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Online Learning Environment Development: Its Relationship to Learning Style and Academic Motivation of Students

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Abstract. The primary aim of this study was to examine the significant impact of learning styles and academic motivation on the development of students' online learning environments. The study utilized a quantitative design with a correlational approach. The participants were 355 public elementary school teachers. The analysis involved the use of mean, Pearson-r, and regression analysis to determine the findings. Additionally, adapted survey questionnaires were employed to assess learning styles, academic motivation, and online learning environment development. The results indicated that the levels of learning styles, academic motivation, and online learning environment were all very high. There was a significant relationship between learning styles and the development of the online learning environment, as well as between academic motivation and the online learning environment. Furthermore, regression analysis revealed that intrinsic occupational motivation and collaborative learning style had the most substantial influence on the development of the online learning environment, as evidenced by the highest beta coefficients.

KEY WORDS

1. virtual 2. online learning environment 3. motivation

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1. Introduction

Challenges in developing online learning environments are particularly complex and multifaceted, significantly impacting students, teachers, and parents alike. Students often face significant barriers due to limited or unequal access to technology, leading to disparities in learning outcomes. Even when technology is available, many students struggle with its use, which can be further compounded by difficulties in concentrating, managing time, and the pervasive sense of isolation that online learning can create (Banks, 2020). The effectiveness of online learning is highly variable, influenced by the specific types of technology being utilized and the nature of the curriculum content. Moreover, while online learning environments hold the potential to foster effective self-directed learning skills, this potential is not universally realized. The diverse and often incompatible online learning tools can overwhelm both students and teachers, leading to frustration rather than engagement. Teachers, who are tasked with integrating these tools into their lesson plans, often find that the promised personalization and enhancement of learning are difficult to achieve in practice. This complexity highlights the necessity of carefully designed and well-supported online learning strategies to truly build essential 21st-century skills (Kennedy et al., 2020). Studying the development of online learning

environments is essential due to factors such as accessibility, flexibility, enhanced learning experiences, scalability, and cost-effectiveness (Johnson, 2021; Martin Parker, 2020; Anderson, 2022). Online learning provides critical access to education for individuals facing barriers related to location, time constraints, or physical disabilities, making it particularly beneficial for non-traditional students, such as working professionals and parents (Graham Dziuban, 2021). Well-designed online environments can offer interactive and engaging learning experiences through the incorporation of multimedia, simulations, and other tools that may not be feasible in traditional classrooms (Mayer Fiorella, 2021). Additionally, the scalability of online learning allows institutions to expand their reach without the physical limitations of classroom space, while reducing costs associated with physical infrastructure and materials (Siemens Baker, 2021). Previous research has highlighted the positive impact of online learning on students' mental health and engagement, with flexible schedules reducing stress and enhancing interaction through synchronous and asynchronous tools (Picciano Seaman, 2020; Shea Bidjerano, 2021). Moreover, cognitive development is supported when online activities are designed with models like cognitive apprenticeship, which improve critical thinking and knowledge retention (Collins Kapur, 2020). Systematic reviews suggest that well-designed online learning can be as effective as traditional methods, provided courses include interactive elements and robust technical support, factors crucial to student satisfaction and success (Means et al., 2020). The implications of these studies underline the importance of thoughtful design, continuous professional development, and policy focus on equity and accessibility in online education (Garrison Vaughan, 2021; Bates, 2020). Given the rapid evolution of online learning, the current study aims to build on these findings by exploring innovative approaches to online education, with the goal of improving student engagement, satisfaction, and learning outcomes through the latest technologies and pedagogical methods (Anderson Dron, 2021). The relationship between learning styles and online learning environments is crucial, as these environments can be customized to suit different learning preferences, thereby enhancing student engagement and effectiveness. Normadhi et al. (2021) demonstrated that adaptive e-learning environments, which modify content according to students' learning styles, significantly improve the quality of online education. Likewise, academic motivation is vital in online learning settings. Bosch and Spinath (2023) emphasized that students' motivation, whether intrinsic or extrinsic, plays a pivotal role in their engagement and success in online courses. They also observed that evidence-based learning activities can positively impact motivation, underlining the importance of designing online courses that foster both motivation and self-regulation.

1.1. Review of Significant Literature—Recent research has explored the complex relationships between learning styles, academic motivation, and online learning environments. Normadhi et al. (2021) showed that adaptive e-learning environments tailored to students' learning styles substantially improve educational quality and student satisfaction. Similarly, Bosch and Spinath (2023) identified that intrinsic and extrinsic motivation are essential for student engagement and success in online courses, highlighting the necessity of incorporating motivational strategies in course design. Vo and Ho (2024) further noted that a clear course structure and task relevance in online learning environments positively influence student engagement through expectancy and task value beliefs. These findings collectively emphasize the importance of designing online learning environments that take into account individual learning preferences and motivational factors to opti-

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mize educational outcomes. In educational settings, the Community of Inquiry (CoI) Framework, developed by Garrison, Anderson, and Archer (2000), offers a comprehensive approach to optimizing online learning environments for effective teaching and learning. This framework highlights the importance of three interconnected elements: social presence, cognitive presence, and teaching presence. In an online classroom, fostering social presence helps students feel connected to their peers and instructors, creating a supportive learning community. Cognitive presence allows students to engage in deep learning through continuous reflection and discussion, while teaching presence involves the instructor's role in guiding, facilitating, and directing these interactions to achieve meaningful educational outcomes. Supporting this framework, Deci and Ryan's Self-Determination Theory (SDT) emphasizes the role of intrinsic motivation in student engagement and academic performance. In a school environment, teachers can enhance students' intrinsic motivation by promoting autonomy, competence, and relatedness within the online learning space. When students perceive control over their learning, feel capable of achieving their goals, and experience a sense of belonging, their motivation to engage actively in the learning process increases, leading to improved academic outcomes. This theory underscores the importance of designing online learning environments that support these psychological needs. Another important factor in the online learning context is the Cognitive Load Theory (CLT), developed by Sweller (1988). This theory posits that the design of instructional materials can significantly influence students' ability to process information and learn effectively. In a school setting, educators must carefully design online content to minimize extraneous cognitive load, allowing students to focus on essential concepts. Using multimedia and interactive elements can enhance learning efficiency by engaging students and aiding in information retention, thereby improving overall academic performance. Lastly, Moore's Transactional Distance Theory (TDT) addresses the psychological and communication gaps that may occur in an online learning environment. According to this theory, reducing transactional distance through increased interaction between students and instructors can lead to better learning outcomes. In a school setting, using synchronous communication tools, such as video conferencing and real-time discussions, can bridge the gap between students and teachers, creating a more connected and engaging online learning experience. This approach helps reduce feelings of isolation, leading to higher levels of student engagement and success.

1.2. Synthesis—The related literature and studies provide essential knowledge and background on learning styles, academic motivation, and the online learning environment, particularly the relationships among these variables and how they influence one another. Insights from renowned scholars contribute significantly to the theoretical framework and the development of the questionnaire. The Community of Inquiry Framework, created to examine the dynamics of online learning communities, has been widely adopted. Understanding the complex dynamics of a community of inquiry involves the interaction of social, cognitive, and teaching presence.

1.3. Theoretical and Conceptual Framework—The conceptual model of this study includes two relationships from two independent variables and one dependent variable, as shown in Figure 1. The independent variables are learning styles and academic motivation, while the dependent variable is the digital learning environment. Since these variables are not directly observable, they cannot be measured directly. Each construct is associated with measures on the observed variable. Thus, the primary interest of this study is the extent of regression paths from the independent variables to the dependent

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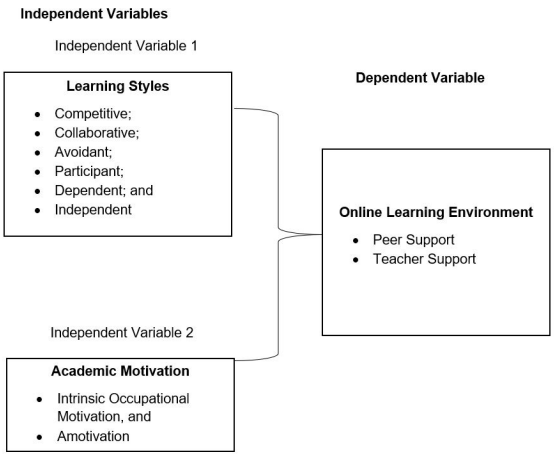

Fig. 1. Conceptual Framework of the Study variable.

The study measured learning styles, one of the independent variables, using six indicators: competitive, collaborative, avoidant, participant, dependent, and independent (Logan Thomas, 2002). A competitive learning style is marked by a strong desire to excel and a proactive approach to overcoming challenges. Collaborative learners prefer to engage with others and work together towards common goals. Avoidant learners tend to withdraw from learning activities and interactions. Participants actively engage in all learning activities and are willing to contribute. Dependent learners rely on others for guidance and support. Independent learners prefer to work autonomously and are self-reliant in their learning approach. Another independent variable in this study was the academic motivation of students, measured by indicators such as intrinsic motivation, introjected motivation, extrinsic motivation, and amotivation (Fischer et al., 2012). Intrinsic motivation refers to engaging in an activity for the inherent satisfaction and personal fulfillment it provides, rather than for any external reward. Introjected motivation involves internalizing external demands or pressures, leading to participation in activities out of a sense of obligation rather than genuine interest. Extrinsic motivation is driven by the pursuit of external rewards, such as praise, approval, competition, or tangible incentives. Amotivation refers to a lack of motivation or a significant reduction in the drive to initiate or persist in goal-directed activities, often resulting in disengagement. The dependent variable in this study was the online learning environment, assessed through the indicators of peer support and teacher support (Ghafar et al., 2016). Peer support refers to the emotional and practical assistance, encouragement, and empathy shared among students, fostering a sense of community and mutual support within the learning environment. Teacher support denotes the help, guidance, and encouragement provided by educators to their students, aimed at facilitating learning, building confidence, and ensuring academic success. Online learning environments generally empower students to cultivate effective self-directed learning skills. Incorporating online learning tools into classrooms can boost student engagement, enhance the quality of teaching, and support personalized learning experiences. These tools also help students build essential 21st - century skills. Socially, online learning offers students easy access to information, accelerated learning, and provides enjoyable opportunities to apply what they have learned. It

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enables students to explore new topics and gain deeper understanding of complex concepts. The global significance of this study lies in its contribution to the growing body of research on online learning environments, learning styles, and academic motivation. As educational institutions worldwide increasingly adopt digital learning, understanding how these factors interact becomes crucial. This study's examination of how various learning styles and motivational factors influence student outcomes in online settings offers valuable insights that can help shape the design and implementation of more effective online education programs. By refining theoretical frameworks and operational definitions, this research deepens our understanding of the complexities of online learning, providing a foundation for future studies. Socially, this study's value lies in improving the educational experiences of students, particularly within the realm of online learning. As online education becomes a more permanent feature in the global educational landscape, it is essential to ensure that the diverse needs of students are met. This research emphasizes the significance of personalized learning approaches and the necessity for strong peer and teacher support systems, aiming to create more inclusive and supportive learning environments. By addressing the psychological and social aspects of learning, this study contributes to the broader goal of improving educational equity and access, particularly for students who may face challenges in traditional learning settings. This study will directly benefit educational institutions at various levels, including universities, colleges, and K-12 schools, as they work to optimize their online learning programs. Administrators and educators can leverage the findings to develop more tailored instructional strategies that address different learning styles and motivational needs, thereby improving student engagement and academic performance. Moreover, the insights gained from this study can inform teacher training programs, enabling educators to better understand and meet the diverse needs of their students in online settings.

1.4. Statement of the Problem—This study aims to investigate the factors influencing the development of online learning environments among students, focusing on the interplay of learning styles and academic motivation. Specifically, it seeks to address the following questions:

(1) What is the students' level of learning styles (competitive, collaborative, avoidant, participant, dependent, and independent)?
(2) What is the level of students' academic motivation, including intrinsic occupational motivation and amotivation?
(3) What is the students' level of online learning environment development based on peer support and instructor support?
(4) What is the significance of the relationship between learning style and online learning development?
(5) What is the significance of the relationship between academic motivation and online learning environment development?

This investigation aims to provide a comprehensive understanding of the dynamics shaping effective online learning environments, offering insights to enhance student engagement and academic success.

1.5. Null Hypothesis—Given the research objectives, the null hypotheses tested at a 0.05 significance level include: no significant relationship exists between learning styles and the online learning environment, and academic mo-

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tivation within the learning environment; no specific domain of learning styles and academic motivation significantly influences the development of the online learning environment. Adapting the online learning environment involves a series of well-designed processes to align with instructional materials. Understanding students' learning styles and maintaining their motivation are crucial for identifying educational needs. Student learning styles are recognized as a critical factor in learning and are often used as a basis for creating personalized learning experiences (El-Sabagh Hamed, 2020; Hussein Al-Chalabi, 2020). It is believed that when learning environments are designed according to students' learning styles, their academic achievements will improve. Identifying learners' learning styles can help teachers enhance the teaching-learning process. Adapting to learners' learning styles benefits their capabilities. Therefore, if learners understand their learning styles, they can identify their strengths and weaknesses in the learning process, adapt to suitable learning environments, and learn more effectively and permanently (Dag Gecer, 2019). From another perspective, Mese and Sevilen (2020) noted that the relationship between the online learning environment and academic motivation is complex, influenced by individual traits and specific contexts. Motivation in online courses has gained increasing attention in recent years (Ozhan Kocadere, 2020). Lin (2017) investigated the roles of learning strategies and motivation in an asynchronous course supplementing face-to-face instruction. They collected 466 completed surveys measuring online learning strategies and motivation, finding that students exhibited low levels of intrinsic and extrinsic motivation in their online learning environment classes.

1.6. Significance of the Study—In the broader educational landscape, policymakers and educational technology developers can also derive benefits from this research. The study's findings can guide the development of policies and tools that support differentiated instruction and foster effective learning environments. Additionally, communities and organizations advocating for educational reform and innovation may find this research valuable in promoting practices that enhance student outcomes and well-being in digital education contexts. For future researchers, this study provides a robust foundation for further exploration into the dynamics of online learning. The operational definitions and theoretical contributions made here can serve as a reference for subsequent studies, allowing researchers to build on these findings and explore new aspects of learning styles, motivation, and online education. By expanding the knowledge base, future research can continue to improve the effectiveness of online learning and contribute to the ongoing evolution of global educational practices.

2. Methodology

In this chapter, we will outline the processes and steps involved in conducting the study. This will encompass selecting the study's design, identifying the respondents and the sampling method, choosing the research instruments for data collection, and delineating the data analysis process. The researcher employed artificial intelligence methods to meticulously proofread this work during its preparation. Artificial Intelligence (AI) was expressly utilized to enhance the overall quality, coherence, and precision of the manuscript. This methodology is being openly communicated to adhere to ethical norms in research. Leveraging AI for proofreading underscores a commitment to the responsible use of cutting-edge technologies and acknowledges AI's growing role and potential in professional and academic writing.

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2.1. Research Design—This research utilized a quantitative, non-experimental design to explore correlations between variables. The structured methodology involved data collection and analysis through computational, statistical, and mathematical techniques to generate findings. The study aimed to quantify the issue and gauge its prevalence, with the intention of applying the results to a broader population (Labaree, 2017). The non-experimental nature of the research meant that variables were examined in their natural context without any manipulation. A correlational design was employed to assess and explain the degree and strength of the relationship between learning styles and the online learning environment, as well as between academic motivation and the online learning environment. The study focused on two independent variables and one dependent variable. The correlational approach allowed for the observation of how the development of the online learning environment influenced learning styles and academic motivation without altering the independent variables.

2.2. Research Respondents—In this study, a universal sampling method was employed, where the entire population of public elementary school teachers in the Laak South District was selected as respondents. This method, as outlined by Taherdoost (2016), is a non-probability sampling technique in which every member of the population is included in the sample. Universal sampling is particularly useful in studies where the population size is manageable, and the research aims to gather comprehensive data from all possible respondents, ensuring that the findings are as representative as possible. In this case, the total teacher population of the Laak South District, recorded at 515, was entirely considered. This population comprised 117 male teachers and 238 female teachers. By including all these teachers, the study aimed to capture a full spectrum of perspectives on the variables under investigation, such as learning styles, academic motivation, and the development of the online learning environment. Universal sampling is especially relevant here because it eliminates sampling bias and provides a complete picture of the entire district's teaching staff, making the results more robust and applicable to the population studied. The participants for this study were selected based on the following criteria: they must be public elementary school teachers with at least one year of teaching experience and be assigned within the Laak South District. These respondents were deemed suitable for the study as they could provide valuable information to test the hypothesis, focusing on the development of the online learning environment and its relationship to students' learning styles and academic motivation within the Laak South District. This study concentrated on the development of the online learning environment, learning styles, and academic motivation, with teachers being the primary observers and facilitators of the teaching-learning process. Their direct experience and interaction with learners make them ideal participants. Consequently, students, parents, school heads, and DepEd officials were excluded from the study as they could not provide close perceptions of the topic under investigation. Participants had the option to withdraw from the study at any time if they felt troubled or uncomfortable. If a participant wished to withdraw, they were required to inform the researcher. While participants could provide reasons for their withdrawal, they were not obligated to do so.

2.3. Materials and Instruments—The original questionnaire was adapted from the Learning Styles Questionnaire developed by Logan and Thomas (2002), a well-established instrument used to assess students' learning styles. Recognizing the need to tailor this tool to the specific context of the study, modifications were made to better reflect the school setting and the unique characteristics of the teacher population in the Laak South District. These modifications

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included the contextualization of language, the inclusion of relevant examples, and the adaptation of certain items to align with the teaching practices and educational environment of the district. To ensure the validity and reliability of the modified questionnaire, it underwent a rigorous validation process. Initially, the questionnaire was reviewed by a panel of experts in the field of education and psychology. These experts provided critical feedback, offering suggestions and recommendations for further refinement of the instrument. Their input was instrumental in enhancing the content validity of the questionnaire, ensuring that it accurately captured the constructs it was intended to measure—namely, the learning styles of teachers and students within the school setting. Following the expert validation, the modified questionnaire was subjected to pilot testing. This involved administering the questionnaire to a small, representative sample of teachers from the district to assess its reliability and to identify any potential issues with clarity, comprehension, or response patterns. The pilot testing allowed the researchers to gather data on the internal consistency of the questionnaire, which was likely analyzed using Cronbach's alpha or similar statistical measures to determine the reliability of the instrument. The results from the pilot test confirmed that the modified questionnaire was reliable and that it effectively measured the intended constructs. Based on the feedback from the expert panel and the results of the pilot testing, the questionnaire was further refined to incorporate the experts' suggestions and address any issues identified during pilot testing. The final version of the instrument was thus a product of collaborative effort, combining the theoretical foundation of the original Logan and Thomas (2002) questionnaire with the practical insights gained through the validation process. This iterative process ensured that the final instrument was both contextually relevant and psychometrically sound. The finalized questionnaire consisted of 30 items, each designed to assess different aspects of learning styles as experienced by the teachers in their educational environment. The items were structured using a five-point Likert Scale, a common method in educational research that allows respondents to express the intensity of their agreement or disagreement with each statement. The scale ranged from "Very High" to "Very Low," providing a nuanced measurement of each learning style indicator. To facilitate the interpretation of responses, a range of means was established to describe the level of learning styles. These descriptive categories helped in summarizing the data, allowing for a clear understanding of the prevalent learning styles among the teachers. By categorizing the mean scores, the study could effectively communicate the results, showing whether certain learning styles were more dominant or less prominent within the population. Overall, the careful adaptation, validation, and testing of the questionnaire ensured that it was a robust tool for assessing learning styles in the Laak South District, contributing valuable data to the study and providing insights that could inform educational practices and policies in the district.

2.4. Data Gathering Procedure—During the research, specific procedures were followed for data collection. Participants were asked to sign an Informed Consent Form (ICF) to confirm their willingness to participate. Health protocols were strictly adhered to, and a Certificate of Appearance was obtained from school administrators to verify the integrity of the data collection process. The data were subsequently gathered, tallied, statistically analyzed, and interpreted. Ethical considerations were central to the study, ensuring the right to con-

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Range of Means	Descriptive Level	Interpretation
4.20 – 5.00	Very High	This means that the professional commitment learning styles item is always manifested.
3.40 – 4.19	High	This means that the learning styles item is oftentimes manifested.
2.60 – 3.39	Moderate	This means that the learning styles item is sometimes manifested.
1.80 – 2.59	Low	This means that the learning styles item is seldom manifested.
1.00 – 1.79	Very Low	This means that the learning styles item is never manifested.

duct the research, maintaining confidentiality, and safeguarding participants' anonymity. The researcher kept all records confidential to protect participants' rights and well-being and implemented a Non-disclosure Agreement (NDA) to maintain integrity and confidentiality. The informed consent process was designed to respect participants' autonomy, outlining the roles of those obtaining consent and the timing and manner in which consent was secured. To ensure the originality of the study, plagiarism detection software such as Turnitin and other online tools were employed. The researcher ensured there was no misrepresentation of others' work, no fabrication of data or results, no faulty conclusions, and no inconsistencies with existing literature. The study was free from exaggerated claims, and any potential conflicts of interest were disclosed, ensuring that professional judgment regarding participants' welfare or research validity was not compromised by secondary interests, such as financial or academic gain. The principal investigator had sole access to the study's files, although the university Ethics Review Committee (UMERC) and other regulatory bodies were granted access for verification and validation. After the study's completion, the data will be retained for three years before being securely destroyed to prevent unauthorized access or disclosure. The researcher, who is pursuing a Master of Education with a concentration in Educational Management, received content feedback from her adviser and panel members, ensuring adherence to the university Ethics Review Committee standards. Upon receiving approval from Ethics Review Committee as shown in Form 2.6 with Protocol Number UMERC- 2023-013 the study underwent pilot testing, and the data were analyzed to ensure consistency in the research questionnaire. With the adviser's support as a co-author, the researcher contributed both intellectually and spiritually to the study, refining the research into a clear and comprehensible format.

3. Results and Discussion

The data analysis and discussion of findings based on the study results are presented in this section. The discussion is structured into the following categories: the level of learning styles, the level of academic motivation, the development of the online learning environment, and the

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significant relationship between academic motivation and the development of the online learning environment. The analysis reveals a significant relationship between learning styles and the development of the online learning environment, with academic motivation emerging as the most influential factor in shaping the online learning environment.

3.1. Level of Learning Style—Table 1 presents the findings regarding the levels of learning styles. The students' learning styles were categorized into competitive, collaborative, avoidant, participant, dependent, and independent styles.

Table 1. Level of Learning Style

Indicators	**SD**	**Mean**	**Descriptive Level**
Competitive	0.499	4.31	Very High
Collaborative	0.550	4.42	Very High
Avoidant	0.728	3.83	High
Participant	0.527	4.19	High
Dependent	0.531	4.26	Very High
Independent	0.511	4.26	Very High
Overall	0.300	4.21	Very High

The overall mean level of students' learning styles is 4.21, classified as very high, with a standard deviation of 0.300, indicating consistent manifestation of these styles among students. Among the different learning styles, the collaborative style stands out with the highest mean score of 4.42 (very high) and a standard deviation of 0.550. This is followed by the competitive learning style, which has a mean score of 4.31 (very high) and a standard deviation of 0.499. Both the dependent and independent learning styles have mean ratings of 4.26 (very high), with standard deviations of 0.531 and 0.511, respectively. The participative learning style is rated at a mean of 4.19 (high) with a standard deviation of 0.527. The avoidant learning style, while still categorized as high, has the lowest mean score of 3.83, with a standard deviation of 0.728. These findings indicate that students strongly prefer learning environments that emphasize collaboration and healthy competition. For educators, this suggests the importance of designing classroom activities that promote teamwork and provide constructive challenges, thereby nurturing both social and cognitive skills. The equal emphasis on dependent and independent learning styles reflects students' appreciation for both autonomy and support, highlighting the need for a flexible teaching approach that caters to these varied preferences. However, the presence of the avoidant learning style suggests that some students might still tend to disengage, making it crucial to create an inclusive and stimulating learning environment that keeps all students actively involved and motivated. This insight can help inform instructional strategies to better address the diverse needs of students and im-

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prove their overall learning experience. These results are consistent with Mousa's (2019) assertion that learning styles play a vital role in the learning process, significantly contributing to the overall educational environment. Everyone has a unique learning style that affects how they engage with their learning surroundings. Anwar et al., (2019) further emphasized that a learning style is the approach through which an individual acquires, retains, and understands information. It is well acknowledged that individuals do not learn in the same way; each person gravitates toward a learning method that they find most comfortable, often abandoning less comfortable approaches (Pritchard, 2019).

3.2. Level of Academic Motivation—The analysis of academic motivation levels reveals an overall grand mean of 4.40, categorized as very high, with a standard deviation of 0.370, indicating consistent manifestation of academic motivation among students. Breaking it down further, intrinsic occupational motivation scored a mean of 4.45 (very high) with a standard deviation of 0.391, while amotivation recorded a mean of 4.35 (very high) accompanied by a standard deviation of 0.407. These results suggest that students exhibit a consistently strong drive to excel academically, fueled primarily by an inherent interest and personal fulfillment derived from their studies. The elevated score in intrinsic occupational motivation underscores a deep-seated engagement and enjoyment in learning activities beyond external incentives. However, the similarly high level of amotivation indicates that students occasionally experience feelings of disengagement or uncertainty regarding their academic efforts. This juxtaposition implies that while students are generally highly motivated from within, there are periods where external factors may impede their engagement. Recognizing and addressing these fluctuations can enable educators to implement strategies that bolster and sustain intrinsic motivation while effectively mitigating instances of amotivation, thereby promoting a more consistently engaged and motivated student population. These findings are consistent with the observations of Berestova et al. (2021), who identified student motivation as a critical factor influencing the success of online learning environments. Motivation serves as a fundamental psychological construct in education that propels students toward learning and achievement (Faridah, 2020). A robust level of motivation is essential for maintaining student satisfaction and effective engagement within the learning process. Conversely, a deficiency in motivation can pose significant challenges, hindering students' ability to concentrate and absorb instructional material (Jaemu et al., 2019). Additionally, it is important to note that amotivation is strongly and negatively correlated with educational outcomes. Defined by a lack of desire to act, amotivation reflects an individual's struggle to see the connection between their actions and potential results, often arising when students do not receive positive feedback or perceive repeated failures in their performance (Çetin, 2021).

3.3. Level of Online Learning Environment Development —The analysis of the online learning environment revealed a grand mean of 4.36, categorized as very high, with a standard deviation of 0.399, indicating that the development of the online learning environment is consistently manifested at a high level. The indicators contributing to this very high level of online learning environment development had mean ratings ranging from 4.32 to 4.41. Specifically, instructor support scored the highest with a mean rating of 4.41 (very high) and a standard deviation of 0.383, followed by peer support with a mean rating of 4.32 (very high) and a stan-

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Table 2. Level of Academic Motivation

Indicators	SD	Mean	Descriptive Level
Intrinsic Occupational Motivation	0.407	4.35	Very High
Amotivation	0.391	4.45	Very High
Overall	0.370	4.40	Very High

dard deviation of 0.470. These findings suggest that the online learning environment is highly effective and well-regarded by students, particularly due to the strong support provided by instructors and positive peer interactions. The high level of instructor support indicates that students highly value the guidance and assistance provided by their educators, which is crucial for navigating the complexities of online learning. Similarly, the significance of peer support underscores the importance of collaborative interactions and mutual help among students, which contribute to a positive and engaging learning experience. Together, these elements are essential in fostering a productive and supportive online learning environment, ensuring that students feel adequately supported both academically and socially.

Table 3. Level of Online Learning Environment Development

Indicators	SD	Mean	Descriptive Level
Peer Support	0.383	4.32	Very High
Instructor Support	0.470	4.41	Very High
Overall	0.399	4.36	Very High

3.4. Significance of the Relationship between the Learning Style and Online Learning Environment Development —The results are consistent with the assertions of Zamani and Khald (2022), who emphasized the critical role of the learning environment in effective learning. The significance of the learning environment lies in its ability to motivate students to engage deeply with their studies and positively influence their academic performance. Numerous studies, such as those conducted by Hassan et al. (2020), support these conclusions, highlighting that the learning environment encompasses various factors—educational, physical, psychological, emotional, and social—that contribute to students' intellectual development. The way students approach their studies and their potential learning outcomes are positively influenced by a learning environment managed by the teacher as a comprehensive support system. The overall correlation (r-value) between students' learning styles and the development of their online learning environment was 0.428, with a significant p-value of 0.000. Since the p-value is less than 0.05, there is a significant relationship between learning styles and the online learning environment, leading to the rejection of the null hypothesis that predicted no significant relationship. When examining specific domains of learning styles, the data revealed

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that the competitive domain significantly correlated with the online learning environment (r-value of 0.158, p-value of 0.009). However, the collaborative domain did not show a significant correlation (r-value of 0.087, p-value of 0.152), nor did the avoidant domain (r-value of 0.092, p-value of 0.132). The participant domain showed a significant correlation (r-value of 0.351, p-value of 0.000), as did the dependent domain (r-value of 0.311, p-value of 0.000). The independent domain, however, did not show a significant correlation (r-value of 0.428, p-value of 0.000). When correlating the domains of the online learning environment with overall learning styles, peer support showed a significant correlation (r-value of 0.369, p-value of 0.000), as did instructor support (r-value of 0.424, p-value of 0.000). These findings align with Khaya and Akpinar's (2021) assertion that students' academic achievements and attitudes towards courses significantly improve in an online learning environment. It was also noted that online learning, which is rapidly expanding due to the Information and Communication Age, brings significant advancements and some limitations to traditional education. Understanding these factors is crucial for designing more effective teaching systems. Therefore, teachers must understand and identify students' learning styles to meet their diverse learning needs (Neo, 2020).

Table 4. Significance of the Relationship between the Learning Style and Online Learning Environment Development

Learning Style	**Peer Support**	**Instructor Support**	**Overall**
Competitive	.172* (0.000)	.126* (0.038)	.158* (0.009)
Collaborative	.131* (0.032)	.042 (0.492)	.087 (0.152)
Avoidant	.105 (0.086)	.070 (0.252)	.092 (0.132)
Participant	.242* (0.000)	.397* (0.000)	.351* (0.000)
Dependent	.215* (0.000)	.353* (0.000)	.311* (0.000)
Independent	.370* (0.000)	.451* (0.000)	.444* (0.000)
Overall	.369* (0.000)	.424* (0.000)	.428* (0.000)

**Significant at 0.05 significance level.*

3.5. Significance of the Relationship between the Academic Motivation and Online Learning Environment Development—The results indicate a significant correlation between levels of academic motivation and the development of the online learning environment, with an overall correlation coefficient of 0.740 and a significant p-value of 0.000. Occupational motivation had a mean rating of 0.757 with a significant p-value of 0.000, while amotivation had a mean rating of 0.612, also with a significant p-value of 0.000. All domains showed significant correlations, as all p-values were less than 0.05. When correlating the domains

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of online learning environment development with academic motivation, the following correlation coefficients were found peer support had an r-value of 0.620 with a significant p-value of 0.000, and instructor support had an r-value of 0.750 with a significant p-value of 0.000. All correlations had significant p-values of less than 0.05. These findings align with Kyewski and Kramer's (2018) description of motivation in online learning environments as a complex phenomenon influenced by individual traits and specific contexts. Similarly, Sener, Ertem, and Ahmet (2020) found that students' lack of motivation significantly affects teachers' motivation. In a cross-sectional survey, they discovered that a lack of learner motivation, interaction, and autonomy was the second most frequently mentioned issue impacting teachers' experiences with online education. Therefore, it can be concluded that there is a dynamic interplay between learner motivation and positive classroom experiences in online settings.

Table 5. Significance of the Relationship between Academic Motivation and Online Learning Environment Development

Academic Motivation	**Peer Support**	**Instructor Support**	**Overall**
Intrinsic Occupational Motivation	.630* (0.000)	.771* (0.000)	.757* (0.000)
Amotivation	.519* (0.000)	.615* (0.000)	.612* (0.000)
Overall	.620* (0.000)	.750* (0.000)	.740* (0.000)

**Significant at 0.05 significance level.*

3.6. Variables on Online Learning Development—Regression analysis revealed that learning style and academic motivation significantly influence the development of the online learning environment. The analysis showed an F value of 161.467 and a p-value of less than 0.05. The R^2 value of 0.547 indicates that 54.7 percent of the variation in the online learning environment is due to learning style and academic motivation, while the remaining 44.7 percent is influenced by other factors not covered in this study. The p-value of less than 0.05 leads to the rejection of the null hypothesis set earlier in the study. Specifically, the data indicated that both learning style and academic motivation significantly influence online learning development, with p-values of 0.000, which are less than the alpha value of 0.05. Among these, academic motivation has the most substantial impact on online learning environment development, with the highest beta coefficient of 0.786. While learning style also influences the online learning environment, it does so with the support of other factors not included in this study. This suggests that both learning style and academic motivation affect the online learning environment.

4. Conclusions and Recommendations

This chapter presents the findings, conclusion and recommendation based on the results of the data analyzed, discussed, and drawn implications. Findings are based on the posed statement of

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the problem; conclusions are based on the findings generated and recommendations are based on the implications of the discussions.

4.1. Findings—There is a significant relationship observed between the levels of learning style and levels of online learning environment development. As revealed, there is a significant relationship between levels of academic motivation and online learning environment development. In its singular capacity, academic motivation influences online learning environment development having the highest beta coefficient. This indicates that academic motivation strongly influenced online learning environment development. The study's results demonstrate that students exhibit a very high level of engagement and motivation within their online learning environment. The overall mean score of 4.21 for learning styles indicates a strong and consistent manifestation of various learning styles among students. The highest mean rating for collaborative learning (4.42) underscores the effectiveness of teamwork-oriented approaches, while the significant scores for competitive (4.31) and dependent (4.26) styles suggest that students also thrive in competitive and supportive settings. The lower mean rating for avoidant learning (3.83) suggests that disengagement is less prevalent but still present. In terms of academic motivation, the grand mean of 4.40 reflects a robust and consistent drive among students to engage with their studies. The high mean rating for intrinsic occupational motivation (4.45) highlights that students are deeply motivated by their inherent interest in learning, whereas the mean rating for amotivation (4.35) indicates that occasional feelings of disengagement are present but do not dominate. For the online learning environment, the grand mean of 4.36 signifies that the development and support structures are highly effective. Instructor support, with a mean rating of 4.41, is particularly valued, emphasizing the critical role of educators in facilitating a successful online learning experience. Peer support also received a high mean rating of 4.32, demonstrating that interactions among students contribute significantly to the overall learning environment. Adapting online learning environment development can be contributory to acquisition of maximum learning. However, the way an online learning environment is designed is largely affected by the teacher's philosophy of learning and understanding of educational learning theories. Teachers need to understand every learner's learning style and give focus in maintaining learners' academic motivation to achieve a positive online learning environment. It can be noted that other factors which were manifested in the respondents' responses were not among those included in this study. The findings in this study confirms Kolb's Experiential Theory which explained that learning style is a signed indicators that students perceive, interact and response to learning environments. Other findings from this study revealed that in the level of academic motivation of students, intrinsic occupational motivation has the lowest rating though still very high. It was identified from the item-statements that the lowest referred to is the necessity of the age in determining academic motivation. With this, teachers may consider developmentally appropriate practices in their lessons for the learners to become academically motivated. The level of online learning environment development of students is very high as shown from the very high results of all its two indicators. It can be drawn from the findings that in the implementation of online learning, peer support is the lowest though it showed very high. Finding showed that students give less support with peers who struggle to learn. Such finding indicated the need to boost others emotionally aspects of life for them to fit in the learning environment.

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4.2. Conclusions—Therefore, the researcher recommends that the Department of Education develop programs to further enhance the intrinsic motivation of learners, helping them maintain the momentum of acquiring skills and knowledge. The Department of Education should also create engaging learning strategies that foster interaction within the community and family, even in the online world. Although the research highlights the significant influence of academic motivation on the development of the online learning environment, the researcher suggests further investigation into other factors associated with online learning environment development. Future studies, both quantitative and qualitative, should be conducted to validate the findings of this study.

4.3. Recommendations—Given the high levels of engagement across various learning styles, particularly in collaborative and competitive settings, it is recommended that educators continue to emphasize and incorporate these elements into their teaching strategies. Teachers should design activities that foster teamwork and encourage friendly competition, as these approaches resonate strongly with students. Additionally, since both dependent and independent learning styles are also highly rated, providing opportunities for students to work autonomously while still offering support when needed will cater to diverse learning preferences. It is also advisable to address the avoidant learning style by implementing strategies that increase student engagement and participation, such as interactive and inclusive activities that mitigate tendencies to withdraw from learning experiences. The very high level of intrinsic motivation observed among students suggests that educators should focus on creating learning experiences that enhance students' inherent interest and enjoyment in their subjects. Incorporating engaging and meaningful content that connects to students' personal interests can help maintain and even increase this motivation. Additionally, while the level of amotivation is relatively lower, it is important to identify and address the factors contributing to any feelings of disengagement. Strategies such as regular feedback, goal setting, and fostering a growth mindset can help combat amotivation and sustain students' drive to succeed. Tailoring support to meet students' individual motivational needs will further enhance their overall academic engagement and performance. The high mean ratings for both instructor and peer support highlight their critical roles in creating a successful online learning environment. To build on these strengths, it is recommended that institutions provide ongoing professional development for instructors to ensure they can offer effective and responsive support. Additionally, enhancing platforms and tools that facilitate peer interactions, such as discussion forums and collaborative projects, can further strengthen the sense of community among students. Regularly assessing and refining online learning practices based on student feedback will also help maintain and improve the quality of support. Ensuring that both instructor and peer support systems are robust and dynamic will contribute to an even more effective and engaging online learning experience. At this point, teachers may plan out activities that will consider learners' emotional needs as well. There is a significant relationship between learning style and online learning environment development. This indicates that considering the learning style in every learning activity within the online learning environment is essential. Teachers may consider the inclusion of learning activities and approaches in their lessons that boost self- confidence and self-reliance. Additionally, there is a significant relationship between academic motivation and the development of the online learning environment, indicating that academic motivation is essential in any online learning setting. To achieve successful learning in online classrooms, teachers must acquire the necessary skills for online

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teaching. Academic motivation, in particular, has the most substantial influence on the development of the online learning environment, as evidenced by its highest beta coefficient.

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