# Factors Influencing Outdoor Recreation Activities with University Courses

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## Abstract

With the increasing integration of outdoor recreation activities into higher education, this study investigated their impact on university courses by focusing on the interplay among interest, circumstances, and teaching, particularly the mediating role of teaching in improving educational outcomes. Using data from 400 university teachers across 10 institutions in Guangxi Province, this research employed Structural Equation Modeling (SEM) to validate a causal model and analyze the mechanisms underlying these relationships.

The results revealed that interest, especially learning engagement (M=3.22, $\beta$=0.58), significantly enhanced educational effectiveness, serving as a key internal factor. Circumstances, particularly resource accessibility (M=3.23, $\beta$=0.63), emerge as critical external factors promoting participation and satisfaction. Teaching mediated these effects ($\beta$=0.75) by converting interest and circumstantial support into improved outcomes through flexible methods, enriched resource allocation, and effective feedback.

This study highlighted the importance of enriching activity design, optimizing resource allocation, and adopting innovative teaching strategies. These findings provided valuable insights for enhancing outdoor recreation programs in higher education and inform future policy development to support sustainable educational practices.

**Keywords:** Outdoor recreation activities; University courses; Interest; Circumstances; Teaching; Structural equation modeling

## Introduction

With the advancement of society and improvements in quality of life, outdoor recreation has become an integral part of people's lives, offering both physical and mental health benefits. Many universities worldwide have recognized its value in fostering students' holistic development, enhancing learning engagement, and promoting well-being. However, the integration of outdoor recreation into university curricula, particularly in China, remains underdeveloped, with theoretical frameworks and structured implementations still lacking (Ma, 2024). This limitation has restricted outdoor recreation's potential as an academic discipline, preventing it from fully contributing to students' experiential learning and overall personal growth.

Despite its benefits, the inclusion of outdoor recreation in university courses faces multiple challenges. Universities often struggle with inadequate funding, limited infrastructure, and a shortage of professional instructors, particularly for high-risk activities like climbing and survival training. Additionally, outdoor recreation courses are frequently treated as optional supplements rather than core components of the curriculum, leading to inconsistent credit recognition and low student participation (Chen et al., 2022). These issues are further exacerbated by fragmented policy support and the absence of standardized educational strategies, making it difficult to implement outdoor programs effectively and ensure their long-term sustainability.

Given these challenges, there is a growing need to explore the key factors that influence outdoor recreation activities within university courses. Understanding how student interest, external circumstances, and teaching strategies interact can provide valuable insights into optimizing course design, improving institutional support, and fostering sustainable educational practices. This study aims to bridge these gaps by identifying critical determinants of successful integration and offering recommendations to enhance the role of outdoor recreation in higher education.

## Research Objectives

1. To examine the key factors influencing the integration of outdoor recreation activities with university courses, focusing on interest, circumstances, and teaching.

2. To analyze the relationships between interest, circumstances, and outdoor recreation activities, identifying their direct and indirect effects on student engagement and satisfaction.

3. To investigate the mediating role of teaching in translating student interest and external conditions into meaningful learning experiences in outdoor recreation programs.

## Literature Review

This section reviews literature on outdoor recreation activities with university courses, focusing on interest, circumstances and teaching. Additionally, it highlights studies concerning the interactions among these variables.

Interest can be defined as a psychological inclination of curiosity and enjoyment toward something, serving as an internal motivation that drives individuals to explore, understand, and engage. It arises from personal needs and is influenced by external circumstances, combining emotional elements like preference and satisfaction with cognitive processes that enhance knowledge and problem-solving abilities (Aslan et al., 2021).

Outdoor recreation activities with university courses mean merging physical activities such as hiking, camping, and cycling with academic instruction. This combination enhances students' physical well-being, practical abilities, and academic understanding, supporting universities' objectives of cultivating innovation, active participation, and overall development to better prepare students for future careers and societal roles (Aquino, 2023).

Circumstances can be defined as the external conditions influencing outdoor activities, including natural (e.g., air, water, climate), social (e.g., infrastructure, services), and cultural (e.g., values, traditions) factors. These elements collectively shape individuals' participation in outdoor activities and their engagement with the environment (Satchabut et al., 2022).

Teaching refers to the methods and strategies educators use to guide students in acquiring knowledge, developing skills, and improving learning techniques. It focuses on achieving educational objectives through interactive activities such as discussions, practical exercises, and lectures, tailored to students' needs and subject requirements, fostering both intellectual and personal growth (Mammadova, 2019).

Natural environments and well-designed physical conditions significantly enhance mental well-being and promote engagement in outdoor activities. Accessibility, quality facilities, and institutional support are vital for ensuring positive student experiences and sustained engagement

(Petersen et al., 2016). Integrating supportive environments into university courses can improve learning outcomes and foster student well-being.

Interest plays a central role in enhancing participation and satisfaction in outdoor recreation activities. Dimensions such as activity variety, autonomy, and social interaction foster sustained engagement. Experiential learning frameworks, such as Hurd's model, integrate goal-setting and real-world engagement, effectively stimulating long-term interest and critical thinking (Hurd et al., 2021).

Circumstances, such as physical environment, social support, and accessibility, provide essential external conditions for outdoor education. Supportive facilities and accessible resources enhance participation, while teaching plays a mediating role by translating these conditions into meaningful learning experiences and active engagement. The synergy between circumstances and teaching fosters cognitive and emotional development in outdoor educational contexts (Pirchio et al., 2021).

Teaching acts as a critical mediator, linking students' circumstances and interests to their engagement in outdoor recreation activities. Effective teaching strategies, such as autonomy support and competence development, foster intrinsic motivation and enhance learning outcomes. Models of interest development further underscore the importance of tailored teaching approaches in sustaining student engagement in outdoor education (Howard et al., 2021).

The literature review establishes a theoretical foundation for understanding the integration of outdoor recreation activities within university courses by examining the roles of interest, circumstances, and teaching. The reviewed studies highlight that interest serves as an intrinsic motivator, fostering curiosity, engagement, and sustained participation, while circumstances, including physical environments, institutional support, and accessibility, provide external conditions that either facilitate or hinder outdoor learning experiences. Teaching emerges as a critical mediating factor, translating student motivation and environmental support into effective educational outcomes through structured instructional strategies and interactive methodologies. By synthesizing research from experiential learning, environmental psychology, and educational theory, the authors demonstrate how these concepts interact to enhance student satisfaction, engagement, and learning effectiveness. This integration of theoretical perspectives supports the study's conceptual framework, offering insights into how universities can optimize outdoor recreation programs by leveraging student interest, improving environmental conditions, and employing innovative teaching methods.

## Conceptual Framework

Research Hypotheses are:

H1: Circumstances have a direct effect on outdoor recreation activities with university courses.

H2: Interest has a direct effect on outdoor recreation activities with university courses.

H3: Teaching is a mediator between circumstances and outdoor recreation activities with university courses.

H4: Teaching is a mediator between interest and outdoor recreation activities with university courses.

The framework of this study is shown in Figure 1.

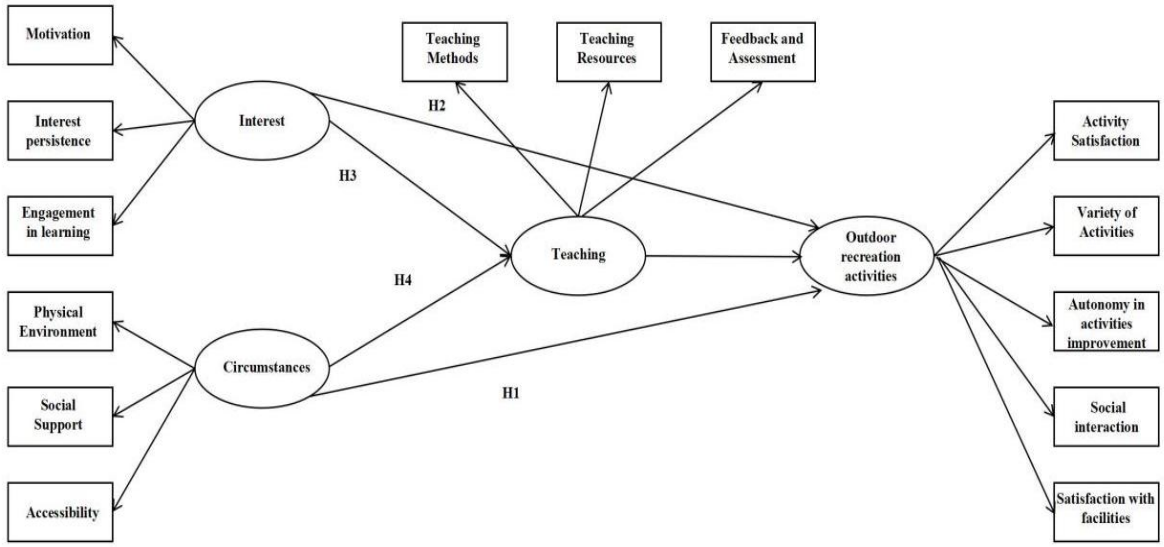



**Figure 1** Conceptual model of the relationships among interest, circumstances, teaching, and outdoor recreation outcomes (Source: Constructed by the author)

## Research Methodology

1. Research Design

This study employed a descriptive research design with a causal relationship approach to explore the factors influencing outdoor recreation activities within university courses. A structured questionnaire was developed and validated by five experts to analyze the interrelationships among interests, circumstances, teaching, and outdoor recreation activities.

2. Population and Sample

The study targeted teachers from 10 universities in Guangxi Province, China, all of which offer outdoor recreation–related courses. These universities were selected based on a preliminary survey, confirming that they had been providing such courses for at least four years, meeting the Ministry of Education's evaluation criteria. According to official university statistics, these institutions collectively employ 28,448 teachers.

The sample size was determined using Structural Equation Modeling (SEM) guidelines, which recommend 5–10 observations per parameter (Jobst et al., 2023). With 36 parameters, the minimum required sample was 360, and 400 teachers were ultimately selected to account for missing responses. This meets the statistical requirements for SEM analysis (Garver & Mentzer, 1999; Sekaran & Bougie, 2016). A non–probability sampling method was applied, with 40 teachers selected from each of the 10 universities, ensuring balanced data distribution.

The final sample consisted of 57.80% female teachers, with 35.30% aged between 36–45 years and 65.30% between 26–35 years. Additionally, 65.3% held a Master's degree or above, and 62.50% had over six years of experience teaching outdoor recreation–related courses. Among participants, 37.30% held the position of assistant professor, while 37.00% had no academic position.

3. Research Instrument

A 5–point Likert scale questionnaire was used to evaluate the factors influencing outdoor recreation activities with university courses. The questionnaire was structured into four key dimensions, each comprising multiple subscales:

Interest (Motivation, Interest Persistence, Engagement in Learning – 8 items)

Circumstances (Physical Environment, Social Support, Accessibility – 9 items)

Teaching (Teaching Methods, Teaching Resources, Feedback & Assessment – 8 items)

Outdoor Recreation Activities with University Courses (Activity Satisfaction, Variety of Activities, Autonomy, Social Interaction, Satisfaction with Facilities – 13 items)

The total questionnaire consisted of 38 items, with responses ranging from 1 ("Strongly Disagree") to 5 ("Strongly Agree"). Content validity was ensured through expert evaluation, using the Index of Item–Objective Congruence (IOC), which scored between 0.6 and 1.0, with most items scoring 0.8 or above. Reliability analysis yielded a Cronbach's Alpha coefficient of 0.98, confirming high internal consistency. The questionnaire was developed based on prior studies,

ensuring relevance and clarity in the context of outdoor recreation activities within university courses.

4. Data Collection

The data collection process took place over a period of two weeks in October 2024. A total of 400 questionnaires were distributed to teachers from 10 universities in Guangxi Province using the online survey platform Wenjuanxing (www.wjx.cn). To maximize participation, follow-up reminders were sent via WeChat groups.

All 400 questionnaires were returned, achieving a 100% response rate. To ensure data quality, responses were screened for completeness and reliability, with incomplete responses or those with straight-line answers excluded to prevent bias.

5. Data Analysis

The data for this study were analyzed using SPSS 23.0 and AMOS 24.0. First, descriptive statistics, including mean (M), standard deviation (SD), skewness (Sk), and kurtosis (Ku), were applied to examine the distribution of each variable, ensuring data validity. Subsequently, structural equation modeling (SEM) was employed to explore the relationships between variables, focusing on the path coefficients to identify both direct and indirect effects within the research framework.

These analyses provided deeper insights into how interest, circumstances, and teaching interact in shaping outdoor recreation activities within university courses. Rather than existing in isolation, these factors are interwoven, collectively influencing students' learning experiences and engagement in outdoor education.

## Research Results

**Objective 1**. Descriptive statistics of observed variables

Table 1 presents the descriptive statistics, including mean values (M), standard deviations (SD), skewness (Sk), and kurtosis (Ku) for the observed variables, indicating participants' overall perceptions of the integration of outdoor recreation activities with university courses. Among the four main variables, outdoor recreation activities with university courses recorded the highest mean score (M = 3.210, SD = 1.316), suggesting that participants perceived this factor as the most influential. This was followed by circumstances (M = 3.181, SD = 1.346), highlighting the significance of external conditions such as university support, accessibility, and the physical

environment. Interest had a mean of 3.150 (SD = 1.329), while teaching showed the lowest mean score (M = 3.131, SD = 1.326), indicating moderate recognition of teaching-related factors.

Within circumstances, university support attained the highest mean score (M = 3.217, SD = 1.329), reflecting its critical role in fostering participation and engagement in outdoor recreation. Similarly, within teaching, teaching methods scored the highest (M = 3.190, SD = 1.309), indicating their effectiveness in shaping students' learning experiences. Under interest, engagement in learning had the highest mean score (M = 3.177, SD = 1.324), highlighting its importance in sustaining motivation and participation. Lastly, within outdoor recreation activities with university courses, satisfaction with facilities exhibited the highest mean (M = 3.290, SD = 1.328), suggesting that well-maintained facilities contribute positively to students' experiences.

The skewness and kurtosis values across variables ranged from −0.287 to 0.213 for skewness and between −1.198 to −0.993 for kurtosis, indicating that the data followed a moderately normal distribution. These findings validate the dataset's suitability for subsequent structural equation modeling and further causal analysis.

**Table 1** Descriptive statistics of observed variables

| Variables/Components | | Min | Max | M | SD | Sk | Ku | Level |
|---|---|---|---|---|---|---|---|---|
| Interest | Motivation | 1 | 5 | 3.130 | 1.305 | −0.157 | −1.075 | Moderate |
| | Interest persistence | 1 | 5 | 3.143 | 1.357 | −0.146 | −1.193 | Moderate |
| | Engagement in Learning | 1 | 5 | 3.177 | 1.324 | −0.195 | −1.106 | Moderate |
| | **Total** | 1 | 5 | 3.150 | 1.329 | −0.166 | −1.125 | Moderate |
| Circumstances | Physical environment | 1 | 5 | 3.166 | 1.365 | −0.219 | −1.150 | Moderate |
| | University support | 1 | 5 | 3.217 | 1.329 | −0.224 | −1.087 | Moderate |
| | Accessibility | 1 | 5 | 3.160 | 1.345 | −0.182 | −1.156 | Moderate |
| | **Total** | 1 | 5 | 3.181 | 1.346 | −0.208 | −1.131 | Moderate |
| Teaching | Teaching methods | 1 | 5 | 3.190 | 1.309 | 0.213 | −1.062 | Moderate |
| | Teaching resources | 1 | 5 | 3.167 | 1.300 | −0.159 | −1.089 | Moderate |
| | Feedback and assessment | 1 | 5 | 3.035 | 1.371 | −0.038 | −1.198 | Moderate |
| | **Total** | 1 | 5 | 3.131 | 1.326 | −0.137 | −1.116 | Moderate |
| Outdoor Recreation Activities with | Activity satisfaction | 1 | 5 | 3.213 | 1.290 | −0.241 | −0.993 | Moderate |
| | Variety of activities | 1 | 5 | 3.160 | 1.321 | −0.152 | −1.103 | Moderate |
| | Autonomy in activities improvement | 1 | 5 | 3.207 | 1.326 | −0.241 | −1.071 | Moderate |

| Variables/Components | | Min | Max | M | SD | Sk | Ku | Level |
|---|---|---|---|---|---|---|---|---|
| University Courses | Social interaction | 1 | 5 | 3.180 | 1.317 | −0.186 | −1.058 | Moderate |
| | Satisfaction with facilities | 1 | 5 | 3.290 | 1.328 | −0.287 | −1.061 | Moderate |
| | **Total** | 1 | 5 | 3.210 | 1.316 | −0.221 | −1.057 | Moderate |

**Objective 2**. Intercorrelations among the observed variables

To better interpret the interrelationships among the observed variables, this study follows a standardized classification of correlation levels. A coefficient between 0.90 and 1.00 is categorized as very high, indicating a strong and significant association between variables. Correlations between 0.70 and 0.89 are considered high, reflecting a robust connection. Moderate correlations fall within the 0.50 to 0.69 range, suggesting a balanced association. Low correlations (0.30–0.49) indicate a weaker yet meaningful relationship, while coefficients below 0.29 denote negligible or no correlation.

Table 2 illustrates the correlation matrix of the key study variables. The findings indicate that most observed variables demonstrated moderate to low positive correlations. Among the four main variables, "satisfaction with facilities" exhibited the strongest correlation with overall outdoor recreation activities ($r = 0.393$, $p < .001$), suggesting that well-maintained facilities significantly enhance engagement in outdoor activities.

For Interest, the highest correlation was found between engagement in learning and interest persistence ($r = 0.553$, $p < .001$), emphasizing the strong interconnection among these motivational factors.

Within Circumstances, university support showed a moderate correlation with accessibility ($r = 0.534$, $p < .001$), suggesting that institutions providing structured support systems tend to enhance accessibility for outdoor activities.

In the Teaching dimension, teaching methods and teaching resources exhibited the strongest correlation ($r = 0.537$, $p < .001$), implying that well-structured teaching strategies are often reinforced by adequate resources. Additionally, teaching resources and feedback showed a moderate correlation ($r = 0.447$, $p < .001$), indicating that effective feedback mechanisms are closely tied to resource availability.

Overall, these results confirm the hypothesized relationships between interest, circumstances, teaching, and outdoor recreation activities, supporting the framework that

institutional support, accessible resources, and effective teaching strategies collectively enhance engagement in outdoor recreation courses.

**Table 2** Correlation matrices of interest, circumstances, teaching, and outdoor recreation activities with university courses

| **Observed variables** | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Motivation | 1.00 | | | | | | | | | | | | | |
| Interest persistence | .545** | 1.00 | | | | | | | | | | | | |
| Engagement in learning | .535** | .553** | 1.00 | | | | | | | | | | | |
| Physical environment | .241** | .290** | .300** | 1.00 | | | | | | | | | | |
| University support | .308** | .349** | .348** | .454** | 1.00 | | | | | | | | | |
| Accessibility | .303** | .310** | .346** | .427** | .534** | 1.00 | | | | | | | | |
| Teaching methods | .266** | .264** | .274** | .182** | .240** | .283** | 1.00 | | | | | | | |
| Teaching resources | .271** | .297** | .278** | .193** | .246** | .293** | .537** | 1.00 | | | | | | |
| Feedback and assessment | .326** | .234** | .210** | .273** | .235** | .154** | .455** | .447** | 1.00 | | | | | |
| Activity satisfaction | .340** | .269** | .330** | .193** | .203** | .284** | .314** | .322** | .267** | 1.00 | | | | |
| Variety of activities | .251** | .323** | .280** | .106** | .165** | .220** | .260** | .239** | 0.084** | .330** | 1.00 | | | |
| Autonomy in activities improvement | .236** | .231** | .227** | .205** | .210** | .355** | .375** | .306** | .238** | .507** | .376** | 1.00 | | |
| Social interaction | .258** | .217** | .231** | .222** | .233** | .331** | .362** | .341** | .210** | .475** | .404** | .500** | 1.00 | |
| Satisfaction with facilities | .361** | .236** | .295** | .207** | .174** | .293** | .307** | .287** | .159** | .396** | .320** | .336** | .393** | 1.00 |

**Note:** *p<.05; **p<.01; ***p<.001

**Objective 3.** Structural equation modeling of factors influencing outdoor recreation activities with university courses.

The results of estimating the standardized factor loadings (β) of the factors influencing outdoor recreation activities with university courses based on structural equation modeling are shown in Table 3. The standardized factor loadings, standard error (SE), t–values and $R^2$ values for different dimensions of interest, circumstances, teaching, and outdoor recreation activities with university courses are presented in the table with the aim of explaining the explanatory power of each latent variable on outdoor recreation activities with university courses.

The structural equation modeling of factors influencing outdoor recreation activities with university courses fit the empirical data well, as indicated by Chi–square statistics ($\chi^2$ = 127.548, df = 71), GFI = 0.958, AGFI = 0.938, RMR = 0.054, and RMSEA = 0.045. The coefficient of determination ($R^2$) values for teaching and outdoor recreation activities with university courses were 0.32 and 0.45, respectively. This indicates that the predictor variables have 32% explanatory power of variance for teaching and 45% explanatory power of variance for outdoor recreation activities with university courses in university programs. This indicates that the predictors included in the model (e.g., circumstances, interest and teaching) have significant explanatory power for the effects of outdoor recreation activities with university courses and teaching.

In addition, the results revealed that outdoor recreation activities with university courses were directly affected by interest (β = 0.182, $p < 0.001$) and circumstances (β = 0.219, $p < 0.001$), supporting H1 and H2. As mediated by teaching, the results showed that interest had a significant indirect effect (β= 0.116, $p < 0.001$) on outdoor recreation activities with university courses, supporting H3. While circumstances had a significant indirect effect (β = 0.154, $p < 0.001$) on outdoor recreation activities with university courses, supporting H4. Comparing the magnitudes of these effects indicated that the effect of circumstances (β= 0.373) is larger than the effect of interest (β = 0.298). The details were shown in Table 3.

**Table 3** Standardized parameter estimates for factors influencing outdoor recreation activities with university courses

| Variables | | Standardized factor loadings (β) | SE | t | R2 |
|---|---|---|---|---|---|
| Interest | Motivation | 0.601*** | 0.084 | 9.906 | 0.361 |
| | Interest persistence | 0.723*** | 0.091 | 11.100 | 0.523 |
| | Engagement in Learning | 0.739*** | 1.000 | – | 0.546 |
| Circumstances | Physical environment | 0.728*** | 0.081 | 12.401 | 0.530 |
| | University support | 0.741*** | 0.079 | 12.540 | 0.549 |
| | Accessibility | 0.744*** | 1.000 | – | 0.429 |
| Teaching | Teaching methods | 0.749*** | 1.000 | – | 0.561 |
| | Teaching resources | 0.729*** | 0.083 | 11.446 | 0.531 |
| | Feedback and assessment | 0.599*** | 0.087 | 10.066 | 0.359 |
| Outdoor recreation activities with university courses | Activity satisfaction | 0.691*** | 0.119 | 9.640 | 0.477 |
| | Variety of activities | 0.538*** | 0.115 | 8.214 | 0.289 |
| | Autonomy in activities improvement | 0.692*** | 0.122 | 9.649 | 0.479 |
| | Social interaction | 0.703*** | 0.123 | 9.736 | 0.494 |
| | Satisfaction with facilities | 0.563*** | 1.000 | – | 0.317 |

**Note:** *p<.05; **p<.01; ***p<.001

Table 3 shows the factor loadings of 14 observed variables, all of which were statistically significant ($p < .001$). The details are as follows:

The factor loadings of the observed variables, as shown in Table 3, were all statistically significant ($p < .001$). For the exogenous latent variable Interest, the observed variables included Motivation (0.601**), Interest Persistence (0.723**), and Engagement in Learning (0.739**), with corresponding $R^2$ values of 0.361, 0.523, and 0.546. These results indicate strong internal consistency, with Engagement in Learning and Interest Persistence making the most significant contributions to the construct of interest.

For the exogenous latent variable Circumstances, the observed variables were Physical Environment (0.728**), University Support (0.741**), and Accessibility (0.744**), with $R^2$ values of 0.530, 0.549, and 0.429, respectively. Accessibility exhibited the highest contribution, emphasizing its critical role in shaping the overall construct of circumstances.

The endogenous latent variable Teaching was measured by Teaching Methods (0.749**), Teaching Resources (0.729**), and Feedback and Assessment (0.599**), with $R^2$ values of 0.561, 0.531, and 0.359. Among these, Teaching Methods emerged as the most influential factor, suggesting its importance in determining teaching effectiveness.

For the endogenous latent variable Outdoor recreation activities with university courses, the observed variables included Activity satisfaction (0.691**), Variety of activities (0.538**), Autonomy in activities improvement (0.692**), Social interaction (0.703**), and Satisfaction with facilities (0.563**). The corresponding $R^2$ values were 0.477, 0.289, 0.479, 0.494, and 0.317. Social Interaction and Autonomy in Activities Improvement demonstrated the highest contributions, highlighting their roles in enhancing participants' satisfaction with outdoor recreation activities.

In summary, the factor loadings and $R^2$ values underscore the strong relationships between observed variables and their respective constructs. Variables such as Engagement in Learning, Accessibility, Teaching Methods, and Social Interaction were identified as key contributors, providing a solid foundation for further analysis.

In this study, the influence of each factor on outdoor recreation activities with university courses was analyzed, and the results are shown in Table 4. The data indicate that Interest, Circumstances, Teaching, and Outdoor recreation activities with university courses are influenced by multiple factors, with clear differences in their levels of impact.

Engagement in learning was the most significant latent variable in interest, with a standardized factor loading of 0.739 ($R^2$ = 0.546), while Motivation had the lowest explanatory power (0.601, $R^2$ = 0.361).

In Circumstances, Accessibility (0.744, $R^2$ = 0.429) and University support (0.741, $R^2$ = 0.549) had strong explanatory power, with university support playing the most critical role (54.9%). These results highlight the importance of institutional support in shaping students' perceptions.

For Teaching, Teaching methods had the highest factor loading (0.749, $R^2$ = 0.561), indicating its key role in instructional quality. In contrast, Feedback and assessment had the lowest explanatory power (0.599, $R^2$ = 0.359).

In outdoor recreation activities with university courses, social interaction (0.703, $R^2$ = 0.494) and Activity autonomy (0.692, $R^2$ = 0.479) were the strongest predictors, emphasizing the importance of both interpersonal and autonomous factors in students' satisfaction.

In summary, the analysis highlights the varying explanatory power of Interest, Circumstances, Teaching, and outdoor recreation activities with university courses. Key findings include the importance of Engagement in learning, University support, and Teaching methods, alongside social interaction and Autonomy in enhancing students' overall experiences.

Table 4 demonstrates a detailed analysis of the total, direct and indirect effects of different dependent variables on outdoor recreation activities with university courses. The purpose of the table is to examine the mechanism of the influence of interest, circumstances, and teaching with outdoor recreation activities with university courses from a holistic perspective, and to identify the complexity of the influence pathways by distinguishing between direct and indirect effects. This type of analysis helps to deeply understand the intrinsic relationship between the variables and provides an empirical basis for hypothesis testing.

**Table 4** Effect size from cause variables to effect variables

| Cause variables | Outdoor recreation activities with university courses | | |
|---|---|---|---|
| | Total effect | Indirect effect | Direct effect |
| interest ----> teaching | 0.266 | – | 0.266 |
| circumstances ----> teaching | 0.355 | – | 0.355 |
| circumstances ----> outdoor recreation activities with university courses | 0.219 | | 0.219 |
| interest ----> outdoor recreation activities with university courses | 0.182 | | 0.182 |
| teaching---->outdoor recreation activities with university courses | 0.434 | | 0.434 |
| interest ----> teaching ----> outdoor recreation activities with university courses | 0.298 | 0.116 | 0.182 |
| circumstances----->teaching---->outdoor recreation activities with university courses | 0.373 | 0.154 | 0.219 |
| Model fit indices: $\chi 2$ = 127.548, df = 71, p < .001, GFI =0 .958, AGFI =0 .938, RMR =0 .054, RMSEA = 0.045 | | | |

**Note:** *p<.05; **p<.01; ***p<.001

The p = .000 indicates that the chi-square test results of the model are significant, suggesting that the model fit is not perfect, but when combined with the results of the other fit indices (e.g., GFI, AGFI, and RMSEA), the overall quality of the fit is acceptable.

Table 4 shows the relationship between the influence of each variable and the dependent variable and its $R^2$ as follows:

(1) The effect of Interest on Teaching explains 19.7% of the variance ($R^2$ = 0.197). This means that Interest explains 19.7% of the variance in Teaching.

(2) The effect of Circumstances on Teaching also explains 19.7% of the variance ($R^2$ = 0.197), which means that Circumstances has a more significant effect on Teaching, with an

explanatory power of 19.7%. This indicates that Circumstances has a more significant effect on Teaching and Learning with an explanatory power of 19.7%.

(3) The effect of Circumstances on Outdoor recreation activities with university courses explains 26.9% of the variance ($R^2$ = 0.269). This indicates that Circumstances explain 26.9% of the variance in Outdoor recreation activities with university courses.

(4) The effect of Interest on Outdoor Recreation Activities explains 26.9% of the variance ($R^2$ = 0.269), which means that Interest explains 26.9% of the variance in Outdoor recreation activities with university courses. “This means that interest explains 26.9% of the variance in satisfaction with outdoor activities.

(5) The effect of teaching on satisfaction with outdoor recreation activities explains 26.9% of the variance ($R^2$ = 0.269). This means that Teaching explains 26.9% of the variance in Outdoor recreation activities with university courses.

(6) Interest The indirect effect of Teaching on Outdoor recreation activities with university courses has no separate $R^2$ value as this path is indirect and labeled as “–”.

(7) Circumstances: Indirect effect of Teaching on Outdoor recreation activities with university courses, which is also labeled as “–”, indicating that there is no separate $R^2$ value.

In the path analysis of this study, we evaluated the influential relationship between several variables. According to the results in Table 4, it can be seen that different factors have different levels of influence on satisfaction with teaching and outdoor recreation.

In terms of the effect of “Interest” on “Teaching”, the total effect is 0.266, which means that “Interest” effect “Teaching”. “The total effect is 0.266, indicating that Interest has a positive influence on Teaching, which suggests that Interest is an important factor influencing the level of Teaching. In addition, the total effect of “Circumstances” on “Teaching” is 0.355, which is also a positive effect, showing that good circumstances can effectively improve the level of teaching.

In the analysis of the effect of “Outdoor recreation activities with university courses”, the study shows that the total effect of “circumstances” on “Outdoor recreation activities with university courses” is 0.355, which also shows a positive effect, showing that a good circumstances can effectively improve the level of teaching and learning. The total effect of “Circumstances” on “Outdoor recreation activities with university courses” is 0.219, while the total effect of “Interest” on “Outdoor recreation activities with university courses” is 0.182. This shows that “Circumstances” and “Interest” have the same effect on “Outdoor recreation activities with university courses” as “Outdoor recreation activities with university courses”. This indicates that

both “Circumstances” and “interest” have a positive effect on students' outdoor recreation activities with university courses, with “Circumstances” having a slightly higher effect than “interest” on satisfaction with outdoor recreation.

The effect of “teaching” on “outdoor recreation activities with university courses” was significant, with a total effect size of 0.434, indicating that the improvement of teaching quality can directly improve students' experience and outdoor recreation activities with university courses.

The total effect of teaching on students' satisfaction with outdoor recreation activities with university courses was 0.434, indicating that improving teaching quality significantly enhances students' experiences. Among these, the indirect effect was 0.116, while the direct effect was 0.182. This demonstrates that teaching plays a dual role, directly improving satisfaction while also mediating the influence of interest and circumstances.

For interest, the total effect on satisfaction through teaching was 0.298, with an indirect effect of 0.116 and a direct effect of 0.182. This suggests that teaching acts as a critical bridge, transmitting the positive effects of interest to outdoor recreation activities.

Similarly, for circumstances, the total effect was 0.373, with an indirect effect of 0.154 and a direct effect of 0.219. These results highlight the importance of favorable circumstances and high-quality teaching in enhancing students’ satisfaction.

In conclusion, the findings emphasize the significance of teaching as a mediating factor, strengthening the influence of interest and circumstances on outdoor recreation activities. This highlights teaching’s central role in the broader influence system.

The standardized path coefficients indicate that interest ($\beta$ = 0.27) and circumstances ($\beta$ = 0.35) both significantly influence teaching, with circumstances having a slightly greater impact. This underscores the importance of a supportive environment in enhancing teaching quality. Furthermore, teaching directly impacts outdoor recreation activities ($\beta$ = 0.43), demonstrating its pivotal role in improving students’ participation and satisfaction.

These results align with motivational theories, which highlight interest and supportive environments as key drivers of learning and engagement. Creating a structured and conducive learning environment not only boosts students' interest but also enhances their participation in outdoor activities.

Additionally, the mediating role of teaching was confirmed, as both interest and circumstances indirectly influence outdoor recreation activities through teaching. This highlights the

importance of teaching as a central mechanism in transmitting the positive effects of interest and circumstances to students' satisfaction with outdoor activities.

In terms of specific dimensions, the unstandardized path coefficients for satisfaction with facilities (1.144) and social interaction (1.192) were among the highest, indicating these factors play a critical role in shaping overall satisfaction. These findings provide clear implications for designing outdoor programs that emphasize interaction and facility quality.

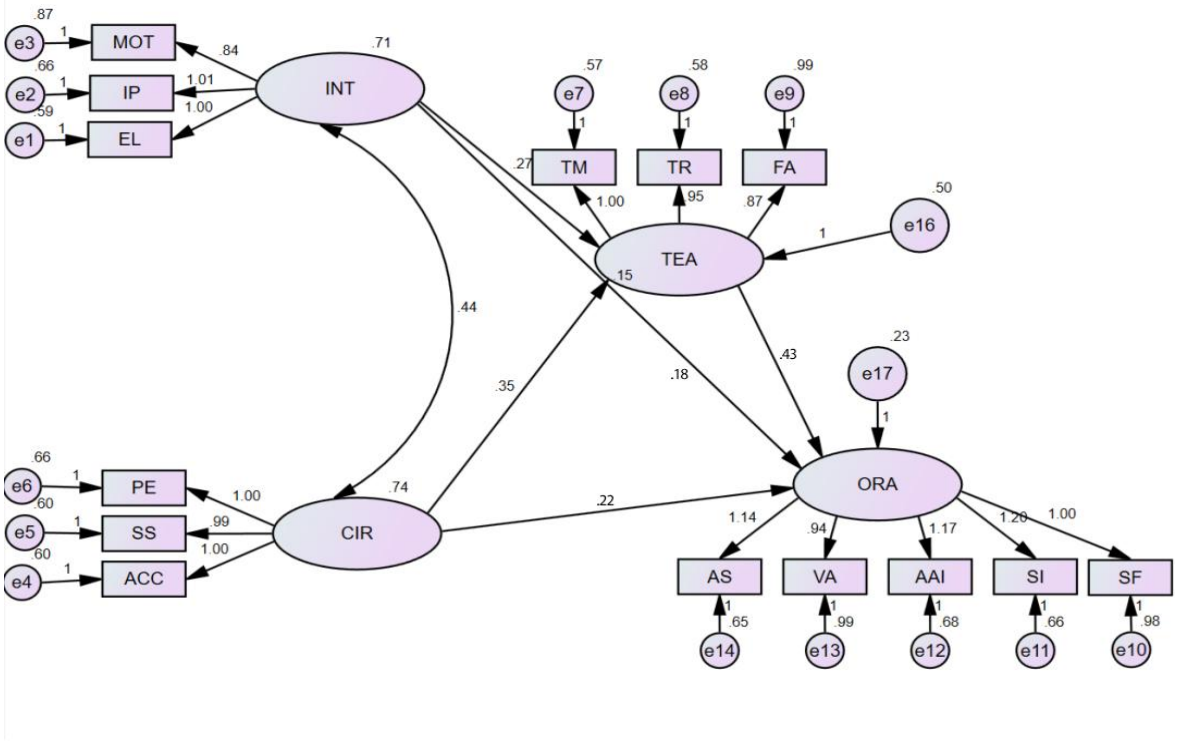



**Figure 2** A causal model concerning effects of dance teaching methods on educational effectiveness with psychophysical well-being as mediator (Source: Constructed by the author)

## Discussions

This study explored the relationships among interest, circumstances, teaching, and outdoor recreation activities within university courses, revealing moderate satisfaction levels and the crucial mediating role of teaching. The findings align with existing literature, reinforcing the significance of motivation, environmental factors, and instructional strategies in shaping outdoor education experiences.

First, interest, particularly learning engagement, significantly influenced participation, supporting Hurd et al. (2021), who emphasized that experiential learning models integrating goal-setting and real-world engagement sustain long-term motivation. This study found that students with higher engagement levels demonstrated stronger participation in outdoor recreation activities,

suggesting that tailored strategies are needed to sustain intrinsic motivation. Additionally, the indirect impact of interest on participation, mediated by teaching, highlights the role of instructional strategies in fostering engagement, which aligns with Howard et al. (2021), who stress the importance of autonomy–supportive teaching methods in sustaining student motivation.

Second, circumstances, particularly accessibility and university support, were significant factors influencing student satisfaction and participation. These results correspond with Petersen et al. (2016), who argued that well–designed learning environments and institutional support enhance engagement. The study also found that circumstances directly influenced teaching quality, as resource availability enabled educators to deliver more structured and interactive instruction, consistent with Pirchio et al. (2021), who emphasized that institutional backing facilitates effective outdoor education programs.

Third, teaching played a crucial mediating role in transforming interest and external support into meaningful learning experiences. The results indicate that teaching methods, instructional resources, and feedback mechanisms serve as the bridge between student motivation, environmental conditions, and participation in outdoor recreation. This aligns with findings by Mammadova (2019), who highlighted that structured teaching frameworks enhance student engagement. The study further supports the idea that high–quality teaching directly improves student experiences, which corresponds with prior research emphasizing the importance of instructional design in outdoor education (Howard et al., 2021).

Finally, outdoor recreation activities within university courses showed moderate satisfaction levels, with social interaction and autonomy emerging as key contributing factors. This suggests that, while students generally benefit from these activities, improvements in interpersonal engagement and facility infrastructure are needed to optimize learning experiences. The strong impact of social interaction supports previous findings that collaborative and immersive experiences play a central role in outdoor education outcomes (Hurd et al., 2021).

The direct and indirect effects observed in this study confirm that teaching not only directly influences participation but also serves as a critical mediator between interest, circumstances, and outdoor recreation engagement. These findings reinforce the importance of integrating motivational and environmental factors into teaching strategies, ensuring that outdoor recreation activities become more impactful and sustainable in higher education settings.

## Knowledge from Research

The concept map illustrates the core relationships identified in this research. Interest and circumstances serve as primary influencing factors, shaping teaching effectiveness and directly impacting outdoor recreation activities within university courses. Teaching acts as a mediator, converting motivation and environmental support into meaningful student engagement. Ultimately, outdoor recreation activities enhance student satisfaction, demonstrating the importance of integrating well-structured teaching methods, accessible resources, and engaging learning experiences to optimize outcomes in higher education (Figure 3).

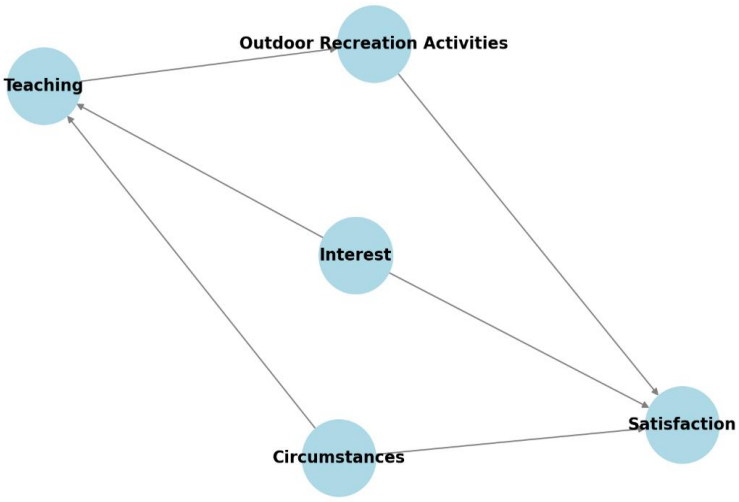



**Figure 3** Simplified Concept Map of Research Findings (Source: Constructed by the author)

## Conclusion

This study confirmed the significant relationships among interest, circumstances, teaching, and outdoor recreation activities in university courses. Accessibility was the most critical factor within circumstances, while learning engagement played a key role in interest. Teaching served as a mediator, transforming both motivational and environmental influences into enhanced participation and satisfaction. The findings emphasize the need for equitable resource allocation, personalized activity design, and innovative teaching strategies to optimize outdoor recreation experiences and support student well-being.

## Suggestions

Based on the study's findings, the following Suggestions aim to enhance the effectiveness and sustainability of outdoor recreation programs in universities. These include general policy and institutional improvements, as well as directions for future research.

### 1. General Suggestions

Stronger policy support and financial investment are crucial for integrating outdoor recreation into university curricula. Universities should allocate dedicated funding for equipment, teacher training, and curriculum development to sustain these programs. Additionally, well-maintained and accessible outdoor spaces are essential to fostering participation, ensuring inclusivity, and improving safety.

Innovative teaching methods should be adopted to enhance engagement. Educators should integrate experiential learning, field-based exercises, and interdisciplinary approaches to bridge theory and practice. Professional development programs and cross-campus collaborations can help share resources and best practices.

Outdoor recreation should also emphasize social interaction and teamwork. Structured activities that promote collaboration, leadership, and problem-solving can enhance student engagement. Institutions should refine guidelines to ensure outdoor education fosters both knowledge and essential soft skills.

### 2. Further Research Directions

Future studies should explore the long-term psychological and academic benefits of outdoor education. Research on how regular participation impacts cognitive development, well-being, and academic performance would provide valuable insights for expanding these programs.

Another key area is the integration of technology. Investigating how digital tools like virtual reality and gamification can enhance outdoor learning without diminishing experiential value is essential.

Cross-cultural research on outdoor education practices would also be beneficial. Comparing implementation models in different educational systems can help identify adaptable strategies and best practices.

By addressing these gaps, future studies can contribute to refining outdoor education, ensuring its continued relevance and impact in higher education.

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