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Exploring the Dynamics of Academic Life Satisfaction of Undergraduate Students in Ghana: Confirmatory Factor and Latent Profile Analyses

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Abstract

This study examined the academic life satisfaction of undergraduate students at the University of Environment and Sustainable Development (UESD) in Ghana. It aimed to investigate the relationship between undergraduate students' personal satisfaction (PSA) and satisfaction with the academic environment (SAE) at UESD and to identify distinct latent classes based on these factors. A cross-sectional research design was adopted, with participants selected through convenience sampling. The sample consisted of 370 participants: 211 males (57.0%) and 159 females (43.0%), aged 16 to 37 years (M = 21.4, SD = 3.10). All participants completed the Students' Academic Life Satisfaction Scale (SALSS), and the data were analysed using confirmatory factor analysis (LPA) and latent profile analysis (LPA). The statistical analyses were carried out in two steps: first, CFA was used to assess the relationship between the satisfaction with academic environment and personal satisfaction. Second, LPA was applied to identify distinct subgroups based on their academic life satisfaction factors. The results obtained from CFA showed a statistically significant positive covariance between Satisfaction with Academic Environment (SAE) and Personal Satisfaction (PSA) factors, with an estimate of 0.579 (SE = 0.045, Z = 12.9, $p < .001$, standardised estimate = 0.579). The LPA identified subgroups of students with varying patterns of satisfaction regarding academic environment and personal satisfaction. Four distinct classes emerged: low satisfaction (12.6%), moderate satisfaction (15.7%), high satisfaction (54.9%) and mixed feelings (7.8%). The findings of this study will enable the university to enhance student support systems, including academic advising, counselling, and peer mentoring, to foster a more inclusive and supportive campus environment for all students, particularly those with lower satisfaction.

Keywords: Academic life satisfaction, Personal satisfaction, Satisfaction with the academic environment, Confirmatory factor analysis, Latent class analysis.

Citation

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Introduction

Research on academic life satisfaction (ALS) has received considerable attention in recent times. This is because ALS is a critical indicator of both academic success and well-being, reflecting students' overall experiences and adaptation to the academic environment (Santos et al., 2013). Therefore, it is essential for higher education institutions to strive to meet and surpass student expectations to maintain the long-term viability of their operations. This study aims to understand how students' academic life satisfaction can contribute to their development and success in higher education.

Student academic life satisfaction plays a crucial role in fostering self-confidence, enhancing skill development, and facilitating knowledge acquisition, which together contribute to better academic performance (Asadizaker et al., 2015). In a study conducted by Kwakwa et al. (2023), they found that students' satisfaction was linked to their academic performance in the College of Education in Ghana. In another study, Sam et al. (2015) investigated the relationship between life satisfaction, psychological symptoms, and factors like English language proficiency and discrimination among international students in Ghana. They found that students with higher life satisfaction and fewer psychological symptoms were more likely to report positive experiences with English language proficiency and less discrimination.

Studies exploring students' satisfaction with the academic environment and personal satisfaction among university students in Ghana are limited. To the best of our knowledge, no prior empirical research has explored the relationship between personal satisfaction and satisfaction with the academic environment in any Ghanaian university. Our comprehensive Google Scholar search conducted in November 2024 using the keywords "Personal Satisfaction," "Ghana University," And "Satisfaction with the Academic Environment" confirmed this research gap. Therefore, this study is among the first to explore the relationship between personal satisfaction and satisfaction with the academic environment using both confirmatory factor analysis and latent profile analysis.

This study employs confirmatory factor analysis (CFA) and latent profile analysis (LPA) to comprehensively examine the latent structures underlying personal satisfaction and satisfaction with the academic environment. CFA is primarily concerned with validating theoretical models, whereas LPA adopts an exploratory approach to identify naturally occurring subgroups. Both methods are valuable in different research contexts, providing insights into the latent structures (Steenkamp & Maydeu-Olivares, 2021) and profiles characterising complex datasets (Lanza & Bray, 2010). Both methods can complement each other in research, providing a comprehensive view of the data's underlying structure.

Many universities around the world conduct annual student surveys to measure satisfaction levels for the purposes of identifying institutional weaknesses as well as providing prospective students with information about the institutions they intend to enrol (Dattey et al., 2019). In other words, student satisfaction surveys are instrumental in helping universities navigate educational reforms and remain competitive in the market. According to Onditi and Wechuli (2017), students are the primary stakeholders of universities, and thereby assessing their satisfaction levels are paramount for accreditation and essential for maintaining a positive institutional image. Arambewela and Hall (2009) argue that while achieving student satisfaction is challenging, it is crucial for attracting students, as satisfied students promote the institution through positive word of mouth. They recommend that universities adopt a customer-centric approach, making student satisfaction a core part of their management strategy alongside teaching and research.

The University of Environment and Sustainable Development (UESD) is a newly funded public university established by the Act of Parliament of Ghana, ACT 898 in 2015. The University is mandated to teach and to conduct research in the area of environmental issues, agribusiness and sustainable education. Operationally, UESD admitted its first cohort of undergraduate students in 2019-2020 academic year and currently has a student population of 948 enrolled in the School of Sustainable Development and the School of Natural and Environmental Sciences (Academic Affairs Division, 2024). In line with the mandate of the university, management of the university has introduced quality education modules such as students' internship, blended learning platform and community-based experiential learning all aiming at meeting student satisfaction and churning out all-rounded graduates. According to Gloria-Barraza and Ortiz-Moreira (2012), universities should shift their focus to providing a supportive learning environment that promotes student well-being and facilitates knowledge acquisition. In summary, the broader trend of universities is to shift their focus towards creating supportive learning environments that promote student well-being and facilitate knowledge acquisition.

To improve the quality of education and implement effective policies, it is crucial to regularly assess student academic life satisfaction. Despite the importance of student academic life satisfaction for both universities and students, there seems to be a lack of empirical research on Ghanaian university students' academic life satisfaction in relation to their personal satisfaction and satisfaction with academic environment. There is a need for more research on Ghanaian university students' personal satisfaction and satisfaction with academic environment to inform the university management's efforts to promote a healthy learning environment and support student success.

Given the aforementioned considerations, the objective of this study is to employ confirmatory factor analysis (CFA) and latent profile analysis (LPA) to assess the relationship between satisfaction with the academic environment and personal satisfaction among undergraduate students at the UESD. This study is guided by two research questions:

1. Is there a significant relationship between undergraduate students' personal satisfaction and their satisfaction with the academic environment at University of Environment and Sustainable Development, UESD?
2. Can undergraduate students at UESD be classified into distinct profile memberships based on their levels of personal and academic satisfaction, and what are the characteristics of these memberships?

Literature Review

Student Academic Life Satisfaction

Academic life satisfaction (ALS) is a complex construct that reflects students' overall campus experiences and their adjustment to the academic environment (Nogueira, 2018). It is a dynamic concept shaped by personal attributes, relationships with peers and faculty, the quality of the curriculum and teaching, as well as the features and environment of the campus (Soares et al., 2011). For instance, Ghansah et al. (2021) underscored the critical role of classroom environment, textbook availability, tuition fees, student support, administrative efficiency, faculty relationships, expertise, staff assistance, feedback, and class size in shaping student satisfaction at Ghanaian private universities. These authors view student satisfaction as a complex concept influenced by a multitude of interconnected factors, including both personal and environmental elements, such as students' attributes, peer and faculty relationships, curriculum quality and campus features (Ghansah et al., 2021; Nogueira, 2018; Soares et al., 2011).

Academic life satisfaction is "operationally defined as the expected satisfaction in one's life in school by the fulfilment of his/her important academic goals or aspirations" (Kumar & Dileep, 2006, p.1). Academic satisfaction is a subjective evaluation of the overall educational experience, characterised as a psychological state that arises from the fulfilment or non-fulfilment of students' academic expectations (Santos et al., 2013). By understanding the range of student satisfaction levels, institutions can tailor strategies to better meet student needs and improve learning outcomes. This can lead to improvements in teaching, staff coordination, and efforts to align institutional offerings with student expectations, ultimately reducing the satisfaction gap (Soares & Almeida, 2011).

Academic satisfaction is strongly related to the quality of students' learning and is a complex interplay of institutional characteristics, the educational context, and individual students' perceptions and interpretations. For instance, Kumar and Dileep (2006) found ALS to be a significant predictor of academic achievement in social studies among secondary school pupils in Kerala. Student satisfaction is not limited to the lectures in class or guidance by tutors during the consultation hours but it includes the students' experiences while interacting with the non-academic staff, the physical infrastructure and other non-academic aspects of college life such as participation in sporting activities such as football. Thus, by understanding the range of student satisfaction levels, institutions can tailor strategies to better meet student needs and improve learning outcomes. This can lead to improvements in teaching, staff coordination, and efforts to align institutional offerings with student expectations, ultimately reducing the satisfaction gap (Soares & Almeida, 2011).

Personal Satisfaction

There is an agreement among scholars that comparing one's actual accomplishments to one's planned results is a key determinant of perceived satisfaction (Pavot & Diener, 2008). This comparison can be applied to both general life satisfaction and specific domains such as work, family, or profession (Suldo et al., 2006). Student experiences contribute to personal fulfilment (Lent & Brown, 2008) but can also be associated with negative outcomes, including dysfunctional behaviours, stress, failure, and delayed starts. Academic satisfaction has been positively correlated with adjustment, social integration, perseverance, achievement, and overall life happiness (Lent et al., 2009; Suldo et al., 2008; Sisto et al., 2008; Suldo et al., 2006).

It can be deducted from the above discussion that personal satisfaction involves comparing one's actual achievements with desired outcomes and applies to various life domains (Sisto et al., 2008; Suldo et al., 2006). In the academic setting, personal satisfaction enhances student experiences but can be undermined by stress and failure, while academic satisfaction leads to positive outcomes like adjustment, persistence, and overall life satisfaction.

Satisfaction with the Academic Environment

Numerous authors have examined students' satisfaction with their academic environment (Nogueira, 2018; Vanaki & Hakim, 2023; Wong & Chapman, 2023). Nogueira (2018) emphasised the importance of the academic environment in student satisfaction, highlighting factors such as course satisfaction and the overall state of the university campus. Importantly, Ramos et al. (2015) found that students who participated in leisure activities such

as football were more likely to be satisfied with their course and development opportunities compared to students who were less involved in extracurricular activities. In a similar context, Alhamad et al. (2024) found that organisational identification and institutional reputation significantly impact student satisfaction. They recommended that institutions focus on building student-university ties and enhancing their reputation.

Tarmizi and Aprillita (2024) conducted a study to evaluate the impact of academic environment satisfaction on student satisfaction. Their findings revealed a significant correlation between service quality and student satisfaction, with satisfied students indicating a willingness to recommend the institution to prospective students. The findings of Amoako and Asamoah-Gyimah (2020) indicate that the quality of instruction, availability of technology, and the overall psychological climate in the classroom are key factors influencing student satisfaction. In a recent study, Wong and Chapman (2023) found that student satisfaction with various aspects of their university experience, including the programme, teaching, facilities, support, learning, and overall life as a student, was associated with three types of interaction: formal student-student, informal student-student, and student-instructor. Contrary to earlier research suggesting the influence of the academic environment on student satisfaction, Vanaki and Hakim (2023) found that undergraduate nursing students were dissatisfied with their practical education, primarily attributing this to faculty and the educational environment.

Overall, these studies suggest that a positive academic environment, characterised by quality instruction, supportive facilities, strong student-university relationships, and opportunities for extracurricular involvement, is essential for fostering student satisfaction and success (Alhamad et al., 2024; Amoako & Asamoah-Gyimah, 2020; Nogueira, 2018; Tarmizi & Aprillita, 2024; Wong & Chapman, 2023). In other words, factors like organizational identification, institutional reputation, and service quality significantly influence student satisfaction with the course aspect of their education, but dissatisfied with the how-to education provided by academics/educators and the educational environment (Vanaki & Hakim, 2023).

Methods

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 946 students studying in the Schools of Natural and Environmental Resources, and Sustainable Development (Academic Affairs Division, 2024).

The participants of this study were 370 undergraduate students, comprising 211 males (57.0%) and 159 females (43.0%), with ages ranging from 16 to 37 years ($M = 21.4$, $SD = 3.10$). The participants were distributed across academic levels as follows: 135 (35.5%) first-year students, 85 (23.0%) second-year students, 98 (26.2%) third-year students, and 53 (14.3%) fourth-year students. Regarding accommodation, 63 students (17.0%) lived in the university hostel, 155 (41.9%) in private (accredited) hostels, 128 (34.6%) in rented houses, and 24 (6.5%) in their own homes.

Study Design

A cross-sectional research design was employed to survey students' academic life satisfaction at a single point during the semester (Polit & Beck, 2014; Sedgwick, 2014). In line with the objectives of the study, participants were selected based on their availability in lecture rooms, making convenience sampling the most suitable method to recruit 370 undergraduate students (Sedgwick, 2014). Convenience sampling is a non-probability sampling method where participants are selected based on their availability, proximity and ease of access. It facilitates data collection when the target population is difficult to reach or when more robust sampling methods are impractical. While convenience sampling offers some advantages, it has notable limitations in terms of generalisability, as findings are often restricted to the specific sample population. Sedgwick (2014) emphasised that this method might limit the applicability of a study's findings beyond its immediate scope. In this study, researchers acknowledged that the convenience sampling approach restricted the generalisability of results, as the sample mainly consisted of university students, whose perspectives might not fully represent the broader student population's academic life satisfaction. Consequently, future studies should explore random sampling to enhance representativeness.

Data Procedure and Instrument

Data were collected between July and August 2024 at UESD in Ghana. Participants were invited to complete a questionnaire in their respective lecture rooms for a duration of 10-15 minutes prior to the commencement of their lectures. The demographic data of the undergraduate students were computed for their gender, age, accommodation and year of study.

An eight-item academic life satisfaction scale (ALSS) was developed and tested on undergraduate students in Portugal (Nogueira et al., 2019) was adopted for this study based on the Cronbach's α internal consistency showed to be adequate (Cronbach's $\alpha = 0.80$). A two-dimensions structure construct validity was established by principal component analysis, explaining 42.90% of total variance.

To ensure that the Academic Life Satisfaction Scale (ALSS) is adapted to the Ghanaian context, a pilot test involving 25 students from the Department of Water Resources and Management at the University of Environment and Sustainable Development (UESD) confirmed the clarity, relevance and comprehensibility of the items, with a

100% item response rate and no reported difficulties or linguistic issues. Furthermore, the original eight-item ALSS, developed by Nogueira et al. (2019) for use in Portugal, was already in English, the official language of instruction in Ghana.

The psychometric evaluation of the adapted scale yielded robust reliability coefficients, with Cronbach's alpha (α) at 0.841 and McDonald's omega (ω) at 0.850. The scale exhibited satisfactory convergent validity, as demonstrated by an average variance extracted (AVE) of 0.537, as presented in Table 1. These values, exceeding the recommended thresholds of 0.7 for reliability (Hayes & Coutts, 2020) and 0.40 for AVE within each dimension (Huang et al., 2013), provide empirical support for the scale's reliability and validity. These results affirm the scale's effectiveness in the Ghanaian context, aligning with results from the original study by Nogueira et al. (2019).

Few modifications were therefore made to the scale by the authors to measure students' academic life satisfaction at UESD. For example, we introduced demographic data such as age, accommodation, level of study and gender to the questionnaire items. The ALSS includes items related to personal satisfaction and satisfaction with the academic environment. The ALSS was rated on a 4-point Likert-type scale with all items positively worded (1 = Very dissatisfied; 2 = Dissatisfied; 3 = Satisfied; 4 = Very satisfied). The instrument was adapted from Nogueira (2019) and modified to fit the Ghanaian context.

Data Analysis

In the present study, confirmatory factor analysis (CFA) and latent profile analysis (LPA) were performed using Jamovi 2.6.13 Version to examine and classify the relationships between personal satisfaction and satisfaction with the academic environment, as components of students' academic life satisfaction at UESD. Thus, CFA is primarily used to test hypotheses about the structure of latent variables, while LPA identifies subgroups within a population based on observed data patterns. The statistical analyses were carried out in two steps: first, CFA was used to assess the association between the variables by testing the measurement models. Second, LPA was applied to identify distinct subgroups of undergraduate students based on their academic life satisfaction. Together, these methods offer valuable insights into data validation and individual variation.

Confirmatory Factor Analysis

Confirmatory factor analysis (CFA) is used to validate a proposed measurement model by assessing how well observed variables represent the underlying theoretical factor variables they are intended to measure. To assess the model fit, we followed the criteria outlined by Memon et al. (2021), which included evaluating the standardised root mean square residual (SRMR), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). Models with RMSEA $\leq .05$, SRMR $\leq .05$, TLI and CFI $\geq .95$ demonstrate close fit, while RMSEA $\leq .08$, SRMR $\leq .08$, TLI and CFI $\geq .90$ indicate a reasonable fit (Steenkamp & Maydeu-Olivares, 2021). According to Hooper et al. (2008), SRMR and RMSEA values below 0.08, along with CFI and TLI values exceeding 0.90, are indicative of an acceptable model fit. In line with literature on evaluating model fit, the following indices including SRMR, RMSEA, CFI, and TLI were employed to understand how well Academic Life Satisfaction Scale (ALSS) represent the underlying theoretical factor variables.

Latent Profile Analysis

Latent profile analysis (LPA) is a model-based classification technique that groups individuals into homogeneous latent classes based on similarities in their scoring patterns (Lubke & Muthén, 2005), taking into account individual characteristics (Lanza & Bray, 2010). To assess the academic life satisfaction of undergraduate students at the University of Environment and Sustainable Development (UESD) in Ghana, LPA was conducted on data collected from all participants using the 8-item Academic Life Satisfaction Scale (ALSS) questionnaire.

When conducting LPA, a few issues relating to the assumptions of the statistical procedure must be met to ensure that the results obtained are valid and valuable. First, the researchers considered the sample of this study large enough for LPA since it is well above the 300 cases often advocated by previous studies. This sample size is largely in line with recommendations from Spurk et al.'s (2020) guide for using latent profile analysis and results from Nylund et al.'s (2007) simulation study, suggesting that approximately 300 - 500 participants provide a sufficient sample for LPA. Although small sample sizes are acceptable with simpler models (having fewer indicators and classes) and "well-separated" classes (Weller et al., 2020), it has been recommended that having at least 300 cases is ideal (Nylund-Gibson & Choi, 2018; Spurk et al., 2020).

The analysis was performed with the tidyLPA package in Jamovi Version 2.6.13, which allows for specifying different models to estimate parameters such as means, variances, and covariances (Rosenberg et al., 2018). It also allows for the comparison of different solutions based on the number of profiles extracted. In this study, models with one to five profiles were tested to determine the optimal number of profiles. Several criteria were used to evaluate the goodness of fit, including the Akaike Information Criterion (AIC), Adjusted Weight of Evidence (AWE), Bayesian Information Criterion (BIC), Classification Likelihood Criterion (CLC), and Kullback Information Criterion (KIC). Lower values of these criteria indicate better model fit (Ferguson et al., 2020). The best fit among the models was determined using the bootstrapped likelihood ratio test (BLRT). Additionally, model

entropy values were examined, with an entropy value above 0.8 indicating a good fit (Muthén, 2004; Tein et al., 2013). Finally, the criterion that the smallest profile should represent at least 5% of the sample was also considered (Marsh et al., 2009).

Results and Discussion

Reliability and Validity of Academic Life Satisfaction Scale

As presented in Table 1, reliability and validity analyses were computed for Cronbach's α, McDonald's ω, and Average Variance Extracted (AVE) for academic life satisfaction scale, which was measured using two dimensions: Satisfaction with Academic Environment (SAE) and Personal Satisfaction (PSA). These dimensions were rated on a four-point Likert scale, where 1 represented "Very dissatisfied" and 4 represented "Very satisfied".

Table 1. Reliability and validity of academic life satisfaction scale

Item	Cronbach's α	McDonald's ω	AVE
SAE	0.871	0.874	0.627
PSA	0.764	0.776	0.447
Total	0.841	0.850	0.537

The results showed a good reliability (α = 0.841, ω = 0.850) and an AVE of 0.537, indicating strong convergent validity. The reliability coefficients exceeded the 0.7 threshold (Hayes & Coutts, 2020), while the AVE of 0.537 was greater than 0.50 guideline outlined by Huang et al. (2013), confirming the scale's adequacy. The scale's adequacy is consistent with Nogueira et al. (2019), who also found the scale reliable and valid when assessing academic life satisfaction in Portuguese undergraduates. These consistent results across diverse settings support the scale's broader applicability in varied educational contexts, including career counselling and academic policy-making. Consequently, universities could implement routine surveys using this scale to identify areas of dissatisfaction among students and design targeted interventions (Dattey et al., 2019).

Confirmatory Factor Analysis

Fit measures for confirmatory factor analysis results

To address the first research question, a confirmatory factor analysis was conducted to examine the relationship between students' satisfaction with their academic environment and their personal satisfaction fit the model. We followed the criteria outlined by Memon et al. (2021), which included evaluating the standardised root mean square residual (SRMR), the root mean square error of approximation (RMSEA), the comparative fit index (CFI), and the Tucker-Lewis index (TLI). The results of confirmatory factor analysis are shown in Table 2.

Table 2. Fit measures for confirmatory factor analysis results

				RMSEA 90% CI				
CFI	TLI	SRMR	RMSEA	Lower	Upper	χ^2	df	p
0.972	0.958	0.0387	0.0710	0.0493	0.0934	54.4	19	<.001

The results indicated that the model achieved satisfactory fit indices: Comparative Fit Index (CFI = 0.972), Tucker-Lewis Index (TLI = 0.958), standardised root mean square residual (SRMR = 0.0387), and root mean square error of approximation (RMSEA = 0.071), supporting model acceptability. According to Hooper et al. (2008), SRMR and RMSEA values below 0.08, as well as CFI and TLI values exceeding 0.90, are indicative of an acceptable model fit. Similarly, Steenkamp and Maydeu-Olivares (2021) suggest that models with RMSEA ≤ .05, SRMR ≤ .05, and both TLI and CFI ≥ .95 demonstrate close fit.

The results of this study support the hypothesis that personal satisfaction and academic environment satisfaction significantly predict students' overall campus experience and academic adjustment (Nogueira, 2018; Ramos et al., 2015). These results align with Soares et al.'s (2011) assertion that personal attributes, peer and faculty relationships, curriculum quality, teaching, and campus features influence academic life satisfaction. Furthermore, universities and colleges can use these findings to design targeted interventions aimed at improving students' satisfaction with their personal and academic environments.

Standardised Factor Loadings for Students Academic Life Satisfaction

The results, as presented in Table 3 and Fig. 1, revealed that all factor loadings were statistically significant ($p < .001$). For the Satisfaction with Academic Environment (SAE) factor, standardised factor loadings ranged from 0.710 to 0.875, with SAE4 demonstrating the strongest association with the latent factor (Estimate = 0.454, SE = 0.0224, Z = 20.2, $p < .001$, Stand. Estimate = 0.875). Similarly, for the Personal Satisfaction (PSA) factor, standardised loadings ranged from 0.578 to 0.820, with PSA4 being the most robust indicator (Estimate = 0.407, SE = 0.0241, Z = 16.9, $p < .001$, Stand. Estimate = 0.820). These findings validate the proposed measurement model, highlighting significant loadings of observed variables on their respective latent factors.

The results support prior research by Kwakwa et al. (2023), who found a relationship between student satisfaction and academic performance in the College of Education in Ghana. Moreover, the findings align with Lent and Brown's (2008) assertion that personal satisfaction positively shapes student experiences. Nogueira (2018) also emphasised the role of academic environment factors, such as course satisfaction and campus quality, in enhancing student satisfaction. The findings suggest that universities and colleges should focus on improving both academic environments and personal satisfaction factors to enhance student experiences and academic performance. Practical steps could include refining academic programmes to ensure course satisfaction, establishing mentorship programmes to strengthen faculty-student relationships, and upgrading campus facilities to create a welcoming and conducive learning environment.

Table 3. Standardised factor loadings for students' academic life satisfaction

				95% Confidence Interval				
Factor	Indicator	Estimate	SE	Lower	Upper	Z	p	Stand. Estimate
SAE	SAE1	0.415	0.0276	0.361	0.469	15	<.001	0.71
	SAE2	0.477	0.026	0.426	0.528	18.4	<.001	0.817
	SAE3	0.477	0.0282	0.421	0.532	16.9	<.001	0.776
	SAE4	0.454	0.0224	0.41	0.498	20.2	<.001	0.875
PSA	PSA1	0.397	0.0288	0.34	0.453	13.8	<.001	0.693
	PSA2	0.326	0.0275	0.272	0.379	11.8	<.001	0.619
	PSA3	0.379	0.0344	0.311	0.446	11	<.001	0.578
	PSA4	0.407	0.0241	0.359	0.454	16.9	<.001	0.82

Factor Covariances for Academic Life Satisfaction

As indicated in Table 4 and Figure 1, the results of the confirmatory factor analysis (CFA) revealed a statistically significant positive covariance between the Satisfaction with Academic Environment (SAE) and Personal Satisfaction with Academics (PSA) factors (Estimate = 0.579, SE = 0.045, Z = 12.9, $p < .001$, Stand. Estimate = 0.579). The 95% confidence interval for the covariance ranged from 0.491 to 0.667, demonstrating a moderate positive relationship between the two latent constructs. This result indicates that an increase in satisfaction with the academic environment is associated with an increase in personal satisfaction with academics.

The findings are consistent with previous research. For instance, Tarmizi and Aprillita (2024) identified a significant correlation between service quality and student satisfaction, highlighting that satisfied students were more likely to recommend their institution to prospective students. Similarly, Wong and Chapman (2023) emphasised that student satisfaction, across aspects such as program quality, teaching, facilities, support, learning, and the overall student experience, was influenced by formal student-student, informal student-student, and student-instructor interactions. The findings suggest that institutions should prioritise improving the quality of academic environments while fostering personal satisfaction through enhanced interaction opportunities. Practical measures could include student relationships both formal and informal interactions among students and improving service quality. These initiatives not only contribute to better academic outcomes but also encourage positive recommendations, enhancing the institution's reputation.

Table 4. Factor covariances for academic life satisfaction

				95% Confidence Interval				
		Estimate	SE	Lower	Upper	Z	p	Stand. Estimate
SAE	SAE	1.000[a]						
	PSA	0.579	0.045	0.491	0.667	12.9	<.001	0.579
PSA	PSA	1.000[a]						

[a] fixed parameter

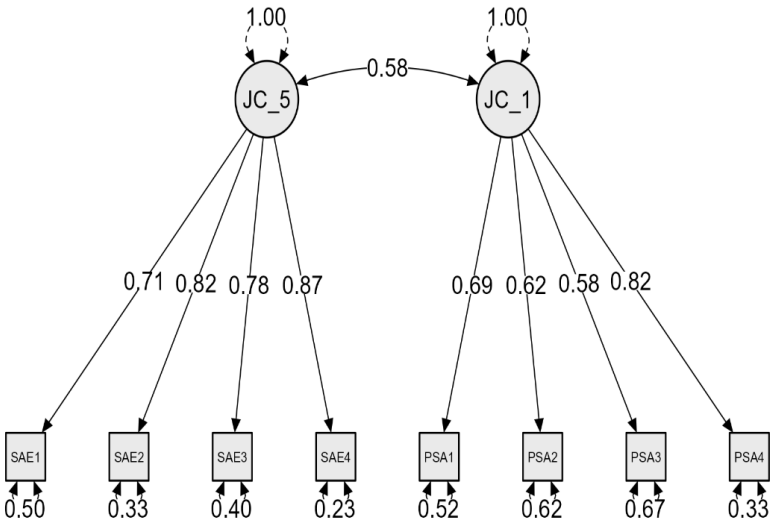

Figure.1. Path model of students' academic life satisfaction

Latent Profile Analysis

Latent Profile Analysis (LPA) was performed to determine the optimal number of profiles representing undergraduate students' academic life satisfaction, as displayed in Table 5. Models with two to five classes were evaluated using multiple fit indices, including the Akaike Information Criterion (AIC), Approximate Weight of Evidence (AWE), Bayesian Information Criterion (BIC), Classification Likelihood Criterion (CLC), and Kullback Information Criterion (KIC). Among these, the 4-class solution demonstrated the best fit, characterised by the lowest AIC (2703), BIC (2941), and CLC (2583) values, along with a high entropy value (1.00), which indicated clear and reliable classification of students into distinct groups. According to Akogul and Erisoglu (2017), prioritising models with better fit indices (AIC, AWE, BIC, CLC, KIC) led to the selection of the 4-class solution as the most appropriate representation of the data. The Bootstrapped Likelihood Ratio Test (BLRT) further supported this decision, showing the 4-class solution as significantly better than both the 3-class and 5-class models (BLRT = 544.49, p = .0099). Additionally, consistent with the recommendations of Marsh et al. (2009), a minimum class size of 5% was upheld, favouring the 4-class model over the 5-class model, as the latter included a profile with just 3% of cases. This approach is aligned with Spurk et al.'s (2020) recommendation to prioritise parsimonious models with adequately sized classes for greater statistical reliability and precision.

The results of this study identify distinct student profiles, offering valuable insights for developing tailored interventions to meet the diverse needs of students. Dattey et al. (2019), advocated that universities could implement routine surveys using this scale to identify areas of dissatisfaction among students and design targeted interventions to enhance students' satisfaction with their academic environment.

Table 5. Fit indices for different models with number of latent profiles

Classes	AIC	AWE	BIC	CLC	KIC	BLRT_val	BLRT_p	Entropy
2	3717	4036	3815	3669	3745	1370.22	0.0099	1
3	3536	3970	3669	3470	3573	198.99	0.0099	0.981
4	3010	3559	3178	2926	3056	544.49	0099	1
5	2985	3650	3189	2883	3040	42.54419	0.0099	0.998

Percentage of Latent Profile

To better understand the distribution of students across the 4- latent profiles, we calculated the percentage of participants falling into each group. This was done by analysing their responses to the 4-point Likert scale items used to construct the latent profile model.

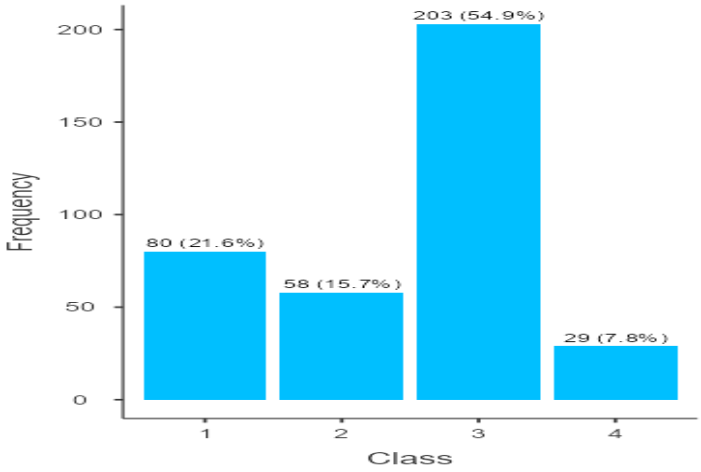

Figure. 2. Percentage of latent profile

Latent profile analysis, as depicted in Figure 2, revealed four distinct student profiles regarding academic life satisfaction: Class 1 (12.6%), Class 2 (15.7%), Class 3 (54.9%), and Class 4 (7.8%). All classes exceeded the recommended minimum of 5% of the sample, indicating adequate class sizes (Nylund-Gibson & Choi, 2018). Notably, Class 3 represented the largest and most satisfied group, highlighting significant variability in academic life satisfaction among the student population. The findings corroborate with Wong and Chapman's (2023) study. They grouped students' satisfaction with the university experience into three interaction as formal student-student, informal student-student, and student-instructor. Consistent with the findings of the study, the results show the distribution of the student population amongst the four classes. For example, students in Class 4, representing the lowest satisfaction group, may benefit from intensive academic counselling, peer support networks, and stress management workshops. Conversely, Class 3, the highest satisfaction group, may benefit from leadership development opportunities or advanced academic enrichment programmes. Thus, university management should develop targeted interventions tailored to the specific needs and characteristics of each profile.

These findings reinforce the importance of cultivating supportive learning environments, as underscored by Gloria-Barraza and Ortiz-Moreira (2012), to promote student well-being and facilitate knowledge acquisition. Consistent with Gloria-Barraza and Ortiz-Moreira's (2012) findings, universities should focus on creating a supportive learning environment that promotes student well-being and facilitates knowledge acquisition. This could involve improving campus facilities, providing access to mental health services, and promoting inclusive classroom practices.

Conclusion

This study aimed to investigate the association between undergraduate students' personal satisfaction (PSA) and satisfaction with the academic environment (SAE) at UESD and to identify distinct latent classes based on these factors. Confirmatory factor analysis (CFA) was conducted to evaluate the model's fit. The results indicated a good fit, with the Comparative Fit Index (CFI = .972) and Tucker-Lewis Index (TLI = .958) demonstrating excellent fit. Additionally, the standardised root mean square residual (SRMR = .039) confirmed a strong fit, and the root mean square error of approximation (RMSEA = .071) fell within an acceptable range. Together, these indices supported the model's suitability in representing the data. According to Hooper et al. (2008), SRMR and RMSEA values below .08, along with CFI and TLI values exceeding .90, are indicative of acceptable model fit.

Consistent with the hypothesis, personal satisfaction and satisfaction with the academic environment were found to significantly predict students' overall campus experiences and academic adjustment. A statistically significant positive covariance was observed between PSA and SAE factors (Estimate = .579, SE = .045, Z = 12.9, $p < .001$, Standardised Estimate = .579). This finding highlights the need to address both academic and personal satisfaction to enhance student experiences. Accordingly, universities should consider strategies such as improving course satisfaction, fostering strong faculty-student relationships through mentorship programmes, and upgrading campus facilities to create an inclusive and supportive learning environment.

Latent profile analysis (LPA) was employed to identify subgroups of students based on their levels of academic and personal satisfaction. The analysis identified four distinct profiles: low satisfaction (12.6%), moderate satisfaction (15.7%), high satisfaction (54.9%), and mixed feelings (7.8%). These findings suggest targeted interventions are necessary. For students in the low-satisfaction group, strategies such as academic counselling,

peer support initiatives, and stress management workshops are recommended. For the high-satisfaction group, opportunities for leadership development and advanced academic enrichment could sustain and enhance their positive experiences. Students in the mixed-feelings group would benefit from focused interventions to identify and address the sources of their ambivalence.

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:

The university should improve the academic environment by enhancing classroom resources, providing more accessible study spaces, and fostering better student-faculty interactions. This would positively impact student satisfaction and overall academic experience.

It is recommended the university should enhance students' academic advising, counselling, and peer mentoring, to help students, especially those with lower satisfaction levels, adjust to campus life and feel more connected to the university community.

The study recommends that future research should explore additional factors that may influence academic life satisfaction, such as financial support, commuting challenges, and other demographic variables. Understanding these nuances will enable UESD to implement more specific and impactful interventions to enhance overall student well-being and success.

The study recommends that university management implement regular student academic satisfaction scale to measure satisfaction levels for the purposes of identifying institutional weaknesses as well as providing prospective students with information about the institution.

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Mr. Bosomtwe contributed 60% of the writing and started the conceptualised ideas, the method and data analysis. Ms. Ampong contributed 40% with academic writing, the method and the conclusion, and the overall final reading of the article.

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The researchers received ethical clearance from the Research Committee of the University of Environment and Sustainable Development in Ghana. The researchers followed human ethics in conducting social science research as outline by the Research Committee of the University of Environment and Sustainable Development in Ghana. The researchers followed human ethics in conducting social science research as outline by the Research Committee (06. 05. 2024.UESD/ OR/ ADR9/006) of the University of Environment and Sustainable Development in Ghana.

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