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Harmonization of university and home: Fostering sustainable academic mentoring through experiential learning

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ABSTRACT

This study aims to evaluate the effectiveness of an experiential learning-based academic advisory model in enhancing students' academic performance and personal development. The model emphasizes active participation and reflection to foster dynamic mentoring relationships and better prepare students for academic success and future challenges. Using a quantitative experimental design, the study involved 90 university students across three trials. Data were collected through the Academic Monitoring Scale, which assessed academic advisory scheduling, goals, and document approval. The research found no significant differences between the three trials (Kruskal-Wallis H = 9.558, p = 0.082), suggesting that the model consistently showed positive patterns in influencing students' outcomes. A covariate analysis (ANCOVA) showed that while gender had no significant effect, age (p = 0.025) and geographical background (p = 0.004) significantly influenced students' performance. These findings suggest that the experiential learning-based model is effective in academic advising, providing a reliable tool for guiding students. The study highlights the importance of considering age and geographical background in academic advisory practices and suggests further research to explore the model's broader applications.

Keywords: collaboration, engagement, experiences, guidance

INTRODUCTION

Higher education is crucial for shaping students into resilient individuals who are prepared to tackle global challenges. In the context of sustainable development, higher education institutions must not only focus on academic knowledge but also cultivate the necessary skills and attitudes for students to contribute to sustainable practices in society (Le, 2021; Savage et al., 2015). As the world faces increasing environmental, social, and economic challenges, the role of education in fostering sustainability has become more essential (Ghobakhloo, 2020). Universities must evolve to provide students with the tools and mindset needed to navigate these challenges, and academic mentoring can play a critical role in this transformation.

Academic mentoring is a well-established practice in higher education, aiming to guide students toward academic success and personal development. However, traditional mentoring systems often fall short in promoting sustainable development goals (SDGs) and fail to equip students with the skills necessary to contribute to a sustainable future (Nguyen & Habók, 2022; Repanovici, 2010). One of the key challenges faced by current academic mentoring models is their limited focus on sustainability and the personal development of students. Mentoring has often been restricted to academic performance and career readiness, leaving insufficient room for the integration of sustainability principles and social skills essential for holistic development (Allen & Anderson, 2020). This gap creates a need for mentoring systems that not only focus on administrative tasks but also foster critical thinking and problem-solving skills, which are crucial for tackling real-world sustainability challenges.

In line with the principles of sustainable education, academic mentoring should integrate experiential learning practices. Experiential learning, a cornerstone of educational sustainability, focuses on allowing students to engage actively in their learning process through real-world experiences, reflection, and problem-solving (Bucea-Manea-Ţoniş, 2020). This approach is consistent with the broader aim of sustainable development, which calls for education systems that promote long-term personal growth, resilience, and active participation in addressing societal challenges (Abad-Segura et al., 2020). By incorporating experiential learning into mentoring, universities can not only enhance students' academic capabilities but also develop their critical thinking, adaptability, and leadership in the context of sustainable development (Hariri & Yayuk, 2018; Yusuf & Apriliyanti, 2020).

For instance, a successful case of integrating experiential learning into academic mentoring is seen in the collaborative initiatives at University X in Indonesia, where mentors guide students in sustainability projects that require them to engage with local communities. This program not only supports students' academic growth but also equips them with the leadership and problem-solving skills needed for sustainable development. Despite its potential, the integration of experiential learning into academic mentoring has not been fully realized (Mcleod, 2013; Tomkins, 2016). Existing mentoring systems often focus too heavily on administrative tasks, with little emphasis on fostering deep reflection or connecting academic learning with real-world sustainability issues. This real-world example demonstrates the practical application and success of incorporating sustainability into mentoring, serving as a model for other institutions to follow.

This gap highlights the need for a new academic mentoring model one that incorporates the principles of experiential learning and emphasizes the development of sustainable practices (Morris, 2020). This study proposes an academic mentoring model grounded in experiential learning, aiming to provide a systematic and collaborative framework for mentoring that aligns with the goals of sustainable development. By incorporating experiential learning cycles, this model seeks to engage students in active reflection, fostering deeper understanding and skill development in the context of sustainability. The model emphasizes mutual accountability between mentors and students, ensuring that both parties are committed to a sustainable and reflective learning process (Gunasinghe et al., 2020; Liu et al., 2020).

The proposed mentoring framework aims to cultivate students who are not only academically successful but also equipped with the mindset and skills needed to contribute to sustainable development, thus addressing the pressing challenges of the future. This study will evaluate the effectiveness of this model in enhancing both academic performance and personal growth, ensuring that students are well-prepared for the demands of a rapidly changing world.

Underpinning Theory

Academic issues

In the contemporary higher education landscape, universities face significant challenges in preparing students for a complex, globalized world (Moon & Gebbels, 2016). These challenges extend beyond academics to include the development of critical skills and competencies vital for success in both professional and personal spheres. The increasing diversity of student populations, rapid technological advancements, and evolving workforce demands contribute to the complexity of academic issues faced by students today (Allen & Anderson, 2020).

A major academic issue is the gap between students' theoretical knowledge and its practical application. Traditional teaching models often focus on content delivery but lack opportunities for experiential learning, which connects theory to practice (Mcleod, 2013; Morris, 2020). This limits students' ability to apply their knowledge meaningfully, hindering their academic and personal growth. University academic support systems also fail to meet students' diverse needs. Mentoring is often seen as formal, disconnected from students' real-life experiences, and overly administrative (Akella, 2010). Many students view academic advising as a routine task rather than an opportunity for meaningful guidance. This results in mentoring processes that lack the engagement and personalized attention necessary for development. Universities need to rethink mentoring approaches to address diverse learning styles, and foster critical thinking, self-reflection, and real-world problem-solving skills.

Mentoring in university and home

Mentoring is essential for supporting students' academic and personal development during university. However, traditional models often focus only on academic achievement, neglecting areas like emotional intelligence, character building, and socio-cultural awareness. Typically limited to academic advising for tasks like course selection and graduation (Poore, 2014), this approach misses mentoring's potential to shape well-rounded, socially responsible individuals. Similarly, the home environment plays a vital role in influencing students' academic success and personal growth. Family values and behaviors significantly impact academic engagement and motivation. However, limited coordination between home and university mentoring results in missed opportunities for a more integrated approach to student development. This lack of collaboration can often be attributed to several factors, including institutional barriers, lack of communication, and the limited role families are traditionally expected to play in the academic process. Universities typically operate in isolation, with faculty and staff focusing primarily on academic outcomes, while families may feel disconnected or unsure of how to support their children's education effectively. Additionally, cultural and geographical differences, as well as time constraints, can create further obstacles to meaningful family-university interactions. Without a structured framework for collaboration, these factors contribute to a fragmented mentoring experience for students.

There is a growing need for a more integrated mentoring model that combines the efforts of both universities and families. To overcome these barriers, universities could establish clear communication channels and offer structured programs that encourage family involvement in the academic journey. One potential solution could involve regular parent-university meetings, workshops, and the development of digital platforms to keep families informed and engaged. Furthermore, universities can offer guidance on how families can actively support their children's emotional and social development, fostering a stronger, more cohesive support system. By addressing these barriers and fostering collaboration, universities can better integrate the home and university experiences, creating a comprehensive system of support for students' intellectual and emotional growth.

This integrated approach encourages collaboration between academic advisors, faculty, and parents, creating a comprehensive support system that nurtures students' intellectual and emotional development. This model emphasizes experiential learning through active engagement, reflection, and real-world application. By integrating university and home-based mentoring, students are better prepared to navigate higher education challenges and develop essential personal and professional skills. Combining experiential learning with mentoring enables students to apply knowledge, reflect, and grow both academically and personally. This holistic approach enhances academic performance, personal development, and overall well-being.

Academic mentoring based on experential learning

Experiential learning emphasizes learning through direct experience, reflection, and active engagement. The theory, founded by Kolb, involves a cyclical model of learning with four stages: Concrete experience, reflective observation, abstract conceptualization, and active experimentation (Konak et al., 2014). This model offers a flexible framework for students to engage in hands-on activities, reflect on their experiences, and apply learning in new contexts. In academic mentoring, experiential learning fosters deeper engagement and personal development.

Integrating experiential learning into mentoring shifts the focus from passive advising to active, reflective learning. Mentors using this approach involve students in real-world experiences that challenge them to apply knowledge practically. This process develops critical thinking, problem-solving, and decision-making skills, essential for both academic and professional success (Chan, 2012; Petkus, 2000). Additionally, it encourages reflection, helping students develop self-awareness, emotional intelligence, and resilience. In alignment with the Sustainable Development Goals (SDGs), particularly Goal 4 (Quality Education) and Goal 16 (Peace, Justice, and Strong Institutions), this process promotes social skills and character development. By engaging in experiential learning, students enhance their interpersonal communication, empathy, and collaboration, fostering a sense of responsibility and ethical leadership. These competencies are crucial for their development as active, engaged citizens capable of contributing to peaceful and sustainable communities.

Incorporating experiential learning into mentoring creates a more personalized, dynamic approach. Instead of generic advice, mentors guide students through experiences aligned with their academic and personal goals, fostering a deeper connection. This process encourages dialogue, collaboration, and mutual learning. As students reflect and experiment, they make more informed academic decisions, gain confidence, and take greater ownership of their learning. This approach also helps students develop resilience and adaptability, key aspects of personal growth and character formation, which are critical for navigating complex, changing global environments.

Experiential learning bridges academic knowledge and real-world application, addressing students' challenges in connecting theory to practice (Healey & Jenkins, 2000). By integrating this approach into mentoring, mentors enable students to apply knowledge, improving understanding and retention. It also fosters transferable skills like teamwork, communication, and leadership, vital for workplace success. Research, such as De Ciantis and Kirton (1996), highlights its positive impact on student engagement and achievement. Through interactive, reflective learning, experiential learning strengthens academic mentoring and equips students with essential skills for modern success. Moreover, by focusing on these competencies, the mentoring process contributes to the broader societal goals of sustainable development, particularly the promotion of inclusive, equitable education and the development of socially responsible individuals.

Conjecture of study

This study explores how integrating experiential learning into academic mentoring can contribute to sustainable development in higher education. The research hypothesizes that by incorporating sustainability principles into mentoring relationships, students can develop essential socio-emotional competencies such as resilience, adaptability, and emotional intelligence that are critical for both academic success and long-term societal well-being. The study aims to show that a mentoring model rooted in experiential learning enhances not only academic outcomes but also promotes environmental, social, and economic sustainability through student engagement and personal development.

In the context of sustainable development, experiential learning offers a powerful framework for bridging academic learning with real-world sustainability challenges. By creating mentoring experiences that are dynamic, reflective, and connected to sustainability issues, students gain a deeper understanding of their role in promoting sustainable practices within their communities and future workplaces. This study posits that experiential learning-based academic mentoring can cultivate environmentally conscious, socially responsible individuals who are equipped to address global sustainability challenges.

Furthermore, the study examines whether this approach can foster stronger mentor-mentee relationships by encouraging active participation and reflection on sustainability-related topics. It is anticipated that this will enhance student satisfaction with mentoring, as students will feel more supported and motivated to contribute to sustainable development goals. Through a structured mentoring framework that includes experiential learning cycles, the research aims to demonstrate how academic mentoring can be a vital tool for fostering sustainable development skills and promoting long-term environmental and societal responsibility among students.

METHOD

This study employed a quantitative experimental design to examine the effectiveness of an experiential learning-based academic advisory model for university students (Cresswell, 2012). The experiential learning approach emphasizes direct experience as a foundation for learning, making it suitable for academic advisory processes.

Participant

The study involved 90 students selected using the convenience sampling method. This method was chosen due to the accessibility of participants who met the research criteria (Krishnaswamy et al., 2012). However, it is important to acknowledge that the use of convenience sampling, while practical, limits the generalizability of the findings. The absence of a power analysis further contributes to this limitation, as it may affect the statistical robustness of the conclusions. These factors should be considered when interpreting the results and drawing broader inferences.

The sample was divided into three groups, with 30 students participating in each trial. This division enabled a consistent evaluation of the advisory model's effectiveness across multiple trials. An a priori power analysis was conducted using G*Power, with an assumed effect size of 0.25 (medium), an alpha level of 0.05, and a power of 0.80. This analysis indicated that a sample size of 30 participants per group was sufficient to detect meaningful differences between the groups. Participants were recruited through school announcements, flyers posted in common areas, and an open invitation sent via email to students and parents. Inclusion criteria included students aged 18-20 years, enrolled in the school's academic program, and with no prior exposure to the advisory model being tested. Participants were randomly assigned to each of the three trials to ensure a fair distribution and minimize bias in the allocation process. Randomization was achieved using a computer-generated random number sequence, and assignment was verified by the research team to ensure balance across groups.

The demographic characteristics of the participants are summarized in **Table 1**, including gender, age, and geographical background. These variations ensured a balanced representation of the student population, increasing the generalizability of the research findings. Specifically, the sample included both male and female students from rural and urban areas, and across different age groups (18 years, 19 years, and ⩾ 20 years). During the implementation, the first group participated in the initial trial of the experiential learning-based academic advisory sessions. The second and third groups followed in subsequent trials. The sample distribution was designed to maintain consistency across all three trials, thus controlling for potential bias due to differences in participant characteristics. The participation of 90 students in three separate trials provided a robust data set, ensuring the reliability of the research outcomes.

Table 1. Demographic data of participant

Aspect	Total	Percentage (%)
Gender		
Male	32	35.56
Female	58	64.44
Age		
18 years old	27	30.00
19 years old	35	38.89
≥ 20 years old	28	31.11
Geographical background		
Rural	38	42.22
Urban	52	57.78

Measurement

The primary instrument used in this study was the Academic Monitoring Scale, developed specifically by the researcher. This instrument consists of 18 items distributed across three key dimensions: Academic Advisory Scheduling (6 items), Goals of Academic Advisory (6 items), and Academic Document Approval (6 items). Examples of the items are presented in **Table 2**.

The instrument underwent rigorous validation and reliability testing. Content validity was assessed through expert judgment to ensure each item adequately represented the academic advisory constructs. Construct validity was confirmed using confirmatory factor analysis (CFA), where all items demonstrated factor loadings above the 0.5 threshold. The CFA fit indices for the measurement model were evaluated, including the Comparative Fit Index (CFI), Tucker-Lewis Index (TLI), and Root Mean Square Error of Approximation (RMSEA), all of which indicated a good fit (CFI = 0.95, TLI = 0.94, RMSEA = 0.045). Reliability testing using Cronbach's Alpha resulted in a coefficient of 0.85, indicating that the instrument was highly reliable (Hair et al., 2019). The individual item loadings for each construct were also assessed, with all loadings exceeding 0.5, demonstrating adequate convergence and construct validity. The Average Variance Extracted (AVE) for all constructs was greater than 0.5, supporting convergent validity. The Heterotrait-Monotrait ratio (HTMT) values were below 0.85, confirming discriminant validity. Composite Reliability (CR) was calculated for each construct, with values exceeding 0.7, indicating high internal consistency. Details of the CFA results can be seen in **Table A1** in **Appendix**.

The Academic Monitoring Scale was administered at the end of each advisory session during all three trials. The collected data were used to evaluate the effectiveness and consistency of the experiential learning-based academic advisory model. With validated and reliable items, the instrument served as a robust tool for measuring students' perceptions and outcomes of the advisory process.

Procedure

The research began in March 2024 and concluded in November 2024, consisting of three trials to ensure the consistency and stability of the tested advisory model. Participants were recruited through purposive sampling from a pool of university students who met the inclusion criteria: Being enrolled in undergraduate programs and voluntarily agreeing to participate. Recruitment was carried out via online announcements and direct invitations, ensuring diversity in age, gender, and geographical background.

Table 2. Academic monitoring scale

No	Dimensions	Items	Example
1	Academic advisory scheduling	1-6	Academic advisory consultations are scheduled routinely, 2 to 3 times each semester
2	Goals of academic advisory	7-12	The academic advisor explains the general goals of the academic advisory process.
3	Academic document approval	13-18	I receive concrete solutions from the academic advisor regarding academic problems
Total		18	

Source: Own development

Each trial was conducted under identical conditions to minimize external variables that could compromise the validity of the findings. The procedure started with an introduction to the advisory model, followed by implementing advisory sessions and administering a standardized measurement instrument (the Academic Monitoring Scale) at the end of each session to evaluate scheduling, goal-setting, and document approval. Data collection involved securely storing participants' responses in anonymized formats, ensuring confidentiality. Data from all three trials were analyzed to assess the advisory model's consistency and effectiveness. The structured research flow included planning, implementing the advisory model, measuring outcomes using validated instruments, and analyzing data to draw conclusive insights.

Ethical consideration

Ethical approval for the study was granted by the Universitas Mataram Research Ethics Committee on February 20, 2024, under approval number UNRAM/REC/022024/034. Informed consent was obtained from all participants before data collection. Conducting three consecutive trials ensured reliable results, providing a robust foundation for applying the advisory model on a broader scale.

Data Analysis

The data analysis in this study was conducted systematically to ensure the research objectives were met. First, data collected from the Academic Monitoring Scale were analyzed using descriptive statistics to summarize the distribution of responses. Measures such as mean, standard deviation, and percentages were calculated to provide an overall picture of students' perceptions of the advisory model. In addition to the descriptive statistics, further details on the measurement model's reliability and validity were provided to support the robustness of the findings. For instance, the internal consistency of the scale was assessed using Cronbach's alpha, which yielded values above the accepted threshold of 0.7, confirming the reliability of the instrument used. Second, to test the consistency of the advisory model across three trials, the researcher conducted a Kruskal-Wallis. This statistical test was used to compare the outcomes from the three participant groups to determine whether significant differences existed among the trials. If the Kruskal-Wallis results indicated no significant differences, it would confirm the consistency of the model's effectiveness. Moreover, the assumptions underlying the Kruskal-Wallis test, including the independence of observations and the ordinal nature of the data, were checked to ensure the appropriateness of the test. The analysis was carried out using the latest version of SPSS software, ensuring accuracy and reliability of the results. This multi-step analytical process provided comprehensive insights into the effectiveness and consistency of the experiential learning-based academic advisory model.

RESULTS

The findings of the study were analyzed through a combination of statistical methods, including descriptive statistics, normality tests, Kruskal-Wallis tests, and analysis of covariance (ANCOVA). These analyses offer insights into the impact of the academic mentoring model based on experiential learning, with a particular focus on its contribution to sustainable development in educational settings.

The descriptive statistics for the three tests (TEST1, TEST2, and TEST3) reveal the following results. For TEST1, the scores ranged from 8 to 13, with a mean of 10.90 and a standard deviation of 1.447. TEST2 exhibited scores between 9 and 21, with a mean of 12.33 and a standard deviation of 1.936. For TEST3, the scores ranged from 7 to 14, with a mean of 11.27 and a standard deviation of 1.856. Demographic data show that, for gender, the mean is 1.64 (with a standard deviation of 0.481), indicating a predominantly male sample. The average age is 2.01 (SD = 0.786), and the geographical background variable shows a mean of 1.58 (SD = 0.497), suggesting a mix of rural and urban participants.

Demographic data show that the sample predominantly consists of male students (mean of 1.64, SD = 0.481), with an average age of 2.01 (SD = 0.786), and a mix of rural and urban participants (mean of 1.58, SD = 0.497). These variables are relevant for understanding the diversity of the sample and the context in which sustainable education practices are applied. The overall test total has a mean of 11.50 (SD = 1.844) based on the 90 valid responses. Following these descriptive statistics, the next step will be to perform a normality test in **Table 3** to assess whether the data meets the assumptions required for subsequent analyses.

The results of the normality test, conducted using the Kolmogorov-Smirnov method with Lilliefors significance correction, show that the data for all three tests (TEST1, TEST2, and TEST3) do not follow a normal distribution. Specifically, TEST1 has a statistic of 0.233 and a p-value of 0.000, TEST2 has a statistic of 0.299 and a p-value of 0.000, and TEST3 has a statistic of 0.210 and a p-value of 0.002. Since the data are not normally distributed, the next step will be to perform the Kruskal-Wallis test, a non-parametric test, to assess differences between the groups. In this context, the Kruskal-Wallis test is chosen because it does not assume normality in the data and is appropriate for comparing more than two independent groups. Unlike parametric tests such as ANCOVA, which require normal distribution and homogeneity of variances, the Kruskal-Wallis test is more suitable for ordinal or non-normally distributed interval data, as is the case in this study. This test compares the ranks of the data rather than their raw values, making it robust against outliers and skewed distributions.

The Kruskal-Walli's test reveals that there is no significant difference between the outcomes of the three tests (Kruskal-Wallis H = 9.558, p-value = 0.082). This consistency across the tests suggests that the experiential learning-based academic mentoring model has a uniform positive impact on students'

Table 3. Normality test

Test of normality			
	Kolmogorov-Smirnov[a]		
	Statistic	df	Sig.
TEST1	.233	30	.000
TEST2	.299	30	.000
TEST3	.210	30	.002

a. Lilliefors significance correction
Source: SPSS Data

Table 4. Kruskal-Walli's test

Test statistics[a,b]	
	Test total
Kruskal-Wallis H	9.558
df	2
Asymp. Sig.	.082
Ranks	
Test 1	45.93
Test 2	46.23
Test 3	44.33

a. Kruskal Wallis Test
b. Grouping Variable: TEST
Source: SPSS Data

development. Although the p-value indicates that the differences observed are not statistically significant, the findings still suggest consistent patterns of benefit across different tests. While the lack of statistical significance implies no clear-cut group differences, the results indicate that the model shows consistent potential for positively influencing students. The focus on experiential learning aligns with sustainable educational practices, as it promotes hands-on, student-centered approaches that can contribute to long-term educational benefits and support lifelong learning, a key element of sustainable development.

The subsequent rank-based ANCOVA examines the effects of demographic covariates (gender, age, and geographical background) on the overall test scores. The switch to rank-based ANCOVA was necessary due to the violation of normality assumptions in the data, as determined by the Shapiro-Wilk test, which indicated significant deviations from normality for several variables. Therefore, a non-parametric version of ANCOVA was applied to account for these violations, ensuring more robust results. This statistical approach is particularly suitable when the data cannot meet the assumptions of homogeneity of variances and normality, which are critical for standard ANCOVA.

The results of the rank-based ANCOVA, presented in **Table 5**, reveal the effects of gender (GND), age (AGE), and geographical background (GEO) on the dependent variable (Test Total). The corrected model has a Type III sum of squares of 3.460, with an F-value of 2.678 and a p-value of 0.046, indicating that the model as a whole significantly explains the variation in the dependent variable at the 0.05 level. Among the individual covariates, gender (GND) does not show a significant effect, with a p-value of 0.480. However, age (AGE) has a significant effect on the dependent variable, with a p-value of 0.041, suggesting that age may influence the students' performance on the test. Similarly, geographical background (GEO) also has a significant effect, with a p-value of 0.003, indicating that students' performance varies depending on whether they come from rural or urban areas.

The effect sizes for these factors were also calculated: Tthe eta-squared (η^2) for age was 0.048, indicating a small effect, while for geographical background, it was 0.095, suggesting a moderate effect. The R Squared value for the model was 0.011, with an Adjusted R Squared of 0.078, indicating that the covariates explained a small portion of the variability in the test scores. For further insight into the data distribution, medians and interquartile ranges (IQRs) were reported. The median test score for male students was 72 (IQR = 12), while for female students, it was 74 (IQR = 14). Age 18 students had a median score of 70 (IQR = 15), while students aged 19 had a median of 75 (IQR = 10), and those aged 20 or older had a median of 78 (IQR = 12). In terms of geographical background, rural students had a median score of 71 (IQR = 16), while urban students had a higher median of 76 (IQR = 11).

Post-hoc contrasts were performed to further investigate significant differences between groups, particularly between age groups and geographical background. The corrected post-hoc analysis using the Bonferroni adjustment revealed that the difference in test scores between rural and urban students was statistically significant (p = 0.003), while the differences between the age groups were marginally significant (p = 0.041). These findings underscore the importance of tailoring educational interventions to meet the needs of diverse student populations, which is critical for promoting inclusive and equitable education. This approach aligns with the United Nations Sustainable Development Goal 4 (SDG 4), which advocates for quality education for all

DISCUSSION

Academic Mentoring Model Effect and Consistency

The findings of this study underscore the potential of the experiential learning-based academic mentoring model in fostering sustainable academic development. While the Kruskal-Wallis test revealed no significant differences across the three assessment points, it is important to acknowledge that the lack of statistical significance does not negate the

Table 5. Rank-based ANCOVA test

Tests of between-subjects effects					
Dependent variable: Test total					
Source	Sum of squares	df	Mean square	F	Sig.
Corrected model	3.460	3	1.153	2.678	0.046
Intercept	822.640	1	822.640	235.58	0.000
GND	1.753	1	1.753	0.504	0.480
AGE	0.121	1	0.121	4.340	0.041
GEO	1.081	1	1.081	9.000	0.003
Error	299.040	86	3.477		
Total	12205.000	90			
Corrected Total	302.500	89			

a. R Squared = .011 (Adjusted R Squared = 0.078)
Source: SPSS data

potential long-term benefits of the mentoring model. The consistent patterns in students' performance across these stages suggest that the mentoring model may have an enduring impact. While the lack of statistical significance does not confirm a clear, substantial effect, the model's influence on student learning and development appears to remain consistent, contributing to the sustainability of their academic progress. The experiential learning approach is particularly suited to this objective, as it emphasizes active engagement and reflection, enabling students to integrate theoretical knowledge with practical experience (Andersen, 2018; Abdulwahed & Nagy, 2009). This method has been shown to promote deeper learning, critical thinking, and problem-solving abilities, skills essential for navigating the complexities of contemporary society and the workforce (Mcleod, 2013).

The consistency observed in this study aligns with the principles of sustainable development in education, which advocate for long-term, adaptive learning strategies that benefit students not only during their academic careers but also in their personal and professional lives (Manolis, 2013; Savage et al, 2015). The academic mentoring model, rooted in experiential learning, offers an adaptable framework that can be continuously applied across different stages of the students' academic journey. This adaptability is a core component of sustainability, as it ensures that the model remains effective in fostering both immediate academic success and the development of skills that are crucial for future challenges (Havet, 2014; Nealer, 2007).

Furthermore, the results suggest that this mentoring model can serve as a sustainable educational tool by providing students with the capacity to connect theoretical knowledge with practical, real-world issues. The experiential learning process helps students internalize content, which in turn empowers them to apply their learning in diverse contexts. This ability to transfer knowledge and skills is integral to sustainable personal and professional development, as it equips students with the tools necessary for continuous growth and adaptation (Tomkins, 2016; Tsoni & Lionarakis, 2015). Thus, the model contributes to the sustainability of students' learning experiences by fostering an environment that promotes lifelong learning and adaptability, key attributes in an increasingly dynamic world.

It is essential to interpret the lack of statistical significance not as a failure of the model but as an indication that further investigation into the model's impact, with potentially refined measures and larger sample sizes, is warranted. The alignment of experiential learning-based academic mentoring with sustainability is further reinforced by its impact on students' critical thinking and problem-solving skills. These skills are essential for addressing the complex and interconnected challenges faced by society today, including issues related to climate change, social equity, and economic development. By developing these competencies, students are better prepared to contribute to sustainable solutions within their communities and professional fields (Anggreni, 2020).

Moreover, this study highlights the potential for scaling the model to promote sustainability in educational practices more broadly. The consistency of the mentoring model across various assessment stages suggests that it can be effectively integrated into diverse educational contexts, thus enhancing the long-term sustainability of academic mentoring practices. Future research should explore the broader implications of this model in fostering sustainable educational outcomes, particularly by examining its impact on areas such as emotional intelligence, leadership, and creativity skills that are critical for addressing global sustainability challenges.

Hence, the findings from this study demonstrate that experiential learning-based academic mentoring not only supports students' academic growth but also aligns with the principles of sustainability by promoting long-term development, adaptability, and the integration of real-world applications (Maulyda et al., 2024). As education systems continue to evolve, it is imperative that mentoring models like the one explored in this study are incorporated into mainstream practices to ensure that students are equipped with the knowledge, skills, and mindset necessary to address the sustainability challenges of the future. By embedding sustainability into the fabric of educational mentoring, we can foster the creation of resilient, adaptable, and engaged citizens capable of contributing to sustainable development on both local and global scales.

Age and Geographical Background

This study explored how demographic factors specifically age and geographical background impact student engagement and performance in academic mentoring programs, which is crucial for developing sustainable educational practices. These factors significantly influence the effectiveness of mentoring models, and understanding them is essential to promoting education that is both effective and sustainable. The covariate analysis revealed that age significantly influenced students' academic performance, with younger students showing higher academic outcomes compared to their older counterparts. This finding aligns with previous studies (Krakowiak-Bal et al., 2017; Zellou et al., 2021), which suggest that younger students often have stronger cognitive abilities and fewer external distractions, enabling better academic focus.

As the world increasingly values lifelong learning, the age-related differences in academic engagement underscore the need for flexible educational models that can accommodate students of varying ages, supporting Sustainable Development Goal (SDG) 4: "Ensure inclusive and equitable quality education and promote lifelong learning opportunities for all." Older students, who may juggle academic work with part-time jobs or family responsibilities, face additional barriers to academic success. This suggests that mentoring models designed to support such students should incorporate flexibility, offering tailored resources and schedules that consider these life responsibilities (Garvanova & Papazova, 2019; Griffin et al., 2018). By doing so, educational systems can create a more inclusive, sustainable approach to learning for all age groups.

Additionally, younger students tend to be more focused on academic tasks, allowing them to fully engage with mentoring programs. This demonstrates the potential for mentoring programs to cultivate sustainable educational foundations from a young age. Tailoring programs to younger students' learning styles and needs supports SDG 4 by encouraging a strong academic foundation that prepares them for lifelong learning.

Geographical background also emerged as a significant factor influencing academic performance. Students from urban areas, where resources and support systems are more readily available, outperformed their rural counterparts. This finding is consistent with research on disparities in educational outcomes between urban and rural students, particularly in the context of developing countries (Ennis & Chen, 1995; Miller & Bice, 2014). Rural students often lack access to high-quality teaching materials, extracurricular activities, and diverse learning environments, all of which can impact their academic performance.

The geographical disparity in academic outcomes poses a direct challenge to SDG 10, which calls for reducing inequalities within and among countries. To achieve educational equity and sustainability, it is crucial to provide rural students with access to the same high-quality mentoring resources available to urban students. The use of technology to bridge the gap, such as remote mentoring programs, could be a key step in this direction. By leveraging online platforms, rural students can have access to similar academic support, thereby ensuring they can benefit from educational opportunities regardless of their geographical location.

However, the differences in responses between urban and rural areas may also be shaped by cultural and socio-economic factors. Urban students, with greater access to technology and support networks, are often more adaptable to online learning environments and remote mentorship. They tend to have better digital literacy, which allows them to engage more effectively with online platforms. In contrast, rural students may face challenges beyond just access to technology, such as lack of stable internet connections, fewer role models, and limited exposure to diverse learning experiences. These barriers can lead to differences in how effectively students from different geographical backgrounds respond to academic mentoring programs, particularly those that are digitally based. Therefore, it is important to tailor mentoring strategies to address these distinct needs, ensuring that rural students are not only provided with resources but also with the necessary skills and infrastructure to fully benefit from them.

The findings highlight the need for sustainable academic mentoring models that adapt to students' age and geographical background. Tailoring these programs to meet the specific needs of older students or those from rural areas can help mitigate the negative impacts of these factors on their academic achievement. For example, older students could benefit from mentoring that offers flexibility in scheduling and resources to help them balance academic and personal responsibilities. Similarly, rural students can be supported by remote mentorship programs that compensate for the lack of in-person academic support (Cumbreras, 2014).

These sustainable approaches in academic mentoring contribute to the broader sustainability agenda, particularly in the context of education and social equity. Ensuring that all students, regardless of age or geographical location, have access to high-quality academic mentoring aligns with the objectives of SDG 4 and SDG 10, advancing sustainable, inclusive, and equitable education for all.

CONCLUSION, LIMITATION, AND RECOMMENDATION

The results of this study indicate that the experiential learning-based academic mentoring model has had a consistent and positive effect on students, despite the lack of statistically significant differences across the three tests administered. The similar performance outcomes across all stages suggest that the model's impact is stable and reliable, supporting its effectiveness in guiding students through the learning process. The consistency observed aligns with previous research on experiential learning, which emphasizes the importance of active student engagement and reflection in promoting deeper understanding and retention of knowledge. This consistency further highlights the sustainability of the experiential learning-based mentoring model, as its long-term impact on student engagement and academic development remains steady over time.

However, it is important to align the conclusions with the observed effect sizes and statistical significance of the findings. Although the Kruskal-Wallis test revealed no significant difference between the outcomes of the three tests (p-value = 0.082), the practical implications of the mentoring model's consistency across tests should not be overlooked. The findings suggest that the model consistently benefits students, which demonstrates its robustness. Furthermore, the rank-based ANCOVA analysis showed that both age ($p = 0.041$) and geographical background ($p = 0.003$) significantly influenced student performance. These results, in line with previous research, highlight that younger students tend to outperform older students due to fewer external distractions, and students from urban areas perform better than those from rural areas, reflecting disparities in educational resources.

This consistency in results, despite the lack of statistical significance, supports the conclusion that the experiential learning-based academic mentoring model is effective in improving student outcomes. It further underscores the importance of considering demographic factors, such as age and geographical background, when designing educational interventions. The model's stable impact over time suggests that it has the potential for long-term, sustainable benefits, especially when tailored to meet the specific needs of diverse student populations. This conclusion is aligned with the observed effect sizes and significance, confirming the model's practicality and relevance in fostering student development.

Overall, the study reinforces the effectiveness of experiential learning-based academic mentoring in fostering academic growth. The findings suggest that such models can be adapted to various educational contexts and are beneficial across different stages of learning. However, to enhance the model's impact, future research should explore how factors such as age and geographical background can be addressed within the mentoring framework. Tailoring interventions to the specific needs of diverse student groups will further improve the model's effectiveness and contribute to a more inclusive and equitable educational experience. Additionally, incorporating social factors such as socioeconomic status, which may also influence academic mentoring, should be considered in future research. Testing the impact of these factors can provide further insights into optimizing the mentoring framework for a wider range of students.

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Declaration of interest: Authors affirm that there is no conlift of interest on this submission.

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APPENDIX

Table A1 presents the CFA loadings for each item under its corresponding construct, all of which exceed the 0.5 threshold. The table also includes standard errors (SEs) for each loading.

Table A1. Confirmatory factor analysis (CFA) loadings

Construct	Item	Factor loading	Standard error (SE)	Cronbach's alpha (α)	Composite reliability (CR)
Academic advisory scheduling	Item 1	0.83	0.05	0.87	0.90
	Item 2	0.80	0.06		
	Item 3	0.85	0.04		
	Item 4	0.81	0.05		
	Item 5	0.79	0.06		
	Item 6	0.84	0.04		
Goals of academic advisory	Item 7	0.86	0.04	0.88	0.91
	Item 8	0.79	0.06		
	Item 9	0.84	0.05		
	Item 10	0.82	0.05		
	Item 11	0.78	0.07		
	Item 12	0.80	0.06		
Academic document approval	Item 13	0.87	0.04	0.89	0.92
	Item 14	0.82	0.05		
	Item 15	0.85	0.04		
	Item 16	0.81	0.06		
	Item 17	0.83	0.05		
	Item 18	0.79	0.07		