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Perceptual Learning Style Preferences among Undergraduate Students of University of Environment and Sustainable Development

Michael Bosomtwe
Office of the Registrar, University of Environment and Sustainable Development, Ghana, *bosomtwemichael@gmail.com*

Grace Ama Ampong
Office of the Vice-Chancellor, University of Environment and Sustainable Development, Ghana, *gaampong@uesd.edu.gh*

Justina Betty Arko Mayne
Examination Unit, University of Environment and Sustainable Development, Ghana, *jbamayne@uesd.edu.gh*

Joyce Adjei Adjekum
Directorate of Finance, University of Environment and Sustainable Development, Ghana, *jaadjekum@uesd.edu.gh*

Research on the preferred learning style preferences of students has become increasingly vital in the contemporary education setting. Students' knowledge of preferred learning styles can significantly enhance the effectiveness of teaching and learning processes across various disciplines. This research employed latent class analysis as the primary analytic approach to identify unobserved heterogeneity beyond mean-level effects, while one-way ANOVA was used to examine group differences in perceptual learning style preferences. A cross-sectional research design was adopted with participants selected through convenience sampling method. Participants (N=310) consisted of 170 males and 140 females, with their ages ranging from 16 to 37 years. All participants completed the perceptual learning style preferences questionnaire which recorded a strong reliability ($\alpha = 0.905$, $\omega = 0.924$). The data were analysed using latent class analysis (LCA) followed by One-way ANOVA. The latent class analysis (LCA) revealed four distinct classes with estimated population shares of 18.2% for Class 1, 26.4% for Class 2, 40.3% for Class 3 and Class 4 comprised 15.1%. The four-class solution revealed by the LCA demonstrates that a homogeneous approach to instructional delivery will leave significant sub-groups of students disengaged. Furthermore, mean differences were examined among the four latent classes using a one-way ANOVA indicated a statistically significant effect of class membership on learning style preferences. The study recommends that management of education institutions strongly emphasise the importance of accommodating diverse learning styles to enhance student academic success.

Keywords: learning styles, perceptual learning style preferences, undergraduate students, latent class analysis, perceptual learning

INTRODUCTION

Research on perceptual learning style preferences (PLSP) has significantly increased in educational settings. This research stream aims to understand how individual students most effectively learn and process information, with a focus on their preferred sensory modalities (AlFhaid et al., 2022; Ariastuti

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& Wahyudin, 2022; AL-Roomy, 2023; Nge & Eamoraphan, 2020; Van Vu & Tran, 2020). For instance, Nge and Eamoraphan (2020) emphasised the rise of blended learning styles, which combine different learning methods to cater to diverse needs. This approach recognizes that learners benefit from varied methods rather than rigid adherence to one style. In their meta-analysis of learning styles and instructional matching, Clinton-Lisell and Litzinger (2024) demonstrated that aligning instruction with students' preferred modalities can produce measurable benefits ($g = 0.31$). However, the limited evidence of crossover effects highlights the constraints of relying solely on this strategy. Evaluating these findings alongside broader research on blended learning and multimodality suggests that while acknowledging students' preferences is valuable, effective teaching requires a balanced, multimodal approach. Therefore, our understanding of students' preferred learning styles is paramount for effective teaching and learning, as this can enhance student engagement, motivation, and academic achievement.

Learning styles among students include various modalities, preferences and strategies. It is shaped by identifying an individual's inclinations toward different types of information and mental activities. These personal preferences reflect the diverse methods students use to acquire and understand new information (Naseer et al., 2020). Learning styles, according to Ha (2021), encompass a multifaceted set of cognitive, affective and psychological behaviours that profoundly influence how learners perceive, interact with and ultimately respond to their learning environment. These styles are not static; rather, they are shaped by a dynamic interplay of physiological and social factors (Reid, 1995). Reid identifies six key components of perceptual learning style preferences as visual, auditory, kinesthetic, tactile, individual and group learning. Based on Reid's classification of learning style preferences, it is important to acknowledge that individuals rarely exhibit a single dominant learning style. Instead, they typically possess a blend of preferences that may vary depending on the subject matter, the learning context and even their own mood or energy levels (Al-Janash, 2018; Firissa & Gebremariam, 2024; Van Vu & Tran, 2020). Recognising this fluidity is essential for educators who aim to create inclusive and effective learning environments.

Studies using perceptual learning style preferences questionnaire (PLSPQ) have revealed diverse findings across different populations. Firissa and Gebremariam (2024) found group learning to be the predominant style among Ethiopian grade 11 students, while Van Vu and Tran (2020) found active learning styles (tactile, auditory, group and kinesthetics) to be most common among Vietnamese first-year university students. Al-Janash (2018) reported that tactile, auditory and kinesthetic as major preferred learning styles among English as some foreign language students in Libya. On the other hand, Gencha (2024) emphasised the importance of understanding learning styles to enhance student success, while Balaraman and Shah (2022) highlighted the significance of considering PLSPs in teaching Orang Asli students. These studies demonstrate the multifaceted nature of learning styles and the value of the PLSPQ in exploring individual learning preferences. What is more, the PLSPQ provides a valuable tool for exploring and understanding student learning preferences.

Studies examining the connection between students' learning style preferences and their academic success among university students have reported mixed findings. The connection between students' learning style preferences and their academic success among university students reported visual learners achieving higher grade point averages (GPAs) compared to kinesthetic and auditory learners (AlFhaid et al., 2022; Ariastuti & Wahyudin, 2022; Firissa & Gebremariam, 2024; Ghobain & Zughaibi, 2024; Van Vu & Tran, 2020). Asadipiran (2016) discovered that Iranian young learners predominantly preferred visual learning, with group learning being the least preferred while Siddique et al., (2014) found that tactile learning style was most preferred among students at the University of Agriculture, Faisalabad, followed by auditory. Conversely, Ghobain and Zughaibi (2024) identified a positive correlation between auditory learning and academic performance among English major students. Van Vu and Tran (2020) observed that active learning styles (tactile, auditory, group,

kinesthetic) were prevalent among Vietnamese first-year university students, with a noted influence on academic outcomes. Nge and Eamoraphan (2020) found that mixed learning styles were most preferred among Myanmar English as Foreign Language (EFL) students, followed by group, kinesthetic, auditory, visual, tactile and individual styles. Similarly, AL-Roomy (2023) identified auditory as the most common learning style, followed by kinesthetic and individual, with group learning being the least preferred. These studies highlight the diverse learning style preferences among students and the need for educators to consider these preferences to enhance teaching effectiveness and student learning outcomes.

Studies exploring students' perceptual learning style preferences among university students in Ghana are limited. Given the importance of perceptual learning style preferences in academic contexts, this study aims to investigate perceptual learning style preferences (PLSP) among undergraduate students at the University of Environment and Sustainable Development (UESD) in Ghana. To the best of our knowledge, no prior empirical research has utilised Reid's (1995) PLSP model within any Ghanaian university. Our comprehensive Google Scholar search conducted in December 2024 using the keywords "Reid's PLSP," "Ghana," And "University" confirmed this research gap. Therefore, this study marks a pioneering effort in Ghanaian universities, particularly at UESD. The researchers attempt to apply Reid's perceptual learning style preferences (PLSP) to classify students according to their preferred learning styles and examine the mean differences among these classes.

UESD is public-funded through the Act 898 of 2015 by Parliament, which offers 4-year honours bachelor's programmes in Natural and Environmental Sciences, Sustainable Development and Built Environment. The university has 944 student population and 378 staff population as at the time of the study. The university can boast of videoconferencing, ICT and dedicated science laboratories. The university embraces diverse pedagogical approaches, including blended learning, community-based experiential learning, student internships, educational field trips, online delivery and traditional face-to-face instruction. The university also provides comprehensive support services for students and staff, including academic advising, peer support, a counselling unit and dedicated student services. This multifaceted approach aims to cultivate graduates who are not only academically proficient but also entrepreneurial, resilient and equipped to address pressing environmental challenges.

This study aims to employ a latent class analysis technique to classify students based on their preferred learning styles. Latent Class Analysis (LCA) is a statistical method that identifies distinct subgroups within a population based on observed characteristics (Weller et al., 2020). By employing LCA, the researchers will categorise students into subgroups based on their responses to the Reid's (1995) six dimensions of the perceptual learning style preference questionnaire (PLSPQ), shedding light on the diversity of student learning styles. LCA is suitable for categorical data (nominal and ordinal), while latent profile analysis (LPA) is typically used with continuous data. Following the latent class analysis (LCA), we conducted a One-way ANOVA to gain a more comprehensive understanding of the differences between these groups. Thus, by applying Latent Class Analysis (LCA), this study adopts an advanced statistical technique to uncover distinct, previously unobserved subgroups within the undergraduate student population. This methodological approach not only improves the accuracy of analyzing learning style preferences but also offers a valuable framework for future educational research in Ghana aimed at exploring complex learner characteristics. Furthermore, the findings of this study will contribute to a better understanding of individual differences in learning and provide valuable insights for improving academic performance. The research study endeavours to contribute to the thoughts on students learning in higher education institutions by identifying sensory-based learning patterns that can guide more inclusive and responsive teaching practices.

This study aims to answering the following research questions:

- What are the predominant latent classes of perceptual learning styles among undergraduate students at the University of Environment and Sustainable Development (UESD) in Ghana?
- What are the mean differences in perceptual learning style preferences among undergraduate students belonging to different latent classes?

METHOD

Participants

The population of the study consisted of all undergraduate students enrolled at the University of Environment and Sustainable Development (UESD) in Ghana. At the time of the study, there were 944 students studying in the Schools of Natural and Environmental Resources, Sustainable Development and Built Environment (Academic Affairs Division, 2024). The participants of this study were 310 undergraduate students, comprising 170 males (54.80%) and 140 females (45.20%), with ages ranging from 16 to 37 years (M = 21.5, SD = 2.84). The participants were distributed across academic levels as follows: 68 (21.90%) first-year students, 102 (32.90%) second-year students, 101 (32.60%) third-year students, and 39 (12.60%) fourth-year students.

Study Design

The study employed a cross-sectional research design to examine students' perceptual learning style preferences among undergraduate students at UESD. This design was selected for its ability to capture data at a single point in time during the semester, providing a snapshot of students' preferences (Polit & Beck, 2014; Sedgwick, 2014). To recruit participants, a convenience sampling method was implemented, targeting 310 undergraduate students. This approach was chosen for its practicality, leveraging the availability of participants as the basis for selection (Sedgwick, 2014).

However, the use of convenience sampling comes with certain limitations. It may lead to selection bias, as participants are chosen based on accessibility rather than randomisation, which can impact the representativeness of the sample. This bias undermines the generalisability of the findings, as the sample may not accurately reflect the broader undergraduate population (Bornstein et al., 2015). In this study, researchers noted that relying on university students restricted the applicability of results to the broader student population's perceptual learning preferences.

To mitigate the inherent limitations of convenience sampling,the researchers employed a quota sampling strategy to ensure comprehensive subgroup representation. Participants were systematically selected based on their department, academic programme, and year of study (Stratton, 2021).

Measures

Participants were invited to complete a perceptual learning style preferences questionnaire (PLSPQ) in their respective lecture rooms for 20-30 minutes before their classes began. The PLSPQ, based on Reid's (1995) model, consisted of 30 items designed to assess visual, auditory, kinesthetic, tactile, individual, and group learning preferences. Students were administered the questionnaire in their classrooms and encouraged to complete it at their own pace. Data collection occurred between July and August 2024 at UESD in Ghana, with all students completing the questionnaire.

Reliability and Validity

To validate the PLSP questionnaire for the Ghanaian context, its reliability and validity were evaluated. Reliability, assessed via Cronbach's α (0.90) and McDonald's ω (0.92), surpassed the 0.7 threshold (Table 1). These values, exceeding the recommended thresholds of 0.7 for reliability (Hayes & Coutts, 2020) provide empirical support for the scale's reliability. Face and construct validity were also examined. A pilot test with 25 students from UESD's Department of Water Resources and

Management ensured the questionnaire's suitability for the Ghanaian context, demonstrating 100% item response and no reported clarity or linguistic issues.

Data Procedure and Instrument

Permissions for this study were obtained from the relevant departments at the university. Students were invited to participate by anonymously completing a questionnaire that included measures on demographics and perceptual learning style preferences. Completed questionnaires were then returned to the researchers, with instructions provided at the top of each measure indicating how it should be completed.

Data Analysis

Latent Class Analysis

This study utilises latent class analysis (LCA) to determine the learning style preferences of undergraduate students at the University of Environment and Sustainable Development (UESD) in Ghana, based on Reid's (1995) perceptual learning style preferences questionnaire. LCA aims to classify similar objects into distinct, unknown groups (Spurk et al., 2020). To ensure valid and valuable results, certain statistical assumptions must be met. First, the sample size for LCA should exceed the 300 cases often recommended by previous studies (Nylund et al., 2007; Spurk et al., 2020). While smaller sample sizes are acceptable with simpler models (fewer indicators and classes) and "well-separated" classes (Weller et al., 2020), a minimum of 300 cases is ideal (Nylund-Gibson & Choi, 2018; Spurk et al., 2020). The analysis was conducted using the SnowRMM module in Jamovi Version 2.6.13.

Several criteria are used to assess the goodness of fit, including the Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Sample-Size Adjusted BIC (SABIC), entropy, and fit statistics (G^2 and χ^2). Lower values of these criteria indicate a better model fit (Ferguson et al., 2020). According to researchers (Nylund et al., 2007; Weller et al., 2020), lower AIC and BIC values are increasingly being recognised as the most reliable and commonly reported in LCA studies. Additionally, it was considered essential that the smallest profile should represent at least 5% of the sample (Marsh et al., 2009).

FINDINGS

Descriptive Statistics and Reliability Analysis of Perceptual Learning Style Preferences

Table 1 provides descriptive statistics (mean and standard deviation) and reliability analyses (Cronbach's α and McDonald's ω) for perceptual learning style preferences (PLSP) based on the responses of 310 participants. These dimensions were evaluated using a four-point Likert scale, where 1 corresponded to "Strongly disagreed" and 4 to "Strongly agree."

The mean scores presented in the table ranged from 3.11 (SD = 0.90) for the individual learning dimension to 3.64 (SD = 0.40) for the visual learning dimension. The overall scale mean was 3.39 (SD = 0.37), indicating moderate variability in responses. These findings highlight significant differences in participants' learning style preferences, with visual learners scoring the highest and individual learners scoring the lowest. These results align with research by Van Vu and Tran (2020), who found tactile, auditory, group, and kinesthetic learning styles to be the most common among Vietnamese first-year university students. Similarly, Al-Janash (2018) reported tactile, auditory, and kinesthetic learning styles as the major preferences among English as a foreign language students in Libya.

Further analysis for the reliability of the perceptual learning style preferences (PLSP) demonstrated strong internal consistency for most learning style dimensions. Cronbach's alpha (α) and McDonald's

omega (ω) exceeded 0.80 for visual, auditory, and tactile learning dimensions. The individual and kinesthetic learning dimensions exhibited excellent reliability (α and ω > 0.93). While the group learning dimension showed moderate reliability (α = 0.70, ω = 0.78), it remained within acceptable limits. The overall scale demonstrated excellent internal consistency (α = 0.90, ω = 0.919). This indicates that the entire set of items used to measure various learning styles was highly reliable. According to Hayes and Coutts (2020), these values exceed the recommended threshold of 0.7 for scale reliability.

Table 1
Descriptive statistics and reliability analysis

Scale	N	Mean	SD	Cronbach's α	McDonald's ω
Visual learner	310	3.64	0.40	0.81	0.82
Auditory learner	310	3.45	0.51	0.81	0.81
Tactile learner	310	3.35	0.50	0.83	0.86
Kinesthetic learner	310	3.26	0.77	0.93	0.94
Individual learner	310	3.11	0.90	0.95	0.96
Group learner	310	3.56	0.39	0.70	0.78
Total	310	3.39	0.37	0.90	0.92

Latent Class Analysis

Latent class analysis was conducted to identify the optimal number of latent classes that best describe the perceptual learning style preferences amongst the 310 participants. The Akaike Information Criterion (AIC), Bayesian Information Criterion (BIC), Sample-Size Adjusted BIC (SABIC), entropy, and fit statistics (G^2 and χ^2) were evaluated across models with two to five classes.

As shown in Table 2, the 4-class solution demonstrated strong model fit indices (AIC = 2769, BIC = 3049, SABIC = 2811, and entropy = 0.967). Additionally, the 4-class solution reduced the likelihood ratio statistic (G^2 = 533, p<.001), indicating it was a good fit for the data. Although the 5-class model had lower AIC (2618), BIC (2969), and SABIC (2671), and higher entropy (0.983), the 4-class model was chosen because it had the best adequacy for representing the population share, suggesting consistency in responses across the groups. This consistency is visually represented in Figure 1. The higher entropy value (0.967) for the 4-class solution indicates higher classification accuracy, meaning the model reliably distinguishes between the different classes. The results align with earlier findings by Nylund et al. (2007) and Weller et al. (2020) who credit lower AIC and BIC values as the most trustworthy and most widely reported in latent class analysis (LCA) studies.

Table 2
Model fit indices for students' perceptual learning style preferences

Class	AIC	BIC	SABIC	Entropy	G^2	χ^2 p
2	3173	3312	3194	1	1014	<.001
3	2888	3097	2920	0.966	690	<.001
4	2769	3049	2811	0.967	533	<.001
5	2618	2969	2671	0.983	345	1

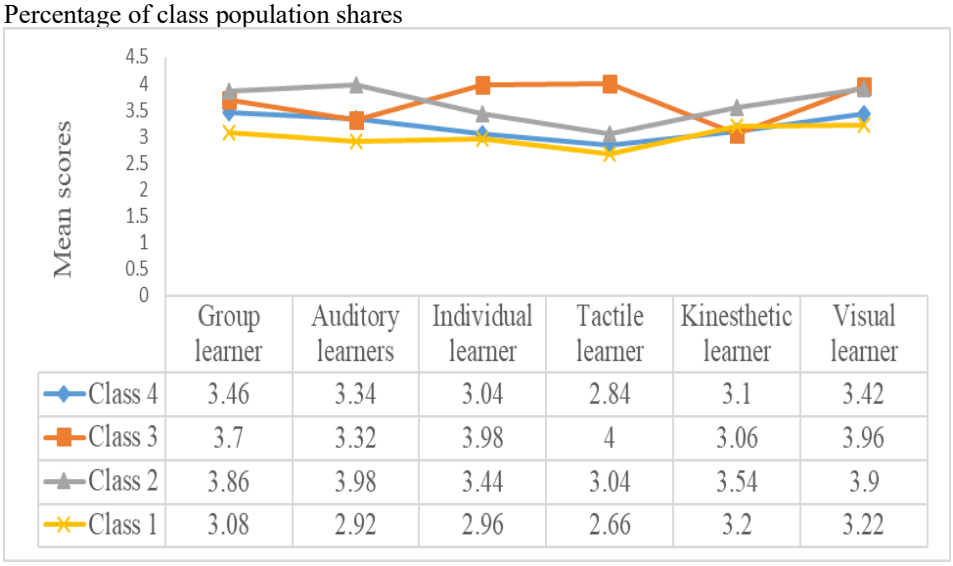
Note. G^2=Likelihood ratio statistic; χ^2=Pearson Chi-square goodness of fit statistic; Entropy=entropy R^2 statistic (Vermunt & Magidson, 2013, p. 71)

The findings of this study provide important practical implications for improving students perceptual learning style preferences among undergraduate students. The identification of four distinct latent classes suggests that students exhibit meaningful differences in their perceptual learning style preferences, which can guide targeted interventions by university administrators and policymakers.

Percentage of Class Population Shares

Class population shares computed based on the 4- latent classes indicating the relative size of each class in the sample. The result presents the conditional item response probabilities and the predicted class memberships derived from a latent class analysis (LCA).

Figure 1
Percentage of class population shares



	Group learner	Auditory learners	Individual learner	Tactile learner	Kinesthetic learner	Visual learner
Class 4	3.46	3.34	3.04	2.84	3.1	3.42
Class 3	3.7	3.32	3.98	4	3.06	3.96
Class 2	3.86	3.98	3.44	3.04	3.54	3.9
Class 1	3.08	2.92	2.96	2.66	3.2	3.22

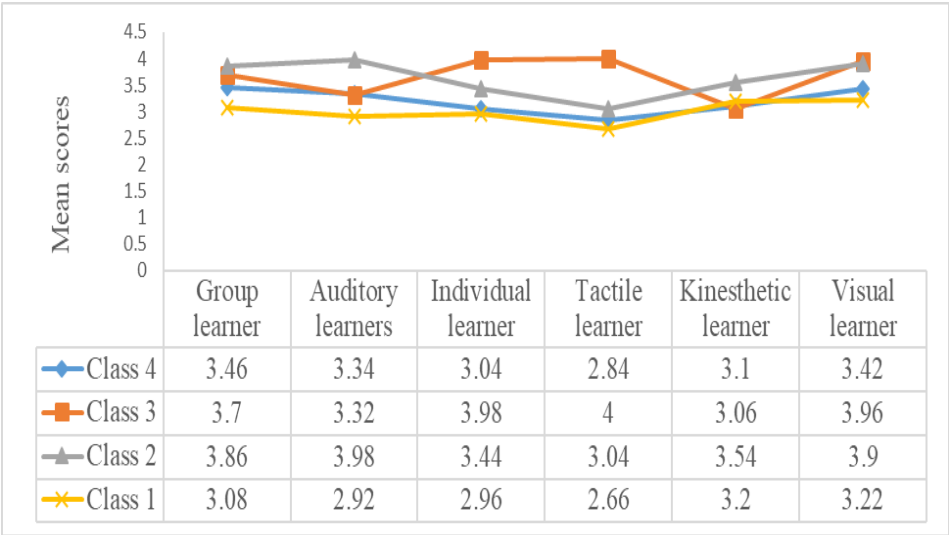
As shown in Figure 1, the analysis revealed the following estimated class population shares and predicted class membership probabilities: Class 1 comprised 18.2% of the sample (predicted membership = 19.0%), Class 2 comprised 26.4% (predicted membership = 25.2%), Class 3 comprised 40.3% (predicted membership = 40.3%), and Class 4 comprised 15.1% (predicted membership = 15.5%). The close correspondence between estimated class population shares and predicted class memberships indicates that the model adequately captures the distribution of participants across the latent classes.

Furthermore, the results support previous studies recommending that 5% of the sample or higher in all classes is sufficient (Nylund-Gibson & Choi, 2018). Overall, the latent class analysis highlights the variability in students' perceptual learning style preferences, with Class 3 (40.3%) representing the predominant and most preferred learning group. These findings underscore the importance of addressing diverse student learning style preferences to enhance overall academic satisfaction. Educational institutions can develop personalized teaching methods and curricular designs to cater to the preferences of each class, thereby improving academic satisfaction and engagement.

Mean Statistics of Class Membership

A descriptive analysis was conducted to examine the mean scores of six perceptual learning styles (group, auditory, individual, tactile, kinesthetic, and visual) across four classes (Class 1 to Class 4).

Figure 2
Mean statistics of class membership



	Group learner	Auditory learners	Individual learner	Tactile learner	Kinesthetic learner	Visual learner
Class 4	3.46	3.34	3.04	2.84	3.1	3.42
Class 3	3.7	3.32	3.98	4	3.06	3.96
Class 2	3.86	3.98	3.44	3.04	3.54	3.9
Class 1	3.08	2.92	2.96	2.66	3.2	3.22

The table presents mean scores for these learning styles, scaled from 1 to 4, with higher scores indicating stronger preferences for a given learning style. For Class 4, Group learners reported the strongest preferences (M = 3.46), followed closely by Visual learners (M = 3.42). Tactile learners exhibited the weakest preference (M = 2.84). For Class 3, Individual learners (M = 3.98) and Tactile learners (M = 4.00) demonstrated the strongest preferences, whereas Kinesthetic learners (M = 3.06) reported the lowest preference. For Class 2, Auditory learners (M = 3.98) and Visual learners (M = 3.90) showed strong preferences, with Tactile learners (M = 3.04) displaying the weakest preference. For Class 1, Kinesthetic learners (M = 3.20) and Visual learners (M = 3.22) reported stronger preferences, while Tactile learners (M = 2.66) had the weakest preference. In all, class membership analysis reveals a distinct student distribution, where a 40.3% plurality clusters into a single dominant profile, and three separate subgroups comprise the remaining 59.7%. This inherent diversity underscores an institutional imperative for universities to formalize flexible, blended, and multimodal learning frameworks to ensure equitable support for all student demographics.
These results align with Nge and Eamoraphan (2020), who emphasize that multimodal approaches effectively accommodate diverse cognitive needs by integrating varied learning styles. Consequently, leveraging these insights allows institutions to transition toward adaptive, student-centred environments that optimize academic engagement and performance.

One-Way ANOVA– Perceptual learning style preferences

To answer this question, the nominal class membership variable generated during the latent class analysis (LCA) was used to test for differences in perceptual learning style preferences among the four latent classes. When conducting a one-way analysis of variance (ANOVA), we checked for the assumption of homogeneity of variances for perceptual learning style preferences across the four latent classes.

The statistically significant effect of class membership on learning style preferences ($F(3, 124) = 128$, $p < .001$) highlights the importance of recognizing and addressing the diverse learning needs of students based on their latent class membership. Given the violation of the homogeneity of variances assumption (Levene's test: $F > 3.84$, $p < .05$), using Welch's ANOVA ensures that these differences

are accurately captured, reinforcing the need for tailored instructional strategies (Field, 2018). The violation of the homogeneity of variances assumption highlights the diverse nature of learning preferences within the population. This calls for the adoption of inclusive teaching methods that address variability and accommodate all learning styles effectively.

Since the findings suggest that mean learning style preferences differ significantly across the latent classes, we further explored pairwise comparisons or post hoc analyses to identify specific group differences.

Table 3
Homogeneity of variances test (Levene's) and one-way ANOVA

	F	df1	df2	p
Perceptual learning style preferences	22.8	3	306	<.001
One-Way ANOVA (Welch's)				
Perceptual learning style preferences	128	3	124	<.001

Games-Howell Post-Hoc Test – Perceptual learning style preferences

The results from the Games-Howell post hoc test provide meaningful insights into how perceptual learning style preferences vary across different student groups. The finding that Class 2 exhibited significantly higher preferences than other classes underscore the importance of tailoring instructional strategies to accommodate these differences. Since the assumption of equal variances was violated, the use of Games-Howell ensures that the identified differences are robust and reliable.

Table 4
Games-Howell Post-Hoc Test – Perceptual learning style preferences

		4	3	2	1
4	Mean difference	—	0.382	-0.175	0.187
	p-value	—	<.001	0.004	0.072
3	Mean difference		—	-0.557	-0.195
	p-value		—	<.001	0.018
2	Mean difference			—	0.363
	p-value			—	<.001
1	Mean difference				—
	p-value				—

The findings of the study suggest a diversity of preferred learning styles among students. This aligns with earlier studies that have described predominant perceptual learning style preferences among students in diverse educational settings (AL-Roomy, 2023; Asadipiran, 2016; Nge & Eamoraphan, 2020; Khalil & Sabir, 2019; Palabıyık, 2014; Siddique et al., 2014). The diverse learning style preferences across latent classes underline the importance of adopting multimodal teaching strategies. Incorporating a mix of auditory, visual, and tactile elements can address the varied needs of students, ensuring more inclusive and engaging learning experiences.

CONCLUSION, DISCUSSION AND SUGGESTIONS

The study aimed to identify the latent classes among undergraduate students' perceptual learning style preferences at the University of Environment and Sustainable Development (UESD) and determine the mean differences among these distinct classes. The reliability analyses demonstrated excellent internal consistency ($\alpha = 0.90$, $\omega = 0.919$) and the overall scale mean of 3.39 (SD = 0.37) suggested moderate variability in responses.

A latent class analysis identified a robust 4-class solution which provided higher classification accuracy (indicated by entropy value) and confirmed the trustworthiness of lower AIC and BIC values in LCA studies. The estimated class population shares and predicted class membership probabilities

closely corresponded, indicating the model adequately captured the distribution of participants across the latent classes. Notably, Class 3, comprising 40.3% of the sample, represented the predominant and most preferred learning group.

The results of Welch's ANOVA indicated a statistically significant effect of class membership on learning style preferences, $F(3, 124) = 128$, $p < .001$. The Games-Howell post hoc test was used to explore pairwise differences in perceptual learning style preferences across the four latent classes, considering the unequal variances observed. Although the comparison between Class 4 and Class 1 was not statistically significant, the results highlighted distinct differences in learning style preferences across latent classes, particularly with Class 2 demonstrating significantly higher preferences compared to other classes.

These findings suggest a diversity of preferred learning styles among students, underscoring the importance of addressing these preferences to enhance overall academic satisfaction. This study aligns with earlier research that has described predominant perceptual learning style preferences among students in diverse educational settings (AL-Roomy, 2023; Asadipiran, 2016; Nge & Eamoraphan, 2020; Khalil & Sabir, 2019; Palabıyık, 2014; Siddique et al., 2014; Vaseghi et al., 2013). The results emphasize the need for educators to consider students' learning style preferences to improve teaching effectiveness and student learning outcomes.

RECOMMENDATIONS

Based on the findings of the study, it is recommended that UESD prioritise initiatives to enhance student satisfaction and overall well-being.

This can be achieved through:

1. The study recommended that the university should highlights the importance of increasing student awareness of their individual learning styles during the admission orientation and academic advising session to facilitate a more personalised and effective learning experience.
2. The study recommends that educators should adopt varied teaching strategies, including visual aids, auditory cues, hands-on activities, and group work, to create an inclusive and engaging learning environment.
3. The study recommends that university management implement regular teacher professional development programmes focusing on differentiated instruction to cater to diverse learning styles and create an inclusive learning environment. By equipping educators with the tools to identify and address diverse learning preferences, institutions can foster a more effective and inclusive learning environment.

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