European Journal of Education Studies
ISSN: 2501 - 1111
ISSN-L: 2501 - 1111
Available online at: www.oapub.org/edu

DOI: 10.46827/ejes.v12i10.6207 Volume 12 | Issue 10 | 2025

EXPLORING THE BEHAVIORAL TRAITS OF CRIMINOLOGY STUDENTS TOWARDS BLENDED LEARNING

Charles Murley O. Alfeche[1], Dearyl Jhay T. Anticamara[1], Christian Joshua M. Arpon[1], Exequiel R. Gono Jr.[2i]
[1]Student,
College of Criminal Justice Education,
University of Mindanao,
Bolton Street, Davao City, 8000,
Philippines
[4]Faculty Member, Dr.,
College of Criminal Justice Education,
University of Mindanao,
Bolton Street, Davao City, 8000,
Philippines

Abstract:
This study examines the behavioral traits of University of Mindanao criminology students with reference to blended learning using a mixed-method approach supported by exploratory factor analysis. The study identifies the key mindsets influencing students' interactions with blended learning environments, drawing on the unified theory of acceptance and use of technology and the theory of planned behavior. A total of 150 students participated in the quantitative survey, which was complemented by qualitative interviews with ten carefully selected respondents. The five primary factors that were shown to have an impact on students' behavior were decreased motivation and engagement, adaptability and self-regulation, reliance on digital resources, emotional difficulties and social disconnection. The findings emphasize the importance of removing technological disparities, promoting dynamic and flexible learning settings, and enhancing student-teacher involvement to optimize blended learning for criminology education. The study offers useful information for educators and organizations seeking to improve their instructional strategies and student support systems in blended learning settings. The study concludes that knowledge of students' behaviors, perceptions, and challenges in blended learning contexts is necessary to improve educational outcomes. These discoveries have important implications for educators and institutions because they highlight the need to develop adaptable, student-centered, and technologically supportive educational practices. By tackling this problems, educational institutions and

[i] Correspondence: email exequielgono@gmail.com

organizations can raise student satisfaction, enhance academic achievement, and increase the effectiveness of blended learning.

Keywords: blended learning, criminology education, behavioral traits, student engagement, learning environment

1. Introduction

Implementing blended learning in higher education presents several challenges that can impede its effectiveness. One significant issue is the digital divide, where disparities in access to technology and the internet can hinder students' ability to participate fully in online components of blended learning (Topping *et al.*, 2022). Students from lower socioeconomic backgrounds may lack reliable internet access or necessary devices, leading to inequities in learning opportunities (Hodges *et al.*, 2020). Additionally, the varying levels of technological proficiency among students and instructors can create obstacles; while some may be adept at navigating digital platforms, others may struggle, leading to inconsistent engagement and participation (Rasheed *et al.*, 2020).

Furthermore, the integration of online and offline learning activities requires careful coordination and planning to ensure coherence and alignment with learning objectives, which can be challenging for educators. The necessity for continuous professional development for instructors to effectively manage and deliver blended learning is also critical, yet often overlooked, exacerbating these issues (Nikolopoulou & Zacharis, 2023). These challenges highlight the need for comprehensive strategies and support systems to address the technological, pedagogical, and logistical aspects of blended learning implementation.

The challenges associated with implementing blended learning can have profound impacts on both students and educational institutions. For students, the digital divide can result in significant disparities in educational outcomes, where those without adequate access to technology and the internet are left behind, exacerbating existing inequalities (Hodges *et al.*, 2020). Students struggling with technological proficiency may experience frustration and disengagement, leading to lower participation rates and poorer academic performance.

For educational institutions, these problems can manifest in decreased overall student satisfaction and retention rates, as well as increased pressure on faculty to adapt to new technologies without sufficient training or support (Sankar *et al.*, 2022). Additionally, schools may face logistical challenges and increased costs related to ensuring equitable access to technology and providing ongoing professional development for staff (Nikolopoulou & Zacharis, 2023). According to Topping *et al.* (2022), institutions also risk damaging their reputation and credibility if they fail to deliver high-quality blended learning experiences. These issues can strain institutional resources and potentially undermine the perceived value and effectiveness of blended learning programs, ultimately impacting the institution’s reputation and ability to attract and retain students.

E-learning is having a greater and greater impact on higher education, particularly in the form of blended learning, which can be practiced in various ways. Online learning and blended learning have been compared in several studies to determine which formats produce the best learning outcomes, the most satisfied students, and the highest rate of course completion (Nortvig, Peterson & Balle, 2018). As time passes, the progressive changes from the traditional lectures towards factors that influence the students in promoting their understanding of the educational content of their online lessons and in-person lectures. It also influences their knowledge recognition and positive relationship with the teacher during synchronous and asynchronous learning sessions (Yu *et al.*, 2020).

Blended learning offers the flexibility and accessibility that modern students seek, but more research is needed to determine how well it develops the self-confidence, discipline, honesty and integrity while learning that are required in the criminological field. Factors such as socioeconomic position, individual learning styles, and technological ability might influence how students perceive and utilize blended learning materials (Yulianti & Sulistiyawati, 2020). Moreover, the very structure of criminology education, which typically combines simulations, case studies, and real-world applications, presents challenges as well as opportunities for the smooth blending of online and offline learning environments.

Currently, the attitude of students towards blended learning is generally positive, with many appreciating the flexibility and accessibility it offers. Students often value the ability to balance their studies with other responsibilities, such as work or family commitments, which blended learning facilitates (Nikolopoulou & Zacharis, 2023). Additionally, the combination of online and face-to-face interactions is seen as beneficial for enhancing learning experiences and providing diverse instructional methods (Villanueva, Redmond & Galligan, 2022). However, there are mixed feelings among students regarding the effectiveness of blended learning in developing practical skills and maintaining motivation, particularly when faced with technical difficulties or insufficient support. Some students express concerns about the lack of personal interaction and the potential for feeling isolated in online components (Yulianti & Sulistiyawati, 2020). Despite these challenges, the adaptability and individualized learning pace of blended learning continue to be significant draws for students, making it a preferred method in many educational settings (Topping, Douglas, Robertson & Ferguson, 2022).

This study was anchored by Icek Ajzen's planned behavior theory (1985). It was explained that a person's attitudes towards a behavior affect their capacity to perceive subjective group norms related to the behavior, and how far they suppose their bodies have control over the behavior, numerous variables significantly impact the decision they make to participate in a healthy behavior (Kagee & Freeman, 2023). According to Icek Ajzen, a person's subjective possibility of engaging in a particular behavior is referred to as their behavioral intention. In other words, a person is more likely to engage in the behavior if they have a stronger behavioral intention. Good or negative attitudes toward a particular conduct are typically the outcome of behavioral beliefs; social pressure or

subjective norms are the consequence of normative views; and perceived behavioral control is the result of control beliefs.

Moreover, the Unified Theory of Acceptance and Use of Technology by Viswanath Venkatesh could also be associated with this study. As stated by Venkatesh, Thong, and Xu (2016), behavioral intention dictates how technology is used. The direct impact of four major constructs, which are performance expectancy, effort expectancy, social influence, and facilitating conditions, will determine the perceived likelihood of technology adoption. Age, gender, experience, and voluntariness of use all moderate the influence of the predictors. Furthermore, users' decisions on any technology and how to use it can be influenced by a variety of factors, including its usefulness, ease of use, complexity, and social influence.

Shown in Figure 1 is the conceptual framework of the study. This study illustrates the model which depicts the attitudes of the students in blended learning in the specified research locale. Moreover, the gauge is labeled as Factor 1, which denotes the elements that cannot be directly observed or measured. Meanwhile, the center denotes the main variable surrounded by proposed determinants.

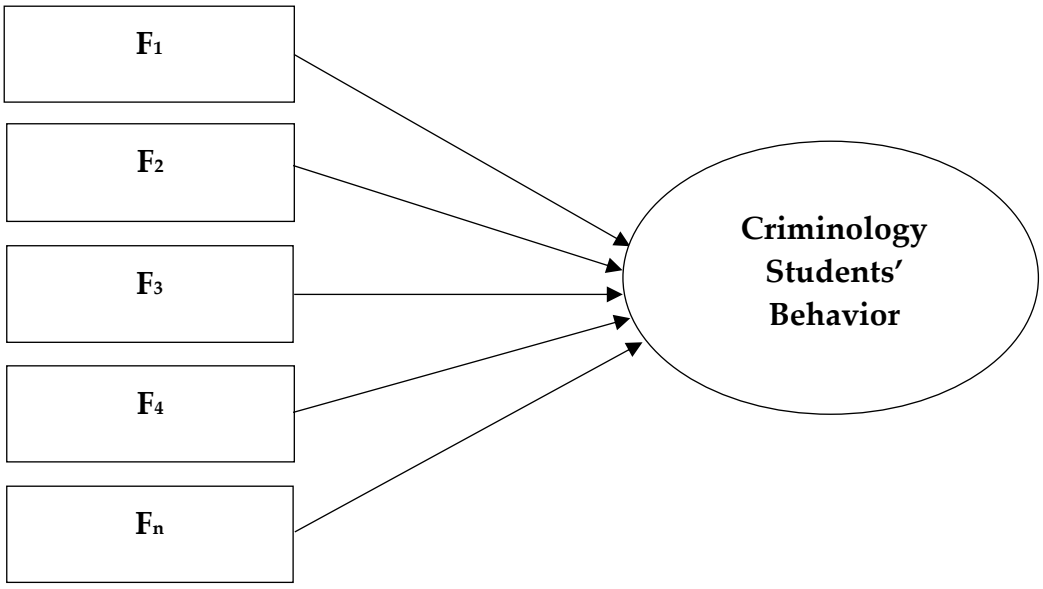

Figure 1: Conceptual Framework of the Study

The primary objective of this study was to investigate the attitudes of criminology students towards blended learning through the application of exploratory factor analysis. Understanding these attitudes is critical for optimizing the educational experience of criminology students and preparing them effectively for their future careers in law enforcement, criminal justice, and related fields. By employing exploratory factor analysis, this research sought to identify the underlying dimensions or factors that shape how criminology students perceive and engage with blended learning environments. By elucidating these dimensions, educators could adapt instructional strategies to better align with the specific needs and preferences of criminology students, thereby enhancing their overall learning outcomes and professional readiness.

This research intends to examine the academic and behavioral dispositions of criminology students in relation to blended learning with the aim of providing comprehensive insights that can inform various levels of policy-making within educational and institutional frameworks. For the University of Mindanao administration, the results will assist in guiding policy formulation and resource allocation towards enhancing technological access, digital infrastructure, and institutional support facilities for blended learning. Addressing these dimensions allows educational institutions to mitigate potential barriers, such as technological challenges or disparities in internet access, that may impact students' ability to fully participate and benefit from blended learning experiences (Jost *et al.*, 2021).

The College of Criminal Justice Education can use the findings for enhancement in curriculum development, pedagogical alignment, and integration of practical training in hybrid formats on World Criminology. For faculty members, this study provides pathways to improve their content delivery through evidence-based strategies to engage students both online and offline. Students will benefit as described above but more particularly from improved teaching, supportive systems academically, and from a responsive environment where their behavioral tendencies are taken into consideration. It is hoped that other researchers focused on blended learning or education behavior studies or criminology teaching would be motivated by this work towards creativity concerning these subjects. Lastly, the research supports Sustainable Development Goal (SDG) 4: Quality Education by promoting accessible, equitable, and student-centered education that responds to the evolving demands of the digital age.

2. Methods

2.1 Study Participant

The respondents of the study were criminology students within the University of Mindanao, particularly the Matina-Main campus in Davao City. For the qualitative phase, the researchers selected 10 participants and for the quantitative phase, selected 150 respondents. The Criminology Department encompasses a four-year program course which comprises first-year to fourth-year levels, characterized by a student's behavior of actively engaged and collaborative. In addition, students who desired to withdraw due to significant physical and emotional discomfort were not included in the research process.

The researchers of the study utilized a non-probability and probability sampling technique in the selection of the research participants. Purposive sampling was used in collecting responses from the perspective of the respondents on blended learning, which serves as baseline information in the formulation of the item statements. The purposive sampling technique was employed in this study, wherein only the available and willing students in the university were taken as respondents of the study. The purposive sampling technique is widely used in selecting a specific group of people or individuals for analysis, resulting in a lower chance of bias in the research. This method allows a more focused approach on how a person exhibits an interest in specified areas and

gathering in-depth data on those existing topics that are based on characteristics or attributes (Dovetail, 2023). In the quantitative part of the study, the researchers utilized a simple random sampling technique.

To gather comprehensive data, the researchers conducted in-depth interviews with 10 purposively selected participants who provided rich qualitative insights into the study. In addition, a survey was administered to 150 criminology students who served as the primary respondents for the quantitative phase. According to Creswell and Plano Clark (2018), a sample size of approximately 100 to 150 participants is generally considered adequate for survey research in mixed-methods studies, particularly when the goal is to identify trends, patterns, and relationships within a specific population.

The study's inclusion criteria were first-year to fourth-year criminology students currently enrolled at the University of Mindanao's Matina Campus who had taken both in-person and online courses as part of blended learning. Participants had to be able to give thoughtful answers in an interview or in writing, as well as be willing and accessible to participate. Students on academic leave, those who had left school, and those who were suffering from serious physical or mental illnesses that might limit their ability to participate completely in the study were all excluded. Also, excluded were pupils who indicated uneasiness or a lack of enthusiasm in taking part. A withdrawal criterion was also established, allowing participants to exit the study at any point without penalty or academic consequences, ensuring ethical standards and respect for voluntary participation were upheld throughout the research process.

2.2 Materials and Instrument

The researchers employed two research instruments: an interview guide for the qualitative phase and a survey questionnaire for the quantitative phase. For the qualitative aspect, an interview guide was used to gather in-depth perspectives on the implementation of blended learning at the University of Mindanao. The guide included clearly defined objectives, main interview questions, and probing questions, allowing participants to articulate their experiences and opinions on various aspects of blended learning. The qualitative responses provided valuable insights into students' attitudes and challenges, which informed the development of the survey questionnaire.

The survey questionnaire for the quantitative phase was custom-designed based on insights from the qualitative interviews and a thorough review of relevant literature. It was structured into three sections, focusing on variables that characterize students' attitudes toward blended learning. To ensure the instrument's reliability and validity, it underwent expert validation. A panel composed of specialists in education and criminology assessed the questionnaire using the Content Validity Ratio (CVR) method. Each item was evaluated for its relevance and necessity in measuring the intended construct. This rigorous validation process ensured that the final survey instrument was both credible and aligned with the study's objectives, accurately capturing the key variables under investigation.

2.3 Design and Procedure

This study used the exploratory factor analysis research design to examine behavioral traits in blended learning. The design was relevant in determining the indicators of behavioral traits towards blended learning of the criminology students within the University of Mindanao in Davao City.

Furthermore, the study took the essential steps to ensure its correctness, beginning with establishing the validity and reliability of the research questionnaire. The researchers prepared a letter signed by the Dean of the College of Criminal Justice Education asking permission towards Criminology students to conduct a survey. When the approval was secured, the questionnaires were provided to the respondents during face-to-face surveying. The researcher interviewed criminology students on their behavioral attitudes in blended learning. After the interview, the researchers formulated item statements behavioral traits towards blended learning. The formulated item statements were subjected to validation using Lawshe's approach. The validated items were included as the final questionnaire in gathering data for behavioral traits towards blended learning of the criminology students.

When the data was collected, the following data analysis tests such as exploratory factor analysis used: mean, which was the average value of a group of data produced by adding all of the values and dividing by the total number of data points; and standard deviations, which assessed the degree of dispersion of data in regard to the mean. These statistical tools, being mentioned were utilized for analyzing the numerical data and further addressed the present research questions.

During the course of this research, the proponents carefully examined the application of the fundamental aspect pertaining to respect for individuals by obtaining informed consent from the institution to distribute a research questionnaire. This approach ensured that respondents could easily comprehend the purpose of the interview and provide their responses. Informed consent was also sought from individual participants throughout the study. Additionally, respondents were given enough opportunity to ask questions regarding the questionnaire's content. The identities of the participants were secured, and their participation was assured. This study prioritized the confidentiality of the respondents, ensuring that their identities remained anonymous and that ethical standards, including respect for voluntary participation, were maintained throughout the research process. The essential data collected, which supported the study, was precisely preserved.

3. Results and Discussions

3.1 Sampling Adequacy and Multidimensionality tests for Behavioral Traits of Criminology Students Towards Blended Learning

Table 1 showcases the outcomes of the assessment conducted to ascertain the adequacy and appropriateness of the sample for exploratory factor analysis (EFA). The KaiserMeyer-Olkin (KMO) measure, gauging sampling adequacy, yielded a robust value of 0.769. This figure surpasses the widely acknowledged threshold of 0.5, affirming the

data's high suitability for EFA. Per Kaiser's standards (1974), such a lofty KMO value signifies the dataset's aptness for identifying distinct factors.

Table 1: Sampling Adequacy and Multidimensionality tests for Behavioral Traits of Criminology Students Towards Blended Learning

Test		**Value**
Kaiser-Meyer-Olkin Measure of Sampling Adequacy.		0.769
Bartlett's Test of Sphericity	**Approx. Chi-Square**	1791.928
	df	435
	Sig.	0.00

Furthermore, Bartlett's sphericity test was utilized to discern whether the correlation matrix (R-matrix) significantly deviates from an identity matrix. The findings of this examination unveiled statistical significance ($p<0.01$), denoting that the variables within the dataset are interrelated and manifest patterned associations. This bolsters the understanding that the dataset harbors meaningful interrelationships among variables, rendering it amenable to factor analysis.

Figure 1 depicts the scree plot derived from the secondary Exploratory Factor Analysis (EFA) undertaken within this investigation. As delineated by Cattell (1966), the scree plot employs eigenvalues extracted from either the input or condensed correlation matrix. The plot itself manifests as a visual representation where eigenvalues are charted on the vertical axis, while factors are delineated along the horizontal axis. Through visual examination of the plot, analysts can identify the juncture at which there is a notable decline in eigenvalue magnitude, often termed the "elbow" of the plot. The scree plot serves as a valuable instrument for discerning the number of significant factors derived from the data and the variance explained by each factor.

Specifically, analysts seek the point on the plot where the trajectory of the line connecting the plotted eigenvalues changes abruptly, indicating a marked reduction in eigenvalue magnitude. This juncture indicates the number of factors deemed meaningful for further analysis. In the context of the presented scree plot, it is evident that the instrument under scrutiny exhibits a multidimensional framework. This observation is substantiated by the conspicuous decline in the plotted line subsequent to the third factor. As emphasized by Gorsuch (1997), the efficacy of the scree test is contingent on specific conditions, particularly the presence of a sizable sample size and well-defined underlying factors within the data.

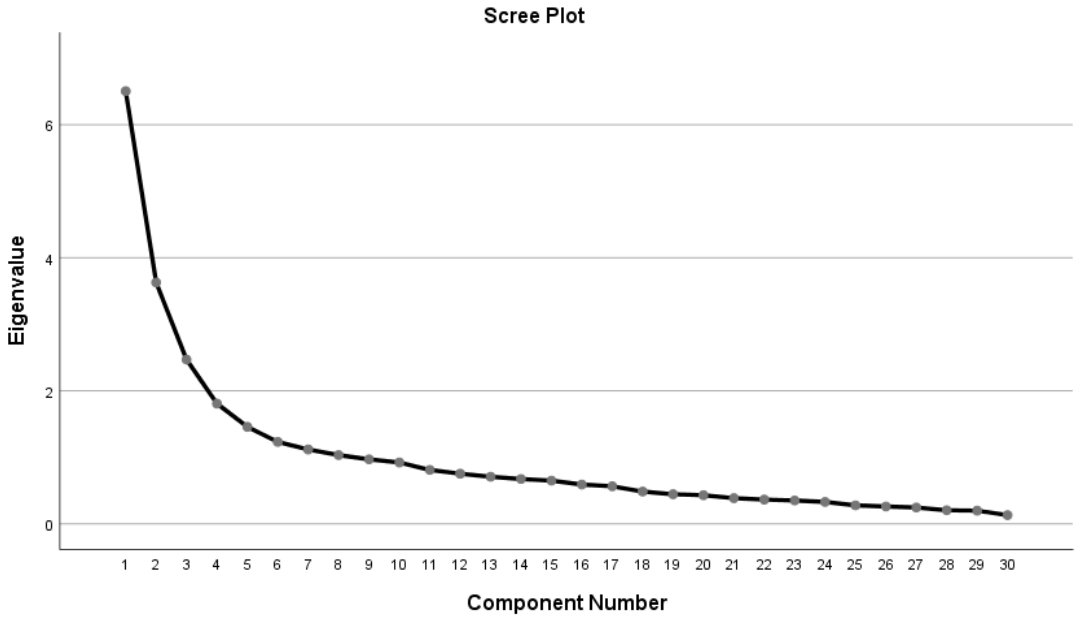

Figure 2: Scree Plot of Behavioral Traits of
Criminology Students Towards Blended Learning

3.2 Rotated Component Matrix

In Table 2, the researcher presents the factor loading of the behavioral traits of criminology students towards blended learning. Following the exploratory factor analysis, the researchers identified a set of 30 items. To ensure the reliability of the analysis, the researchers systematically removed any items with factor loadings below 0.4, consistent with the rigorous criteria established by previous studies (Romero & Gono Jr, 2021; Jr & Abalos, n.d; Costello & Osborne, 2005). Additionally, the researchers eliminated any factors with fewer than three-item statements, as recommended by MacCallum *et al.* (1999) and Raubenheimer (2004). As a result, the researchers identified five distinct factors that characterize the behavioral traits of criminology students towards blended learning.

Table 2: Factor Loading of the Behavioral Traits of Criminology Students Towards Blended Learning

Item Statement	Factor Loading							
	1	2	3	4	5	6	7	8
1. The lack of physical activities in blended learning reduces my enthusiasm for criminology courses	0.782							
2. I struggle to engage in criminology subjects that require hands-on training when conducted online	0.768							
3. I struggle to stay motivated when I do not have direct interaction with my instructors.	0.688							
4. I have difficulty adapting to online learning due to distractions and lack of interaction	0.627							
5. I feel more motivated in face-to-face classes than in online sessions.	0.539							
6. I struggle to maintain discipline when studying online due to distractions at home	0.526							
7. I try to maintain a positive attitude despite the challenges of blended learning		0.725						
8. I practice self-discipline to stay focused in online classes		0.701						
9. I adjust my behavioral approach depending on the learning environment (online or face-to-face).		0.692						
10. I set personal goals to maintain motivation in a blended learning setup		0.651						
11. I engage in extracurricular activities to manage stress caused by online learning		0.601						
12. I prefer seeking clarification from instructors in person rather than via email or chat		0.528						
13. Slow internet connection sometimes prevents me from effectively engaging in online discussions		0.406						
14. I find myself becoming more dependent on online resources when completing assignments and quizzes			0.835					
15. Online materials such as PDFs, PowerPoint presentations, and recorded lectures help me learn better			0.806					
16. I rely on search engines and AI tools to help me understand criminology topics.			0.746					
17. Face-to-face interaction helps me understand criminology concepts better than online discussions			0.477					
18. I have developed time management strategies to balance online and face-to-face classes				0.726				
19. I create study schedules to keep track of deadlines and assignments				0.639				
20. I find it challenging to manage my emotions in an online learning environment					0.743			
21. I sometimes feel isolated or disconnected from my classmates in an online setup.					0.736			
22. I often hesitate to ask questions in online classes due to fear of being judged					0.512			
23. I take detailed notes during both online and face-to-face classes to help me study						0.839		
24. I have adjusted my study habits to suit blended learning, such as using planners and online tools						0.834		
25. I often find online classes boring and unengaging							0.599	
26. The flexibility of blended learning allows me to manage my academic workload better							0.508	
27. I stay focused and actively participate in face-to-face discussions but struggle to do so in online settings							0.479	
28. I find it difficult to communicate with my instructors in an online environment							0.477	
29. I prefer studying using online resources over traditional textbooks								0.721
30. I feel less motivated to put in extra effort when I can easily find answers online								0.709
Extraction Method: Principal Component Analysis.								
Rotation Method: Varimax with Kaiser Normalization.								

Note: A rotation converged in 11 iterations.

3.2.1 Thematic Analysis of Behavioral Traits of Criminology Students Towards Blended Learning

The results of the exploratory factor analysis were further examined through thematic analysis to identify the underlying behavioral traits of criminology students in a blended learning environment. The researchers also assessed the relevance of each item in relation to its corresponding factor. Items that did not demonstrate strong alignment or conceptual fit within a factor grouping were excluded from the final structure to ensure internal consistency and thematic coherence.

The first factor was the *reduced motivation and engagement* (Table 3). Criminology students' behavioral traits towards blended learning, as revealed through the provided themes and item statements, demonstrate a multifaceted perspective encompassing various dimensions of behavioral traits. Criminology students revealed that it reduces their enthusiasm due to a lack of physical facilities, and also, they struggle because of a lack of hands-on training when conducted online. They also feel that they have difficulty in adapting to online learning due to distractions, a lack of interactions, and struggle to maintain self-discipline. In line with this, criminology students perceive that it affects their motivation and engagement with the instructors due to a lack of personal interaction. According to the findings, the absence of direct interaction, physical activities, and distractions at home lowers criminology students' motivation and involvement in blended learning.

This challenge has been affirmed by various authors. One significant issue is the digital divide, encompassing disparities in both access to technology and digital skills, which can significantly hinder students' participation in the online components of blended learning [(Topping, Douglas, Robertson, & Ferguson, 2022; Deng & El Hag, 2024)]. Additionally, varying levels of technological proficiency among students and instructors can create obstacles; some are adept at navigating digital platforms, while others struggle—leading to inconsistent engagement—an issue widely documented among both learners and educators (Rasheed, Kamsin, & Abdullah, 2020; Adhikari, Mathrani, & Parsons, 2016; Fabito, Trillanes, & Sarmiento, 2020). In contexts with poor internet access, inadequate learning environments, and insufficiently prepared faculty, these challenges are even more pronounced (Fabito et al., 2020).

Table 3: Factor 1- Reduced Motivation and Engagement

Item Number	Item Statement	Coefficient
27	The lack of physical activities in blended learning reduces my enthusiasm for criminology courses.	0.782
26	I struggle to engage in criminology subjects that require hands-on training when conducted online.	0.768
10	I struggle to stay motivated when I do not have direct interaction with my instructors.	0.688
28	I have difficulty adapting to online learning due to distractions and a lack of interaction.	0.627
15	I struggle to maintain discipline when studying online due to distractions at home.	0.526

The second factor is adaptability and self-regulation (Table 4). Many criminology students reported maintaining a positive attitude and practicing self-discipline to navigate challenges in blended learning environments. As noted by Nikolopoulou and Zacharis (2023), the integration of online and offline learning activities requires careful coordination and planning to ensure alignment with learning objectives, which can be challenging for educators. The necessity of continuous professional development for instructors to manage and deliver blended learning effectively is critical, yet often overlooked, which can exacerbate difficulties in course delivery (Kintu, Zhu, & Kagambe, 2017).

Furthermore, successful blended learning often depends on students' self-regulation skills, such as setting personal goals, managing time, and employing coping strategies like engaging in extracurricular activities to reduce stress (Broadbent & Poon, 2015). Research suggests that adaptability—defined as the ability to adjust to new learning formats and demands—is closely linked to persistence and satisfaction in blended courses (Martin, Sun, & Westine, 2020). Comparative studies indicate that blended learning formats that incorporate interactive and dynamic online elements, which replicate the interaction of in-person environments, can lead to higher satisfaction and completion rates (Norvig *et al.,* 2018; Bernard *et al.,* 2014).

Table 4: Factor 2- Adaptability and Self-Regulation

Item Number	Item Statement	Coefficient
25	I try to maintain a positive attitude despite the challenges of blended learning.	0.725
21	I practice self-discipline to stay focused in online classes.	0.701
24	I adjust my behavioral approach depending on the learning environment (online or face-to-face).	0.692
22	I set personal goals to maintain motivation in a blended learning setup.	0.651
23	I engage in extracurricular activities to manage stress caused by online learning.	0.601
20	I prefer seeking clarification from instructors in person rather than via email or chat.	0.528

The third factor is digital resource dependence (Table 5). Criminology students reported that they increasingly rely on online resources to complete assignments, create presentations, and conduct research using search engines and academic databases. This dependence reflects a broader shift in higher education where digital tools are integral to students' learning processes (Kebritchi, Lipschuetz, & Santiague, 2017). Despite facing several issues and challenges in blended learning, many students gradually adapt to and embrace the online approach as a primary means of learning. As Topping *et al.* (2022) emphasize, the flexibility and individualized learning pace offered by blended learning remain strong motivators for students, making it a preferred instructional method in many contexts.

Similarly, Nortvig, Petersen, and Balle (2018) found that e-learning is playing an increasingly significant role in higher education, particularly in blended learning formats, which can be adapted in diverse ways to meet learners' needs. Comparative studies of online and blended learning have shown that, while fully online learning offers flexibility, blended learning often yields higher satisfaction, stronger engagement, and better completion rates (Bernard et al., 2014). This suggests that the integration of digital resources within blended learning environments is not merely supplementary but is becoming a central component of the learning experience.

Table 5: Factor 3- Digital Resource Dependence

Item Number	Item Statement	Coefficient
1	I find myself becoming more dependent on online resources when completing assignments and quizzes.	0.835
3	Online materials such as PDFs, PowerPoint presentations, and recorded lectures help me learn better.	0.806
2	I rely on search engines and AI tools to help me understand criminology topics.	0.746

Furthermore, the fourth factor is emotional challenges and social disconnection (Table 6). Many criminology students reported struggling to manage their emotions in blended learning environments, often feeling isolated from classmates and hesitant to ask questions during online sessions due to fear of being judged. These experiences point to the importance of creating supportive virtual spaces that reduce feelings of loneliness and judgmental anxiety, encouraging peer interaction and fostering a sense of belonging (Besser, Flett, & Zeigler-Hill, 2020). Students are more likely to participate actively and confidently in blended learning when they receive emotional support and structured opportunities for collaboration (Stone & Springer, 2019).

Table 6: Factor 4- Emotional Challenges and Social Disconnection

Item Number	Item Statement	Coefficient
30	I find it challenging to manage my emotions in an online learning environment.	0.743
29	I sometimes feel isolated or disconnected from my classmates in an online setup.	0.736
17	I often hesitate to ask questions in online classes due to fear of being judged.	0.512

The study by Yulianti and Sulistiyawati (2020) found that students hold mixed feelings about the effectiveness of blended learning in building practical skills and sustaining motivation, particularly when faced with technical difficulties or insufficient academic and social support. Concerns about reduced personal interaction and potential feelings of disconnection are common, highlighting the need for intentional social engagement strategies in online components (Zhao *et al.*, 2021). However, as Topping *et al*. (2022) emphasize, the adaptability and individualized learning pace inherent in blended learning continue to appeal to students, making it a preferred method despite these emotional and social challenges.

In addition, the fifth and final factor is engagement and communication challenges (Table 7). Criminology students reported that they often perceive online classes as boring and unengaging, making it difficult to sustain focus and actively participate. Many also expressed difficulty in communicating with instructors during virtual sessions, which further limited their learning experience. This aligns with the observations of Hodges, Moore, Lockee, Trust, and Bond (2020), who argued that the challenges inherent in blended learning can significantly impact both students and institutions. In particular, inequities in access to technology and stable internet connectivity can exacerbate existing educational disparities, leaving some students at a disadvantage.

Table 7: Factor 5- Engagement and Communication Challenge

Item Number	Item Statement	Coefficient
7	I often find online classes boring and unengaging.	0.599
9	The flexibility of blended learning allows me to manage my academic workload better.	0.508
8	I stay focused and actively participate in face-to-face discussions but struggle to do so in online settings.	0.479
16	I find it difficult to communicate with my instructors in an online environment.	0.477

Similarly, Sankar, Kalaichelvi, Elumalai, and Alqahtani (2022) highlighted that students with lower levels of technological proficiency often experience frustration and disengagement, which can lead to reduced participation and weaker academic performance. Poor digital communication skills can compound these difficulties, creating barriers to effective interaction with both peers and instructors. This suggests that to foster a more inclusive and responsive blended learning environment, institutions should prioritize interactive learning platforms, provide prompt and meaningful instructor

feedback, and offer training in digital communication competencies. Such measures can help maintain student engagement, support effective communication, and improve overall learning outcomes (Martin & Bolliger, 2018).

Table 8: Latent Roots Criterion of the Extracted Factors

Factor	Total Eigenvalue	% of Variance	Cumulative %
1	6.51	21.68	21.68
2	3.63	12.10	33.78
3	2.47	8.23	42.01
4	1.81	6.02	48.03
5	1.46	4.86	52.89

3.2.2 Latent Roots Criterion of the Extracted Factors

Shown in Table 8 is the latent roots criterion of the extracted factors, depicting the percentage of Variance. The first factor has an initial eigenvalue of 6.51 and a variance of 21.68%. The second factor has an initial eigenvalue of 3.63 and a variance of 12.10%. The third factor has an initial eigenvalue of 2.47 and a variance of 8.23%. The fourth factor has an initial eigenvalue of 1.81 and a variance of 6.02%. The fifth and last factor has an initial eigenvalue of 1.46 and a variance of 4.86%. Overall, the factors explain 52.89 percent of the behavioral traits of criminology students towards blended learning. The findings in Table 8 demonstrate that the five behavioral factors that were extracted explain 52.89% of the variation, suggesting that these dimensions accurately reflect the main characteristics affecting criminology students' participation in blended learning. This implies that learning results can be greatly improved by addressing these fundamental areas, which include communication, self-regulation, motivation, and emotional difficulties. A cumulative variance above 50% is typically regarded as appropriate in behavioral research since it indicates a well-structured factor model (Costello and Osborne, 2005). This demonstrates the significance of concentrating on these characteristics when creating interventions or instructional strategies in mixed learning environments and bolsters the validity of the results.

4. Conclusion and Recommendations

The Exploratory Factor Analysis identified five key behavioral traits toward blended learning among criminology students: Reduced Motivation and Engagement, Adaptability and Self-Regulation, Digital Resource Dependence, Emotional Challenges and Social Disconnection, and Engagement and Communication Challenges.

The first factor, Reduced Motivation and Engagement, aligns with the findings of Rasheed, Kamsin, and Abdullah (2020), who noted that varying levels of technological proficiency among students and instructors can create barriers to participation, with some adeptly navigating digital platforms while others struggle, resulting in inconsistent engagement. Similarly, Adaptability and Self-Regulation reflect the perspective of Nikolopoulou and Zacharis (2023), who emphasized that integrating online and offline

learning requires careful planning to maintain coherence with learning objectives—an often challenging task for educators.

The Digital Resource Dependence factor supports the observation of Topping, Douglas, Robertson, and Ferguson (2022) that, despite challenges, the flexibility and individualized pacing of blended learning remain attractive to students, making it a preferred learning method in many contexts. In parallel, Emotional Challenges and Social Disconnection correspond with Yulianti and Sulistiyawati (2020), who reported mixed feelings among students regarding the effectiveness of blended learning, with many expressing concerns about reduced personal interaction and increased feelings of isolation. Lastly, Engagement and Communication Challenges resonate with Sankar, Kalaichelvi, Elumalai, and Alqahtani (2022), who found that students with lower technological proficiency often experience frustration, disengagement, and reduced academic performance.

These findings hold important implications for improving blended learning in higher education. A deeper understanding of these behavioral traits allows stakeholders—particularly educators and administrators—to design targeted interventions that address students' academic and emotional needs in online and hybrid settings.

To improve the blended learning experience for criminology students, institutions should enhance online interaction through more engaging and collaborative activities between instructors and students, while also ensuring reliable and fast internet connectivity to bridge the digital divide. A balanced approach that incorporates more face-to-face sessions, supplemented by online learning when necessary, can foster stronger engagement and personal connection. Providing digital literacy and communication training for both students and instructors will help overcome technological barriers, reduce frustration, and improve participation. Finally, further research should be conducted using this study as a baseline to explore additional factors that can strengthen the effectiveness and inclusivity of blended learning.

Funding Information
No funding was involved.

Conflict of Interest Statement
We have no personal, financial, or other interest that could or could be seen to influence the decisions or actions we are taking or the advice we are giving during my research for this.

About the Authors
Charles Murley O. Alfeche, Dearyl Jhay T. Anticamara, and Christian Joshua M. Arpon are criminology students of the University of Mindanao.
Exequiel R. Gono Jr. is a faculty member at the College of Teacher Education of the University of Mindanao, Matina Campus. He is a member of the Philippine Statistical Association, the Philippine Association of Researchers and Statistical Software Users, the

Philippine Association for Teacher Education, Mathematics Teacher Education, and the Philippine eLearning Society (Member). His research interests are Mathematics Education, Assessment of Learning, Mathematical Modeling, and Applied Statistics.

References

Adhikari, J., Mathrani, A., & Parsons, D. (2016). Bring your own devices classroom: Issues of digital divides in teaching and learning contexts. Proceedings of the Australasian Society for Computers in Learning in Tertiary Education Conference (ASCILITE 2016). https://arxiv.org/abs/1606.02488

Ajzen, I. (1985). From intentions to actions: A theory of planned behavior. In J. Kuhl & J. Beckmann (Eds.), Action control: From cognition to behavior (pp. 11–39). Springer. https://doi.org/10.1007/978-3-642-69746-3_2

Bernard, R. M., Borokhovski, E., Schmid, R. F., Tamim, R. M., & Abrami, P. C. (2014). A meta-analysis of blended learning and technology use in higher education: From the general to the applied. *Journal of Computing in Higher Education, 26*(1), 87–122. https://doi.org/10.1007/s12528-013-9077-3

Besser, A., Flett, G. L., & Zeigler-Hill, V. (2020). Adaptability to a sudden transition to online learning during the COVID-19 pandemic: Understanding the challenges for students. *Personality and Individual Differences, 168*, 110271. https://doi.org/10.1016/j.paid.2020.110271

Broadbent, J., & Poon, W. L. (2015). Self-regulated learning strategies and academic achievement in online higher education learning environments: A systematic review. *The Internet and Higher Education, 27*, 1–13. https://doi.org/10.1016/j.iheduc.2015.01.003

Costello, A. B., & Osborne, J. W. (2005). Best practices in exploratory factor analysis: Four recommendations for getting the most from your analysis. Practical Assessment, Research, and Evaluation, 10(7), 1–9. Retrieved from https://www.researchgate.net/publication/209835856_Best_Practices_in_Exploratory_Factor_Analysis_Four_Recommendations_for_Getting_the_Most_From_Your_Analysis

Creswell, J. W., & Plano Clark, V. L. (2018). Designing and conducting mixed methods research (3rd ed.). SAGE Publications. Retrieved from https://books.google.ro/books/about/Designing_and_Conducting_Mixed_Methods_R.html?id=eTwmDwAAQBAJ&redir_esc=y

Deng, W., & El Hag, A. (2024). The double digital divide: Examining disparities in access and skills among underserved college students. *Journal of Information Systems Education, 35*(3), 377–389. https://jise.org/Volume35/n3/JISE2024v35n3pp377-389.pdf

Dovetail Editorial Team (2023). What Is Purposive Sampling? Technique, Examples & FAQs. Dovetail. https://dovetail.com/research/purposive-sampling/emergency-remote-teaching-and-online-learning

Fabito, B., Trillanes, A., & Sarmiento, J. (2020). Barriers and challenges of computing students in an online learning environment: Insights from one Philippine university. arXiv preprint. https://arxiv.org/abs/2012.02121

Hodges, C., Moore, S., Lockee, B., Trust, T., & Bond, A. (2020). The difference between emergency remote teaching and online learning. EDUCAUSE. https://er.educause.edu/articles/2020/3/the-difference-between

Jost, N., Fast, E., McDonnell, M., & Munoz, J. (2021). The role of digital equity in remote learning during COVID-19. *Educational Technology Research and Development, 69*(1), 315–320. https://doi.org/10.1007/s11423-021-09955-8

Kagee, A & Freeman, M. (2023). *Mental health and physical health.* Elsevier. https://doi.org/10.1016/B978-0-323-99967-0.00085-5

Kebritchi, M., Lipschuetz, A., & Santiague, L. (2017). Issues and challenges for teaching successful online courses in higher education: A literature review. *The Internet and Higher Education, 31*, 1–9. https://doi.org/10.1016/j.iheduc.2016.10.001

Kintu, M. J., Zhu, C., & Kagambe, E. (2017). Blended learning effectiveness: The relationship between student characteristics, design features, and outcomes. *The Internet and Higher Education, 33*, 1–10. https://doi.org/10.1016/j.iheduc.2017.09.001

Martin, F., Sun, T., & Westine, C. D. (2020). A systematic review of research on online teaching and learning from 2009 to 2018. *Computers & Education, 159*. https://doi.org/10.1016/j.compedu.2020.104009

Nikolopoulou, K., & Zacharis, N. Z. (2023). Blended learning implementation in higher education: Teachers' views, practices, and challenges. *Education and Information Technologies, 28*(1), 1121–1139. https://doi.org/10.1007/s10639-022-11243-4

Nortvig, A., Peterson, A., & Balle, S. (2018). A Literature Review of the Factors Influencing E-learning and Blended Learning in Relation to Learning Outcome, Student Satisfaction and Engagement. https://academic-publishing.org/index.php/ejel/article/view/1855

Rasheed, R. A., Kamsin, A., & Abdullah, N. A. (2020). Challenges in the online component of blended learning: A systematic review. *Computers & Education, 144*, 103701. https://doi.org/10.1016/j.compedu.2019.103701

Sankar, S., Fadhel, K., & Rashed, A. (2022). Blended learning in higher education: Faculty readiness and challenges. *International Journal of Emerging Technologies in Learning (iJET), 17*(13), 56–72. https://doi.org/10.3991/ijet.v17i13.31305

Stone, C., & Springer, M. (2019). Interactivity, connectedness, and 'teacher-presence': Engaging and retaining students online. *The Internet and Higher Education, 40*, 55–65. https://doi.org/10.1016/j.iheduc.2019.04.002

Topping, K., Douglas, G., Robertson, D., & Ferguson, J. (2022). Online and blended learning in higher education: Impact on student engagement, satisfaction and performance. *Innovations in Education and Teaching International, 59*(6), 693–703. https://doi.org/10.1080/14703297.2022.2083068

Topping, K., Douglas, W., Robertson, D., & Ferguson, N. (2022). Online formative assessment in higher education: Challenges and opportunities. *Assessment &*

Evaluation in Higher Education, *47*(2), 221–237. https://doi.org/10.1080/02602938.2021.1935549

Venkatesh, V., Thong, J., and Xu, X. (2016). Unified Theory of Acceptance and Use of Technology: A Synthesis and the Road Ahead. *Journal of the Association for Information Systems*. https://ssrn.com/abstract=2800121

Villanueva, J., Redmond, P., & Galligan, L. (2022). Manifestations of cognitive presence in blended learning classes of the Philippine K-12 system. *Online Learning*, *26*(1), 19–37. https://doi.org/10.24059/olj.v26i1.302

Yu, Z., Chen, J., & Wang, M. (2020). Factors influencing students' satisfaction and performance in blended learning in higher education. *Educational Technology Research and Development*, *68*(1), 161–182. https://doi.org/10.1007/s11423-019-09651-8

Yulianti, K., & Sulistiyawati, I. (2020). Blended learning to improve students' motivation in learning. In *Proceedings of the 5th Progressive and Fun Education International Conference* (Vol. 473, pp. 397–402). Atlantis Press. https://doi.org/10.2991/assehr.k.200827.118

Zhao, Y., Pinto Llorente, A. M., & Sánchez Gómez, M. C. (2021). Digital competence in higher education research: A systematic literature review. *Interactive Learning Environments*, *29*(6), 745–758. https://doi.org/10.1080/10494820.2020.1853555