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Influence of Classroom Environment and Perceived Teaching Style on Student Learning Engagement In Science

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Abstract — Low student engagement in science is a problem in education. This study examined classroom environment and perceived teaching style as determinants of student learning engagement among 216 Junior High School students. Diagnostic research design, total enumeration sampling, survey technique, and multiple regression analysis were applied. It was revealed that only classroom environment shows a significant contribution on the criterion, partly and partially affirming the Social Cognitive Theory. Future researchers may examine additional variables explaining the remaining 41% of the variance, while school administrators may improve science engagement through supportive, student-centered, and interactive learning environments.

Keywords: Influence of classroom environment, perceived teaching style, student learning engagement in science

I. INTRODUCTION

This chapter includes the following: the problem and its scope, significance of the study, statement of the problem, hypotheses, theoretical and conceptual frameworks.

Problem and Its Scope

Low student learning engagement in science has become a growing concern in the global educational landscape. International educational reports emphasize that many students show declining interest, participation, and involvement in science learning activities, particularly in secondary education. Science engagement is considered essential in developing scientific literacy, critical thinking, and problem-solving competencies needed in the 21st century. However, global assessments continue to indicate that many learners demonstrate low enthusiasm and limited active participation in science-related tasks and classroom interactions (Kaliisa et al., 2023). Researcher further noted that maintaining students' engagement in science remains a major challenge among educational institutions worldwide (Riegle-Crumb et al., 2023).

In United States of America, low student learning engagement in science has also been recognized as an educational concern. Studies in the United States reported that many students display declining interest and participation in science subjects as they progress to higher grade levels (Riegle-Crumb et al., 2023). In the United Kingdom, educational reports highlighted persistent concerns regarding students' reduced involvement and motivation in science classrooms, particularly among adolescents. Meanwhile, despite Singapore's strong academic performance in science, researchers observed that sustaining students' active engagement and interest in science learning continues to be an important educational issue due to increasing academic demands and learning pressures (Kaliisa et al., 2023).

In the Philippine context, low student learning engagement in science remains a significant educational challenge. Studies revealed that Filipino students often exhibit low levels of participation, motivation, and engagement in science learning activities. National and international assessments likewise continue to show poor science performance among Filipino learners, reflecting concerns regarding students' involvement in science education (Bernardo et al., 2023). Recent local studies further emphasized that science learning engagement among Filipino students remains an area that requires greater educational attention and improvement (Briones et al., 2023). Researchers also noted that many learners demonstrate limited interest and participation in science classes, particularly in secondary education settings (Sarsale & Langub, 2023).

Low student learning engagement in science may lead to several negative educational consequences. Students with low engagement are more likely to demonstrate poor academic performance, reduced scientific literacy, limited classroom participation, and decreased motivation to pursue science-related careers and disciplines. In addition, low engagement may hinder the development of critical thinking, problem-solving skills, and meaningful learning experiences necessary for academic success and lifelong learning. Persistent disengagement in science may also contribute to lower achievement in national and international assessments, affecting the overall quality of science education and students' readiness for future scientific and technological demands (Bernardo et al., 2023; Obenza-Tanudtanud & Obenza, 2023).

Significance of the Study

This study is significant because it supports sustainable development Goal 4 by highlighting the importance of fostering student's classroom environment and perceived teaching style for enhancing student learning engagement in science. In the Philippines context, the findings provide empirical evidence to inform future researchers and support the goal of the Department of Education in fostering inclusive, motivating learning environments that promote autonomy and classroom community. Furthermore, the study is valuable to Holy Cross of Davao College as it identifies key factor influence student engagement in science, guiding the development of student-centered strategies and supportive environments that enhance motivation, engagement, and academic performance.

Statement of the Problem

This study determined the significance influence of the classroom environment and perceived teaching as causes of student engagement in science learning. More specifically, it seeks to achieve the following objectives:

1. To determine the level of classroom environment in terms of Student Cohesiveness, Teacher Support, Investigation, Involvement, Task Orientation, cooperation, and equality; Perceived teaching style in terms of Teacher-Student interaction, Decision-making

negotiation, teaching structure, and behavioral control; and student Learning engagement in science in terms of Cognitive Engagement, behavioral engagement, and Emotional Engagement;

2. To determine the significant of the correlation between classroom environment and perceived teaching style and students' engagement in science among junior high school students.

3. To determine individual and combined significant influence on classroom environment and perceived teaching style on students' engagement in science learning.

Hypotheses

The research hypotheses were tested at a 0.05 level of significance.

Ho_1: Classroom environment and Perceived teaching style have no significant correlation with students' learning engagement in science.

Ho_2: Classroom environment and Perceived teaching style do not significantly influence students' learning engagement in science.

Theoretical Framework

This study was anchored on the theory of Social Cognitive Theory (SCT), which posits that human functioning is the product of a continuous interaction between personal factors, the environment, and behavior. Individuals develop knowledge, skills and behaviors through observation, experience, and social interaction. The theory further emphasizes self-efficacy, self-regulation, and reciprocal determinism, which explain how individuals' beliefs, actions, and surroundings continuously influence one another (Bandura,1977;1986).

In this study, the classroom environment represents the external conditions that shape students' learning experiences (Baflor & Paglinawan, 2024), while the teacher's instructional approach, or perceived teaching style, reflects the personal and behavioral influences that guide how learning unfolds (Paurom & Paglinawan, 2024). Meanwhile, student learning engagement as reflected in a supportive classroom can boost students' confidence and self-efficacy, which may

influence their engagement, as their belief in their ability to succeed encourages them to participate actively and stay engaged in science (Wu, 2023). The personal factor as a component of the theory was excluded in the study. Hence, this study was partly and partially anchored in the theory

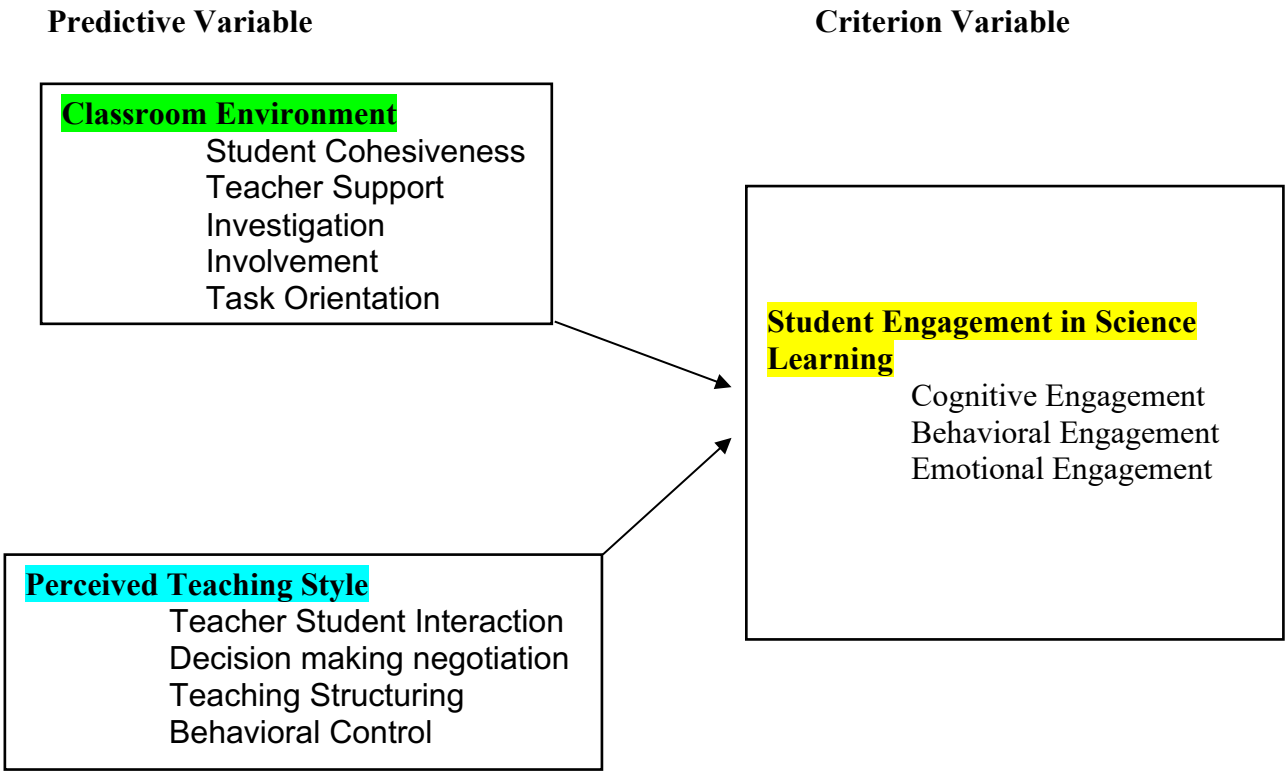

FIGURE 1
CONCEPTUAL FRAMEWORK OF THE STUDY

II. METHODOLOGY

Included in this chapter are the research design, locale of the study, sample and sampling technique, data gathering technique, data analysis technique and ethical consideration.

Research Design

This study employed a diagnostic research design. This design is suitable because it enables the researcher to describe the existing levels of the variables and analyze their relationship among

classroom environment, perceived teaching style, and student learning engagement in science without manipulating any variables. The finding may serve as a basis for improving teaching practices and creating a more supportive classroom environment that enhance student learning engagement in science.

Locale of the Study

This study will be conducted in selected private school located in Davao, City Philippines. It will be conducted particularly at one private school under Cluster three, Division of Davao City. This school is one of the chosen schools for the strengthening of Junior high school. This school also provide a sufficient number of students who served as the respondents of the study. Since, the school supports an interactive and child friendly classroom, with that it is the perfect school to conduct the study to discover the influence of classroom environment and perceived teaching style on student learning engagement in science.

Sample and Sampling technique

The respondents in this study are consisting of 216 grade 7-10 junior high school students enrolled in science classes one private school, during School Year (SY) 2025-2026. Total enumeration sampling of representing a diverse mix of socioeconomic and academic backgrounds. This method is employed when it is feasible and practical to collect data from every individual within the population (Arnab, 2017). In this study, the researcher did not apply a particular method to calculate the exact number of respondents from the target population. Rather, the number of participants was pre- determined according to the overall population size.

Data Gathering Technique

In this study, the survey technique was used in gathering data. It is a method for collecting data through questionnaires or interviews (Creswell & Creswell 2023) to obtain standardized information about respondents' attitudes, perception, or behavior (Cohen et al.,2021). It is

advantage for data collection from large, diverse populations, produces quantifiable data for analysis supports generalization, enables rapid data collection, and ensures replicability through standardized procedures (Oranga Matere, 2025).

There were three adopted questionnaires were used in this study, and validators employed a 4-point Likert scale was used to evaluate participants responses across the three research instruments, ranging from 1-Strongly Disagree to 4- Strongly Agree, to avoid central tendency bias (Koo, 2025). The first instrument the classroom environment was adopted (Fraser et al., 1996), It consists of 56 items designed to assess student classroom environment, which includes seven key indicators: Student Cohesiveness, Teacher Support, Investigation, Involvement, Task Orientation, Cooperation, Equality, with a Cronbach's alpha of 0.868.

The second instrument, the Perceived teaching style questionnaire, was adapted from Diana Abello, Jesús Alonso-Tapia, and Ernesto Panadero (2020) and measured through four key factor Teacher Student Interaction, Decision making negotiation, Teaching Structuring, Behavioral Control. It consists of 28 items with a Cronbach's alpha of 0.766.

The third instrument, the student learning engagement in science education questionnaire, was adopted from Imran, Rehan Ahmed Khan, and Kinza Aslam (2023) and assessed using three indicators Cognitive Engagement, Behavioral Engagement, Emotional Engagement. It consists of 19 items with a Cronbach's alpha of 0.711

In this study, the data analysis techniques used was descriptive, correlation and multiple linear regression analyses, Descriptive analysis helps organize and summarize large amounts of data, making it easier for researchers to understand real world patters while serving time, no matter the situation or field of the study (Costa, 2024).

The matrix containing the range of mean, descriptive level and corresponding interpretation for each variable in this study is presented, specifically used to describe classroom environment and perceived teaching style to the student learning engagement in science.

Range of Mean	Descriptive Level	Classroom Perceived Environment	Student Learning in teaching style	Engagement
3.26-4.00	Very High	Very Good	Very Good	Very Strong
2.50-3.25	High	Good	Good	Strong
1.75-2.49	Low	Poor	Poor	Weak
1.00-1.74	Very Low	Very Poor	Very Poor	Very Weak

Moreover, Correlation analysis statistical tool was applied to assess the strength and direction of relationship among the variables, and to test hypothesis on significant associations (Casinillo, 2023); thus, the Pearson Product Moment Correlation statistical tool was used.

For interpreting the Pearson correlation coefficient (r), the following scale (Guilford, 1956) was used:

Computed r	Descriptive Interpretation
+/-1.00	Perfect correlation
Between +/-0.75- +/- 0.99	High correlation
Between +/-0.51- +/-0.74	Moderately high correlation
Between +/- 0.31- + /- 0.50	Moderately low correlation
Between + / - 0.01- +/ - 0.30	Low correlation
0.00	No correlation

Furthermore, Multiple linear regression analysis is a statistical method used to examine the relationship between one dependent variable and two or more independent variables. It determines how predictor variables collectively and individually influenced an outcome variable (Sun et al., 2023). Multiple linear regression is widely used in educational, social, business, and health research because it helps explain and predict outcomes based on several factors simultaneously (Anandhi & Nathiya, 2023). In terms of scale of Beta (β) Coefficient strength, the following schemes as proposed by Cohen (1988) and Hair et al. (2019), was used.

In terms of Scale of Beta (β) Coefficient Strength, the following scheme as proposed by Cohen (1988) and Hair, et al. (2019) was used:

β Value Range	Strength of Relationship
±0.00 – ±0.09	Very Weak
±0.10 – ±0.29	Weak
±0.30 – ±0.49	Moderate
±0.50 – ±0.69	Strong
±0.70 and above	Very Strong

Ethical Consideration

This study strictly followed ethical standards in conducting research involving junior high school students. Before collecting any data, informed consent was obtained from all participants and their parents or guardians, ensuring that participation was entirely voluntary and that responses would remain confidential. Participants were informed about the purpose of the study and their rights to withdraw at any time without penalty. Permission from the Department of education division and from the school authorities was obtained, the research instruments were carefully validated and tested for reliability to ensure that the findings would be accurate and trustworthy. Permission to conduct the study was formally secured from the school administrators under Cluster 3. Additionally, the research proposal underwent review and approval by the Society of Moral Integrity and Legal Ethics (SMILE), ensuring that all procedures adhered to ethical, legal, and moral principles in educational research.

III. RESULTS

Included in this chapter are the descriptive, correlation, and regression tabular presentation, and the corresponding analysis and interpretation of the statistical results. This chapter is ended with the summary of findings.

Descriptive Results

Table 1 are the descriptive statistical results of the study including the variables involved namely, classroom environment, teaching style, and student learning engagement in science with their respective indicators. Likewise, the number of samples, standard deviation, mean, and descriptive level specifically corresponding with each of the variables are presented in the table.

TABLE 1
DESCRIPTIVE STATISTICS (N = 216)

Variables	Standard Deviation	Mean	Descriptive Level
Classroom Environment	0.40	3.03	High
Student Cohesiveness	*0.43*	*3.13*	*High*
Teacher Support	*0.53*	*3.03*	*High*
Involvement	*0.59*	*2.70*	*High*
Task Orientation=	*0.50*	*3.23*	*High*
Investigation	*0.58*	*2.85*	*High*
Cooperation	*0.49*	*3.23*	*High*
Equality	*0.55*	*3.09*	*High*
Perceived Teaching Style	0.44	3.19	*High*
Teacher Student Interaction	*0.49*	*3.17*	*High*
Decision Making Negotiation	*0.51*	*3.16*	*High*
Teaching Structuring	*0.52*	*3.18*	*High*
Behavioral Control	*0.49*	*3.26*	*Very high*
Student Learning Engagement in science	0.52	2.94	High
Cognitive Engagement	*0.60*	*3.02*	*High*
Emotional Engagement	*0.68*	*2.92*	*High*
Behavioral Engagement	*0.56*	*2.88*	*High*

Specifically, Table 1 shows that the classroom environment variable obtained a mean score 3.03 describe as high. This indicates that the respondents have a good and positive classroom environment were high. All indictors are also described as high. The standard deviation of 0.40, described as highly consistent responses, indicate strong and uniform perception.

Furthermore, Perceived teaching style variable has a mean of 3.19, describe as high. except for Behavioral control, which describe as very high. It implies that respondent's standard deviation of 0.44, describe as highly consistent responses, denotes a strong and uniform perception.

Moreover, student learning engagement in science variable has a mean of 2.94, describe as high It indicates that the respondents are strongly engaged in science class. A standard deviation of 0.52, describe as highly consistent responses, indicates a strong a uniform perception. This indicates that students are actively engaged in science learning in terms of cognitive, emotional, and behavioral aspects.

The findings reveals that all variables were interpreted at a high level with consistent responses, though perceived teaching style particularly behavioral control was rated slightly higher, while student engagement in science, though also high, was comparatively lower than the others.

Correlation Result

Table 2 is correlation table it presents the predictive and criterion variable. Likewise, the r-value and p-value, decision on hypothesis, and interpretation are presented. Finally, the correlation results between classroom environment and teaching style as determinants of the student learning engagement in science as the criterion variable.

TABLE 2
CORRELATION TABLE (N=216)

Variables	Student Learning Engagement			
	r-value	p-value	Decision on *H*0	Interpretation
Classroom Environment	0.77	<.000	Reject *H*0	High Positive, Significant
Perceived Teaching Style	0.55	<.000	Reject *H*0	Moderate Positive, Significant

Level of Significance: 0.05

Decision Rule: Reject H_0 if $p < 0.05$

Specifically, Table 2 shows that the correlation between classroom environment and perceived teaching style in Learning student engagement in science variable obtained a p-value of 0.000, which is less than 0.05 degree of confidence. Hence the null hypothesis was rejected. It indicates that the correlation is significant. The corresponding r-value of 0.77 reflects high positive correlation. This finding implies that when Classroom environment is very strong, their learning engagement in science is very strong.

Similarly, Perceived teaching style obtained a p-value of 0.000, which is less than the 0.05 level of significance. Hence, the null hypothesis was rejected. It indicates that the correlation is significant. The corresponding r-value of 0.55 shows a moderately high positive correlation between learning student engagement in science.

The findings reveal that both classroom environment and perceived teaching style are significantly related to students' learning engagement in science, but classroom environment shows a stronger positive relationship compared to perceived teaching style.

Regression Analysis

Table 3 presents the regression analysis. It examined the influence of the predictive variable and criterion. Furthermore, the table showed the unstandardized beta, beta coefficient, t-value, p-value, and the corresponding interpretation.

TABLE 3
REGRESSION TABLE (N=216)

	Student Learning Engagement						
	Unstandardized Coefficients		Standardized Coefficients				
Variables	B	Std. Error	Beta	t	Sig.	Decision on H_0	Interpretation
(Constant)	-0.06	0.18	–	-0.35	0.72	–	–
Classroom Environment	0.99	0.07	0.77	12.50	<.000	Reject	Positive Significant Influence
Perceived Teaching Style	-0.09	0.07	-0.01	-0.12	.900	Failed to Reject	Not Significant

R = 0.77 | R^2 = 0.59 | F = 158 | p = <.001

Level of Significance: 0.05

Decision Rule: Reject H_0 if p < 0.05

Table 3 Specifically shows that the Influence of Classroom environment and Perceived teaching style on learning engagement in science variable obtained an unstandardized beta

coefficient 0.77. It indicates that the strength of the influence of classroom environment on the criterion is high. With corresponding p-value of 0.000, which is less than the 0.05 level of significance, the null hypothesis was rejected. It signifies that the influence of classroom environment on students learning engagement in science is positively significant. This implies that for every unit change in classroom environment, there is a corresponding 0.77unit change in engagement in science.

Likewise, the influence of Perceived teaching style variable on learning engagement in science variable obtained a standardized beta coefficient of 0.01. It indicates that the strength of the influence of perceived teaching style on the criterion is weak. With a corresponding p-value of 0.000, which is less than 0.05 level of significance, the null hypothesis is rejected. It denotes that the influence of classroom environment on student learning in science is positive significant. This implies that for every unit change in perceived teaching style there is a corresponding 0.01unit change in student learning engagement in science.

The table also shows the R-squared value of 0.59 indicating strong combined influence of determinants on the criterion variable. With corresponding p-value of 0.000, which is less than 0.05 level of significance, hence, the null hypothesis was rejected. It indicates that the combined influence of classroom environment and perceived teaching style on the student learning engagement in science is significant. This implies that for every unit change in the combined influence of the determinant variables, there is a corresponding 0.59-unit change in the criterion variable.

The finding reveals that Classroom environment has a strong and meaningful influence on students' learning engagement in science, whereas perceived teaching style shows only a very weak influence, despite both contributing to a significant combined effect.

Summary of Findings

Based on statistical results, it specifically was found that:

Classroom Environment and Perceived Teaching style significantly correlate with Student Learning Engagement in science

Classroom Environment, not perceived teaching style variable, significantly influence student learning engagement.

IV. DISCUSSIONS

In this chapter, the findings of the study are discussed. Likewise, the conclusion and recommendation are presented.

Classroom Environment, Perceived Teaching style, Student Learning Engagement in Science Correlation

The current finding that classroom environment, rather than teaching style, has a significant positive combined influence on student engagement is supported by several recent studies. The current finding affirms the study of Li and Xue (2023) explaining that the learning environment factors such as classroom interaction, support, and participation significantly influenced student engagement, emphasizing that environmental conditions strongly affect students' behavioral and emotional involvement in learning. Similarly, the current finding affirms the study of Peng (2023) who elaborated that a supportive and technology-enhanced classroom environment positively increased students' learning engagement by improving participation, motivation, and interaction in the classroom. These studies parallel the current findings by highlighting the importance of classroom conditions in fostering student engagement.

In contrast, the current finding study opposes Bolo et al. (2023), who found that teaching style significantly influences student engagement and revealed that teacher instructional styles were significantly associated with classroom engagement among junior high school students, indicating that the way teachers deliver instruction can directly affect student participation and

involvement. Likewise, the current finding affirms with the study of Thomas and Nair (2023), who elaborated that teacher influence and instructional practices play an important role in shaping student engagement in high school classrooms. These studies contradict the current findings since they stress the significant contribution of teaching style to student engagement.

Classroom Environment and Perceived Teaching style as Determinants of Student Learning Engagement in Science Correlation.

The finding of this study indicates that classroom environment significantly influences student learning engagement while perceived teaching style may not independently predict engagement. The current finding affirms the study of (Briones et al., 2023) found that a positive and supportive classroom climate significantly predicted students' behavioral, emotional, and cognitive engagement in science learning, highlighting the dominant role of the learning environment in shaping student participation. Similarly, the current finding affirms the study of (Salmela-Aro et al., 2023) who reported that research showed that classroom climate and peer interaction were stronger predictors of student engagement than instructional practices when analyzed simultaneously, emphasizing the importance of environmental factors in learning engagement.

However, the current finding affirms the study of (Lazarides & Buchholz, 2023), elaborating that teacher instructional practices and teaching style significantly predicted students' engagement even after controlling for classroom climate, suggesting that teaching strategies can independently influence student involvement. The current finding affirms the study of (Wang et al., 2024), explaining that supportive teaching practices significantly contributed to student engagement and motivation in science classrooms, indicating that teaching style can serve as a key determinant of engagement.

V. CONCLUSION

Base on the findings, it was concluded that Classroom Environment, not perceived teaching style variable, significantly influence student learning engagement. This result partly and partially affirms the Social Cognitive theory, which posits that human functioning is the product of a continuous interaction between personal factors, the environment, and behavior. Individuals develop knowledge, skills and behaviors through observation, experience, and social interaction.

VI. RECOMMENDATIONS

Based on the conclusions, the following are recommended:

1. Future research may include other variables beyond those examined this study in order to account the remaining 41% of unexplained variance in the student learning engagement in science.

2. School administrators can work together to enhance student learning engagement in science by fostering supportive and inclusive classroom environments and promoting student-centered teaching. To be achieved through professional development, effective classroom management, and interactive instructional practices. The students become more motivated and engaged, leading to improved learning outcomes in science.

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