

Factors Influencing Student's Engagement: Environmental Art Design Students at Suzhou Vocational Colleges

Yuetian Shen¹, Pimurai Limpapath²

¹ Suryadhep Teachers College, Rangsit University

² Suryadhep Teachers College, Rangsit University

¹ shen.y62@rsu.ac.th

² pimurai.l@rsu.ac.th

Corresponding author, pimurai.l@rsu.ac.th

How to cite this article: Yuetian Shen, Pimurai Limpapath (2024). Factors Influencing Student's Engagement: Environmental Art Design Students at Suzhou Vocational Colleges. *Library Progress International*, 44(3), 23087-23097

Abstract:

The objective of this study was to explore the factors influencing the students' engagement in environmental art design classes in Suzhou Vocational colleges. Survey research design was used with a distribution of questionnaires to a sample of 384 subjects. Descriptive statistics with mean, standard deviation, Frequency, and Percentage and CFA were employed to examine the five-factors model of learning engagement of students majoring in Environmental Art Design courses at the vocational colleges in Suzhou City. The results showed that the relevance of course content and the quality of interaction between teachers and students had a significant positive impact on student engagement. In addition, the openness and support of the learning environment are also important facilitators of student participation. This study provided a model of factors influencing students' engagement that can be used to improve the teaching quality of the Environmental Art Design with the practical suggestions on how to optimize teaching strategies in vocational colleges in Suzhou Vocational Colleges.

Keywords: Students' Engagement; Environmental Art Design; Vocational Colleges; Suzhou

Introduction

Students' engagement is a critical factor in the success of Interior Design students in Environmental Art Design courses (Care, 2018). These courses are essential in vocational education, aiming at cultivating skills that enhance job opportunities (Van, 2021). That, at Suzhou Vocational Colleges, the Environmental Art Design course structure includes: 1) Interior Design of Spatial Design Concepts; 2) Design Expression, Ergonomics; 3) Material Technology; 4) Architectural Design Foundation; 5) Furnishings Art Design; 6) Furniture Design; 7) Environmental Lighting Design; and 8) Environmental Color Design. In order to become Interior Design for Environmental Art Courses, the combinations of art and environmental functionality and sustainability are taught to create comfortable, functional, and aesthetic interior spaces through the careful collocation of the elements of the layout, materials, and colors (Nathan, 2021).

While the course contains both the artistic and functional sides, it is important to understand how effectively the interior design students engage themselves during the Environmental Art Design (Hilliger, 2022; Salimi, 2024). As a students' engagement is a psychological state of mind while studying in any subject (Miller, 2024), it not only relates to the students' energy, enthusiasm, motivation, and participation in learning in order to achieve their academic tasks (Small, 2024) but also it encompasses various factors, such as Affective Engagement, Behavioral Engagement, Cognitive Engagement, Course Activities' Engagement, and 5) Instructor Skills' Engagement.

Given the lack of systematic research on students' engagement in Environmental Art Design in China, this study aimed to develop measurement scales to accurately assess engagement levels of the interior design students. Using

Confirmatory Factor Analysis (CFA), the study validated the five constructs of engagement in which it ultimately enhanced the understanding of the dynamics of the classroom participation with the emphasis of the current situation of Environmental Art Design course engagement and participation of the Environment Art Design course in Vocational Colleges in Suzhou.

Research Objectives

To explore the Confirmatory Factor Analysis (CFA) in supporting the five-factors model of learning engagement of the students in order to advance the Environmental Art Design courses students' engagement in Vocational Colleges in Suzhou City.

Literature Review

As affective engagement is a degree to which the students actively and effectively participate in their learning activities (Nanney, 2023), it also promotes effective academic tasks and social interactions (Zhao F,2024), which in turn, enhances positive learning outcomes (Pekrun et al., 2012). Among the five factors, Behavior Engagement refers to the actual behavior that can be observed by students' exhibition in learning activities, including participation in class discussion, completion of assignment, and attendances of classes (Knudsen,2023; Van Braak,2021). When it comes to the Cognitive Engagement, it refers to the level of investment the students use their thinking and deep thoughts to complete their tasks (Fredricks et al., 2004) with the right choices of what they can do to manage themselves in learning (Frost,2024; Flowerday, 2023).

Next, Course Activities Engagement is related to the improvement of academic performance through the active learning of course activities engagement in which it results in effective academic performance (El-Mansy, 2023; Nanney, 2023). Finally, the Instructors' Skills Engagement is defined as the ability of the instructors in designing the engaging tasks and activities for students to succeed in the completion of their course (Kurban, 2024). The instructors who utilize various course strategies with: 1) strong flexibility; 2) adaptability; 3) intellectual open- mindedness; 4) initiative; and 5) excellent self-regulation skills (Elharrouss, 2024) are believed to better achieve their goals in promoting their students' academic outcomes (Wilson, 2024).

Since there has never been of the measurement scale, as to assess, students' engagement, particularly, of the students studying in Environmental Art Design courses in Vocational Colleges in Suzhou, this study emphasized the use of CFA in testing the validity of the constructs of 1) Affective Engagement; 2) Behavioral Engagement; 3) Cognitive Engagement; 4) Course Activities Engagement; and 5) Instructor Skills Engagement.

Research Methodology

Population and Sample

The population in this study was 689 students majoring in environmental art design. The three colleges' names and students' amounts were as followed: 1) Suzhou Polytechnic Institute of Agriculture (294); 2) Suzhou Art & Design Technology Institute (262); and 3) Suzhou Tourism and Finance Institute (133). The sample size was 407 calculated by Krejcie & Morgan (1970). Stratified and systematic sampling method were used to enhance the reliability and generalizability of the research findings. A structured questionnaire. IOC was done with five experts in the field of education and gained the result of 1. Back translation was also performed by two languages experts, from English to Chinese and, then, Chinese back to English. Next, to ensure the reliability of the questionnaire, a small- scale pre-survey of 30 subjects outside the sampling was conducted and the results of Cronbach alpha coefficient was 0.964. In this study the instrument to collect data was developed by taken and adapted from the literature reviews of the theoretical concepts and previous research conducting to study learning engagement and finally gained a five-factor structure of students' learning engagement.

Research Instrument

1. The questionnaire consisted of two parts: Part 1), Demographic information with: 1) gender; 2) age; 3) years of the study; and 4) names of the colleges. Part 2), The five factor of the students' learning engagement in Environmental Art Design Course gained by the Synthesis of Students' Engagement's characteristics, taken and adapted, from Literature review, Theoretical Concepts, and previous research by several authors with 50 questionnaire items: 1) Affective Engagements (Arnold,2024; Nanney, 2023; Zhao, 2024); 2) Behavioral Engagement (Abbas, 2022; Ghasemkhani, 2024; Knudsen, 2023); 3) Cognitive Engagement (Flowerday, 2023;

Frost, 2024; Wang, 2013); 4) Course Activities Engagement (Barlow, 2021; Dawana, 2024; El-Mansy, 2020) and 5) Instructors' Skills Engagement (Elharrouss, 2024; Kurban, 2023; Wilson, 2023).

Data Analysis: A Statistical Computer Program was used to examine descriptive analysis with means, standard deviations, Frequency, and Percentage and Confirmatory factor analysis (CFA) for the relationships among factors.

Research Conceptual Framework

The Five-Factors of Students' Engagement: Affective Engagement, Behavioral Engagement, Cognitive Engagement, Course Activities Engagement, and Instructors' Skill Engagement.

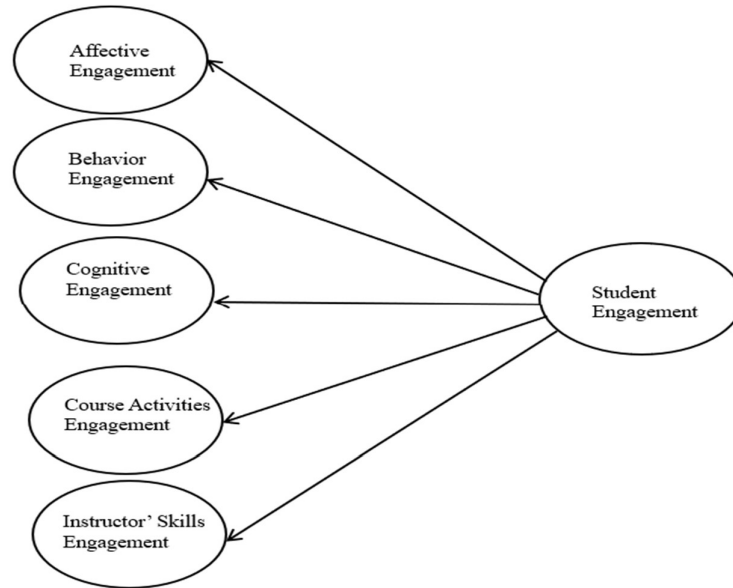


Figure 1 Conceptual Framework

Research Results

Demographic data showed that 407 respondents (46.93%) were male and 216 (53.07%) were female, indicating a higher number of female participants. Age distribution included 82 participants aged 18-19 (20.15%), 154 aged 19-20 (37.84%), 139 aged 20-21 (34.15%), and 32 in the "Other" category (7.86%), with the majority being 19-21 years old. Regarding the current year of study, there were 54 participants in 2021 (13.27%), 238 in 2022 (58.48%), and 115 in 2023 (28.26%), with nearly 60% being in 2022. In terms of university affiliation, 90 participants (22.11%) were from Suzhou Polytechnic Institute of Agriculture (SPIA), 176 (43.24%) from Suzhou Art & Design Technology Institute (SADTI), and 141 (34.64%) from Suzhou Tourism and Finance Institute (STFI), indicating that the majority of respondents were from SADTI.

The study was conducted at three vocational and technical colleges in Suzhou to test the effectiveness of five factors related to student engagement. In this study, confirmatory factor analysis (CFA) was used to test the five-factor.

Table 1 Students Engagement Construct

Factors	Items
Affective Engagement (AE)	I am very interested in learning
	I think what we are learning in school is interesting
	I like what I am learning in school
	I enjoy learning new things in class
	I think learning is boring
	I like my school

	I am proud to be at this school
	Most mornings, I look forward to going to school
	I am happy to be at this school
Behavior Engagement (BE)	I try hard to do well in school
	In class, I work as hard as I can
	When I'm in class, I participate in class activities
	I pay attention in class
	When I'm in class, I just act like I'm working
	In school, I do just enough to get by
	When I'm in class, my mind wanders
	If I have trouble understanding a problem, I go over it again until I understand it
Cognitive Engagement (CE)	When I run into a difficult homework problem, I keep working at it until I think I have solved it
	When I study, I try to understand the material better by relating it to things I already know
	When I study, I figure out how the information might be useful in the real world
	When learning new information, I try to put the ideas in my own words
	When I study, I try to connect what I am learning with my own experiences
	I make up my own examples to help me understand the important concepts I learn from school
	When learning things for school, I try to see how they fit together with other things I already know
	When learning things for school, I often try to associate them with what I learn in other classes about the same or similar things
	I try to see the similarities and differences between things I am learning for school and things I know already
	I try to understand how the things I learn in school fit together with each other
	I try to match what I already know with things I am trying to learn for school
	I try to think through topics and decide what I'm supposed to learn from them, rather than studying topics by just reading them over
	When studying, I try to combine different pieces of information from course material in new ways
Course Activities Engagement (CAE)	I am happy if I can be actively involved in Learning Lecturers are quite interactive in the learning process Lecturers respond well to the learning process
	I can manage my study schedule well
	I have regular discussions with colleagues about solving Learning problems
	Actively involved in learning can show my intelligence
	Being actively involved in learning shows that I am interested in learning
	Being actively involved in learning shows that I have high learning motivation
	Colleagues collaborate in completing the exercises given by the lecturer
	Colleagues collaborate in studying the material
	I am actively involved in doing group assignments
	I can complete the given task
	I can understand the material given well
	Instructors have excellent demonstration skills about course.
	Instructors have remarkable diversity in teaching.

Instructors' Skill Engagement (ISE)	Instructors' creativity works well
	Instructors can motivate the students well
	Instructors can do the problem solving well
	Instructors are actively involved in e-learning by providing answers to student questions
	Instructors try hard so that students understand the material presented in e-learning
	Instructors work hard to teach in a method that is easily understood by students
	Instructors show interest in e-learning actively
	Instructors show their involvement with students both in class and outside class
	Instructors shows concern for student involvement in e- learning
	Instructors can direct students to complete assignments independently
	Instructors motivate students to always be involved in the learning process
	Instructors motivate students to complete assignments as well as possible
	Instructors motivate students to work together in completing assignments
	Instructors can direct students to help colleagues who have difficulty learning the material
	Instructors are willing to help students in solving problems they face related to lessons
	Instructors can inspire students to follow campus life
	The ideal role of Instructors in motivating students is very important
	Instructors can set a good example for students
	Instructors can direct students to always be involved in the learning process
	Instructors have excellent presentation skills of content delivery
	Instructors' behavior is appreciable inside or outside the class

Research Design Approach

Phrase 1: To formulate to theoretically test of the model by incorporating defined items from existing literature, research, and theories in a measurement model as to validate the framework using confirmatory factor analysis (CFA).

Phrase 2: A key requirement for conducting confirmatory factor analysis (CFA) is that each construct must include at least three variables, and there should be no fewer than five constructs overall to effectively test the model.

Phrase 3: The Goodness-of-fit index indicators in the study are: Chi-square goodness-of-fit (ideal, 0.05), Goodness-of-fit index (GFI), Adjusted Goodness-of-fit index (AGFI), Comparative Fit Index (CFI), Normed Fit Index (NFI), Relative Fit Index (RFI), Incremental Fit Index (IFI), and Tucker-Lewis Fit Index (TLI) (Kline, 2010). Further, for the badness of fit index is Root mean square error of approximation (RMSEA) and Root mean squared residual (RMR) (Stevens, 2009).

Research Results

Demographic data showed that 407 respondents (46.93%) were male and 216 (53.07%) were female, indicating a higher number of female participants. Age distribution included 82 participants aged 18-19 (20.15%), 154 aged 19-20 (37.84%), 139 aged 20-21 (34.15%), and 32 in the "Other" category (7.86%), with the majority being 19-21 years old. Regarding the current year of study, there were 54 participants in 2021 (13.27%), 238 in 2022 (58.48%), and 115 in 2023 (28.26%), with nearly 60% being in 2022. In terms of university affiliation, 90 participants (22.11%) were from Suzhou Polytechnic Institute of Agriculture (SPIA), 176 (43.24%) from Suzhou Art & Design Technology Institute (SADTI), and 141 (34.64%) from Suzhou Tourism and Finance Institute (STFI), indicating that the majority of respondents were from SADTI.

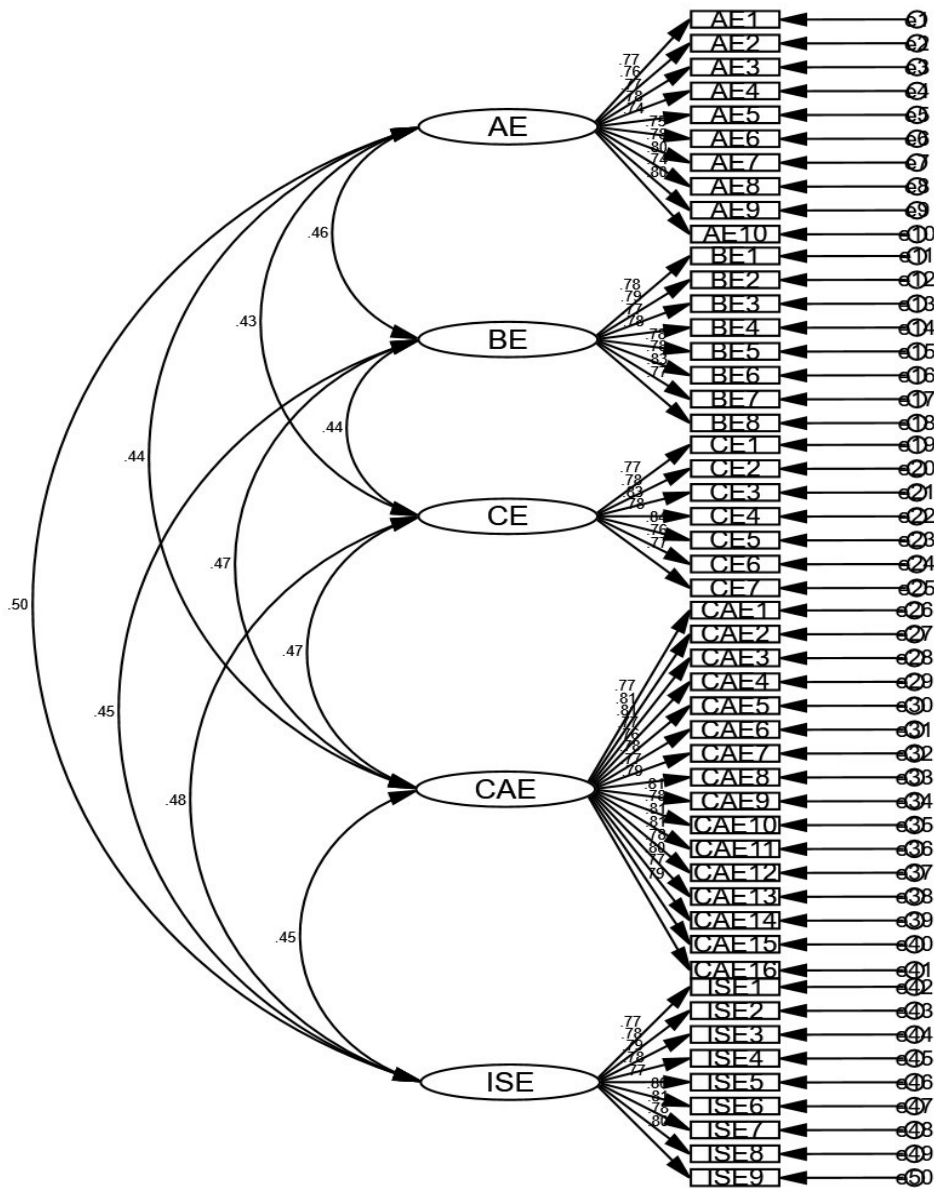


Figure 2 Measurement Model: Confirmatory Factor Analysis of Student Engagement

According Table 2 The CMIN/DF of the affective engagement was 0.737, which was less than 3. The RMSEA value was 0.000, and the NFI, IFI, TLI, and CFI values were 0.990, 1.004, 1.005, and 1.000, respectively, all above 0.9. The GFI and AGFI values were 0.988 and 0.981, both above 0.85; the CMIN/DF of the behavior engagement was 1.084, which was less than 3, and the RMSEA value was 0.014. The NFI, IFI, TLI, and CFI values were 0.990 and 0.999, respectively, all above 0.9. The GFI and AGFI values were 0.987 and 0.976, respectively, both above 0.85; the CMIN/DF of Cognitive Engagement was 2.127, which was less than 3, and the RMSEA value was 0.053. The NFI, IFI, TLI, and CFI values were 0.983, 0.991, 0.987, and 0.991, respectively, all above 0.9. The GFI and AGFI values were 0.980 and 0.960; The CMIN/DF of Course Activities Engagement was 0.921, which was less than 3, and the RMSEA value was 0.000. The NFI, IFI, TLI, and CFI values were 0.981, 1.002, and 1.000, respectively, all above 0.9. The GFI and AGFI values were 0.971 and 0.962; the CMIN/DF of the Instructors' Skills Engagement was 1.044, which was less than 3, and the RMSEA value was 0.010. The NFI, IFI, TLI, and CFI values were 0.981, 1.000, 0.999, and 1.000, all above 0.9. The GFI and AGFI values were 0.985 and 0.975, both above 0.85. As observed from the table, each index in the

measurable model was within the standard range, and the fit degree of the model was high, indicating that all the items could effectively reflect the latent variables.

Table 2 Goodness -of-Fit Students' Engagement

Affective Engagement

reference index	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
statistic	0.737	0.988	0.981	0.990	1.004	1.005	1.000	0.000
Adaptation standard	<3	>0.85	>0.85	>0.9	>0.9	>0.9	>0.9	<0.08

Behavior Engagement

reference index	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
statistic	1.084	0.987	0.976	0.990	0.999	0.999	0.999	0.014
Adaptation standard	<3	>0.85	>0.85	>0.9	>0.9	>0.9	>0.9	<0.08

Cognitive Engagement

reference index	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
statistic	2.127	0.980	0.960	0.983	0.991	0.987	0.991	0.053
Adaptation standard	<3	>0.85	>0.85	>0.9	>0.9	>0.9	>0.9	<0.08

Course Activities Engagement

reference index	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
statistic	0.921	0.971	0.962	0.981	1.002	1.002	1.000	0.000
Adaptation standard	<3	>0.85	>0.85	>0.9	>0.9	>0.9	>0.9	<0.08

Instructors' Skills Engagement

reference index	CMIN/DF	GFI	AGFI	NFI	IFI	TLI	CFI	RMSEA
statistic	1.044	0.985	0.975	0.981	1.000	0.999	1.000	0.010
Adaptation standard	<3	>0.85	>0.85	>0.9	>0.9	>0.9	>0.9	<0.08

Construct Validity

The paper tests convergent validity and discriminant validity to reflect the theoretical latent-construct. The ideal standardized factor loading range for construct validity should be 0.5to 0.7 (Wang et al., 2005).

Table 3 Results for Model AVE and CR

Subjective variables	AVE price	CR price
Affective Engagement	0.591	0.935
Behavior Engagement	0.617	0.928
Cognitive Engagement	0.624	0.921
Course Activities Engagement	0.623	0.963
Instructors' Skills Engagement	0.619	0.936

As can be seen from the table 3, convergence validity is generally used to measure the combined reliability (CR) of the correlation between the same latent variable is greater than 0.7, and the average variance extraction (AVE) is greater than 0.5, so the convergence degree of the model is considered to meet the requirements. As can be seen from the above table, all the AVE values corresponding to the five public factors are greater than 0.5, and all the CR values are higher than 0.7, which means that the analyzed data has good aggregation (convergence) validity.

Objective was to verify the factor structure of observed variables related to the five constructs of student engagement in Environmental Art Design courses at vocational colleges in Suzhou. The analysis confirmed significant relationships among the engagement variables, with high path coefficients indicating the quality of each item in the model. Age, gender, grade, and school did not show significant differences in engagement. The factors were ranked by their significance: 1) Course Activities Engagement, 2) Instructors' Skills Engagement, 3) Affective Engagement, 4) Behavioral Engagement, and 5) Cognitive Engagement. The CFA results validated significant path relationships among the factors, highlighting the critical roles of curriculum activities and instructor skills in enhancing student engagement.

Discuss the Findings

In this survey, Confirmatory Factor Analysis (CFA) was conducted to test a set of observed variables represents distinct dimensions or factors of a latent construct, where each variable loads onto only one factor, and the factors are correlated. This analysis helped determine if the constructions and loading align with anticipated hypotheses. The second significant factor is Instructors' Skills Engagement. Prior studies have consistently shown that skilled instructors positively impact student engagement. The students exposed to effective teaching are more likely to develop intellectual engagement. Teachers play a crucial role in fostering and maintaining student engagement, which correlates with positive learning outcomes (Pedler et al., 2020).

Affective Engagement, or emotional engagement, ranks third. While emotionally engaged students typically feel good about their learning, Environmental Art Design students may experience mixed emotions. Support is essential for effective participation, as less experience can lead to lower engagement (Henry, 2023). Emotional balance significantly affects behavior and engagement in learning.

The fourth factor is Behavioral Engagement, often linked to learning engagement. This emphasizes the need for developing new behaviors that enhance learning. Research in game design suggests that engagement can improve skills through effective interactions. Similar strategies in Environmental Art Design could enhance academic performance and career readiness (Hartzog, 2024).

Finally, Cognitive Engagement is the fifth significant factor, involving mental processes related to knowledge and understanding. Research indicates that contemporary learners view cognitive engagement as an investment in their education. A positive emotional connection to learning content further enhances cognitive engagement, influencing effective participation (Schreiner et al., 2021).

The research findings revealed the significance of factors in the following order: Course Activities Engagement; Instructors' Skills Engagement; Behavioral Engagement; Cognitive Engagement; Affective Engagement. The subsequent discussion will delve into the rationale behind these findings in relation to existing research on student engagement.

The study revealed that Course Activities Engagement was the most crucial factor influencing student engagement among Environmental Art Design students in Suzhou vocational colleges. This aligns with previous research highlighting the need for effective, interactive, and project-based learning, which energizes both mental and physical involvement in the learning process (Knudsen, 2023). The more students perceive their courses as interactive, the greater their engagement and learning outcomes. Additionally, effective course activities contribute to skill development across various areas.

In summary, this study combined quantitative and qualitative analyses to explore student engagement in Environmental Art Design at Suzhou Vocational Colleges. While quantitative data highlighted the relevance of various factors, qualitative interviews provided insights into the reasons behind them. The research identified five key factors influencing engagement: curriculum activities, teacher skills, emotional engagement, behavioral engagement, and cognitive engagement. These findings offer valuable theoretical support and practical recommendations for enhancing educational practices, ultimately promoting students' overall development and improving their learning experiences.

Recommendations

The recommendations for educational administrators: Promote Interaction and Cooperation: Curriculum activities should foster collaboration among colleges by involving instructors in research, training, and curriculum assessment methods. This teamwork can enhance Environmental Art Design programs and courses. The development for Teachers: Colleges should offer professional development opportunities for instructors, such as educational seminars, classroom observations of exemplary teachers, and collaborative teaching initiatives across disciplines or colleges. Ongoing professional development will help educators refresh their teaching methods and improve their skills, ultimately increasing student engagement.

1. Academic recommendations

The recommendations for Improvement of teachers' skills : The role of teachers in student learning is crucial, making the enhancement of their skills a priority for educational institutions. Strengthening Communication Skills: Teachers should focus on improving their communication abilities to engage more effectively with students. Regular training workshops can help educators enhance their listening skills, provide timely feedback, and promote emotional engagement. Enhancing Classroom Management: Effective classroom management significantly impacts the learning experience. Teachers should develop skills to maintain a positive learning environment, including establishing clear classroom rules, addressing discipline issues proactively, and managing conflicts among students.

The recommendations for Establishment of Students Engagement Skills: Build teacher-student relationships: Teachers should build good relationships with students and pay attention to their emotional state. By understanding students' interests, puzzles, and needs, teachers are able to support students' learning more effectively. For example, teachers can have regular one-on-one communication with students to understand their feelings and challenges in learning. Encourage positive learning engagement environments: Colleges should strive to create a supportive and inclusive learning engagement environment where students feel safe and respected. In the classroom, teachers should encourage students to express their own views and accept different opinions, so as to enhance the positive sense of engaging, participation and belonging.

2. Policy Recommendations

Invest in improving campus infrastructure to create comfortable and inspiring spaces that foster creativity and student engagement; Support partnerships between schools and local businesses to provide internships and real-world projects, allowing students to apply their knowledge and feel more connected to their field; Establish career counseling services to help students set clear professional goals, thereby enhancing their commitment to their studies; Encourage schools to regularly host exhibitions, design competitions, and workshops to stimulate student interest and participation in their field; Develop mental health resources on campus to address student stress and anxiety, which can improve overall engagement and well-being.

3. Recommendations for Action

Motivate students to take part in extracurricular activities and clubs, fostering a sense of belonging and community; Create channels for students to voice their opinions and suggestions, ensuring they feel their input is

valued and considered; Facilitate teamwork through group projects and discussions, helping students build collaborative skills and enhance engagement; Invite successful alumni to share their experiences, inspiring current students to engage more deeply in their studies and careers; Implement goal-setting activities and smaller projects to help students experience success, thereby increasing their confidence and willingness to participate.

References

- Abbas, A., Haruna, H., Arrona-Palacios, A. et al. (2022:12049–12064.). Students' evaluations of teachers and recommendation based on course structure or teaching approaches: An empirical study based on the institutional dataset of student opinion survey.
- Arnold, C. L. (2024). Social anxiety and achievement emotions in high school virtual learning students (Order No. 30990747). Available from ProQuest Dissertations & Theses Global. (3054688085). Retrieved from <https://www.proquest.com/dissertations-theses/social-anxiety-achievement-emotions-high-school/docview/3054688085/s>
- Bakker, A. B. (2017:67-75). Strategic and proactive approaches to work engagement.
- Care, E., Kim, H., Vista, A., & Anderson, K. (2018). Education system alignment for 21st century skills: Focus on assessment. Washington, DC: Brookings Institution, Center for Universal Education.
- Chen, L. (2023). Students' learning styles and preferences in a gamification-enhanced partially flipped classroom: A Q-methodology study. *Journal of Educational Technology & Society*.
- El-Mansy, S. (2023). Cognitive engagement during group learning activities in chemistry courses: An analysis of student discourse (Order No. 30693204). Available from ProQuest Dissertations & Theses Global.
- Fredricks, J. A., Reschly, A. L., & Christenson, S. L. (2019:1-11). Interventions for student engagement: Overview and state of the field. In *Handbook of student engagement interventions*.
- Flowerday T, Schraw G(2023). Effect of choice on cognitive and affective engagement[J]. *The Journal of Educational Research*, 96(4): 207-215.
- Frost, K. (2024). The influence of play as positive emotion on engagement and self-regulated learning in an online higher education classroom (Order No. 31236037). Available from ProQuest Dissertations & Theses Global. (3050917730). Retrieved from <https://www.proquest.com/dissertations-theses/influence-play-as-positive-emotion-on-engagement/docview/3050917730/se-2>
- Ghasemkhani, B., Kadriye, F. B., Kokten, U. B., & Birant, D. (2024). A novel classification method: Neighborhood-based positive unlabeled learning using decision tree (NPULUD). *Entropy*, 26(5), 403. doi:<https://doi.org/10.3390/e26050403>
- Hartzog, J. G. (2024). Career technical education, academic achievement, and behavioral engagement (Order No. 31295637). Available from ProQuest Dissertations & Theses Global.
- Henry, M. (2023). A phenomenology of affective engagement in advanced placement courses.
- Knudsen, S., Mathilde, B. B., Høj, T. K., Jensen, C., Rebecca Louise Nørskov Jørgensen, & Loft, C. S. (2023). Reflections on designing and running visualization design and programming activities in courses with many students.
- Kurban, F. (2024:202-235). Evolution of pre-service mathematics teachers' spatial visualisation skills during A cognitive load theory-based education.
- Krejcie, R.V. and Morgan, D.W. (1970) Determining Sample Size for Research Activities. *Educational and Psychological Measurement*, 30, 607-610. <https://doi.org/10.1177/001316447003000308>
- Nanney, L. (2023). Physical activity engagement and wellbeing in an instructional physical activity program. Pedler, M., Hudson, S., & Yeigh, T. (2020:48-62). The teachers' role in student engagement: A review.
- Pekrun, R., Goetz, T., Titz, W., Perry, R.P. (2012). Academic emotions in students' self-regulated learning and achievement: A program of qualitative and quantitative research, *Educational Psychologist*, 37 (2), pp. 91-105
- Stevens, J.P. (2009) *Applied Multivariate Statistics for the Social Sciences*. 5th Edition, Routledge, New York.

- Sharp-Rekieta, C. (2021). The impact of instructors' interpersonal skills on student engagement: A phenomenological study.
- Schreiner M, Fischer T, Riedl R (2021: 329-345). Impact of content characteristics and emotion on behavioral engagement in social media: literature review and research agenda.
- Kline, R.B. (2010) Principles and Practice of Structural Equation Modeling. The Guilford Press, New York.
- Van Hooft, E. A. J., Kammeyer-Mueller, J. D., Wanberg, C. R., Kanfer, R., & Basbug, G. (2021). Job search and employment success: A quantitative review and future research agenda. *Journal of Applied Psychology*, 106(5), 674–713. <https://doi.org/10.1037/apl0000675>
- Van Braak, M., van de Pol, J. E., Poorthuis, A. M. G., & Mainhard, M. T. (2021). A micro-perspective on students' behavioral engagement in the context of teachers' instructional support during seatwork: Sources of variability and the role of teacher adaptive support. <https://dspace.library.uu.nl/handle/1874/410935>.
- Wang Hualei. (2023:153-155). Teaching reform practice of cml model for Architectural Interior design major based on Modern apprenticeship.
- Wang, Xuequn; French, Brian F.; and Clay, Paul F. (2015). Convergent and Discriminant Validity with Formative Measurement: A Mediator Perspective. *Journal of Modern Applied Statistical Methods*. 1(14). DOI: 10.22237/jmasm/1430453400 Available at: <http://digitalcommons.wayne.edu/jmasm/vol14/iss1/11>
- Zhao, F. (2024). Affective synchrony: Associations with and implications of emotion type, friendship, and loneliness (Order No. 31239173). Available from ProQuest Dissertations & Theses Global. (3064892981). Retrieved from <https://www.proquest.com/dissertations-theses/affective-synchrony-associations-with/docview/3064892981/se-2>