gap limits educational leaders to make well-informed and strategic decisions on the integration of sport within a broader teaching and learning framework that can be aligned with institutional priorities.

In this context, the current study explores the interplays between sports environments, student learning engagement, and teaching effectiveness in Chinese universities. Sports environments are characterized as multidimensional, inclusive of physical facilities, instructional strategies, motivational climate, teacher support and value orientation. It has been suggested in past studies that structured sports context can increase the efficiency of teaching by enhancing explicit teaching, upholding classroom management,

providing assertive feedback, and encouraging mastery-oriented learning practices (Ryan & Deci, 2020; Zheng et al., 2023). But these contexts might also facilitate more profound transactional engagement at the core of students' earlier activities of interest (Stringfellow, et al., 2024; Li, et al. 2025), a complex meta-construct cognitive presence including behavioral attendance, participation in the environment, and affective reactions like interest, involvement, dedication, motivation, passion, self-efficacy, group cohesiveness, social interactivity, and team context between students as peers. Together, these perspectives promote more situated understandings of the processes involved in learning and teaching in physical education contexts.

This study aims to achieve three main objectives: first, it looks into students' views on the sports environments provided by their universities; second, it examines students' perceptions of teaching effectiveness in sports-related instructional settings; and third, it investigates student learning engagement and its relationship with sports environments and teaching effectiveness. Based on the findings, this study offers a Sports-Integrated Teaching and Learning Framework that can guide institutional efforts focused on enhancing instructional quality and student engagement through improved sports environments.

This study is timely and relevant given the current educational reforms in China. In situating sports environments as active agents in the delivery of pedagogy, it promotes a vision about how physical education can nurture programs concerning both cognitive advancement and social attitudes. These findings would contribute to the evidence-based policy making, as well as resource distribution and teacher training in Chinese universities. This study is also expected to contribute to international discourses of educational leadership and how intentionally designed sport settings, in this case a university sporting arena, may represent powerful leverage points that help to promote positively engaged students and pedagogically agile

outcomes across higher education environments.

## LITERATURE REVIEW

**Sports Environments as Contexts for Learning in Higher Education.** Learning has been referred to as a process that is influenced by environmental and socio-contextual system. Sports settings are complex learning environments comprising of many elements including physical facilities, pedagogues, motivational climate, teacher support, and value orientation. In terms of the Self-Determination Theory, more engaging and productive learning is possible under environments that enable autonomy, competence, and relatedness (Ryan and Deci, 2020). Sports environments, continued motivation (Bourne & Cavanagh, 2012), and better quality of learning experiences (Lee & Hammer, 2011) have been linked to stronger student engagement.

Research confirms that the good attitude of the students towards sports is the predictor of sport learning and personal growth (Liu et al., 2023). Wu et al. (2024) also found that perceived sport environments facilitated the gains of sport and impacts of students indirectly through the behavior of physical activity and the self-efficacy of learning. These results depict that sports environments cannot be seen as neutral systems or static infrastructures; the environment is a complex system of pedagogy that influences the mental and behavioral reactions of students to the learning process.

One of the measures of the sports settings is physical facilities. It has also been revealed that participation, motivation, and learning are positively related to high-quality and adequate access to sport facility resources (Zhu et al., 2023). Student Meaningful Engagement: When students are together in a general space, the surroundings will facilitate and support various activities/teaching approaches, the students will become more meaningfully engaged and continue to carry out the learning activities. However, the quality of facilities in institutions

differs significantly between institutions, particularly in developing systems of higher education (Pan et al., 2022; Tang et al., 2022), which restricts equal chances of learning.

**Teaching Effectiveness in Physical Education Contexts.** Teaching effectiveness is the teacher's ability to provide clear instruction, demonstrate knowledge of content and pedagogy, implement appropriate classroom strategies, manage a productive learning environment, and give effective feedback. Within PE settings, teaching effectiveness is highly influenced by the environment and instructional context. Studies show that teachers with a supportive sports environment have better instructional clarity, classroom management, and feedback practice (Zheng et al., 2023).

Research on physical education in higher education demonstrates that effective PE instruction is characterized by the integration of skills development, student ownership and autonomy, and motivational support. Spittle et al. (2023) found that teaching efficacy in university PE programs was significantly predicted by teachers' instructional confidence and management skills. Likewise, Boonsem & Chaoensupmanee (2020) found that teaching effectiveness was rated the highest among students when teachers could showcase clear instructional objectives and adaptive teaching strategies given adequate facilities.

In China, instructional quality in PE teaching is still inconsistent despite their policies centering on quality teaching, student-centered approaches, and holistic development (Tang et al., 2022). This is because many teachers have limited access to professional development opportunities and do not actively pursue innovative pedagogical approaches. Ultimately, this means that the general level of effective instruction is low. Studies on sports-based contexts have similarly found that effective teaching leads to increased learning among students with mastery-oriented approaches, structured feedback mechanisms, and support for the dynamics of the learning environment (Zheng et al., 2023).

**Student Learning Engagement in Sports Environments.** Learning engagement is widely conceptualized as a multi-dimensional construct consisting of behavioral, cognitive, emotional, and social aspects. In the context of Physical Education, the climate of motivation and support of the teachers strongly influences engagement. The Self-determination Theory fully supports this concept, affirming that learning environments satisfy students' psychological needs for self-directness, competence, and relatedness (Ryan & Deci, 2020).

Further, empirical evidence from recent studies supports the positive association between sports participation and learner involvement. Similarly, Guo et al. (2023) found that teacher support sets the mood for greater student PE learning engagement. Likewise, Zhang et al. (2026) showed that physical activities promote learning engagement, mental adaptability, and psychological toughness.

The literature also identifies motivational climate as a key influence on student engagement (Zheng et al. (2023). Positive learning environments build students' confidence and are most likely to increase commitment, autonomy, and attention (Milton et al., 2025). Moreover, sports settings that highlight teamwork, perseverance, and development help students become more involved and emotionally connected

While an emerging body of evidence supports this view, existing work has largely focused on secondary education or discrete facets of engagement. Against this backdrop, few integrated studies have examined the mechanisms by which sports environments, teaching performance, and student involvement affect students' educational performance in higher education, specifically in China.

**Relationships among Sports Environments, Teaching Effectiveness, and Learning Engagement Methods.** Studies indicate that student commitment in athletic contexts is also determined directly by the environment and

indirectly by the quality of teaching. Supportive environments help teachers engage effective strategies, which in turn enhance student engagement. Guo et al., (2023) and Tian & Shen, (2023) articulate that environmental and instructional factors together frame the motivational and engagement outcomes of students.

However, there are few studies that investigate these constructs as part of a single framework. Moreover, previous research tends to examine factors such as environmental perception, instructional quality, or engagement in isolation rather than in the context of a holistic view. Such a gap illustrates the urgent need for integrated models that reflect the systemic nature of sports environments, teaching effectiveness, and student engagement in higher education.

By responding to such calls through addressing this gap, the present study contributes towards generating theory-driven, evidence-based educational leadership around physical education learning processes at university, as well as a greater understanding in this area through a comprehensive and context-sensitive analysis of such phenomena.

## METHOD

**Research Design.** To investigate the relationships among the sports environment, teaching performance, and student learning activity in institutions of higher learning, a quantitative correlational research design was used. Correlational research is a popular way of determining and quantifying the relationship between variables, with no interference by the analysts, leading to a very realistic learning environment that represents the relationship very well. The independent variable, which was determined as the sports environment, was broken down into five dimensions, which included physical facilities, instructional strategies, motivational climate, instructor support, and value orientation. The predetermined dependent variables were learning engagement and teaching



effectiveness. Empirical studies in the past years have supported this approach in Physical Education (PE). The rate of instruction that students get is strongly correlated with their satisfaction rates with learning experiences, as shown by both the correlational and regression analyses. These approaches enabled a combination of environmental and psychological aspects as time went on to give a strong foundation in the formation of integrated educational models. The Ecological Systems Theory and the Self-Determination Theory help understand the interaction of the three factors (environmental conditions, motivation, and teaching activities) in determining the learning outcomes among students. It is a complex scaffold increasing the topicality of the existing research and meeting the tendencies of the learning process.

**Research Setting and Participants.** The study was carried out at five Chinese universities where Physical Education (PE) courses were organized and where sports facilities were located. These learning institutions were carefully selected in order to position the participants in actual sports-based learning environments in the variables applied in the study. The sample consisted of 500 PE undergraduate students, 100 students in each university. The participants were selected using a convenience sampling technique, which is appropriate in educational research, as the relevance and accessibility are prioritized (Etikan et al., 2016). Even though convenience sampling limits the chances of generalizations, it is tolerable in the correlational study, as the sampled participants have prior experience with the phenomenon being studied (Fraenkel et al., 2019). Recent studies on teaching effectiveness and student engagement in Physical Education have adopted similar sampling approaches (Sørensen & Lagestad, 2024). A suitable sample of PE students was selected to ensure that the respondents would be exposed to sports settings and teachings directly and in a long-term orientation, which would render their perception valid.

**Instrumentation.** Data were collected with the help of the researcher-constructed, structured questionnaire based upon the conceptual framework of the study and comprised three scales, namely: the sports environment, the teaching effectiveness, and the learning engagement. It was created in a 4-point Likert scale to increase the response clarity and reduce the bias of central tendency (Joshi et al., 2015). A careful evaluation of content validity was conducted, and pilot testing on a similar sample was done. The reliability analysis did not reveal any issues with high internal consistency (Cronbach's  $\alpha = 0.88$ ), which exceeds the recommended level (Taber, 2018).

**Data Gathering Procedures.** The researcher received ethical clearance from the Adamson University Ethics Review Committee prior to data collection. When the certification was released, the researcher wrote letters of permission to the target schools to collect data. The survey was conducted in a systematic way by liaising with the university administrators and the nominated faculty. There was also a clear information about the purpose of the study, procedures, confidentiality and voluntariness of the study to the participants. It was an informed-consent participation. The questionnaire was made online and discharged within the available period of OD in each university. The instrument was administered to the respondents to independently fill out the instrument and take around 20-30 minutes. The completed questionnaires were filtered on completeness and consistency. Any missing or invalid responses were also excluded, and the rest of the valid responses were coded and ready to be evaluated statistically.

**Ethical Considerations.** The research followed accepted ethical guidelines for conducting an educational study. The subjects were involved on a voluntary basis, and they knew well at all times that they could leave the process at any point without penalty. In order to safeguard the confidentiality and anonymity, no personally identifiable data was gathered; all data were coded and kept in a highly secure place, with access only to the researcher and provided

advisers, and reported in terms of aggregation. The research had low risk, because it only entailed a survey, and no incentives were offered to prevent coercion. The study was done purely on an academic basis and the objective of making a contribution to the improvement of sports-based education, the quality of teaching, and the learning engagement of students.

## RESULTS

**Assessment of Sports Environments.** Table 1 presents the summary of the assessment of the sports environment that includes five dimensions, namely, physical facilities, instructional strategies, motivational climate, teacher support, and value orientation. The findings show that all dimensions have received a low rating, as per the scale given. The total sports environment received a composite mean of 2.41 and a standard deviation of 0.68, which is associated with Low verbal interpretation. This implies that respondents in general were opposed to the statements that captured the positive conditions in the sports environment. The teacher support had the highest mean score ( $M = 2.45$ ,  $SD = 0.90$ ), teacher support was followed by instructional strategies ( $M = 2.42$ ,  $SD = 0.94$ ) and motivational climate ( $M = 2.42$ ,  $SD = 0.93$ ). The physical facilities got a mean of 2.41 ( $SD = 0.88$ ), with the value orientation getting the lowest mean of 2.36 ( $SD = 0.90$ ). The five indicators are all in the category of disagree (Low). In totality, the results indicate that the sports setting and its elements always scored low, as attested by mean scores of 2.36–2.45.

**Table 1**  
*Mean Distribution of Sports Environments*

| Variables                  | Mean | SD   | Verbal Interpretation |
|----------------------------|------|------|-----------------------|
| Physical Facilities        | 2.41 | 0.88 | Low                   |
| Instructional Strategies   | 2.42 | 0.94 | Low                   |
| Motivational Climate       | 2.42 | 0.93 | Low                   |
| Teacher Support            | 2.45 | 0.90 | Low                   |
| Value Orientation          | 2.36 | 0.90 | Low                   |
| Overall Sports Environment | 2.41 | 0.68 | Low                   |

**Assessment of Teachers' Teaching Effectiveness.** Table 2 summarizes how students rated teachers' effectiveness in

teaching across five dimensions: teaching clarity, content expertise, teaching strategies, classroom management, and feedback and encouragement. The findings suggest that the rating of all dimensions was low according to the scale that was created. Teaching effectiveness had a composite mean of 2.38 and a standard deviation of 0.66, which is a Low verbal interpretation. This indicates that, on average, the students did not agree with the claims of effective teaching practice. Content expertise has registered the highest mean score ( $M = 2.42$ ,  $SD = 0.88$ ), followed by teaching clarity ( $M = 2.40$ ,  $SD = 0.92$ ). The average score of teaching strategies and classroom management was 2.37 and 2.37, with a standard deviation of 0.89 and 0.87, respectively. The mean score of feedback and encouragement was lowest ( $M = 2.33$ ,  $SD = 0.92$ ). And all the indicators are in the category of Disagree (Low). In general, the results demonstrate that the teaching performance of teachers was rated by the students at a consistently low rate in all measured aspects, and the average scores evaluated by the students are between 2.33 and 2.42.

**Table 2**  
*Mean Distribution of Teachers' Teaching Effectiveness*

| Variables                       | Mean | SD   | Verbal Interpretation |
|---------------------------------|------|------|-----------------------|
| Teaching Clarity                | 2.40 | 0.92 | Low                   |
| Content Expertise               | 2.42 | 0.88 | Low                   |
| Teaching Strategies             | 2.37 | 0.89 | Low                   |
| Classroom Management            | 2.37 | 0.87 | Low                   |
| Feedback and Encouragement      | 2.33 | 0.92 | Low                   |
| Overall Teachers' Effectiveness | 2.38 | 0.66 | Low                   |

**Assessment of Students' Learning Engagement in Sports Environment.** Table 3 explores the overview of student learning activities in the sports setting on five dimensions, namely, behavioral participation, cognitive investment, emotional involvement, social interaction, and persistence and resilience. According to the established scale, all the dimensions were low in verbal interpretations, which denotes that students were generally in disagreement with the statements that depicted high levels of engagement among students. The total learning involvement of all students gave a compound

mean score of 2.38 and a standard deviation of 0.65, which is a low level of involvement. This implies that the engagement of students in the sports environment was below the expected average. The highest mean score ( $M = 2.43$ ,  $SD = 0.83$ ) was observed in the dimension of cognitive investment, and the second dimension was behavioral participation ( $M = 2.42$ ,  $SD = 0.90$ ). Mean scores of emotional involvement and social interaction were equal, at 2.37, with standard deviations of 0.89 and 0.87, respectively. Persistence and resilience were the lowest scored variables ( $M = 2.33$ ,  $SD = 0.92$ ). All dimensions were within the Disagree (Low) category. On the whole, these findings suggest that the degree of students' engagement in learning is low in all the dimensions measured, with an average score of between 2.33 and 2.43, which indicates a rather low profile of engagement among students in the sports environment.

**Table 3**

*Mean Distribution of Students' Learning Engagement in Sports Environment*

| Variables                   | Mean | SD   | Verbal Interpretation |
|-----------------------------|------|------|-----------------------|
| Behavioral Participation    | 2.42 | 0.90 | Low                   |
| Cognitive Investment        | 2.43 | 0.83 | Low                   |
| Emotional Involvement       | 2.37 | 0.89 | Low                   |
| Social Interaction          | 2.37 | 0.87 | Low                   |
| Persistence and Resilience  | 2.33 | 0.92 | Low                   |
| Overall Learning Engagement | 2.38 | 0.65 | Low                   |

**Relationship between Sports Environments and Student Learning Engagement.** Table 4 shows the Pearson correlation analysis of learning engagement of students based on the sports environment. The relationships were all positive and statistically significant ( $p < .001$ ), leading to the rejection of the null hypothesis for all variables. Physical facilities were, on average, related to overall learning engagement ( $r = .58$ ) and were significantly related to all dimensions of engagement ( $r = .39-.47$ ). Among the elements of the environment, instructional strategies showed the highest correlation, and moderate to strong correlations with the engagement dimensions and a strong correlation with the overall learning

engagement ( $r = 0.66$ ). In the case of motivational climate, there were significant positive relationships with all the dimensions of engagement ( $r = .37-.53$ ) and a moderate association with the total engagement in learning ( $r = .46$ ). Teacher support also showed considerable correlation with all the aspects of engagement with a moderate relationship with overall learning engagement ( $r = .56$ ). Equally, value orientation showed consistent positive correlation with the dimensions of engagement and has strong correlation with the overall learning engagement ( $r = .60$ ). It is worth noting that the overall sports environment was significantly related to all dimensions of learning engagement ( $r = .56-.65$ ) and highly correlated with overall learning engagement ( $r = .81$ ), with higher-quality sports environments having strong links with student engagement.

**Table 4**

*Correlation between Sports Environments and Overall Student Learning Engagement*

| Variables                  | Pearson's $r$ | $p$    | Decision     | Remarks     |
|----------------------------|---------------|--------|--------------|-------------|
| Physical Facilities        | 0.58          | < .001 | Reject $H_0$ | Significant |
| Instructional Strategies   | 0.66          | < .001 | Reject $H_0$ | Significant |
| Motivational Climate       | 0.46          | < .001 | Reject $H_0$ | Significant |
| Teacher Support            | 0.56          | < .001 | Reject $H_0$ | Significant |
| Value Orientation          | 0.60          | < .001 | Reject $H_0$ | Significant |
| Overall Sports Environment | 0.81          | < .001 | Reject $H_0$ | Significant |

**Relationship Between Teachers' Teaching Effectiveness and the Sports Environment.** Table 5 presents the Pearson product-moment correlation analysis of teachers' assessment of teaching effectiveness and the sports environment. All the correlations were positive and significant at  $p < .001$ , which resulted in the null hypothesis being rejected in all the relationships analyzed. Instructional strategies were found to have the strongest relationships with teachers' teaching effectiveness ( $r = .64$ ), value orientation ( $r = .62$ ), and physical facilities ( $r = .60$ ), all showing a strong positive relationship. Motivational climate was also positively related to teaching effectiveness ( $r = .59$ ) and teacher support ( $r = .54$ ) in a moderate way. When all the sports environments were brought together the overall sports

environment showed a very strong positive correlation with the teaching effectiveness of the teachers ( $r = .81$ ) which means that the higher the perceived quality of the sports environments the higher is the perceived quality of the teaching effectiveness in the aspects of instructional clarity, content expertise, teaching strategies, classroom management and feedback and motivation. Generally, the results obtained clearly demonstrate empirical information that, in sports-related instructional settings, the enhancement of the environment of sports greatly correlates with teaching effectiveness.

**Table 5**  
*Correlation between Sports Environments and Teachers' Teaching Effectiveness*

| Variables                  | Pearson's $r$ | $p$    | Decision     |
|----------------------------|---------------|--------|--------------|
| Physical Facilities        | 0.60          | < .001 | Reject $H_0$ |
| Instructional Strategies   | 0.64          | < .001 | Reject $H_0$ |
| Motivational Climate       | 0.59          | < .001 | Reject $H_0$ |
| Teacher Support            | 0.54          | < .001 | Reject $H_0$ |
| Value Orientation          | 0.62          | < .001 | Reject $H_0$ |
| Overall Sports Environment | 0.81          | < .001 | Reject $H_0$ |

**Relationship Between Teaching Effectiveness and the Environmental Factors in Sports.** Table 6 shows the Pearson product-moment correlation analysis of teaching effectiveness and the environmental factors in sports. All the correlations were found to be positive and statistically significant ( $p < .001$ ), and the null hypothesis was rejected in all the considered relationships. Instructional strategies showed the highest correlation to teacher effectiveness in teaching ( $r = .64$ ), then there was value orientation ( $r = .62$ ) and physical facilities ( $r = .60$ ). There was a positive relationship between motivational climate and teaching effectiveness ( $r = .59$ ), and teacher support had a moderate positive association ( $r = .54$ ). As a composite construct, the overall sports environment was strongly positively related to teaching effectiveness ( $r = .81$ ) of teachers, which is significantly higher than most of the other relationships with instructional clarity, content expertise, teaching strategies, classroom management, and feedback and motivation.

**Table 6**  
*Correlation between Sports Environments and Teachers' Teaching Effectiveness*

| Sports Environment         | Teachers' Teaching Effectiveness | Pearson's $r$ | $p$    | Decision     |
|----------------------------|----------------------------------|---------------|--------|--------------|
| Physical Facilities        | Overall                          | 0.60          | < .001 | Reject $H_0$ |
| Instructional Strategies   | Overall                          | 0.64          | < .001 | Reject $H_0$ |
| Motivational Climate       | Overall                          | 0.59          | < .001 | Reject $H_0$ |
| Teacher Support            | Overall                          | 0.54          | < .001 | Reject $H_0$ |
| Value Orientation          | Overall                          | 0.62          | < .001 | Reject $H_0$ |
| Overall Sports Environment | Overall                          | 0.81          | < .001 | Reject $H_0$ |

## DISCUSSION

The study has investigated the perceptions of the students on the sports environment, teaching performance of teachers, engagement in learning, and the relationship between these variables in university-based sports-related teaching settings (Guan et al., 2026; Zhu et al., 2023). The results provide a logical trend: even when the quality of the sports environment, the effectiveness of teaching, and the engagement in learning were rated low by the students, the correlation among these constructs was high and significant (Ryan & Deci, 2020). This contradiction would also imply that the setting of the sporting environment is central in the development of quality of instructions and student interactions, despite the perceived present circumstances as unsatisfactory (Milton et al., 2025).

**Perceived Quality of Sports Environments.** Descriptive findings indicated that, all the dimensions of the sports environment including physical facilities, instructional strategies, motivational climate, teacher support, and value orientation were rated low (Zhu et al., 2023). This means that students were not in agreement that their sports environments offered a supportive physical, instructional, and motivational environment (Guan et al., 2026). These results indicate institutional issues in the application and prioritization of sports-related learning in higher education (Pham & Nguyen, 2025). In the settings where facilities are old, instructional design is minimal, and value-based orientation is low, then students will be less inclined to see sports as an important learning environment as opposed to a routine, or even compulsory, activity (Ryan & Deci, 2020).



The teacher support, though it scored a little higher than other dimensions, remained in the range of low, which implies that students do not feel that they get sufficient guidance, encouragement, or responsiveness in instruction based on sports (Guo et al., 2025). The fact that value orientation is low also shows that sports activities are not framed enough with respect to personal growth, teamwork, and lifelong learning, which is required to keep students motivated (Guan et al., 2026).

**Teaching Effectiveness and Student Learning Engagement.** Teachers were also rated in the teaching effectiveness as being low in all the dimensions assessed, including teaching clarity, instructional strategies, classroom management, and feedback and encouragement (Zhu et al., 2023). These results indicate that the pedagogical procedures of sports situations might not be structured, transparent, and sensitive to the learning requirements of students (Ryan & Deci, 2020). The low scores in feedback and encouragement, specifically, suggest that students might not get adequate signals to inform them on how to improve or remain motivated in the learning process (Guo et al., 2025).

On the same note, engagement among students based on behavioral, cognitive, emotional, and social levels was rated low (Wong et al., 2024). Although students have mentioned a comparatively greater cognitive investment and behavioral participation, emotional involvement, social interaction, and persistence were particularly low (Guan et al., 2026). Such a profile indicates a surface level of engagement instead of a profound engagement where students might be able to meet the requirements but fail to engage and show interest in sports learning activities, as well as a lack of commitment (Fredricks et al., 2004). These trends are common in learning settings that lack significant challenges, freedom, and encouraging feedback (Ryan & Deci, 2020).

**Relationships Between Sports Environments and Learning Engagement.** Regardless of the perceived quality, the correlation analysis

showed that the sports environment was strongly correlated with student learning engagement (Guan et al., 2026). Instructional strategies and value orientation were most related to overall engagement, whereas physical facilities and teacher support had significant relationships (Zhu et al., 2023). Notably, the overall sports climate had a very high association with overall engagement in learning (Guan et al., 2026).

The implication of these findings is that any changes in the quality of sports environments, especially regarding the way of designing instruction and communicating values, can lead to significant positive changes in the engagement of the students (Ryan & Deci, 2020). The clarity, activity-focused, and participatory instructional strategies seem to be particularly effective in encouraging such aspects of students as intellectual investment and long-term engagement (Milton et al., 2025). Similarly, value-based spaces, which are focused on development, teamwork, and hard work, can motivate learners to continue and get more involved in sports-related learning (Zhang et al., 2026).

**Relationships Between Sports Environments and Teaching Effectiveness.** The findings also indicated that the teaching effectiveness of teachers was greatly associated with sports environments (Zhu et al., 2023). The strongest correlations were seen between instructional strategies, value orientation, and physical facilities, though motivational climate and teacher support were not of lesser significance (Milton et al., 2025). The close association between the overall teaching effectiveness and the overall sports environment is quite drastic, and it reflects the importance of the environmental quality in facilitating effective teaching (Guan et al., 2026).

These findings imply that the capability of teachers to provide explicit, systematic, and inspiring instruction is strongly related to the resources, arrangements, and cultural beliefs incorporated in the sporting setting (Ryan & Deci, 2020). In cases where there are sufficient

facilities, instructional strategies are formulated, and values are clearly stated, teachers are in better positions to coordinate learning processes, as well as deliver constructive feedback and encourage students (Zhu et al., 2023). On the other hand, the environmental support can be a limiting factor to even a well-intentioned instructor, causing less clarity and effectiveness of instruction (Milton et al., 2025).

Combined, the results indicate a systemic problem, but not specific shortcomings (Guan et al., 2026). The fact that the descriptive ratings are low suggests that the existing sports settings might be incapable of enhancing the quality of teaching or significant student input (Zhu et al., 2023). Nevertheless, the high correlations between sports settings, instructional practices, and learning activities depict a lot of room for improvement (Ryan & Deci, 2020). When sports environments are improved, especially in terms of instructional strategies, value orientation, and the quality of the facilities, cascading benefits are likely to be achieved in the fields of teaching effectiveness and student engagement (Milton et al., 2025).

These findings make it clear that educational institutions should consider sports settings as part of the system, rather than as additional areas (Guan et al., 2026). It may consequently be necessary to make strategic investments in the development of the facilities, curriculum development, and teacher development in order to increase the educational value of physical education and sports in higher education institutes (Zhu et al., 2023).

**Conclusions and Implications.** This research demonstrates that sports settings provide an important structural foundation for teaching effectiveness and student engagement in learning in university settings. Even though the existing sports settings and teaching were seen as poor, their close linkage with teaching performance and learning interaction indicated that they had significant room for development. The results indicate that insufficiency in sports-based education is a systemic problem, not an

instructional or student-specific constraint. The role of instructional strategies and value orientation became central, and this implies that intentional pedagogic planning and the clearly defined educational values are critical to the enhancement of learning outcomes. The physical facilities and teacher support also serve to bolster the requirement of both material and relational resources in the sport-based instruction.

Policymakers would recommend that higher education institutions rebrand sports environments as part of the academic system. This requires strategic investment in the modernization of facilities, redesigning the curriculum, and continuous teacher professional development. Policies that incorporate sports-based learning into institutional quality assurance systems have the ability to produce propagating enhancements in instructional performance and student involvement in higher education.

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**Data availability statement.** The data supporting the findings of this study are not publicly available due to ethical and confidentiality considerations involving the study participants. However, the datasets generated and/or analyzed during the current study may be made available by the corresponding author upon reasonable request and subject to applicable ethical and institutional requirements.

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## REFERENCES

- Boonsem, A., & Chaoensupmanee, T. (2020). Determining the factors of teaching effectiveness for physical education. *International Education Studies*, 13(3), 43–52. <https://doi.org/10.5539/ies.v13n3p43>
- Etikan, I., Musa, S. A., & Alkassim, R. S. (2016). Comparison of convenience sampling and purposive sampling. *American Journal of Theoretical and Applied Statistics*, 5(1), 1–4. <https://doi.org/10.11648/j.ajtas.20160501.11>
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2019). How to design and evaluate research in education (10th ed.). *McGraw Hill Education*.
- Fredricks, J. A., Blumenfeld, P. C., & Paris, A. H. (2004). School engagement: Potential of the concept, state of the evidence. *Review of Educational Research*, 74(1), 59–109. <https://doi.org/10.3102/00346543074001059>
- Gao, C., Chen, S., & Sun, H. (2021). Policy evolution and physical education reform in China. *Journal of Sport and Health Science*, 10(3), 285–289. <https://doi.org/10.1016/j.jshs.2021.03.001>
- Guan, A., Zhang, L., & Wu, H. (2026). The relationship between college students' perceived physical education environment and student engagement: A latent profile and structural equation modeling analysis. *Frontiers in Sports and Active Living*, 7, 1698164. <https://doi.org/10.3389/fspor.2025.1698164>
- Guo, Q., Samsudin, S., Yang, X., Gao, J., Ramlan, M. A., Abdullah, B., & Farizan, N. H. (2023). Relationship between perceived teacher support and student engagement in physical education: A systematic review. *Sustainability*, 15(7), 6039. <https://doi.org/10.3390/su15076039>
- Guo, Q., Wang, X., Gao, Z., Gao, J., Lin, X., & Samsudin, S. (2025). The influence of teacher support on student engagement in physical education among college students. *PLOS ONE*, 20(9), e0331876. <https://doi.org/10.1371/journal.pone.0331876>

- Joshi, A., Kale, S., Chandel, S., & Pal, D. K. (2015). Likert scale: Explored and explained. *British Journal of Applied Science & Technology*, 7(4), 396–403.
- Li, J. (2026). Predictive analysis of student engagement in university physical education courses. *Scientific Reports*, 16, Article 45928. <https://doi.org/10.1038/s41598-026-45928-w>
- Milton, D., Appleton, P. R., Bryant, A., & Duda, J. L. (2025). Promoting a more empowering motivational climate in physical education: A mixed-methods study. *Frontiers in Psychology*, 16, 1564671. <https://doi.org/10.3389/fpsyg.2025.1564671>
- Ministry of Education of the People's Republic of China [PRC]. (2021). *Opinions on comprehensively strengthening and improving school physical education in the new era*. <http://www.moe.gov.cn>
- Pan, M., Ying, B., Lai, Y., & Kuan, G. (2022). Status and influencing factors of physical exercise among college students in China: A systematic review. *International Journal of Environmental Research and Public Health*, 19(20), 13465. <https://doi.org/10.3390/ijerph192013465>
- Pham, X. T., & Nguyen, V. P. (2025). The roles and benefits of physical education in university settings: A comprehensive review. *International Journal of Research and Review*, 12(4), 401–412. <https://doi.org/10.52403/ijrr.20250434>
- Ryan, R. M., & Deci, E. L. (2020). Intrinsic and extrinsic motivation from a self-determination theory perspective. *Contemporary Educational Psychology*, 61, 101860. <https://doi.org/10.1016/j.cedpsych.2020.101860>
- Sheng, X., Liang, K., Li, K., Chi, X., & Fan, H. (2024). Association between sports participation and resilience in school-attending students: A cross-sectional study. *Frontiers in Psychology*, 15. <https://doi.org/10.3389/fpsyg.2024.1365310>
- Spittle, S., Spittle, M., Itoh, S., & Watt, A. P. (2023). Teaching efficacy of undergraduate physical education students. *Frontiers in Education*, 8, 1124452. <https://doi.org/10.3389/feduc.2023.1124452>
- Sørensen, A., & Lagestad, P. (2024). Physical education students' reflections about the learning outcomes of different teaching methods: A mixed methods study. *Frontiers in Education*, 9, 1365916. <https://doi.org/10.3389/feduc.2024.1365916>
- Bai, H., Yu, H., Bantsimba, N. R., & Luo, L. (2022). How college experiences impact student learning outcomes: Insights from Chinese undergraduate students. *Frontiers in Psychology*, 13, 1021591. <https://doi.org/10.3389/fpsyg.2022.1021591>
- Taber, K. S. (2018). The use of Cronbach's alpha when developing and reporting research instruments in science education. *Research in Science Education*, 48(6), 1273–1296. <https://doi.org/10.1007/s11165-016-9602-2>
- Tang, Y., Wu, R., & Wang, M. (2022). Quality enhancement of physical education in Chinese universities from the perspective of the supply-side structural reform. *Quality in Sport*, 8(3). <https://doi.org/10.12775/QS.2022.08.03.02>
- Tian, L., & Shen, J. (2023). The effect of perceived teachers' interpersonal behavior on students' learning in physical education: A systematic review. *Frontiers in*



*Psychology*, 14.  
<https://doi.org/10.3389/fpsyg.2023.12335>  
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*and Social Science*, 7(12), 2603–2607.  
<https://doi.org/10.26855/jhass.2023.12.038>

Wong, Z. Y., Liem, G. A. D., Chan, M., & Datu, J. A. D. (2024). Student engagement and its association with academic achievement and subjective well-being: A systematic review and meta-analysis. *Journal of Educational Psychology*, 116(1), 48–75.

Xin, Z., Saab, N., & Admiraal, W. (2020). University-school partnership in China: Teachers' personal factors, working conditions, and principal leadership that explain their development in teaching. *Frontiers of Education in China*, 15, 621–646. <https://doi.org/10.1007/s11516-020-0029-1> [philpapers.org]

Zhang, Q. (2022). Understanding Chinese mathematics teaching: How secondary mathematics teachers' beliefs and knowledge influence their teaching in mainland China. *ZDM-Mathematics Education*, 54(3), 693–707. [ncbi.nlm.nih.gov], [link.springer.com]

Zhang, Z., Rao, Z., Liu, M., Han, J., & Zheng, L. (2026). The relationship between physical exercise and learning engagement among Chinese college students. *Frontiers in Psychology*, 17, 1731426. <https://doi.org/10.3389/fpsyg.2026.1731426>

Zheng, S., Ji, X., Cheng, L., Xu, J., & Cronin, L. D. (2023). Perceptions of the motivational climate, basic psychological needs, and life skills development in Chinese physical education students. *Frontiers in Psychology*, 14. <https://doi.org/10.3389/fpsyg.2023.1232849>

Zhu, D., Yang, C., Ma, H., & Wang, W. (2023). Research on the influence of sports facilities on college physical education teaching. *Journal of Humanities, Arts*