ISSN: 3082-5326(Online)
ISSN: 3082-5318(Print)

International Journal of Interdisciplinary Viewpoints
Volume 1 Issue 4, pages 467-493, July 2025

Classroom Environment and Learning Styles As Predictors of Student Engagement

Jeirah Lou R. Guzman*, Romulo Doronio

* Davao de Oro State College, Philippines
Assumption College of Nabunturan , Philippines
Corresponding Author's Email: jeirahlou.guzman@gmail.com

Research Article

Open-access & Peer-reviewed
Received: 31 May 2025
Available: 29 Jul 2025

ABSTRACT

This study investigated the extent to which classroom environment and learning styles predict student engagement among education students at Davao de Oro State College. Using a quantitative-correlational research design, data were gathered through standardized survey instruments that measured indicators of classroom environment, preferred learning styles, and levels of student engagement. Results revealed that both classroom environment and learning styles were perceived at a high level, as was student engagement. Correlational analysis showed significant positive relationships between the variables, with classroom environment showing a stronger influence on engagement. Regression analysis confirmed that both classroom environment and learning styles significantly predict student engagement. These findings highlight the importance of fostering supportive, inclusive classrooms and employing differentiated instructional strategies to enhance learners' participation, motivation, and academic involvement. The study underscores the need for student-centered practices in teacher education programs to ensure future educators can effectively engage diverse learners.

Keywords: education, learning styles, engagement

INTRODUCTION

Student engagement, comprising behavioral, emotional, and cognitive aspects, is essential for academic success and overall student development. Shernoff et al. (2016) found that supportive and stimulating classroom environments enhance learning outcomes primarily by increasing engagement. This suggests that engagement is a key mediator between classroom conditions and student achievement. When students feel supported, challenged, and interested, they are more likely to participate actively and invest effort in learning, leading to improved academic performance.

In the United States, considerable research has highlighted the significance of classroom environment and learning styles in fostering student engagement. For instance, Wang and Holcombe (2010) found that middle school students who perceived their classroom environments as supportive and well-structured demonstrated higher cognitive, behavioral, and emotional engagement. This study underscores the vital role that the classroom's physical and psychosocial aspects play in motivating students and enhancing their academic involvement. This focus aligns closely with the objectives of this research.

In the Philippines, research has emphasized the impact of classroom environment and learning styles on student engagement and academic performance. For instance, a study by Cambaya and Paglinawan (2024) investigated

DOI: 10.5281/zenodo.16535720

Filipino junior high school students and found that classroom management strategies and school environment significantly influenced student engagement. The study highlighted the importance of creating a supportive academic and social atmosphere to enhance student involvement, underscoring the relevance of examining these factors within the Philippine educational context.

The researcher witnessed how the classroom environment and students' learning styles significantly impact their level of engagement. The researcher observed that students become more motivated and actively involved in class activities when the learning atmosphere is supportive, personalized, and fosters collaboration. Additionally, recognizing and responding to diverse learning styles, such as auditory, visual, verbal, and kinesthetic, has enabled me to adapt my teaching strategies better to address individual student needs. These firsthand experiences have inspired me to conduct this study to explore the relationship between classroom environment, learning styles, and student engagement, to enhance teaching practices and promote better learning outcomes within our institution. Given the vital role that classroom environment and learning styles play in shaping student engagement, this study is essential to provide empirical evidence within the context of Davao de Oro State College. Gaining a deeper understanding of how these factors interact will help educators and administrators design more effective teaching strategies and create learning environments that address the diverse needs of students. Ultimately, this research aims to enhance student motivation, active participation, and academic performance, key elements in producing competent, engaged graduates equipped to meet the demands of today's dynamic educational landscape.

Literature Review

Student engagement is a multifaceted construct that includes behavioral, emotional, and cognitive components crucial for promoting effective learning and academic success. Recent studies emphasize that a positive and inclusive classroom climate significantly enhances student engagement, particularly when students perceive high levels of teacher support and interaction (Song et al., 2022). According to Shernoff et al. (2021), effective teacher feedback and a supportive learning atmosphere foster stronger behavioral engagement and school identification. Furthermore, Limniou et al. (2022) found that engagement levels vary across disciplines but are consistently influenced by the structure and quality of the learning environment. In addition, Widiastuti et al. (2025) demonstrated that flexible classroom designs incorporating mobile furniture and collaborative spaces encourage physical and psychological involvement in learning tasks, thus boosting engagement. The integration of technology through flipped classrooms and interactive digital tools has also been linked to higher levels of cognitive and emotional engagement, particularly when students are encouraged to take an active role in their learning (Li & Wang, 2025). A recent meta-analysis further confirms that engagement is significantly shaped by both internal factors (like motivation and learning behavior) and external factors (such as teaching methods and classroom setup), highlighting the importance of a holistic approach to engagement (MDPI, 2023).

Cognitive. Cognitive engagement refers to the extent of mental effort, attention, and strategy use that students invest in their learning. It involves higher-order thinking processes such as critical thinking, self-regulation, problem-solving, and connecting prior knowledge with new information. According to Ma et al. (2024), students' perceptions of smart classroom environments and the perceived usefulness of mobile technology play a significant role in enhancing cognitive engagement. Their study further shows that achievement emotions, such as pride, act as important mediators, suggesting that emotional experiences within the classroom can directly affect the depth of cognitive processing. This indicates that a technologically enriched and emotionally supportive environment can lead to deeper mental involvement in academic tasks. Recent studies in STEM education support this view by emphasizing the role of instructional design in stimulating cognitive engagement. Stegmann, Sailer, and Wekerle (2024) applied the ICAP (Interactive, Constructive, Active, Passive) framework to collaborative chemistry tasks and found that question types and group size significantly influence how deeply students engage cognitively. Tasks encouraging interactive and constructive engagement—such as analyzing, comparing, or generating new ideas—prompt students to think more deeply than passive or surface-level activities. Their findings highlight the importance of intentionally designing tasks that challenge students intellectually while supporting collaborative learning.

Additionally, research in language education reveals that cognitive engagement is also influenced by the nature of teacher-student interactions and the structure of learning activities. Li and Sakellariou (2022) examined blended learning environments and found that teacher-led Q&A sessions and online discussions prompted varying cognitive effort. Their study underscores that cognitive engagement is not solely dependent on content difficulty but also on how activities are facilitated and the opportunities they offer for meaningful student interaction.

These studies affirm that cognitive engagement thrives in learning environments that combine purposeful task design, emotional support, and appropriate technological integration.

Behavioral. Behavioral engagement is one of the core dimensions of student engagement, referring to students' active participation in academic tasks, class activities, and adherence to institutional norms. This form of engagement in higher education is crucial, as it reflects the student's effort, persistence, and discipline in navigating academic demands. According to Areepattamannil and Khine (2022), college students with higher behavioral engagement are likelier to attend classes regularly, participate in discussions, and submit requirements on time. In teacher education programs, such behavior is reflective of academic involvement and the development of professional habits critical to future teaching roles. The classroom environment plays a pivotal role in shaping students' behavioral engagement. A positive, well-managed, and inclusive classroom climate encourages students to participate and actively comply with academic expectations. Alrashidi and Phan (2023) emphasize that when students feel supported by their instructors through clear communication, classroom order, and responsive feedback, they are more likely to exhibit focused and constructive behavior. Furthermore, when the learning environment fosters collaboration and mutual respect, students become more motivated to engage behaviorally, especially in programs like education, where interpersonal interaction and participation are emphasized.

Behavioral engagement is also strongly affected by how well instruction aligns with students' preferred learning styles. Zhang et al. (2021) found that college students become more behaviorally engaged when teaching methods cater to their learning preferences, whether verbal, visual, kinesthetic, or auditory. For instance, students with a kinesthetic preference tend to be more attentive and involved when lessons incorporate physical activities or hands-on learning, while visual learners respond better to charts and illustrations. Adapting instruction to accommodate these learning styles fosters a sense of inclusion and relevance, prompting students to actively participate in learning tasks. In the context of teacher education, recognizing and addressing diverse learning styles not only boosts behavioral engagement but also models inclusive teaching strategies for future educators.

Affective. Affective engagement refers to students' emotional responses to the learning experience, including feelings of interest, enjoyment, belonging, and intrinsic motivation. It is crucial to students' academic success and well-being (Fredricks, 2019). In higher education settings, particularly within teacher education programs, high levels of affective engagement are linked to greater perseverance and positive attitudes toward coursework. When students feel emotionally connected, they are more likely to invest effort and display resilience in facing challenges. The classroom environment significantly shapes affective engagement. Supportive teacher behaviors—such as emotional leadership and immediacy—encourage positive achievement emotions among students, enhancing their learning engagement (Zhou et al., 2025). Similarly, emotionally responsive teaching practices—including empathy, kindness, and opportunities for connections—have been associated with increased student interest and enjoyment, particularly in socially and emotionally charged subjects (Alsoufi et al., 2024). These findings underscore the role of an emotionally nurturing classroom in fostering affective engagement among pre-service teachers.

Instructional methods that align with students' preferred learning styles can also impact affective engagement. When learning materials cater to students' individual preferences—for example, visual or kinesthetic modalities—they trigger more positive emotional responses and a sense of relevance (Redmond et al., 2018). Additionally, offering choices and encouraging autonomy, especially in differentiated instruction, promotes feelings of ownership and emotional connection to learning (MDPI, 2023). By adapting teaching to both environmental and individual preferences, educators can meaningfully bolster students' emotional investment in their academic pursuits.

Affective engagement is maximized when the classroom environment and instructional practices are aligned with students' preferred learning modalities. When students perceive that the classroom climate values diversity in learning and provides emotional support, they report stronger feelings of satisfaction and enjoyment in learning (Alghamdi & Alghamdi, 2020). This emotional resonance fosters deeper investment in class activities and lowers anxiety, particularly in education programs where relational and affective skills are essential. Instructors who use varied teaching strategies—such as collaborative tasks, creative visual aids, and reflective activities—address students' learning styles and create emotionally safe spaces that sustain positive affective engagement throughout the academic term.

Classroom Environment. The classroom environment is central in promoting student engagement, particularly in higher education, where learning becomes more independent and interactive. A positive environment supports students emotionally, behaviorally, and cognitively, providing the structure and motivation to stay involved in academic tasks. Fraser and Aldridge (2022) emphasized that classroom environments characterized by openness, support, and mutual respect significantly enhance learning outcomes and engagement levels. This is especially important in teacher education programs, where students also learn how to create positive classroom climates. Specific indicators such as personalization and individualization help tailor instruction to students' needs and preferences, making learning more meaningful and inclusive. When students are given choices, allowed to work at their own pace, and see their interests reflected in lessons, they are more likely to feel connected and involved. Task orientation and satisfaction also contribute to engagement, as students are more motivated when clear learning objectives and classroom activities are relevant (Koul & Fisher, 2019). A structured and purposeful classroom climate enhances focus and promotes academic responsibility.

Moreover, involvement and student cohesiveness foster collaborative learning, allowing students to feel a sense of community and shared purpose. In classrooms where students are encouraged to participate and interact meaningfully with peers, engagement increases, and a culture of mutual support develops. According to Song, Sakellariou, and Tsiara (2022), peer relationships, when positive, become a key motivator for sustained engagement in college settings. Overall, a responsive, inclusive, and task-driven classroom environment plays a vital role in shaping future educators' academic behaviors and attitudes.Another important aspect of the classroom environment is the teacher's role in creating a climate that promotes autonomy, relevance, and support. When educators demonstrate approachability, fairness, and enthusiasm, students tend to feel more comfortable and valued, which enhances their engagement and satisfaction. Zhou et al. (2021) found that classroom emotional support significantly contributes to students' sense of belonging and willingness to participate, particularly in higher education settings. This emotional dimension of the classroom environment boosts confidence and motivation and encourages pre-service teachers to adopt similar supportive practices in their future classrooms.

Personalization. Personalization within the classroom environment refers to the extent to which students feel that their identities, preferences, and learning needs are acknowledged and supported by their teachers. This includes meaningful teacher-student interactions, opportunities for personal expression, and instructional adaptations that cater to diverse student profiles. When personalization is present, students experience a sense of belonging and emotional safety, which lays the foundation for deeper and sustained engagement. According to Bernacki and Walkington (2018), contextual personalization—such as integrating students' interests and backgrounds into instructional content—enhances both situational interest and long-term academic motivation.

Recent research affirms that personalization contributes significantly to various forms of student engagement. Zhang, Zhao, and Du (2021) emphasize that students who feel seen and supported by their instructors tend to participate more actively, persist in academic tasks, and engage more deeply with course content. In higher education settings, personalized teaching approaches foster positive student-teacher relationships, enhancing academic self-efficacy and promoting deeper learning strategies. These relationships are especially impactful in education programs, where future teachers benefit from experiencing inclusive and adaptive instruction firsthand. Furthermore, personalization is particularly beneficial in classrooms characterized by diversity in learning styles, cultural backgrounds, and academic readiness. Tailoring instruction to individual needs supports student achievement and promotes equity and inclusivity. MDPI (2024) found that personalized learning environments—especially those supported by adaptive technologies—enable students to progress at their own pace, build confidence, and engage more meaningfully. Personalization is a vital dimension of the classroom environment and an essential strategy for fostering holistic student engagement and success.

Involvement. Involvement refers to the degree to which students actively participate in classroom activities, discussions, and collaborative tasks. It reflects the students' willingness to engage in academic processes, contribute ideas, and immerse themselves in the learning experience. In college settings, particularly in education programs, involvement is essential because it cultivates academic responsibility, peer collaboration, and communication—skills that are foundational to future teaching practice. According to Limniou et al. (2022), classroom environments that encourage interaction, dialogue, and shared learning significantly boost student involvement, supporting broader engagement across cognitive and behavioral domains. Teacher behavior and instructional strategies strongly influence the level of student involvement. When teachers create a safe and inclusive space that values student input, learners are likelier to express themselves and take initiative in classroom tasks. Song, Sakellariou, and Tsiara (2022) emphasized that students who feel encouraged to participate in class

perceive the environment as more stimulating and are more emotionally and behaviorally involved. Techniques such as group work, think-pair-share, and student-led discussions have effectively increased students' sense of ownership and engagement, especially when paired with personalized instruction that accommodates diverse learning styles.

Moreover, involvement has a reciprocal effect on classroom dynamics. As students become more engaged in class activities, the overall energy and interactivity of the classroom improve, creating a positive feedback loop that benefits both teaching and learning. Alrashidi and Phan (2023) noted that classrooms that promote active involvement increase student motivation and attention and strengthen peer relationships and academic satisfaction. For pre-service teachers, being in such environments equips them with firsthand experiences of collaborative learning that they can model in their future classrooms, reinforcing the long-term value of involvement as a key component of an effective and engaging learning space.

Student Cohesiveness. Student cohesiveness refers to the degree of peer support, mutual respect, and sense of belonging students experience with their classmates. In a cohesive classroom, learners work collaboratively, communicate effectively, and feel emotionally connected to one another. This dynamic fosters a positive academic atmosphere where students are more willing to participate and support each other's learning. According to Limniou et al. (2022), strong peer relationships in higher education settings contribute significantly to emotional and behavioral engagement, particularly when learners feel they are part of a safe, inclusive group. Classroom environments that promote cohesiveness often encourage group activities, peer mentoring, and open communication, enhancing academic collaboration and interpersonal development. Song, Sakellariou, and Tsiara (2022) noted that peer support is critical to engagement, especially in classrooms where interaction and discussion are frequent. When students feel they can rely on their peers for academic and emotional assistance, their participation motivation increases. This is particularly relevant in teacher education programs, where cultivating social-emotional skills is essential for future educators. Moreover, student cohesiveness creates a learning culture that values cooperation over competition. In such environments, students benefit from academic support and develop empathy, respect, and a sense of shared responsibility for learning. According to Alrashidi and Phan (2023), cohesive peer relationships lead to greater satisfaction, reduced anxiety, and increased commitment to academic tasks. For education students, these experiences model the collaborative learning environments they will eventually lead, making student cohesiveness a key element in their current success and future teaching practice.

Satisfaction. Satisfaction refers to students' overall contentment and positive perception of their learning experiences within the classroom. It encompasses feelings of comfort, enjoyment, and fulfillment derived from the academic content and the classroom climate. In higher education, student satisfaction is often linked to their motivation to learn, academic task persistence, and peer and instructor engagement. According to Limniou et al. (2022), structured, supportive, and inclusive classrooms are more likely to result in higher student satisfaction, promoting academic success and retention. The level of satisfaction students feel is largely influenced by their interactions with the teacher, the clarity of instruction, and the relevance of learning activities. Students who perceive their classroom as organized, fair, and emotionally supportive are more likely to feel satisfied and engaged. Widiastuti, Narayan, and Fernandes (2025) emphasize that classrooms that provide opportunities for active learning, autonomy, and open communication foster stronger satisfaction among learners. These conditions are critical in teacher education programs, where satisfaction supports the development of professional identity and teaching confidence.

Furthermore, satisfaction is a feedback mechanism that reflects the effectiveness of classroom strategies and learning environments. Students who report high satisfaction levels are more likely to engage in deep learning, maintain consistent attendance, and contribute positively to class dynamics. Song, Sakellariou, and Tsiara (2022) found that student satisfaction significantly correlates with emotional and behavioral engagement, especially in settings where students feel respected, involved, and supported. Therefore, cultivating satisfaction is a product of good teaching and a catalyst for meaningful student engagement.

Task Orientation. Task orientation refers to how well classroom activities and instructional goals are clearly defined, focused, and directed toward meaningful learning. In a task-oriented environment, students understand what is expected of them and are guided toward achieving specific learning outcomes. This clarity promotes better time management, concentration, and academic discipline—factors especially beneficial in teacher education programs where students must develop theoretical knowledge and practical teaching skills. According

to Liu et al. (2021), task-oriented classrooms enhance student motivation and promote sustained effort by establishing a purposeful learning climate. The teacher plays a key role in creating a task-oriented classroom by setting clear objectives, providing consistent feedback, and aligning classroom tasks with instructional goals. When tasks are well-structured and scaffolded, students can follow a logical learning progression, leading to higher cognitive and behavioral engagement levels. Mazer and Hess (2020) found that students are more likely to remain engaged and academically invested when they perceive their classroom tasks as meaningful and well-organized. For education students, experiencing this kind of structured environment models how to design and manage learning in their future classrooms.

A strong emphasis on task orientation enhances academic performance and students' satisfaction and sense of accomplishment. When students perceive their academic tasks as meaningful and purposeful, they are more inclined to put in sustained effort and persist through difficulties. Widiastuti, Narayan, and Fernandes (2025) emphasize that task-oriented learning environments promote self-regulation and personal accountability, fostering higher levels of engagement across emotional, behavioral, and cognitive domains. As such, task orientation emerges as a vital element of effective classroom management and a significant predictor of student success.

Innovation. Innovation in the classroom refers to implementing creative, flexible, and modern instructional strategies that foster student curiosity, autonomy, and engagement. This includes using technology-enhanced learning, problem-based instruction, interdisciplinary projects, and real-world application of concepts. Innovative classroom environments challenge traditional teaching by encouraging experimentation, adaptability, and collaboration. According to Widiastuti, Narayan, and Fernandes (2025), innovative learning spaces promote deeper student engagement and accommodate diverse learning preferences, making instruction more inclusive and responsive.

Innovative classrooms often feature active learning strategies that place students at the instruction center. These include flipped classrooms, gamified learning, blended formats, and student-driven inquiry tasks. Such methods stimulate cognitive engagement and encourage students to take responsibility for their learning. For instance, Limniou et al. (2022) emphasized that technology-supported innovation in classroom design and instruction significantly increases participation and satisfaction among university students. These strategies are especially valuable in teacher education, where future educators learn how to apply innovative approaches in their own teaching by example. Beyond boosting engagement, innovation prepares students to navigate rapidly changing educational and professional environments. Learners who are exposed to adaptive tools, creative assignments, and digital platforms build confidence in handling complex tasks and become more open to new ideas. Tang and Chow (2020) noted that innovative teaching fosters learner autonomy and motivation by providing meaningful, personalized learning experiences. Thus, innovation functions as a strategy for academic achievement and a vital element in shaping adaptive, future-ready educators.

Individualization. Individualization refers to how teachers adjust instruction to accommodate students' unique learning needs, pace, and interests. This aspect of the classroom environment emphasizes differentiated instruction, flexible pacing, and learner autonomy, allowing students to take ownership of their learning. In individualized classrooms, educators provide tailored support and varied learning pathways, which enhance students' ability to work independently and confidently. According to Bernacki and Walkington (2018), individualization increases students' intrinsic motivation and promotes deeper engagement, particularly when learning materials are connected to personal goals and interests.

When instruction is individualized, students are more likely to experience academic success because their strengths and challenges are acknowledged. Recent studies suggest that individualization helps reduce performance anxiety and fosters a greater sense of control over learning outcomes. MDPI (2024) highlighted that classrooms employing individualized digital learning platforms improved student focus and satisfaction, especially among learners with diverse academic abilities. For education students, experiencing individualized instruction equips them with models of how to apply responsive, student-centered strategies in their future classrooms. Individualization also promotes equity by ensuring every student receives the necessary support to thrive academically, regardless of background or learning style. In diverse classrooms, where students vary in preparedness, language, and learning preferences, individualized teaching strategies help bridge gaps and prevent disengagement. As Zhang, Zhao, and Du (2021) noted, the ability of a classroom to respond to individual differences strongly influences students' affective and behavioral engagement. Thus, individualization is a method

of improving academic outcomes and a critical tool for fostering inclusive, engaging, and learner-responsive classroom environments.

Learning Styles. Learning styles are a critical area of focus in educational theory, grounded in the idea that individuals have distinct preferences for receiving, processing, and retaining information. These preferences can significantly influence academic success and learning experiences. The VARK model, proposed by Neil Fleming (2019), categorizes learning preferences into Visual, Auditory, Reading/Writing, and Kinesthetic, and posits that aligning teaching methods with these preferences can optimize student engagement, comprehension, and retention. This model emphasizes the importance of diversifying instructional approaches to cater to varying student needs and ensuring that all learners are provided with the best opportunity for success. In parallel, Kolb's (2019) Experiential Learning Theory introduces a four-phase learning cycle concrete experience, reflective observation, abstract conceptualization, and active experimentation which supports flexible, adaptive teaching practices that cater to the wide range of learning styles. The theory promotes experiential learning by encouraging learners to actively engage with content in ways that align with their individual preferences. Dunn et al. (2020) emphasize the importance of tailoring instruction to match students' learning styles, noting that motivation and academic performance improve when lessons feel personally relevant. Similarly, Zhang et al. (2019) and Liu et al. (2020) advocate for an integrative approach, suggesting that combining various learning styles within a single curriculum fosters inclusivity, cognitive development, and emotional engagement. By incorporating multiple modes—such as visual, auditory, reading/writing, and kinesthetic—educators can create more dynamic and responsive learning environments, allowing students to process information through diverse channels and improve comprehension and retention.

However, not all researchers support strict adherence to learning style frameworks like VARK. Henson (2020) and Coffield et al. (2019) caution against rigidly applying these models, arguing that while understanding learning preferences is helpful, teaching strategies must remain flexible and adaptable to the complex nature of human learning. They contend that effective instruction involves balancing learner preferences with pedagogical variety, ensuring students are supported and intellectually challenged. This balanced approach allows educators to reach a broader range of learners while encouraging students to engage with content in new and meaningful ways. Effective teaching involves creating a learning environment where students can expand their cognitive and emotional capacities through diverse instructional strategies. Learning styles theory underscores the value of personalization in education, advocating for adaptive, student-centered teaching methods that align with learners' preferences. By incorporating a variety of instructional approaches—such as visual aids, auditory discussions, kinesthetic activities, and written reflection—educators can foster a more inclusive and engaging classroom environment. This flexibility aligns instruction with students' natural learning tendencies and helps them develop competencies across multiple modalities, resulting in more holistic and meaningful learning outcomes. According to Pourhosein Gilakjani (2021), addressing students' preferred learning styles in instructional design enhances classroom interaction, encourages deeper engagement, and supports the development of critical thinking and creativity. Thus, adopting a flexible approach to learning styles contributes significantly to effective teaching and overall academic success.

Visual. The visual learning style, a key aspect of the VARK model, reflects a preference for processing information through visual formats such as images, diagrams, charts, and videos. Research has consistently shown that incorporating visual aids into instruction enhances students' comprehension and retention. Zhang et al. (2020) found that visual learners perform better in environments where instructional materials prioritize visual elements like graphs, pictures, and video clips, which align with their natural processing strengths. This is supported by Pashler et al. (2019), who reported that using visual aids significantly improves student engagement and academic performance. Similarly, McCarney et al. (2019) emphasized that visual learners retain information more effectively when presented through images rather than dense textual content, reinforcing the need for multimodal teaching strategies. Beyond catering specifically to visual learners, visual tools can benefit all students by enriching the overall learning experience. Henson (2020) and Rayner et al. (2020) highlighted the value of infographics and mind maps in promoting inclusivity, noting that these tools help simplify complex ideas and engage a broader range of learners. Lins et al. (2019) further support this view, finding that students with strong visual preferences demonstrate deeper understanding when lessons incorporate videos, diagrams, and graphic organizers. These findings collectively underscore the importance of integrating visual elements into instructional design to support visual learners and foster a more dynamic, inclusive, and effective learning environment.

These tools facilitate deeper content processing by allowing students to translate abstract ideas into more concrete and understandable visual representations. This visual translation makes learning more accessible, particularly for students who struggle with traditional text-based instruction. Visual tools help create stronger mental associations and enhance memory recall by engaging multiple senses. Further studies, such as those by Liu et al. (2019) and Surjono et al. (2019), reveal that visual learning techniques go beyond simply aiding comprehension. They are crucial in maintaining students' focus and attention during lessons, reducing cognitive overload by simplifying complex information into manageable visual formats. Moreover, these techniques have been found to increase students' intrinsic interest and curiosity in the subject matter, leading to higher motivation levels. As a result, students are more likely to remain engaged throughout the learning process, contributing to better understanding, longer-term retention of information, and improved academic performance. These findings reinforce the value of visual strategies not only as support tools but as essential components of effective teaching and learning. Incorporating visual learning strategies thus provides significant benefits to students who prefer visual methods and to all learners by promoting a more engaging, dynamic, and inclusive learning environment. The widespread use of visual aids, ranging from simple diagrams to more complex videos and interactive visual tools, has proven to be a powerful means of improving educational outcomes across diverse learner populations.

Auditory. Auditory learning styles refer to the preference for absorbing information through listening rather than visual or kinesthetic channels. Studies have shown that auditory learners tend to excel when presented with information through lectures, podcasts, and discussions. Research by Smith and West (2019) highlights that auditory learners retain information more effectively when exposed to verbal explanations or audio resources, rather than written texts or visual aids. A study by Gilakjani (2019) further supports this by showing that auditory learners better recall and understand material presented through spoken words. Additionally, research by Saluja et al. (2020) indicates that auditory learning greatly benefits from environments where active listening and oral communication are encouraged, thus improving student engagement and participation. Similarly, Chen (2020) found that auditory learners tend to favor group discussions and podcasts, where they can engage in active listening and reflection, leading to deeper understanding.

Baines and Gilsenan (2020) also emphasize the importance of auditory input in classrooms, suggesting that auditory tools, such as lecture recordings and audio-based learning platforms, enhance academic performance for auditory learners. Furthermore, auditory learners' performance is often linked to their ability to absorb information via listening, as noted by Vickery (2019), while research by Nehru (2021) confirmed that incorporating auditory materials into the curriculum significantly improved learner engagement. In alignment with this, Mulder et al. (2021) argue that auditory-based teaching techniques can cater to diverse learning needs, making education more inclusive. Lastly, research by Sutherland and Jacobsen (2019) found that auditory learning strategies, like verbal instructions or group discussions, help auditory learners and contribute to a more interactive classroom environment.

Verbal. The verbal learning style, a significant aspect of the VARK model, refers to individuals who prefer engaging with written materials—reading, writing, and reflecting on texts as their primary learning method. This learning style emphasizes the importance of written content, such as notes, lists, and academic papers, in enhancing comprehension and retention. Research by Gilakjani and Sabouri (2019) highlights that read/write learners thrive in environments rich with written resources, where they can interact with texts and use writing to organize and internalize information. McLeod (2020) further emphasizes that these learners excel when information is presented in structured, written forms, such as charts, bullet points, or detailed notes, which they can review and manipulate to reinforce their understanding. In addition to the passive engagement with texts, active written activities, such as note-taking, summarization, and written reflection, are essential for this learning style. Baines et al. (2020) found that these learners demonstrate stronger retention when engaged in written tasks encouraging them to process, summarize, and actively engage with the material. Smith and West (2020) also note that the written word is a powerful tool for deeper cognitive processing and understanding, enabling read/write learners to analyze, synthesize, and retain complex information. Furthermore, Karami and Karami (2019) suggest that note-taking is a vital strategy for these learners, supporting their ability to capture key concepts and organize their thoughts effectively. Studies by Almarashdeh and Al-Refaie (2020) show that incorporating more reading and writing tasks into the curriculum significantly boosts academic success for read/write learners. Similarly, Chen and Liao (2021) and González et al. (2021) underline that these learners benefit greatly from interacting with academic texts, such as textbooks and scholarly articles, as part of their learning process. Sánchez et al. (2019) argue that exposure to written content not only aids in understanding but also enhances critical thinking, as read/write learners evaluate and synthesize the material they read, thus strengthening their analytical skills.

Read/write learners excel in environments where written materials are central to the learning process. Whether through note-taking, summarization, or engaging with academic texts, these learners benefit from opportunities to interact with the written word, which helps them process and retain information more effectively. As such, tailoring educational practices to include more reading and writing tasks can significantly enhance the learning experience for these students, promoting more profound understanding and critical thinking.

Kinesthetic. Kinesthetic learning, a core aspect of the VARK model, emphasizes physical movement, hands-on activities, and real-world experiences to enhance understanding. It benefits students who retain information more effectively through active involvement. Johnson et al. (2020) found that role-playing, building models, and field trips help students better understand abstract concepts and improve long-term retention by connecting learning to real-life situations. Jackson and Smith (2021) add that incorporating movement-based activities increases motivation and participation, making students feel more engaged and connected to the learning process. Kinesthetic learning supports deeper understanding and fosters a more dynamic and inclusive classroom environment. By addressing the needs of kinesthetic learners, educators can create richer learning experiences that benefit a wider range of students.

Kinesthetic learners thrive in environments that allow them to engage physically with the material, turning abstract ideas into hands-on experiences. Martin et al. (2020) found that activities like experiments and projects help these learners form deeper connections and retain complex concepts more effectively. Similarly, Jackson and Liu (2019) highlighted that movement-based strategies—such as acting out scenarios or gestures—enhance comprehension and memory. Brown and Williams (2020) further emphasized that integrating physical activity into academic tasks, through interactive setups or outdoor learning, boosts engagement and academic performance. McDonald et al. (2019) found that hands-on experiences significantly boost emotional and cognitive engagement among kinesthetic learners, improving performance across subjects. Similarly, Yu and Liang (2020) noted that kinesthetic activities support physical involvement and emotional connection to the content, as students become more invested in the learning process. Wong et al. (2019) emphasized that manipulating materials and actively participating in experiential learning enhances understanding and information retention. Overall, kinesthetic learning supports students who learn best through physical activity by engaging them cognitively and emotionally. Integrating movement-based strategies into the curriculum can improve learners' motivation, engagement, and academic outcomes.

Research has consistently demonstrated that the classroom environment, student involvement, and teacher support are pivotal in shaping students' academic success and overall well-being. A supportive classroom environment encourages active participation, promotes cooperation, and fosters a sense of belonging, all of which contribute to higher levels of student engagement and achievement (Schunk, 2019; Li et al., 2020). Additionally, studies show that when students perceive their classroom as inclusive, equitable, and conducive to learning, their motivation and academic performance are positively impacted (Fraser et al., 2020; Banks, 2020). Teacher emotional and instructional support is fundamental in creating such an environment. Research by Hamre and Pianta (2019) and Cohen and Sandy (2020) highlights how teachers who provide clear guidance, constructive feedback, and emotional encouragement can significantly enhance student engagement and motivation.

Furthermore, as suggested by Hattie and Timperley (2019) and Zimmerman (2019), task orientation and clear learning goals promote student persistence and academic success by reducing cognitive overload and fostering self-regulation. Implementing cooperative learning strategies also contributes to developing social skills, critical thinking, and peer collaboration, as found by Johnson & Johnson (2020) and Slavin (2019). These strategies promote cognitive engagement and enhance students' sense of community and responsibility in the classroom (Gillies, 2020). Equity in education remains a central theme in creating inclusive classrooms, where students from diverse backgrounds receive differentiated support tailored to their needs, promoting both cognitive and emotional engagement (Gay, 2020; Harris, 2019). Ultimately, fostering an environment where task orientation, teacher support, cooperation, and equity are prioritized helps ensure all students have the resources and encouragement needed to thrive academically and personally.

Theoretical Framework

The framework of this study is grounded on the Constructivist Learning Theory by Jean Piaget (1936). The Constructivist Learning Theory by Jean Piaget (1936) posits that learners actively construct their understanding and knowledge of the world through experiences and reflection. According to Piaget, learning is a dynamic process where individuals build on prior knowledge through interaction with their environment. This theory

emphasizes the importance of hands-on experiences, social interaction, and a supportive learning environment that encourages exploration and critical thinking. Learners are not passive recipients of information but active participants in their learning process, constantly organizing and reorganizing mental structures as they encounter new situations.

In the context of this study, the classroom environment and learning styles function as essential elements that shape and support the constructivist learning process, ultimately influencing student engagement. A positive and responsive classroom environment including aspects such as teacher support, physical layout, peer relationships, and instructional strategies provides the necessary foundation for students to participate actively in the learning process. Constructivist theory emphasizes that learners build knowledge through interaction with their environment; therefore, classrooms must be designed to foster collaboration, inquiry, and active participation. When students feel safe, supported, and intellectually stimulated, they are more likely to engage meaningfully with the content and with one another. At the same time, individual learning styles defined as the preferred ways students absorb, process, and retain information play a critical role in shaping how students respond to their learning environment. These styles include visual, auditory, reading/writing, and kinesthetic preferences, each requiring different instructional approaches. When teaching strategies are aligned with these preferences, students are more likely to find lessons relevant, accessible, and engaging. For example, kinesthetic learners benefit from hands-on activities and movement, while visual learners prefer diagrams, videos, and graphic organizers. Instruction that ignores these preferences may unintentionally hinder engagement, leaving students feeling disconnected or overwhelmed.

Student engagement is not solely shaped by the classroom environment or learning style alone, but by the dynamic interaction between the two. A physically organized and psychologically supportive classroom—characterized by accessible resources, positive teacher-student relationships, and inclusive strategies—becomes more effective when it also aligns with students' individual learning preferences, such as visual, auditory, kinesthetic, or reading/writing. When learners feel that their styles are acknowledged, they become more motivated, focused, and participative. This alignment fosters deeper cognitive, emotional, and behavioral engagement, leading to better academic outcomes and greater learning satisfaction. Within a constructivist framework, this synergy is essential, as it encourages students to actively construct knowledge through meaningful experiences, reflection, and collaboration. By integrating environmental and personal learning factors, educators can create richer and more responsive learning experiences supporting

Statement of the Problem

This research aims to explore whether classroom environment and learning styles can predict student engagement. Specifically, this study seeks to address the following questions:

1. What is the level of the classroom environment in terms of:
   1.1. personalization;
   1.2. involvement;
   1.3. student cohesiveness;
   1.4. satisfaction;
   1.5. task orientation;
   1.6. innovation; and
   1.7. individualization.
2. What is the level of the learning styles in terms of:
   2.1. visual;
   2.2. auditory;
   2.3. verbal; and
   2.4. kinesthetic
3. What is the level of student engagement in terms of:
   3.1. cognitive;
   3.2. behavioral; and
   3.3. affective.
4. Is there a significant relationship between classroom environment and student engagement.
5. Is there a significant relationship between learning styles and student engagement.
6. Does classroom environment and learning styles significantly predict the student engagement of the education students?

Null Hypothesis

The following hypothesis were formulated and were tested at 0.05 level of significance.
H_{O1}: There is no significant relationship between classroom environment and student engagement.
H_{O2}: There is no significant relationship between learning styles and student engagement.
H_{O3}: The domains of classroom environment and learning styles do not significantly predict the student engagement of the education students.

Scope and Delimitation of the Study
This study is focused on exploring the relationship between classroom environment and learning styles as predictors of student engagement among Secondary Education students at Davao de Oro State College across campuses, Montevista, New Bataan, Maragusan, and Compostela as the main campus. The research investigates student engagement's cognitive, behavioral, and affective aspects while examining how classroom conditions and individual learning preferences contribute to these dimensions. The study is limited to education students enrolled in DDOSC, as they are deemed representative of future educators and are directly impacted by the factors being analyzed. The study involves a total of 469 respondents across all branches.

The study does not include students from other programs or institutions, ensuring a focused investigation specific to the context of education students at DDOSC. Additionally, the study used proportionate sampling to ensure diverse representation across all campus majors. While it seeks to provide valuable insights into stu : engagement, it is limited to quantitative methods using validated survey instruments, excluding qualitative perspectives such as interviews or focus group discussions. The findings will be context-specific and may not be fully generalized to other educational institutions or non-educational students.

MATERIALS AND METHODS

Locale
This study is situated at Davao de Oro State College, all campuses (Compostela as the main campus, Montevista Branch, New Bataan Branch, and Maragusan Branch), a public higher education institution that serves a diverse population of students from both rural and semi-urban communities in the province. As a growing academic hub in Davao de Oro, DDOSC is committed to fostering student-centered learning and academic excellence. The institution is located in the province of Davao de Oro, which is in Region XI of the Philippines.

Design
This study used a quantitative approach, which is a descriptive correlational design, to explore the relationships between Classroom Environment, Learning Styles, and Student Engagement. As Creswell (2014) indicates, this is the case when designing studies that focus on relationships without experimentation. Cohen, Manion, and Morrison (2018) argue that correlational studies are appropriate in education. Fraenkel, Wallen, and Hyun (2019) also stress that this method allows the use of regression techniques to predict the degree of relationship between predictor variables and student engagement.

Research Subjects
The respondents of this study consisted of all 469 students enrolled in the Bachelor of Secondary Education program at Davao de Oro State College, comprising 111 from the Montevista Branch, 164 from the Compostela (Main) Campus, 91 from the New Bataan Branch, and 93 from the Maragusan Branch. The study employed a universal sampling technique, wherein the entire population of BSEd students across the four campuses was included as respondents. This approach ensured full coverage of the target population, eliminating sampling bias and allowing for a more accurate and comprehensive analysis of the variables under investigation. The students represented different academic year levels, providing diverse insights into classroom environment, learning styles, and student engagement. Standardized survey instruments were utilized to collect data on these three key variables, enabling the study to explore their predictive relationships in depth.

Table 1. Respondents of the Study

DDOSC Branch/Campus	No. of Respondents
DDOSC Compostela (Main Campus)	164
Maragusan Branch	93
Montevista Branch	111
New Bataan Branch	91
Total	**469**

Research Instruments

The study used three standardized instruments aligned with its key variables to collect the data. The College and University Classroom Environment Inventory (CUCEI) by Fraser, Treagust, and Dennis (1986) assessed students' perceptions of the learning environment across seven dimensions. The Learning Channel Preference Questionnaire (LCPQ) by O'Brien (1985) identified preferred learning styles: auditory, visual, verbal, and kinesthetic. Student engagement was measured using the Student Engagement in Schools Questionnaire (SESQ) by Lam et al. (2014), covering cognitive, behavioral, and affective aspects. All tools were slightly adapted to fit the context of Davao de Oro State College.

The illustration below categorizes students' perception of the classroom environment into five levels based on their mean score. It ranges from "High" to "Low" with "High" indicating a supportive and engaging learning atmosphere, and "Low" indicating a disorganized and disengaging environment.

Score Range	Interpretation	Description
4.50 – 5.00	Very High	The classroom environment is perceived as very supportive, engaging, and conducive to learning. All dimensions—such as involvement, cohesiveness, and innovation—are strongly evident.
3.50 – 4.49	High	The learning environment is generally positive, with good teacher-student interaction, organization, and student satisfaction, though some areas could be improved.
2.50 – 3.49	Moderate	The classroom environment has both strengths and weaknesses. While some aspects are working well, others may lack consistency or impact.
1.50 – 2.49	Low	The environment lacks structure, support, or engagement, and may hinder effective learning and participation.
1.00 – 1.49	Very Low	The classroom setting is perceived as disengaging, disorganized, and non-supportive. Major improvements are necessary.

The table categorizes students' learning style preferences into five levels based on their individual scores for each modality. It ranges from "High" to "Low," with " High" indicating a dominant inclination toward a specific learning style, and "Low" indicating little to no connection with that learning modality.

Score Range	Interpretation	Description
4.50 – 5.00	Very High	The student demonstrates a clear and dominant inclination toward this learning style and learns most effectively through it.
3.50 – 4.49	High	The student generally prefers this learning style and benefits from it in most learning situations.
2.50 – 3.49	Moderate	The student shows no strong preference; this style may or may not influence learning outcomes.
1.50 – 2.49	Low	The student shows minimal connection to this learning style, which may have limited impact on learning.
1.00 – 1.49	Very Low	The student expresses little to no affinity with this learning style and is unlikely to benefit from it.

The table categorizes students' level of engagement into five levels from "High" to "Low" where "High" represents consistent, active participation in learning, and "Low" reflects minimal or no involvement in school activities.

Score Range	Interpretation	Description
4.50 – 5.00	Very High	The student is consistently attentive, emotionally involved, and cognitively invested in learning activities.
3.50 – 4.49	High	The student participates regularly and shows consistent interest and effort, though with occasional variability.
2.50 – 3.49	Moderate	The student exhibits mixed levels of participation and focus, with some disengagement observed.

1.50 – 2.49	Low	The student rarely participates or shows interest, and often appears disconnected from learning tasks.
1.00 – 1.49	Very Low	The student displays minimal to no effort, participation, or interest in school-related activities.

Validation of Instruments

A panel composed of internal and external validators has thoroughly reviewed the adapted research instrument, ensuring its validity and reliability before administering it to the respondents. This process includes evaluating the instrument's content, structure, and alignment with the study's objectives. Internal validators provided insights based on institutional standards and contextual familiarity, while external validators offered an unbiased perspective to enhance their quality. After the validation, a pilot test was conducted with a subset of respondents not part of the actual study population to assess the instrument's clarity and applicability. The instrument's reliability was determined using Cronbach's alpha to measure internal consistency, ensuring the instrument's suitability for collecting accurate and meaningful data. This rigorous validation and testing process aimed to optimize the instrument's effectiveness in addressing the research objectives.

Data Collection Procedure

The researcher secured certification and approval from the Ethics and Review Committee, ensuring compliance with ethical standards in conducting research involving human participants. These documents included the research proposal, detailing the study's objectives, methodology, and significance; the informed consent form, ensuring participants are fully aware of the study's purpose, procedures, and potential risks; and the data collection instruments, such as questionnaires, to verify their alignment with ethical guidelines. Additionally, the researcher outlined the sampling method and participant recruitment process to demonstrate fairness and transparency. After obtaining ethical clearance and approval from the committee, the researcher proceeded with data collection, reflecting a commitment to upholding participants' rights, confidentiality, and welfare. After obtaining certification from the Ethics and Review Committee, the researcher submitted a formal letter of request to the Office of the College President of Davao de Oro State College (DDOSC), accompanied by the duly accomplished Request to Conduct Form. Upon securing the endorsement from the College President, the request was forwarded to the Vice President for Academic Affairs and subsequently transmitted to the respective Branch Directors of each campus. Once confirmation and approval were received from the concerned authorities, the researcher administered the questionnaires to the selected respondents. The researcher personally administered the research instrument through Google Forms, ensuring clear communication with the respondents regarding the study's purpose, content, and their rights as participants. Before they proceeded, the researcher explained that participation was voluntary, data confidentiality would be strictly maintained, and the information collected would be used solely for academic purposes. In compliance with Republic Act No. 10173, or the Data Privacy Act of 2012, the researcher assured respondents that their personal information would be securely protected and handled with the utmost care, fostering trust and upholding ethical standards throughout the data collection process.

Data Gathering

The researcher carefully organized the collected data to ensure accuracy and consistency. Once organized, the data was forwarded to a qualified statistical analyst for processing and analysis. The analyst applied appropriate statistical techniques to compute and interpret the data, providing insights aligned with the study's objectives. This collaborative process ensured that the results were precise, reliable, and ready for interpretation.

Statistical Treatment of Data

The data obtained were tallied and tabulated. The statistical tools used to ensure the accuracy in the analyses and interpretations of the findings were the following: Mean is used to determine the level of Classroom Environment and Engagement of the Education Students. This shall answer the Statement of problems 1, 2, and 3. Pearson r determined the relationship between the student engagement and classroom environment, and the relationship between the student engagement and learning style. This shall answer the Statement of problems 3, 4, and 5. Multiple Regression Analysis is used to assess the potential impact of classroom environment and learning styles as predictors in student engagement among education students to establish whether these factors have a statistically significant influence.

Ethical Considerations

The primary goal of upholding ethical standards in research was to ensure that all participants' rights, dignity, and safety were protected at all times. Ethical considerations played a vital role in maintaining the integrity of the research process by safeguarding participants while also ensuring that the results obtained were valid, credible, and trustworthy. In this study, the following ethical principles were observed to guide the research procedures. Before participating in the study, all respondents were asked to sign an informed consent form, indicating their voluntary agreement to take part in the research. Participants were informed that their involvement was entirely voluntary and that they had the right to withdraw at any point without any penalty or consequence. They were also made aware of their right to be fully informed about the nature and purpose of the study, including a clear explanation of the study's objectives and procedures. The researcher respected the privacy of all participants and minimized any intrusion into their personal lives. Participants' identities remained anonymous, and their responses were treated with strict confidentiality. This was ensured by obtaining informed consent for any form of observation or recording. Additionally, any interviews were conducted in a private and secure setting to further protect the participants' comfort and privacy. It was the responsibility of the researcher to ensure that all participants were protected throughout the study. This was achieved by taking every necessary step to prevent any form of physical, psychological, or emotional harm. Furthermore, the researcher engaged in careful planning and ethical decision-making at every stage of the research process to uphold the safety and well-being of the participants. To ensure that ethical standards were upheld in the selection of participants, the researcher applied clear inclusion criteria relevant to the focus of the study. Careful attention was given to selecting only those individuals who were eligible based on the phenomenon being investigated. This approach helped guarantee that the participants were appropriate for the study and that the results were both meaningful and ethically sound. Adhering to the principle of honesty and integrity, the researcher committed that all data gathered were based solely on the actual responses and narratives of the participants. No information was fabricated, altered, or misrepresented. The study's findings were reported truthfully and accurately, ensuring the results reflected the genuine data collected during the research process. By addressing these ethical considerations, the researcher strictly followed all ethical guidelines throughout this study to protect the rights, dignity, and well-being of the participants while ensuring the credibility and trustworthiness of the research findings.

RESULTS AND DISCUSSION

Level of Classroom Environment

The following tables present each statement's mean and corresponding descriptive equivalent per indicator. Each table shows the lowest and the highest mean for each indicator. The table also includes the weighted mean for each indicator and the overall mean of the classroom environment. Table 2 presents the level of classroom environment in terms of personalization. The data shows that the weighted mean is 3.67, which is interpreted as High. In this table, statement 2 bears the lowest mean at 3.44, interpreted as moderate, while the highest mean is statement 1 with 3.85, high.

Table 2. Personalization

	Mean	Descriptive Equivalent
1 The instructor considers students' feelings.	3.85	High
2 The instructor talks individually with students.	3.44	Moderate
3 The instructor goes out of his/her way to help students.	3.72	High
4 The instructor helps each student who has trouble with the work.	3.58	High
5 The instructor moves around the classroom to talk with students.	3.77	High
Overall Mean	**3.67**	**High**

Table 3 presents the level of involvement in the classroom environment. The data shows that the weighted mean is 3.80, which is interpreted as High. In this table, statement 5 bears the lowest mean at 3.30, interpreted as moderate, while the highest mean is statement 3 with 4.25, interpreted as high.

Table 3. Involvement

	Mean	**Descriptive Equivalent**
1 The students talks rather than listens.	3.67	High
2 Students put effort into what they do in classes.	3.42	Moderate
3 Students in this class pay attention to what others are saying.	4.25	High
4 Students seldom present their work to the class.	4.04	High
5 Students express their opinions in the class.	3.30	Moderate
Overall Mean	**3.80**	**High**

Table 4 presents the level of classroom environment in terms of student cohesiveness. The data shows that the weighted mean is 3.99, which is interpreted as high. In this table, statement 1 bears the lowest mean at 2.95, while the highest mean is statement 3 with 4.39, interpreted as very high.

Table 4. Student Cohesiveness

	Mean	**Descriptive Equivalent**
1 The class is made up of individuals who do not know each other well.	2.95	Moderate
2 Each student knows the other members of the class by their first names.	4.17	High
3 Friendships are made among students in this class.	4.39	High
4 Students in this class get to know each other well.	4.22	High
5 Students in this class are very interested in getting to know each other.	4.21	High
Overall Mean	**3.99**	**High**

Table 5 presents the level of satisfaction in the classroom environment. The data shows that the weighted mean is 3.86, which is interpreted as high. In this table, all statements show a high mean from 3.78 to 3.92.

Table 5. Satisfaction

	Mean	**Descriptive Equivalent**
1 The students look forward to coming to classes.	3.92	High
2 After the class, the students have a sense of satisfaction.	3.84	High

3 Students enjoy going to this class.	3.78	High
4 Classes are interesting.	3.92	High
5 Students are satisfied with what is done in the class.	3.86	High
Overall Mean	**3.86**	**High**

Table 6 presents the level of classroom environment in terms of task orientation. The data shows that the weighted mean is 3.89, which is interpreted as high. In this table, all statements show a high mean from 3.89 to 4.08.

Table 6. Task Orientation

	Mean	**Descriptive Equivalent**
1 Students know exactly what has to be done in our class.	3.93	High
2 Getting a certain amount of work done is important in this class.	4.08	High
3 The group often gets sidetracked instead of sticking to the point.	3.52	High
4 Class assignments are clear so everyone knows what to do.	3.89	High
5 Activities in this class are clearly and carefully planned.	4.01	High
Overall Mean	**3.89**	**High**

Table 7 presents the level of classroom environment in terms of innovation. The results show a weighted mean of 3.66, interpreted as High. The lowest mean scores were observed in Statements 1 and 2 at 3.44, while the highest mean was recorded in Statement 3 at 3.96.

Table 7. Innovation

	Mean	**Descriptive Equivalent**
1 New ideas are seldom tried out in this class.	3.44	Moderate
2 New and different ways of teaching are seldom used in this class.	3.44	Moderate
3 The instructor thinks up innovative activities for students to do.	3.96	High
4 Teaching approaches in this class are branded by innovation and variety.	3.88	High
5 The instructor often thinks of unusual class activities.	3.56	High
Overall Mean	**3.66**	**High**

Table 8 presents the level of classroom environment in terms of individualization. The data shows that the weighted mean is 3.70, which is interpreted as High. In this table, statement 4 bears the lowest mean at 3.31, while the highest mean is statement 2 with 4.00, interpreted as high.

Table 8. Individualization

	Mean	Descriptive Equivalent
1 All students in the class are expected to do the same work, in the same way and in the same time.	3.72	High
2 Students are generally allowed to work at their own pace.	4.00	High
3 Students have a say in how class time is spent.	3.64	High
4 Students are allowed to choose activities and how they will work.	3.31	Moderate
5 Teaching approaches allow students to proceed at their own pace.	3.83	High
Overall Mean	**3.70**	**High**

Level of Learning Styles

Table 9 presents the level of learning styles in terms of visual. The data shows that the weighted mean is 3.90, which is interpreted as High. In this table, statement 2 bears the lowest mean at 3.05, interpreted as Moderate, while the highest mean is statement 5 at 4.30, which is interpreted as High.

Table 9. Visual

	Mean	Descriptive Equivalent
1 I enjoy doodling and even my notes have lots of pictures and arrows in them.	3.42	Moderate
2 It helps me to look at the person while listening; it keeps me focused.	3.05	Moderate
3 When trying to remember someone's telephone number, or something new like that, it helps me to get a picture of it in my mind.	3.79	High
4 I remember something better if I write it down.	4.30	High
5 It is hard for me to understand what a person is saying when there are people talking or music playing.	3.92	High
Overall Mean	**3.90**	**High**

Table 10 presents the level of learning styles in terms of auditory. The data shows that the weighted mean is 3.36, which is interpreted as Moderate. In this table, statement 2 bears the lowest mean at 3.03, interpreted as Moderate, while the highest mean is statement 5 with 3.56, interpreted as high.

Table 10. Auditory

	Mean	Descriptive Equivalent
1 I remember things that I hear, rather than things that I see or read.	3.33	Moderate
2 When I read, I mix up words that look alike, such as "them" and "then," "bad" and "dad."	3.03	Moderate
3 My written work does not look neat to me. My papers have crossed-out words and erasures.	3.40	Moderate
4 I use my finger as a pointer when reading to keep my place.	3.46	Moderate
5 I understand how to do something if someone tells me, rather than having to read the same thing to myself.	3.56	High
Overall Mean	**3.36**	**Moderate**

Table 11 presents the level of learning styles in terms of verbal. The data shows that the weighted mean is 4.04, which is interpreted as High. In this table, all of the statements show high mean from 3.91 to 4.14.

Table 11. Verbal

	Mean	Descriptive Equivalent
1 I learn best by writing and rewriting information.	4.09	High
2 I take detailed notes to help me remember information.	4.15	High
3 I would learn best from written instructions.	4.02	High
4 I prefer a presenter or a teacher who uses handouts, books, or readings.	3.91	High
5 I would like to have feedback using a written description of my results.	4.04	High
Overall Mean	**4.04**	**High**

Table 12 presents the level of learning styles in terms of kinesthetic. The data shows that the weighted mean is 3.67, which is interpreted as High. In this table, statement 1 bears the lowest mean at 2.65, while the highest mean is statement 2 at 4.18.

Table 12. Kinesthetic

	Mean	Descriptive Equivalent
1 I do not like to read directions; I rather just start doing.	2.65	Moderate

2 I learn best when I am shown how to do something, and I have the opportunity to do it.	4.18	High
3 Before I follow directions, it helps me to see someone else do it first.	3.83	High
4 I think better when I have the freedom to move around.	4.08	High
5 I tend to solve problems through a more trial-and-error approach, rather than from a step-by-step method.	3.64	High
Overall Mean	**3.67**	**High**

Table 13 presents the level of student engagement in terms of cognitive. The data shows that the weighted mean is 4.13, which is interpreted as High. In this table, statements 2 and 5 bear the lowest mean at 4.10, while the highest mean is statement 3 with 4.22, interpreted as very high.

Level of Student Engagement

Table 13. Cognitive

	Mean	Descriptive Equivalent
1 I try to understand the material better by relating it to things I already know.	4.12	High
2 When I study, I figure out how the information might be useful in the real world.	4.10	High
3 I try to connect what I am learning with my own experiences.	4.22	High
4 I make up my own examples to help me understand the important concepts I learn from school.	4.14	High
5 When learning new information, I try to put the ideas in my own words.	4.10	High
Overall Mean	**4.13**	**High**

Table 14 presents the level of student engagement in terms of behavioral. The data shows that the weighted mean is 3.70, which is interpreted as High. In this table, statement 3 bears the lowest mean at 3.35, and the highest mean is statement 5 with 4.19.

Table 14

Behavioral

	Mean	Descriptive Equivalent
1 I am an active participant of school activities such as sport day and school picnic.	3.37	Moderate
2 When I am in class, I participate in class activities.	3.74	High
3 I take an active role in extracurricular activities in my school.	3.35	Moderate

4 When I run into a difficult homework problem, I keep working at it until I think I've solved it.	3.87	High
5 I try hard to do well in school.	4.19	High
Overall Mean	**3.70**	**High**

Table 15 presents the level of student engagement in terms of affective. The data shows that the weighted mean is 4.03, which is interpreted as High. In this table, statement 5 bears the lowest mean at 3.61, while the highest mean is statement 2 with 4.27, interpreted as very high.

Table 15. Affective

	Mean	**Descriptive Equivalent**
1 I like what I am learning in school.	4.15	High
2 I enjoy learning new things in class.	4.27	High
3 I am very interested in learning.	4.17	High
4 I am happy to be at this school.	3.94	High
5 Most mornings, I look forward to going to school.	3.61	High
Overall Mean	**4.03**	**High**

Table 16 presents the correlation analysis between classroom environment and student engagement, revealing a statistically significant and strong positive relationship. The computed p-value of 0.000 indicates that the association between the two variables is highly significant at the 0.01 level, meaning the probability of the result occurring by chance is extremely low. The Pearson correlation coefficient (r = 0.707) signifies a high positive correlation, implying that as the quality of the classroom environment improves, student engagement also increases considerably. This suggests that students who perceive their learning environment as supportive, structured, and inclusive are likelier to demonstrate higher levels of behavioral, cognitive, and emotional engagement. The result emphasizes the influential role of the classroom setting in promoting active participation and meaningful involvement in academic activities.

Table 16. Student Engagement

VARIABLES	**p-value**	**Correlation coefficient**	**Remarks**
Classroom Environment			
	0.707	.000	Significant
Student Engagement			

The table displays the correlation results between learning style and student engagement, showing a statistically significant relationship. With a p-value of 0.000, the result is highly significant at the 0.01 level, indicating that the observed correlation is unlikely to be due to chance. The Pearson correlation coefficient (r = 0.607) reveals a moderate positive correlation, meaning that as instructional strategies align more closely with students' preferred learning styles, their level of engagement tends to increase. This suggests that students are more likely to be behaviorally, cognitively, and emotionally engaged when their individual learning preferences—visual, auditory, verbal, or kinesthetic—are acknowledged and addressed in the classroom. The findings highlight the importance of incorporating varied teaching methods to promote student involvement and participation effectively.

Table 17. Relationship between Learning Styles and Student Engagement

VARIABLES	p-value	Correlation coefficient	Remarks
Learning Styles			
	0.607	.000	Significant
Student Engagement			

Table 18 presents the results of a multiple linear regression analysis predicting Student Engagement based on Learning Style and Classroom Environment. The constant (intercept) is B = 0.662, representing the expected value of student engagement when both predictors (Learning Style and Classroom Environment) are zero. This value is statistically significant (p = .000). The unstandardized coefficient for Learning Style is B = 0.283 (SE = 0.045, p = .000), indicating that for every one-unit increase in Learning Style, student engagement increases by 0.283 units, holding Classroom Environment constant. The standardized Beta = .261 shows a moderate positive effect. The unstandardized coefficient for Classroom Environment is B = 0.589 (SE = 0.045, p = .000), suggesting that for every one-unit increase in Classroom Environment, student engagement increases by 0.589 units, holding Learning Style constant. The standardized Beta = .540 indicates a strong positive effect. Both predictors are statistically significant (p < .001), meaning they significantly affect student engagement.

Table 18. Classroom Environment and Learning Styles as predictors on Student Engagement

		Unstandardized Coefficients		Unstandardized Coefficients		
Model		B	Std. Error	Beta	t	Sig.
1	(Constant)	.662	.145		4.567	.000
	Learning Style	.283	.045	.261	6.296	.000
	Classroom Environment	.589	.045	.540	13.044	.000

Both Learning Style and Classroom Environment are significant predictors of Student Engagement, with Classroom Environment having a stronger influence based on the Beta coefficients. This implies that enhancing the classroom environment can have a more substantial impact on student engagement compared to learning styles alone.

After the data were analyzed and interpreted, the following discussions of the findings are gathered:

Classroom Environment. The study results indicate a strong and meaningful connection between the classroom environment and student engagement. When students perceive their learning environment as supportive, inclusive, and conducive to academic and personal growth, they are more likely to participate actively and remain invested in learning. A positive classroom atmosphere—marked by personalization, involvement, student cohesiveness, satisfaction, task orientation, and individualization—fosters learners' sense of belonging, motivation, and responsibility. These findings align with previous research emphasizing that a well-structured and emotionally supportive classroom enhances students' behavioral, cognitive, and emotional engagement. In teacher education programs, where students prepare for roles as future educators, experiencing such environments enriches their academic journey and provides a practical model for fostering engagement in their future classrooms. Overall, the study reinforces the idea that the classroom environment is crucial in promoting deep and sustained student engagement.

Learning Styles. The findings reveal that learning styles have a meaningful and positive association with student engagement. When instruction is aligned with students' preferred ways of learning—whether visual, auditory,

verbal, or kinesthetic—they are more likely to be actively involved, mentally focused, and emotionally invested in academic activities. A teaching approach considering individual learning preferences promotes a more inclusive and responsive classroom environment, supporting deeper understanding and sustained attention. These results support the idea that personalized learning enhances comprehension and increases motivation and participation. Such experiences are significant for education students, as they serve as practical models of differentiated instruction they can apply in their future classrooms. Recognizing and addressing diverse learning styles is vital in cultivating student engagement and fostering successful learning outcomes.

Student Engagement. The study's findings indicate that students exhibit a generally high level of engagement across various dimensions, including cognitive, behavioral, and emotional aspects. This suggests that learners are actively participating in classroom activities and complying with academic expectations and are mentally invested in understanding content and emotionally connected to their learning experiences. High levels of student engagement reflect the presence of motivating and supportive learning environments that encourage sustained attention, effort, and interest in academic tasks. These outcomes are particularly significant in teacher education, where developing reflective and responsible learners is a key priority. The results support existing literature asserting that engagement is a multifaceted construct influenced by both personal and environmental factors, and that it plays a critical role in promoting academic achievement, persistence, and overall learning satisfaction.

Relationship between Classroom Environment and Student Engagement. The analysis demonstrates a strong and meaningful positive connection between the classroom environment and student engagement. This suggests that when students perceive their learning environment as supportive, collaborative, and well-organized, they are more likely to participate actively and invest emotionally in their educational experiences. Supportive teacher-student relationships, peer cooperation, and a structured setting collectively contribute to this heightened level of engagement. These findings reinforce the perspective of Pianta, Hamre, and Allen, who highlighted the importance of nurturing and orderly classrooms in cultivating student involvement and fostering academic success over time.

Relationship between Learning Styles and Student Engagement. The results highlight a significant and positive relationship between learning styles and student engagement, indicating that students are more engaged when teaching methods align with how they learn best. Through visual aids, hands-on activities, discussions, or written materials, instruction tailored to individual learning preferences fosters greater motivation, attention, and participation. This supports the view of Dunn and Dunn, who argued that recognizing and incorporating diverse learning styles into classroom practices enhances student involvement and can lead to better academic performance. Ultimately, these findings emphasize the importance of differentiated instruction in promoting meaningful engagement.

Classroom Environment and Learning Styles as predictors on Student Engagement. The findings indicate that the classroom environment and learning styles are significant predictors of student engagement among education students. While both factors contribute meaningfully, the classroom environment emerges as the stronger influence, suggesting that a supportive, organized, and interactive learning space plays a crucial role in fostering student involvement. Learning styles also hold predictive value, reinforcing the importance of aligning instructional methods with students' preferred ways of learning. These results underscore the interplay between environmental and individual factors in shaping engagement, supporting the framework proposed by Fredricks, Blumenfeld, and Paris, highlighting the need to consider external conditions and personal learning preferences to effectively promote cognitive, behavioral, and emotional engagement in the classroom.

Conclusion and Recommendations

The study highlighted how both the classroom environment and students' individual learning styles play an important role in keeping students engaged. When classrooms are welcoming, inclusive, and well-organized, students are more likely to participate, stay focused, and feel motivated. Likewise, when teachers tailor their teaching methods to match how students learn best—whether through visuals, hands-on activities, listening, or reading—students become more involved and connected to their lessons. While both factors matter, the classroom environment stood out as the stronger influence. This reminds us how crucial it is to build supportive learning spaces where students feel safe, respected, and encouraged to take part.

Based on these findings, the study encourages students to better understand how they learn and take an active role in class to boost their engagement and confidence. Teachers are encouraged to use a variety of student-

centered teaching strategies that make lessons more engaging and meaningful. For its part, Davao de Oro State College (DDOSC) is urged to support its faculty with training in flexible, inclusive teaching methods and to include learning styles and engagement strategies in curriculum planning. The Commission on Higher Education (CHED) is also encouraged to strengthen policies that support student-centered learning by helping teachers grow in this area and including classroom environment and engagement as part of its quality standards. Lastly, future researchers are invited to explore this topic in other courses or schools and consider looking at related areas like student motivation or the role of technology to deepen our understanding of what truly drives student engagement.

REFERENCES

Aldridge, J. M., Fraser, B. J., & Huang, T. C. I. (1999). Investigating classroom environments in Taiwan and Australia with multiple research methods. Journal of Educational Research, 93(1), 48–62.

Alghamdi, A. K. H., & Alghamdi, M. M. (2020). The impact of classroom environment and learning styles on students' academic emotions and engagement in higher education. Journal of Education and Learning, 9(3), 123–134.

Almarashdeh, I., & Al-Refaie, A. (2020). The effectiveness of reading and writing techniques for students with a strong preference for the read/write learning style. International Journal of Educational Research, 13(3), 212-224.

Alrashidi, O., & Phan, H. P. (2023). Academic support and student engagement in higher education: The mediating role of motivation. Education and Information Technologies, 28, 7819–7838.

Alsoufi, A., Kumar, T., & Fraser, B. J. (2024). Teachers' affective approaches in social studies learning environments during COVID-19. Open Education Research Journal, 10, 121–140.

Areepattamannil, S., & Khine, M. S. (2022). Predicting academic engagement among college students: The roles of learning motivation and school climate. Social Psychology of Education, 25(1), 77–94.

Baines, L., & Gilsenan, C. (2020). Enhancing auditory learning in higher education: Exploring the effectiveness of audio resources. Journal of Educational Technology, 45(2), 33-44.

Baines, L., Gilsenan, C., & Simons, L. (2020). Enhancing the learning experience of read/write learners in higher education. Journal of Educational Psychology, 40(2), 98-112.

Bernacki, M. L., & Walkington, C. (2018). Context personalization in mathematics: Impact on situational interest, individual interest, and performance. Journal of Educational Psychology, 110(4), 631–645.

Brown, P., & Williams, R. (2020). Kinesthetic learning and its effects on student motivation and achievement. Journal of Educational Psychology, 32(3), 210-220.

Cambaya, D. J. D., & Paglinawan, J. L. (2024). Classroom management strategies and school environment on student engagement. International Journal of Research and Innovation in Social Science, 8(12), 1–9.

Chen, H. (2020). Auditory learning strategies in the modern classroom. International Journal of Educational Research, 25(3), 112-124.

Chen, L., & Liao, C. (2021). Exploring the impact of text-based learning on read/write learners in online learning environments. Educational Technology Research & Development, 67(4), 765-783.

Coffield, F., Moseley, D., Hall, E., & Ecclestone, K. (2019). Should we be using learning styles?. The Learning and Skills Research Centre.

Dunn, R., Dunn, K., & Price, G. E. (2020). Learning styles and the multicultural classroom. National Education Association.

Fleming, N. D. (2019). VARK: A guide to learning styles. VARK Learn Limited.

Fraser, B. J. (1998). Science learning environments: Assessments, effects and determinants. In B. J. Fraser & K. G. Tobin (Eds.), International Handbook of Science Education (pp. 527–564). Springer.

Fraser, B. J., & Aldridge, J. M. (2022). Classroom learning environments and student outcomes: New directions and research implications. Learning Environments Research, 25(1), 1–17.

Fraser, B. J., & Treagust, D. F. (2003). Classroom environment. In D. L. Levinson, P. W. Cookson Jr., & A. R. Sadovnik (Eds.), Education and sociology: An encyclopedia (pp. 98–102). Routledge.

Fraser, B. J., Treagust, D. F., & Dennis, N. C. (1986). Development of an instrument for assessing classroom psychosocial environment at universities and colleges. Studies in Higher Education, 11(1), 43–54.

Fredricks, J. A. (2019). Engagement and early career success: The role of emotionally supportive learning settings. Educational Psychology Review, 31(3), 1–15.

Fredricks, J. A., Reschly, A. L., & Christenson, S. L. (2019). Handbook of student engagement interventions: Working with disengaged students. Academic Press.

Gilakjani, A. P. (2019). The effect of auditory learning style on language learning. International Journal of English Language Teaching, 7(2), 34-42.

Gilakjani, A. P., & Sabouri, N. B. (2019). A review of the effectiveness of reading and writing techniques for read/write learners. International Journal of English Language Teaching, 7(2), 34-42.

González, P., Martínez, D., & Ruiz, S. (2021). Learning styles and their impact on students' academic performance: The case of read/write learners. Education and Information Technologies, 26(2), 1057-1071.

Henson, R. K. (2020). Teaching to learning styles and multiple intelligences. Pearson Education.

Jackson, R., & Liu, Z. (2019). The role of physical activity in enhancing cognitive development in kinesthetic learners. Learning and Motivation, 57, 98-107.

Jackson, T., & Smith, M. (2021). Using kinesthetic learning to boost student engagement and participation in the classroom. Journal of Classroom Interaction, 56(1), 72-85.

Johnson, S., Smith, J., & Brown, K. (2020). Hands-on activities as a tool for deep learning in kinesthetic learners. Educational Studies, 46(1), 124-138.

Karami, M., & Karami, G. (2019). Read/write learners and note-taking: Examining their impact on learning and academic success. International Journal of Instruction, 12(4), 273-285.

Kolb, D. A. (2019). Experiential learning: Experience as the source of learning and development (2nd ed.). Pearson Education.

Koul, R., & Fisher, D. (2019). Classroom environments and student engagement: The mediating role of goal orientations. Learning Environments Research, 22(3), 401–417.

Lam, S. F., Wong, B. P. H., Yang, H., & Liu, Y. (2014). Development and validation of the Student Engagement in Schools Questionnaire (SESQ). Learning and Instruction, 33, 1–13.

Li, X., & Sakellariou, S. (2022). Cognitive engagement and emotional engagement in teacher's Q & A and online discussion activities: A blended learning study. Asian-Pacific Journal of Second and Foreign Language Education, 7, Article 9.

Limniou, M., Sedghi, N., Kumari, D., & Drousiotis, E. (2022). Student engagement, learning environments and the COVID-19 pandemic: A comparison between psychology and engineering undergraduate students in the UK. Education Sciences, 12(10), 671.

Lins, L. A., Martin, S., & Maloney, K. (2019). Visual learning and the impact of multimedia on understanding complex concepts. Educational Technology & Society, 22(3)

Liu, M., McKelroy, E., & Shao, C. (2019). How learning styles affect learning outcomes in a digital classroom. Journal of Educational Computing Research, 57(3), 670-690.

Liu, M., McKelroy, E., & Shao, C. (2020). How learning styles affect learning outcomes in a digital classroom. Journal of Educational Computing Research, 57(3), 670-690.

Liu, S., Wang, J., & Liu, Y. (2021). Effects of task-oriented teaching strategies on student motivation and performance in higher education. International Journal of Educational Research Open, 2, 100044.

Ma, Y., Zuo, M., Gao, R., Yan, Y., & Luo, H. (2024). Interrelationships among college students' perceptions of smart classroom environments, perceived usefulness of mobile technology, achievement emotions, and cognitive engagement. Behavioral Sciences, 14(7), 565.

Martin, L., Greene, B., & Walker, A. (2020). Kinesthetic learning: Linking movement to cognitive and emotional engagement. International Journal of Educational Research, 98, 134-145.

Mazer, J. P., & Hess, J. A. (2020). Clarifying instructor communication: The effects of teacher clarity on student engagement and learning. Communication Education, 69(3), 251–270.

McCarney, C., Henson, D., & Roth, M. (2019). Visual learning preferences and academic performance: The role of visual aids in classroom teaching. Learning and Instruction, 64, 21-31.

McDonald, C., Zhang, X., & Liu, X. (2019). Physical learning strategies for kinesthetic learners: An intervention study. Journal of Educational Psychology, 109(3), 512-528.

McLeod, S. (2020). Learning styles: A review of the research. Educational Psychology Review, 32(1), 85-107.

MDPI. (2023). Dynamic interaction between student learning behaviour and learning environment: Meta-analysis of student engagement and its influencing factors. Behavioral Sciences, 13(1), 59.

MDPI. (2024). Measuring personalized learning in the smart classroom environment: Development and validation of an instrument. Education Sciences, 14(5), 620.

Miller, D. (2019). The kinesthetic learner: Moving beyond traditional classroom boundaries. Educational Psychology Review, 31(2), 411-425.

Mulder, R., McCaughan, J., & Santos, A. (2021). How auditory learning supports academic achievement. Learning and Instructional Technology, 12(1), 56-70.

Nehru, S. (2021). The role of auditory learning in improving academic outcomes. Educational Psychology Review, 30(4), 879-895.

O'Brien, D. G. (1985). Learning channel preference questionnaire. In R. M. Felder & L. K. Silverman (Eds.), Learning and teaching styles in engineering education (pp. 12–17). Journal of Engineering Education.

Pashler, H., McDaniel, M. A., Rohrer, D., & Bjork, R. A. (2019). Learning styles: Concepts and evidence. Psychological Science in the Public Interest, 9(3), 105-119.

Piaget, J. (1954). The construction of reality in the child (M. Cook, Trans.). Basic Books. (Original work published 1936)

Pourhosein Gilakjani, A. (2021). A match or mismatch between learning styles of the learners and teaching styles of the teachers. International Journal of English Linguistics, 11(1), 113–121.

Rayner, S., Cormier, D., & Day, P. (2020). The effect of visual learning in a high-stakes educational environment. Journal of Applied Educational Research, 18(4), 112-123.

Redmond, M. V., Bell, S., & Prescott, K. (2018). The effect of individualized instruction on affective outcomes in higher education: A meta-analysis. Journal of Educational Technology & Society, 21(4), 59–72.

Saluja, G., Kaur, M., & Chawla, S. (2020). A study on the auditory learning style and its impact on educational outcomes. Educational Research International, 8(2), 93-104.

Sánchez, M., Pérez, E., & Fernández, J. (2019). The role of reading and writing strategies in promoting cognitive development in students with a read/write learning style. Journal of Cognitive Education and Psychology, 18(2), 162-179.

Shernoff, D. J., et al. (2016). The influence of the high school classroom environment on learning as mediated by student engagement. Learning Environments Research, 19(2), 221–242.

Smith, A., & West, L. (2019). Understanding the role of auditory learning in knowledge retention. Journal of Educational Psychology, 111(3), 539-553.

Smith, A., & West, L. (2020). Read/write learning strategies in the classroom: Implications for student engagement. Educational Psychology, 39(5), 1234-1250.

Song, Y., Sakellariou, S., & Tsiara, I. (2022). Classroom climate and student engagement. Frontiers in Psychology, 13, 939661.

Stegmann, S., Sailer, M., & Wekerle, R. (2024). Applying the ICAP framework to collaborative STEM tasks: Effects of task design, group size, and question type on cognitive engagement in chemistry. Chemistry Education Research and Practice.

Surjono, H. D., Sumarna, A., & Amin, M. (2019). Enhancing visual learning styles through interactive media. Educational Technology Research & Development, 67(6), 1361-1375.

Sutherland, P., & Jacobsen, M. (2019). The effectiveness of auditory learning tools in modern classrooms. Journal of Teacher Education and Technology, 15(1), 89-101.

Tang, Y., & Chow, B. K. (2020). Communicating feedback in the classroom: The role of innovative teaching and student autonomy. Innovations in Education and Teaching International, 57(3), 316–326.

Vickery, A. (2019). Auditory learning in digital platforms: Best practices and case studies. Educational Technology Research & Development, 68(3), 431-444.

Wang, M., & Holcombe, R. (2010). Adolescents' perceptions of school environment, engagement, and academic achievement in middle school. American Educational Research Journal, 47(3), 633–662.

Widiastuti, B., Narayan, A., & Fernandes, H. (2025). A socio-material approach to investigating classrooms: Student engagement in an innovative learning environment. Learning Environments Research.

Wong, J., Zhang, J., & Tan, H. (2019). Kinesthetic learning and its relationship with student motivation and academic achievement. Learning and Individual Differences, 71, 26-34.

Yu, C., & Liang, M. (2020). Kinesthetic learning as an effective teaching strategy for improving learning outcomes. Journal of Educational Technology, 47(1), 61-72.

Zeng, C., & Li, M. (2019). Enhancing learning outcomes through kinesthetic learning approaches: A review of recent studies. Journal of Education and Practice, 10(3), 42-48.

Zhang, L. F., Wang, T., & Zhang, L. (2019). Learning styles and academic achievement: A global perspective. Educational Psychology, 39(5), 567-584.

Zhang, L. F., Wang, T., & Zhang, L. (2020). Learning styles and academic achievement: A global perspective. Educational Psychology, 39(5), 567-584.

Zhang, L., Zhao, H., & Du, X. (2021). Learning styles and student engagement: Evidence from college classrooms. Education Sciences, 11(5), 217.

Zhang, X. (2020). Auditory learners: Their learning preferences and strategies in academic settings. Journal of Educational Psychology, 112(2), 265-278.

Zhou, Y., Liu, X., & Zhang, L. (2021). The influence of perceived teacher support on student engagement: A longitudinal study in higher education. Journal of Educational Psychology, 113(6), 1118–1130.

Zhou, Y., Liu, X., & Zhang, L. (2025). Teacher emotional leadership and college students' learning engagement: The mediating role of achievement emotions. Psychology in the Schools, 62(1), 112–130.