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Uncovering the Key Drivers that Strengthen Students' Academic Resilience in Open, Distance, and Digital Education Higher Institutions

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Abstract

This study emphasises the vital role of students' academic resilience in enhancing success within higher education institutions offering open, distance, and digital education (ODDE). Given the unique challenges faced by ODDE students, such as limited face-to-face interactions and increased dependence on self-regulation and support systems, understanding the factors that strengthen resilience is critical. The primary aim was to examine how self-regulated learning, academic stress, faculty and peer support, and academic grit influence academic resilience among ODDE students. Data were collected through a structured survey, with a purposive sampling approach targeting students enrolled in ODDE programs. Out of 454 distributed questionnaires, 336 valid responses were obtained, and 311 samples were deemed suitable for analysis based on quality criteria. Partial Least Squares-Structural Equation Modelling (PLS-SEM) was employed to analyse the data, with hypothesis testing

revealing that academic grit, faculty and peer support, and self-regulated learning significantly positively influence resilience, while academic stress showed no significant effect. These findings suggest that fostering grit, support systems, and self-regulation strategies can effectively enhance resilience in online and digital learning contexts. For future research, longitudinal studies are recommended to explore resilience development over time, along with intervention-based research to identify effective methods of strengthening these factors. The practical implications of this study highlight that institutions should implement targeted programs focusing on resilience-building, stress management, and support mechanisms to improve student success and well-being. Overall, the study contributes valuable insights to the theoretical frameworks of SRL and resilience, emphasising the importance of holistic approaches to fostering resilience in ODDE students for sustained academic and personal growth.
Keywords: Self-Regulated Learning, Academic Stress, Faculty & Peer Support, Academic Grit, Students' Academic Resilience

Introduction

Academic resilience is the capacity of students to successfully adjust to and bounce back from academic difficulties, stress, and obstacles, while maintaining motivation and performance despite facing adversity (Mirzabeigi, 2024; Sartika & Nirbita, 2023). In the context of open, distance, and digital education (ODDE) higher institutions, this resilience is especially crucial because students frequently encounter unique challenges such as limited face-to-face interaction, technological barriers, feelings of isolation, and the high demands for self-regulation and autonomous learning (Tran et al., 2023; Jivraj, 2024). Developing strong academic resilience becomes vital for enabling students to navigate these hurdles effectively, which in turn can enhance their retention, persistence, and overall academic success (García-Ramírez et al., 2023). Globally, the significance of fostering academic resilience in ODDE settings is increasingly recognised, especially amidst the rapid expansion of online education driven by technological advancements and responses to global crises such as the COVID-19 pandemic (Shaya et al., 2023; Gull et al., 2024). Recent trends emphasise the importance of promoting emotional intelligence, social support networks, self-efficacy, and adaptive coping strategies to bolster students' resilience (Abdelrahman et al., 2025; Bagdžiūnienė et al., 2025). However, despite these developments, significant research gaps remain. For instance, there is limited understanding of how resilience develops over time in digital learning environments and what internal (such as self-beliefs and motivation) and external factors (such as institutional support and peer collaboration) influence resilience progression (Liaqat et al., 2025; Syukur et al., 2024). Additionally, a pressing problem in this context is that many students struggle to sustain motivation, cope with stress, and remain engaged in online learning, often resulting in disengagement or dropout (Ross et al., 2024; Bukhari et al., 2023). This underscores the urgent need for targeted interventions and policies aimed at fostering resilience among digital learners, including building supportive learning environments and developing resilience-enhancement programs tailored to open and flexible education contexts. Understanding how resilience can be cultivated and sustained in these settings is essential for improving student well-being, academic achievement, and continuity (Elnaem et al., 2024). This research holds significant implications for policymakers, higher education institutions, educators, and students, offering evidence-based insights for designing effective support systems that promote resilience, reduce dropout rates, and foster a positive learning atmosphere in online and digital higher education environments. This study aims to evaluate

the direct relationship between self-regulated learning, academic stress, faculty & peer support, and academic grit on students' academic resilience in the context of open, distance, and digital education higher institutions

Literature Review

Underpinning Theories

The proposed study is grounded in the combination of Self-Regulated Learning (SRL) Theory and Resilience Theory to explore the relationships among variables such as Self-Regulated Learning, Academic Stress, Faculty & Peer Support, Academic Grit, and Academic Resilience in open, distance, and digital higher education contexts. SRL Theory, as articulated by Zimmerman (2000), emphasises that learners actively control their learning processes through goal setting, self-monitoring, and self-reflection. In online and distance education, where direct supervision is limited, students' ability to self-regulate becomes essential for maintaining motivation and learning effectiveness. Effective self-regulation skills help students manage academic stress, develop perseverance, and utilise available support systems, thereby fostering resilience. Resilience Theory, meanwhile, focuses on the capacity of individuals to adapt and thrive despite adversity (Luthar et al., 2000). Academic resilience specifically pertains to students' ability to recover from setbacks and persist toward academic goals amidst challenges such as stress and limited social interaction in digital environments. Factors like academic grit, perseverance, and passion toward long-term goals further enhance resilience. By integrating these theories, the study posits that students who possess strong self-regulation skills are better equipped to manage academic stress and leverage faculty and peer support, ultimately strengthening their academic resilience. Academic grit serves as an internal trait that complements self-regulation, reinforcing resilience. This combined theoretical framework illustrates how internal self-regulatory processes and external support networks interact to foster resilience in online higher education students.

Relationship between Academic Grit & Students' Academic Resilience

The relationship between academic grit and students' academic resilience is interconnected and mutually reinforcing. Academic grit, defined as perseverance and passion for long-term goals, plays a crucial role in fostering resilience in students by encouraging sustained effort despite setbacks and challenges (Demir, 2023; Setlogelo & Nyoni, 2024). Gritty students are more likely to demonstrate perseverance when faced with academic difficulties, viewing obstacles as opportunities for growth rather than insurmountable barriers (Intaratat et al., 2024). This persistent attitude helps them recover quickly from setbacks, maintain motivation, and continue striving toward their goals, which are key components of academic resilience (Obeng et al., 2025; Chen et al., 2024). Research suggests that students with higher levels of grit tend to develop stronger resilience because their commitment and resilience enable them to adapt actively to adverse circumstances such as academic stress, failure, or uncertainty, especially in open, distance, and digital learning environments (Shirey, 2025). Grit enhances one's capacity to persist over time, even when facing difficulties, thus reinforcing resilience by promoting emotional endurance, self-efficacy, and adaptive coping strategies (Kebah et al., 2019). Consequently, fostering grit in students can significantly contribute to cultivating resilience, which ultimately supports their academic success and well-being in challenging educational contexts. *Therefore, the following hypothesis was proposed for this study:*

H1: There is a relationship between academic grit and students' academic resilience in Open, Distance, and Digital Education (ODDE)

Relationship between Academic Stress & Students' Academic Resilience

The relationship between academic stress and students' academic resilience is complex and closely interconnected. Academic stress, which arises from heavy workloads, high expectations, performance pressures, and time constraints, can negatively impact students' mental health and motivation (Fatimah et al., 2024; Pérez-Jorge et al., 2025). However, students with high levels of academic resilience are better equipped to cope with these stressors effectively. Resilient students can view challenges and setbacks as opportunities for growth rather than insurmountable obstacles, allowing them to maintain focus and perseverance despite experiencing stress (Abdelrahman et al., 2025). They develop emotional endurance and adaptive coping strategies that help mitigate the adverse effects of stress, enabling them to recover quickly from setbacks and continue pursuing their academic goals (Chen, 2024). This resilience is crucial in higher education, where students often face multifaceted pressures, such as balancing coursework, personal responsibilities, and future career concerns (Kebah et al., 2019) The stronger their resilience, the more capable they are of managing stress healthily, preventing burnout, and staying engaged in their studies (Ross, Scanes et al., 2024). In essence, academic resilience acts as a protective factor that buffers students against the negative impacts of stress, fostering a positive attitude towards learning and enhancing overall academic success despite challenging circumstances. *Thus, the following hypothesis was proposed for this study:*

H2: There is a relationship between academic stress and students' academic resilience In Open, Distance, and Digital Education (ODDE)

Relationship between Faculty and Peer Support & Students' Academic Resilience

The relationship between faculty and peer support and students' academic resilience is vital in fostering a positive learning environment that enables students to thrive academically. Support from faculty provides students with guidance, encouragement, and feedback, which helps them navigate academic challenges more effectively (Li et al., 2020). When students feel supported by instructors, they are more likely to develop confidence in their abilities, maintain motivation, and view setbacks as manageable obstacles rather than insurmountable barriers (Saad & Ali, 2025; Jivraj, 2024). Faculty support also creates a sense of belonging, which enhances emotional well-being and resilience. Equally important is peer support, which offers students emotional reassurance, shared experiences, and collaborative problem-solving (Mohamad & Osman, 2025). Peers serve as role models and sources of motivation, especially in challenging periods, such as transitions to online learning or high-pressure situations (Demir & Köksal, 2025). Peer interactions foster a sense of community, reduce feelings of isolation, and promote resilience by encouraging resilience-building behaviours like mutual encouragement and shared goal setting (Puspaningrum & Ruby, 2024). Support from both faculty and peers forms a crucial network that helps students develop and sustain resilience in demanding academic environments (Nguyen et al., 2025). When students perceive strong support systems, they are better equipped to handle academic stress, overcome setbacks, and persist toward their educational goals, leading to improved academic success and well-being (Abdelrahman et al., 2025). *Hence, the following hypothesis was proposed for this study:*

H3: There is a relationship between faculty & peer support and students' academic resilience in Open, Distance, and Digital Education (ODDE)

Relationship between Self-Regulated Learning & Students' Academic Resilience

The relationship between self-regulated learning (SRL) and students' academic resilience is essential in understanding how students succeed in challenging educational environments. Self-regulated learning involves students actively managing their learning through goal setting, strategic planning, self-monitoring, and self-evaluation (Khan & Bibi, 2025). These skills empower students to take control of their academic tasks, which is particularly important in higher education where autonomous learning is often emphasised. When students effectively regulate their learning, they become more adaptable and better able to cope with setbacks, making them inherently more resilient (Nadeak & Surbakti, 2024). Students with strong SRL skills are more likely to persist through difficulties, viewing challenges as opportunities to learn and grow rather than as insurmountable obstacles (Matitaputty et al., 2025). This proactive approach helps them recover quickly from academic failures, maintain motivation, and sustain effort despite stress or hardship (Mahama, Amoako, Nandzo, & Eshun, 2024). By continuously adjusting their strategies and maintaining focus on their goals, students develop a resilient mindset that enhances their capacity to navigate academic pressures, manage stress, and sustain their well-being (Ge, 2025). Ultimately, self-regulated learning fosters resilience by encouraging independence, emotional endurance, and adaptive problem-solving, which are vital for academic success in higher education, especially in demanding online and digital learning contexts. Therefore*, the following hypothesis was proposed for this study:*

H4: There is a relationship between self-regulated learning and students' academic resilience in Open, Distance, and Digital Education (ODDE)

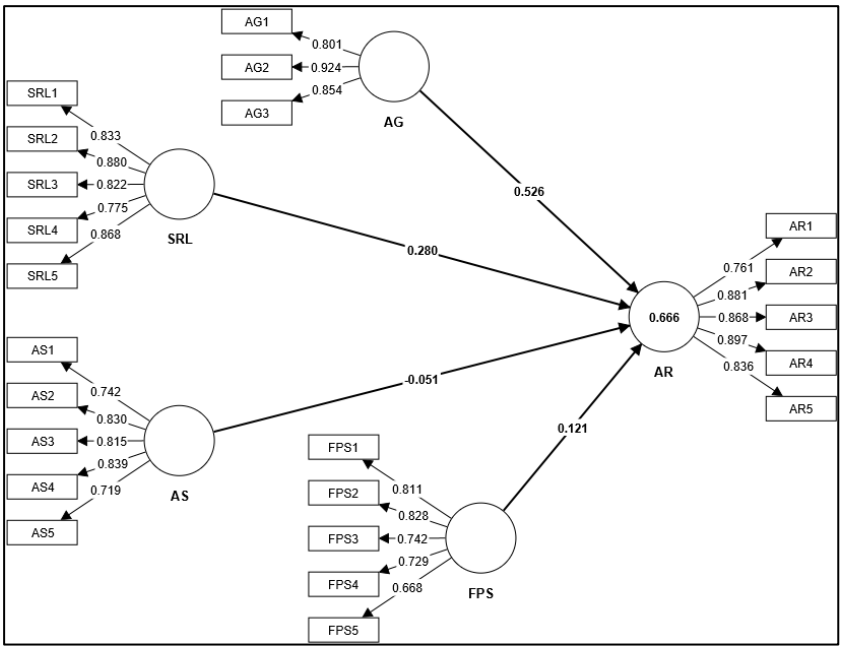

Figure 1: Research Model

Note: AG=Academic Grit SRL=Self-Regulated Learning AS=Academic Stress FPS=Faculty & Peer Support AR=Academic Resilience

Methodology

This study aimed to systematically investigate the direct impacts of self-regulated learning, academic stress, faculty and peer support, and academic grit on students' academic resilience in open, distance, and digital education higher institutions. To achieve this, primary data collection was carried out through a survey, with measurement tools carefully chosen following an extensive review of the existing literature to ensure their reliability and validity. The questionnaires were distributed via email to selected participants using purposive sampling, due to the absence of a complete sampling frame. A total of 23 observed variables were analyzed, including exogenous variables such as academic grit (3 items, adapted from Duckworth et al. (2007); self-regulated learning (5 items) from Zimmerman and Schunk (2013); academic stress (5 items) from Cohen and Williamson (2003); and faculty and peer support (5 items) based on Tinto (1975). The endogenous variable was academic resilience (5 items), adapted from Cassidy (2016). Participants responded to each item on a five-point Likert scale ranging from strongly disagree to strongly agree. Out of 454 distributed surveys, 336 valid responses were received, yielding a response rate of 74%, which is sufficient for structural equation modelling (SEM). Of these, 311 responses met the quality standards for analysis after deleting the outliers. Data analysis and hypothesis testing were conducted using SmartPLS 4 software, recognised for its effectiveness in SEM due to its robust assessment features and capacity to handle complex multivariate data, aligning with the study's objectives and following guidelines established by Ringle et al. (2022). This software enabled a detailed evaluation of both measurement and structural models, supporting a comprehensive test of the proposed hypotheses.

Data Analysis

Respondents' Profile

The respondent profile analysis reveals a diverse group of 311 participants. The majority were female, comprising 62.7% (195 individuals), while males accounted for 37.3% (116 individuals). In terms of age distribution, most respondents were between 31-40 years old (35.7%), followed by those under 30 (31.2%). A smaller segment included participants aged 41-50 (24.1%) and a few older groups aged 51-60 (7.4%) and above 60 (1.6%). Regarding their academic year, the majority were in the second year (26.4%), with notable numbers in the first year (19.0%) and third year (19.3%). Participation from the fourth year (16.1%) and subsequent years showed a gradual decrease, with the smallest group being those in their eighth year or beyond (1.3%). Analysing their academic programs, most respondents were enrolled in bachelor's programs (60.8%), followed by those in diploma (13.8%) and master's programs (19.6%). Doctoral students constituted a smaller portion at 5.8%.

Common Method Bias

To assess common method bias, one approach recommended by Kock and Lynn (2012) and Kock (2015) is to evaluate the full collinearity variance inflation factors (VIFs). Common method bias is indicated if these VIF values exceed 3.3. In the provided data, the VIFs for all constructs are as follows: Academic Resilience (3.134), Self-Regulated Learning (3.002), Academic Stress (1.024), Faculty & Peer Support (1.260), and Academic Grit (3.114). Among these, Academic Resilience and Academic Grit have VIFs below the threshold of 3.3, indicating the absence of common method bias. However, other constructs like Academic Stress and Faculty & Peer Support show VIFs well below the threshold, suggesting minimal bias in those areas.

Table 1
Full Collinearity (VIF)

	AR	SRL	AS	FPS	AG
AR		3.134	3.820	3.178	1.982
SRL	1.841		2.005	3.002	1.922
AS	1.017	1.024		1.957	1.024
FPS	1.244	1.230	1.260		1.254
AG	1.851	3.114	3.093	1.024	

Measurement Model

Based on the data presented in Table 2, the constructs demonstrate strong reliability and validity, aligning with the criteria recommended by Hair et al. (2019). All constructs exhibit Cronbach's alpha (CA) values exceeding the acceptable threshold of 0.7, indicating good internal consistency. Specifically, Academic Grit (CA=0.825), Academic Resilience (CA=0.903), Academic Stress (CA=0.851), Faculty & Peer Support (CA=0.825), and Self-Regulated Learning (CA=0.892) all show high reliability. Similarly, the composite reliability (CR) values for each construct are above 0.70, further confirming internal consistency: Academic Grit (CR=0.852), Academic Resilience (CR=0.911), Academic Stress (CR=0.870), Faculty & Peer Support (CR=0.871), and Self-Regulated Learning (CR=0.898). Concerning convergent validity, the average variance extracted (AVE) values for all constructs are above 0.50, indicating adequate variance explained by the constructs: Academic Grit (AVE=0.742), Academic Resilience (AVE=0.722), Academic Stress (AVE=0.625), Faculty & Peer Support (AVE=0.574), and Self-Regulated Learning (AVE=0.700). Item loadings are all above the recommended threshold of 0.7, with several items (e.g., AG2, AR4, SRL2) except FPS5, which is close to 0.7, but acceptable for the analysis, demonstrating loadings well above this threshold, which affirms the convergent validity of the measurement model. Overall, these results indicate that the constructs possess excellent internal consistency and convergent validity, ensuring the measurement model's reliability and appropriateness for hypothesis testing. The HTMT values in Table 3 are all below 0.85, confirming strong discriminant validity and that constructs are distinct yet related. Along with previous reliability and validity results, these findings validate the measurement model's quality, enhancing confidence in the accuracy of subsequent analyses and ensuring reliable interpretation of the study's results (Henseler et al., 2015).

Table 2
Constructs' Reliability and Validity & items Loadings

Constructs	Items	Loadings	CA	CR	AVE
Academic Grit	AG1	0.801	0.825	0.852	0.742
	AG2	0.924			
	AG3	0.854			
Academic Resilience	AR1	0.761	0.903	0.911	0.722
	AR2	0.881			
	AR3	0.868			
	AR4	0.897			
	AR5	0.836			
Academic Stress	AS1	0.742	0.851	0.870	0.625
	AS2	0.830			

	AS3	0.815			
	AS4	0.839			
	AS5	0.719			
Faculty & Peer Support	FPS1	0.811	0.825	0.871	0.574
	FPS2	0.828			
	FPS3	0.742			
	FPS4	0.729			
	FPS5	0.668			
Self-Regulated Learning	SRL1	0.833	0.892	0.898	0.700
	SRL2	0.880			
	SRL3	0.822			
	SRL4	0.775			
	SRL5	0.868			

Notes: CA=Cronbach's Alpha CR=Composite Reliability AVE=Average Variance Extracted

Table 3
Heterotrait-Monotrait (HTMT) Ratios

	AG	AR	AS	FPS
AR	0.881			
AS	0.144	0.173		
FPS	0.481	0.504	0.074	
SRL	0.771	0.763	0.132	0.482

Structural Model

This study evaluated the structural model following the procedures outlined by Hair et al. (2017), focusing on pathway coefficients (β) and the coefficient of determination (R^2). The analysis utilised a Partial Least Squares (PLS) approach with 5,000 bootstrapped samples to assess the significance of the path coefficients. The results of hypothesis testing, shown in Table 4, include beta values, t-statistics, and p-values, providing clear insight into the strength and significance of the relationships between variables. This thorough methodology enhances the credibility of the findings by offering a detailed understanding of how the variables interact, ensuring that the conclusions are reliable and well-supported. The hypothesis testing results provide clear insights into the relationships among the variables. For *H1*, the effect of academic grit (AG) on academic resilience (AR) is positive and significant, with a beta value of 0.526, a t-statistic of 9.502, and a p-value of 0.000, leading to the acceptance of *H1*. This indicates that higher levels of grit are strongly associated with increased resilience among students. Conversely, *H2* hypothesised a negative relationship between academic stress (AS) and academic resilience; however, the effect is weak and not statistically significant, with a beta of -0.051, t-statistic of 1.534, and a p-value of 0.125, resulting in the rejection of *H2*. This suggests that academic stress does not have a significant direct impact on resilience in this context. For *H3*, faculty and peer support (FPS) positively influences resilience, evidenced by a beta of 0.121, a t-statistic of 3.018, and a p-value of 0.003, leading to the acceptance of *H3*, which underscores the importance of social support systems in fostering resilience. Lastly, *H4*, self-regulated learning (SRL) shows a significant positive effect on resilience, with a beta of 0.280, a t-statistic of 5.409, and a p-value of 0.000, supporting *H4*. Overall, the findings affirm that grit, social support, and self-regulation

significantly contribute to students' resilience, while academic stress does not show a direct effect in this model.

Table 4
Hypothesis Testing Results

Hypotheses	Beta	T-statistics	P-values	2.50%	97.50%	Decision
H1: AG -> AR	0.526	9.502	0.000	0.413	0.631	*Accepted*
H2: AS -> AR	-0.051	1.534	0.125	-0.116	0.016	*Rejected*
H3: FPS -> AR	0.121	3.018	0.003	0.043	0.200	*Accepted*
H4: SRL -> AR	0.280	5.409	0.000	0.184	0.387	*Accepted*

Note: Significant at p<0.05

Effect Sizes (f^2)

According to Cohen's (1992) guidelines, the effect size (f^2) values in Table 5 indicate varying levels of impact on academic resilience (AR). The effect of academic grit (AG) on AR is large, with an f^2 of 0.439, highlighting a strong influence. Academic stress (AS) has a very small effect size of 0.008, suggesting minimal impact. Faculty and peer support (FPS) has a small effect size of 0.033, while self-regulated learning (SRL) shows a medium effect with an f^2 of 0.122. These findings suggest that grit is the most influential factor in explaining variations in academic resilience within the model.

Table 5
Effect Sizes (f^2)

	AR
AG	0.439
AS	0.008
FPS	0.033
SRL	0.122

PLSpredicts

Based on the PLSpredicts procedure recommended by Shmueli et al. (2016, 2019), the RMSE values from PLS-SEM predictions are lower than the Linear Model (LM) benchmarks, indicating better predictive accuracy. Specifically, the PLS-RMSE values are consistently smaller than the LM-RMSE for all five items (AR1 to AR5). The table shows that four out of five PLS-RMSEs (AR1, AR3, AR4, and AR5) are smaller than the corresponding LM-RMSEs, with the remaining one (AR2) being slightly lower. This suggests that the PLS model provides more accurate predictions than the linear benchmark across most indicators, supporting its suitability for predictive purposes in this study.

Table 6
PLSpredicts

Items	Q^2predict	PLS-RMSE	LM-RMSE	PLS-LM
AR1	0.300	0.710	0.729	-0.019
AR2	0.516	0.551	0.564	-0.013
AR3	0.549	0.519	0.539	-0.020
AR4	0.514	0.550	0.569	-0.019
AR5	0.458	0.594	0.610	-0.016

Cross-Validated Predictive Ability Test (CVPAT)

Based on the CVPAT as recommended by Hair et al. (2022) and Liengaard et al. (2021), the negative average loss difference of -0.297 indicates that the predictive model outperforms the benchmark in terms of predictive accuracy. The significant t-value of 5.674 and a p-value of 0.000 demonstrate that this difference is statistically significant. These results confirm that the model has strong cross-validated predictive ability overall, consistently reducing prediction errors compared to the benchmark. Consequently, the findings support the model's robustness and confirm its effectiveness in predicting the outcome variable with high confidence.

Table 7
Cross-Validated Predictive Ability Test (CVPAT)

	Average loss difference	t-value	p-value
AR	-0.297	5.674	0.000
Overall	-0.297	5.674	0.000

Importance-Performance Map Analysis (IPMA)

Based on the Importance-Performance Map Analysis (IPMA) following Ringle and Sarstedt (2016) and Hair et al. (2018), academic grit (AG) has the highest importance (0.526) but a relatively moderate performance score of 77.775, indicating it significantly influences students' resilience yet has room for improvement. Academic stress (AS) has a negative importance (-0.051), with a lower performance score of 66.537, suggesting it has minimal or adverse impact, but enhancing other constructs may be more effective. Faculty and peer support (FPS) shows moderate importance (0.121) and similar performance, while self-regulated learning (SRL) demonstrates high importance (0.280) with the highest performance score of 79.394. To improve the construct with the lowest importance and performance (AS), strategies should focus on reducing the negative impacts of stress through stress management programs, providing mental health resources, and fostering stress-coping skills. Strengthening support systems and promoting resilience-building activities could shift this construct towards positive relevance, ultimately better supporting students' resilience in ODDE higher institutions.

Table 8
Importance-Performance Map Analysis (IPMA)

	Importance	Performance
AG	0.526	77.775
AS	-0.051	66.537
FPS	0.121	66.473
SRL	0.280	79.394

Discussion & Conclusion

Discussion

The study underscores the importance of fostering self-regulated learning, faculty and peer support, and academic grit to positively impact students' academic resilience in open, distance, and digital education (ODDE) institutions. With a high beta of 0.526, academic grit plays a crucial role in enhancing resilience. ODDE institutions can therefore implement programs that build perseverance and passion for long-term goals. Workshops and

mentorship initiatives focusing on goal-setting and maintaining motivation could reinforce students' grit, helping them navigate challenges with steadfastness. Self-regulated learning also shows a significant positive impact on resilience, evidenced by a beta of 0.280. ODDE institutions should promote SRL by integrating learning strategies that encourage goal-setting, self-monitoring, and reflective practices into the curriculum (Gull et al., 2024). Tools like digital portfolios and self-assessment modules can empower students to take charge of their learning processes, thereby enhancing their adaptability and success in diverse learning environments. Faculty and peer support, with a beta of 0.121, highlights the importance of social connections. Institutions can strengthen these supports by creating virtual communities and collaborative platforms where students can interact and share experiences (Khan & Bibi, 2025). Training faculty to provide timely, constructive feedback and fostering peer mentoring systems could enhance these support structures, promoting a sense of belonging and resilience among students. Interestingly, academic stress does not display a significant direct impact on resilience, as reflected by the beta of -0.051. One possible reason for this might be the complex nature of stress, which can have varying effects depending on individual coping mechanisms and support levels (Obeng et al., 2025). It is essential for ODDE institutions not only to identify stressors but also to provide effective stress management resources. Workshops on stress reduction techniques, access to counselling services, and promoting a balanced workload could mitigate the adverse effects of stress. Institutions can also leverage technology by incorporating adaptive learning tools that personalise educational content to meet individual learner needs, reducing undue stress and enhancing engagement (Chen et al., 2024). By aligning these practices with digital tools that track progress and offer personalised feedback, students can better manage their workloads and academic expectations. Overall, the integration of these strategies into the institutional framework can create an environment that not only addresses the academic requirements of ODDE students but also supports their emotional and psychological well-being, encouraging resilience (Shirey, 2025). By emphasising enhancements in grit, self-regulation, and support systems while addressing stress management, ODDE institutions can build robust pathways for student success and resilience, aligning with the findings of this study.

Theoretical Implications

The study offers significant contributions to the Self-Regulated Learning (SRL) Theory (Zimmerman, 2000) and Resilience Theory (Luthar et al., 2000), enriching our understanding of how these frameworks function within the context of open, distance, and digital education (ODDE). The findings affirm the pivotal role of SRL in enhancing student resilience by emphasising the importance of strategic goal-setting, self-monitoring, and reflective practices in digital learning environments. Furthermore, the study extends Resilience Theory by demonstrating the critical role of academic grit, suggesting that perseverance and passion are fundamental characteristics of resilient learners. This introduces a nuanced perspective, proposing grit as a potential mediator between self-regulation efforts and resilience outcomes, thereby refining existing frameworks. Additionally, the insignificant direct effect of academic stress invites further exploration into its complex interplay with resilience, suggesting that stress management might interact with and possibly moderate the effects of self-regulation and support systems. These insights provide a deeper understanding of how SRL and Resilience Theory can be adapted to address the unique challenges faced by ODDE students, offering a strong theoretical foundation for developing innovative interventions and strategies that cultivate resilience, perseverance, and effective self-regulation, ultimately

facilitating student success and well-being in increasingly digital and flexible academic landscapes.

Practical Implications

The practical implications of this study highlight the importance of developing targeted strategies to enhance students' resilience, which can lead to significant improvements in academic success and well-being. Strong students' academic resilience can lead to several positive outcomes. First, resilient students tend to perform better academically because they can recover from setbacks and persist through challenges, resulting in higher grades and overall achievement. Additionally, resilience fosters increased motivation and engagement, encouraging students to maintain a positive attitude toward learning and actively participate in their educational activities. Resilient students also develop effective stress management strategies, allowing them to handle academic pressures and anxieties more efficiently. Moreover, resilience enhances persistence and perseverance, making students more likely to continue working toward their goals despite encountering obstacles, which can reduce dropout rates. Finally, academic resilience contributes to improved psychological well-being, as students develop greater self-efficacy and emotional strength, leading to better mental health and higher overall life satisfaction. These interconnected benefits underscore the importance of fostering resilience in students to support their academic success and overall personal development.

Suggestions for Future Studies

Future studies should explore longitudinal designs to examine how self-regulated learning, academic stress, faculty and peer support, and academic grit influence students' resilience over time in ODDE settings. This would provide deeper insights into the development and sustainability of resilience throughout students' academic journeys. Additionally, research could investigate the moderating and mediating roles of variables such as emotional intelligence, motivation, and learning motivation in shaping resilience outcomes. More qualitative studies are also recommended to understand students' perceptions and experiences regarding the effectiveness of various support systems and self-regulation strategies. Future research could also compare different student populations, such as undergraduates, postgraduates, and students from diverse cultural backgrounds, to identify context-specific factors influencing resilience. Moreover, intervention-based studies testing specific programs aimed at improving grit, self-regulation, and stress management could provide practical guidance for educators and policymakers seeking to foster resilience. These directions would contribute to a more comprehensive understanding of resilience and its enhancing factors within ODDE environments.

Conclusion

This study underscores the critical role of self-regulated learning, faculty and peer support, and academic grit in fostering students' academic resilience in open, distance, and digital education settings. The findings demonstrate that these factors significantly influence students' ability to adapt, persist, and succeed despite challenges. Strengthening these constructs through targeted interventions can enhance students' motivation, stress management, and overall academic achievement. The study also highlights areas for improvement, such as reducing academic stress and reinforcing support systems, to create a more conducive learning environment. The practical and theoretical implications emphasise

the importance of adopting comprehensive strategies that promote resilience, which is vital for student success in the increasingly digital landscape of higher education. Moving forward, future research should explore longitudinal effects and intervention strategies to further understand and support resilience development. Overall, enhancing students' resilience is essential for their academic persistence, psychological well-being, and lifelong learning in the evolving landscape of open and digital education.

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