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Academic mindfulness, self-regulated learning and school engagement as predictors of academic resilience among pre-service Religious and Moral Education teachers in two female Colleges of Education

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ABSTRACT
The study examined the predictive roles of academic mindfulness, self-regulated learning, and school engagement in explaining academic resilience among pre-service Religious and Moral Education teachers in two female Colleges of Education in Ghana. Guided by Self-Determination Theory, the study employed a cross-sectional survey design involving a census of 178 final-year pre-service teachers from Our Lady of Apostles College of Education and Holy Child College of Education. Data were collected using validated questionnaires measuring academic mindfulness, self-regulated learning, school engagement, and academic resilience and analysed using Partial Least Squares Structural Equation Modelling

(PLS-SEM). The findings revealed that all three predictor variables significantly and positively predicted academic resilience. School engagement emerged as the strongest predictor ($\beta = 0.661$, $R^2 = 0.437$), followed by self-regulated learning ($\beta = 0.565$, $R^2 = 0.319$) and academic mindfulness ($\beta = 0.420$, $R^2 = 0.176$). These results suggest that students who are actively engaged in their academic environment, regulate their learning effectively, and maintain mindful awareness are more resilient when confronted with academic challenges. The study recommends integrating engagement-enhancing pedagogies, self-regulated learning strategies, and mindfulness interventions into teacher education programmes to strengthen the academic resilience and professional preparedness of future teachers.

Keywords: Academic resilience, Academic mindfulness, Self-regulated learning, School engagement, Pre-service teachers

1 Introduction

In contemporary educational discourse, the capacity of students to thrive despite academic challenges has become a central concern, particularly in teacher education contexts where future educators must develop both cognitive and psychosocial competencies. Academic resilience, defined as the ability to effectively deal with setbacks, stress, and pressure in the academic environment, has been identified as a critical determinant of students' success and well-being (Obeng et al., 2025; Twum-Barimah, 2024). In sub-Saharan Africa, and Ghana in particular, increasing academic demands, resource constraints, and socio-cultural expectations place considerable pressure on students, including pre-service teachers, thereby making resilience an indispensable attribute for academic and professional success (Ntumi et al., 2025; Britwum, 2025).

Emerging research suggests that academic resilience is not an isolated construct, but it is influenced by a constellation of psychological and behavioural factors, notably academic mindfulness, self-regulated learning, and school engagement. Academic mindfulness, which refers to a student's present-moment awareness and non-judgmental attention to academic tasks, has been associated with improved emotional regulation, reduced stress, and enhanced adaptive coping strategies (Liao & Hu, 2025; Putra & Huwae, 2023). Within the Ghanaian context, mindfulness has also been linked to students' psychological well-being and engagement, indicating its potential as a protective factor in demanding academic settings (Azila-Gbettor et al., 2022; Cole et al., 2015).

Similarly, self-regulated learning, the process through which learners actively plan, monitor, and evaluate their own learning, has been widely recognised as a key predictor of academic achievement and persistence. Self-regulated learning

empowers students to take control of their learning processes, thereby enhancing their ability to overcome academic obstacles and sustain motivation (Anane, 2014). In teacher education, the importance of self-regulated learning is particularly pronounced, as pre-service teachers are expected not only to master content but also to model effective learning strategies in their future classrooms.

School engagement, encompassing behavioural, emotional, and cognitive involvement in learning activities, also plays a vital role in fostering academic resilience. Engaged students are more likely to exhibit persistence, enthusiasm, and a sense of belonging, all of which contribute to their capacity to navigate academic difficulties (Amoadu et al., 2025; Obeng et al., 2025). Evidence from Ghanaian educational settings indicates that higher levels of engagement are associated with improved academic outcomes and well-being, further underscoring its relevance in resilience-building (Mahama et al., 2024).

Despite the growing body of literature on these constructs, existing studies have largely focused on basic and secondary school students, with limited attention given to pre-service teachers in Colleges of Education. Academic mindfulness, self-regulated learning, and school engagement have all been associated with the academic resilience of university students across different cultural contexts (Ahern et al., 2006; Brown & Ryan, 2003; Combes-Malcome, 2007; Cole et al., 2015; Keye & Pidgeon, 2013). However, despite previous research on academic resilience within the school context, scholarly information on similar themes among Religious and Moral Education pre-service teachers in female Colleges of Education is sparse. Educationally, it is important to note that the few studies that explored pre-service teachers' resilience within the Ghanaian context (Abukari, 2018; Kumi-Yeboah, 2020; Sossah & Asiedu, 2015) did not direct their focus on how academic mindfulness, self-regulated learning, and academic engagement explains the overall resilience of pre-service teachers. Rather, students' perspective on resilience, risk, and academic achievement (Abukari, 2018); academic resilience connected with the achievement of immigrant students within the urban schools in Ghana (Kumi-Yeboah, 2020); stress management and resilience among nursing students in Ghana (Sossah & Asiedu, 2015) are investigated. To the best of the authors' knowledge, no study has been conducted on the issue and concurrently measured these research variables in one design.

This represents a significant gap, considering that pre-service teachers occupy a unique position as both learners and future educators who will be responsible for fostering resilience in their own students. Moreover, the intersection of academic mindfulness, self-regulated learning, and school engagement as combined predictors of academic resilience remains underexplored, particularly within female Colleges of Education in Ghana, where gender-specific experiences and institutional contexts may influence these relationships.

The situation is further compounded by the increasing recognition of mental health challenges, academic stress, and burnout among students in higher education, including teacher trainees (Ntumi et al., 2025). Without adequate psychological resources, such as mindfulness and self-regulation skills, and without strong engagement with their academic environment, pre-service teachers may struggle to cope with academic demands, thereby undermining their resilience and future teaching effectiveness. Consequently, there is a pressing need for empirical research that examines how these variables interact to predict academic resilience among this population. Therefore, this study aims to determine academic mindfulness, self-regulated learning, and school engagement as predictors of academic resilience among pre-service teachers of Religious and Moral Education (RME) in two female Colleges of Education in Ghana. By addressing this gap, the study contributes to the growing literature on positive educational psychology in Ghana and provides insights that may inform interventions aimed at enhancing resilience among future educators. Based on the overarching aim, the following hypotheses guided the study:

1. H1: Academic mindfulness will predict academic resilience among female pre-service RME teachers.
2. H2: Self-regulated learning will predict academic resilience among female pre-service RME teachers.
3. H3: School engagement will predict academic resilience among female pre-service RME teachers.

The hypotheses formulated to guide the study are exemplified in the conceptual model below:

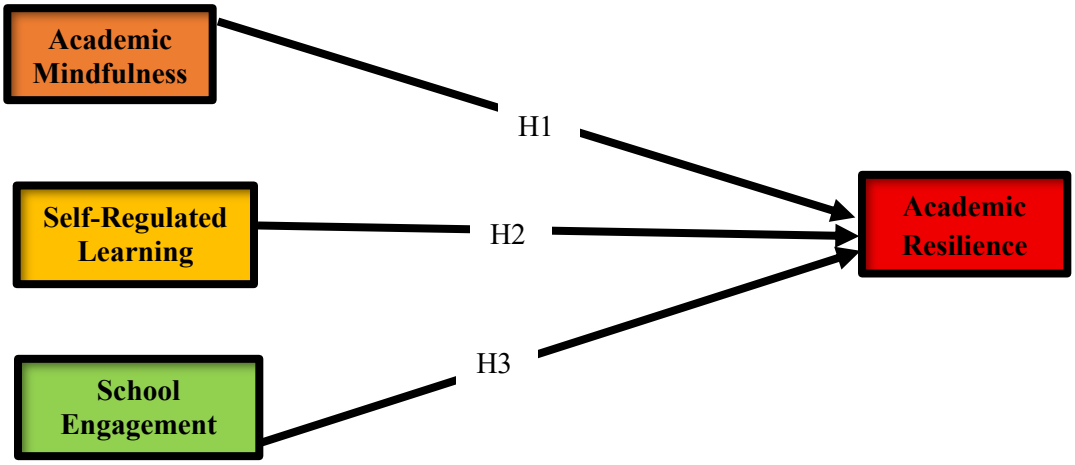


Figure 1: Conceptual Framework

2. Theoretical Foundation

2.1 Self-Determination Theory

The study is underpinned by Self-Determination Theory (SDT). Developed originally by Deci and Ryan (1985) and subsequently elaborated in a series of seminal works (Ryan & Deci, 2000; 2017), SDT is a macro-theory of human motivation and personality that provides a comprehensive and empirically grounded account of the psychological processes underlying sustained goal-directed behaviour, adaptive coping, and personal growth within social contexts. Its theoretical architecture encompasses the constructs of academic mindfulness, self-regulation, school engagement, and academic resilience in a unified and coherent explanatory system, making it uniquely suited to the present investigation.

At its core, SDT holds that human beings possess innate psychological needs whose satisfaction is necessary for optimal functioning, well-being, and growth. Ryan and Deci (2000) articulate three such basic psychological needs: the need for autonomy (the experience of volition and self-endorsement of one's behaviour), the need for competence (the experience of effectiveness and mastery in one's activities), and the need for relatedness (the experience of feeling connected to and cared for by significant others). These needs are considered universal, meaning that their satisfaction promotes psychological health and adaptive functioning across diverse cultural settings, including African and Ghanaian educational contexts (Chirkov, Ryan, Kim, & Kaplan, 2003; Vansteenkiste & Ryan, 2013).

A distinguishing feature of SDT is its treatment of motivation not as a unitary construct but as lying along a continuum ranging from amotivation (absence of motivation) through various forms of extrinsic motivation (external regulation, introjected regulation, identified regulation, and integrated regulation) to intrinsic motivation (engagement out of inherent interest and enjoyment). This continuum, articulated in the Organismic Integration Theory (OIT), a sub-theory of SDT (Ryan & Deci, 2017), reflects the degree of autonomy or self-determination underlying the regulation of behaviour. Research consistently demonstrates that more autonomous, self-determined forms of motivation are associated with greater persistence, deeper learning, higher academic achievement, and superior psychological well-being (Guay, Ratelle, & Chanal, 2008; Niemiec & Ryan, 2009).

SDT provides an explicit theoretical account of the role of mindfulness in academic life. Within the SDT framework, mindfulness is conceptualised as a natural capacity for present-centred awareness and attention that supports autonomous self-regulation (Brown & Ryan, 2003). Brown and Ryan (2003) demonstrated empirically that trait mindfulness is positively associated with autonomous motivation and the satisfaction of basic psychological needs. From an SDT perspective, mindfulness enhances academic functioning because it reduces the operation of automatic, ego-defensive psychological processes that fragment attention and undermine self-endorsement of learning behaviour. When pre-service RME teachers practise academic mindfulness, bringing deliberate, non-judgmental attention to their studies, pedagogical interactions, and reflective practice, they are better able to connect with their intrinsic interest in religious and moral education,

to experience their learning as volitional, and to sustain engagement even in the face of academic difficulties (Niemiec, Ryan, & Brown, 2008).

Ryan and Deci (2017) explicitly integrate mindfulness into the SDT motivational sequence by proposing that mindful awareness creates a psychological space between stimulus and response in which need-supportive, self-determined behaviour can emerge. In the context of the present study, academic mindfulness is thus theorised as a personal resource that supports both the quality of motivation and the exercise of self-regulation, directly linking the construct to SDT's central motivational continuum.

The relationship between SDT and self-regulated learning is particularly well-developed theoretically. Zimmerman (2000) and Pintrich (2004) define self-regulated learning as the active, constructive process by which learners set goals for their learning and monitor, regulate, and control their cognition, motivation, and behaviour guided by their goals and by contextual features of the environment. SDT complements and enriches this cognitive-behavioural account by specifying the motivational quality that underlies self-regulatory processes. Ryan and Deci (2017) argue that the same overt self-regulatory behaviour, for example, planning, monitoring, and strategy use, can be regulated more or less autonomously, and that autonomously regulated self-regulation produces qualitatively superior outcomes compared with controlled self-regulation.

For pre-service RME teachers in female Colleges of Education in Ghana, who must navigate demanding academic coursework, practicum requirements, and the unique challenges of professional identity formation in religious and moral domains, the quality of self-regulation is critical. SDT predicts that when the institutional environment supports basic psychological needs, offering students meaningful choice, affirming their competence, and fostering a sense of belonging, more autonomous and effective self-regulation will result. Vansteenkiste, Niemiec, and Soenens (2010) reviewed extensive evidence demonstrating that need satisfaction in academic contexts predicts deep-level cognitive strategy use, volitional persistence, and greater achievement, all constitutive features of effective self-regulated learning. Boekaerts (1997) further highlights that self-regulatory processes are mobilised in response to academic challenges and setbacks, making their quality directly relevant to resilience outcomes. Within the SDT framework, the present study therefore conceptualises self-regulated learning not merely as a behavioural capacity but as a motivationally qualified process whose effectiveness is conditional upon the degree to which it is autonomously endorsed by the learner.

School engagement, commonly conceptualised as comprising behavioural, cognitive, and emotional dimensions (Fredricks, Blumenfeld, & Paris, 2004), is treated within SDT as a proximal outcome of basic psychological need satisfaction. Reeve (2012) elaborated an agentic dimension of engagement, emphasising students' proactive, constructive contributions to their own learning. In SDT terms, engagement is not merely the result of compliance with institutional demands but reflects the internalisation and integration of academic values into the self. When pre-service teachers experience their training environment as autonomy-supportive, competence-affirming, and relatedness-sustaining, they are theorised to exhibit

richer, more multidimensional engagement with their coursework, peer interactions, and professional preparation activities (Reeve & Cheon, 2021).

The relevance of SDT to the Ghanaian context is underlined by research indicating that even in collectivist cultural settings, the satisfaction of basic psychological needs, particularly autonomy and relatedness, albeit expressed through cultural norms of communal interdependence, predicts academic engagement and well-being (Chirkov et al., 2003). The female Colleges of Education in Ghana provide a distinctive social ecology in which the gendered dynamics of teacher preparation, the communal ethos of single-sex institutions, and the cultural significance of religious and moral education intersect. SDT's universal need structure, modulated by the specific cultural press of these institutions, provides a theoretically appropriate and culturally sensitive lens for understanding how engagement develops and sustains itself among pre-service RME teachers.

Academic resilience. defined as the capacity to sustain academic motivation, engagement, and achievement despite significant challenges, stressors, and adversity, is the central outcome of interest in the present study. Martin and Marsh (2008) developed the academic resilience model, identifying confidence, coordination, control, composure, and commitment as its constituent dimensions. SDT offers a theoretical mechanism through which academic resilience is developed and sustained: namely, through the satisfaction of basic psychological needs and the resulting internalisation of autonomous motivation (Ryan & Deci, 2017).

When pre-service RME teachers perceive their academic environment as need-supportive, SDT predicts a cascade of beneficial psychological processes. Need satisfaction leads to intrinsic motivation and well-internalised extrinsic motivation; these in turn fuel self-regulated learning and active school engagement; and the combination of autonomous motivation, effective self-regulation, and sustained engagement produces the adaptive coping and persistence that characterise academic resilience. Vansteenkiste and Ryan (2013) articulate this mechanism explicitly, arguing that need satisfaction, as opposed to need frustration, provides the psychological resources (energy, volition, and a sense of competence) required for adaptive functioning when confronted with obstacles.

Mindfulness enters this SDT account of academic resilience as a facilitating condition. Niemiec et al. (2008) demonstrated that mindfulness moderates the relationship between need satisfaction and well-being by enhancing awareness of need-relevant environmental affordances and by reducing the defensive cognitive-motivational processes that follow from need frustration. In the context of pre-service RME teacher education, academic mindfulness may therefore buffer the adverse effects of stressors such as examination pressure, the emotional demands of moral and religious pedagogy, and the challenges of teaching practice, thereby strengthening academic resilience.

SDT is highly applicable to this study for the following reasons. First, SDT uniquely integrates all four constructs under investigation (academic mindfulness, self-regulated learning, school engagement, and academic resilience) within a single theoretical system, whereas alternative frameworks would require eclectic bridging of distinct theoretical traditions. Second, SDT provides explicit

motivational mechanisms linking these constructs, rather than merely cataloguing them as correlated variables. Third, SDT has demonstrated cross-cultural validity in African educational contexts, lending it particular applicability to the Ghanaian setting of the present study (Chirkov et al., 2003). Fourth, SDT's emphasis on the role of social context in supporting or frustrating basic psychological needs makes it sensitive to the institutional characteristics of female Colleges of Education in Ghana, including their gendered pedagogical culture and the distinctive demands of RME teacher preparation.

In a nutshell, SDT provides the overarching theoretical framework for the present study. The theory explains how the satisfaction of basic psychological needs for autonomy, competence, and relatedness among pre-service RME teachers in female Colleges of Education in Ghana fosters academic mindfulness, autonomous self-regulation, and multidimensional school engagement, and how these proximal motivational resources in turn predict greater academic resilience. This SDT-informed conceptual model guides the formulation of the study's hypotheses, the operationalisation of its variables, and the interpretation of its findings.

3. Methods

3.1 Research design and participant recruitment

A cross-sectional survey design was employed as the blueprint for this study. The design, premised on the positivist paradigm, enables researchers to employ a quantitative approach (measures) to describe the views, opinions, and characteristics of a sample and generalise these to a population. It also allows for the description and establishment of relationships between variables in a study (Creswell & Clark, 2017; Babbie, Wagner & Zaino, 2022). Final year student-teachers from Our Lady of Apostles (OLA) College of Education and Holy Child College of Education who majored in Religious and Moral Education (RME) constituted the population for the study. There were 70 from Our Lady of Apostles (OLA) College of Education, Cape Coast and 108 from Holy Child College of Education, Sekondi-Takoradi, making a total population of 178. A census strategy involved all 178 pre-service RME teachers from the two female Colleges of Education. The census method allows researchers to involve all elements within a population in a study. This strengthens generalisation claims and eradicates sampling errors (Leavy, 2017; Babbie, Wagner & Zaino, 2022).

3.2 Measures

Data on the Academic Mindfulness (AM), Self-Regulated Learning (SRL), School Engagement (SE) and Academic Resilience (AR) of participants were collected with a questionnaire. The questionnaire had 76 items categorised under five sections. Section "A" had 4 items that gathered data on participants' demographics. Section "B" gathered data on academic mindfulness of pre-service RME teachers with an adapted version of the Langer Mindfulness Scale (LMS) developed by

Langer (2000). The LMS had 14 items and three sub-scales (4 items for academic engagement, 5 items for novelty-seeking and 5 items for novelty-producing). Section "C" gathered data on self-regulated learning of pre-service RME teachers with an adapted version of the Self-Regulated Learning Behaviour Scale (SRLBS) developed by Tan, Loh and Zhang (2019). The SRLBS had 14 items and three sub-scales (3 items for help-seeking, 6 items for self-monitoring and 5 items for strategic adaptation). Section "D" gathered data on students' engagement with an adapted version of the Behavioural Emotional Cognitive School Engagement Scale (BECSES) developed by Li and Lerner (2013). The BECSES had 15 items and three sub-scales (5 items for behavioural engagement, 5 items for emotional engagement and 5 items for cognitive engagement). Section "E" gathered data on the academic resilience of pre-service RME teachers with an adapted version of the Academic Resilience Scale (ARS) developed by Cassidy (2016). The ARS had 30 items and three sub-scales (14 items for academic perseverance, 9 items for reflecting and adaptive help-seeking and 7 items for negative affect and emotional response). All the items in Sections "B" to "E" were measured on a 5-point scale: 5= Strongly Agree, 4= Agree, 3=Uncertain, 2= Disagree, and 1= Strongly Disagree.

3.3 Validity and reliability

Before the main data collection, face and content validity were sought with the help of two faculty members in the University of Education, who are experts in quantitative instrument construction. The instrument was subjected to scrutiny to ensure that it can measure and relate to the variables of interest for the study. There was also the need to establish internal consistency on the instrument. A pilot test was conducted with 60 third-year students who majored in RME. This was made up of 30 students from each of the two female Colleges of Education. The Cronbach alpha reliability coefficients were determined as: Academic Mindfulness (AM) = 0.88, Self-Regulated Learning (SRL) = 0.92, Students' Engagement (SE) = 0.86 and Academic Resilience (AR) = 0.95. The overall reliability coefficient for the instrument before the main data collection was determined as 0.98. It is essential to note that we conducted the pilot test on 17th April, 2026.

3.3 Data collection procedures and ethical considerations

To ensure a high return rate, the instrument was administered by the researchers. Before administering the instrument to the respondents, the researchers made phone calls to the known lecturers at the two female Colleges of Education and had comprehensive discussions with them about the study and their intention to collect the data. Those known lecturers helped us to seek permission from the authorities of their respective Colleges of Education. After the permissions were given, appropriate dates were scheduled and the data were collected on the respective

dates scheduled. Data from Our Lady of Apostles (OLA) College of Education, Cape Coast, was collected on 25th April, 2026, and data from Holy Child College of Education, Sekondi-Takoradi, was collected on 5th May, 2026. During the data collection, participants were briefed about the details of the study, particularly on the purpose of the research and the need to be involved in the study. Stringent ethical protocols were followed to ensure that the conduct of the study aligns with the ethical principles laid down by the University of Education, Winneba (UEW) Ethical Review Board. Written informed consent was obtained from all respondents before administering the questionnaire. In addition to that, written informed consent to publish the study was obtained. Participants were informed that their participation was voluntary and that they could withdraw from the study at any time. Efforts were made to maintain the confidentiality of the responses. Participants were assured that their responses would be kept confidential and that no one known to them would have access to the information provided. Additionally, the dataset was securely stored and password- protected to prevent unauthorised access. One hundred and seventy-eight (178) questionnaires were distributed and retrieved.

3.4 Data processing and analysis

After collecting the quantitative data, the Statistical Package for Social Sciences (SPSS) version 27.0 was used for data entry and cleaning. Before the data entry and cleaning, the items for Academic Mindfulness (AM) were coded as "AM1 to AM14". Following that, items for Self-Regulated Learning (SRL) were coded as "SRL1 to SRL14", items for Students' Engagement (SE) were coded as "SE1 to SE15". Finally, items for Academic Resilience (AR) were coded as "AR1 to AR30. The researchers decided to code the items in that order, as initially stated, to make it easier for the researchers to identify the right items for each of the variables. Afterwards, the researcher imported the SPSS data to SMART PLS (version 4.1.1.7). PLS-SEM statistics were used to analyse the hypotheses formulated to guide the study. Using SMART PLS statistical software (version 4.1.1.7), data for this study were analysed through Partial Least Squares Structural Equation Modelling (PLS-SEM). This tool was chosen for its effectiveness in handling complex statistical models that incorporate multiple latent and observed variables. The analysis involved assessing both the measurement model and the structural model. The reliability of the measurement model was evaluated using Cronbach's alpha and composite reliability, while convergent validity was assessed through the average variance extracted (AVE). Furthermore, discriminant validity was examined using three key criteria: the Fornell-Larcker criterion, the Heterotrait-Monotrait ratio (HTMT), and the uniqueness of the latent variables.

4. Results

4.1 Hypothesis One: Academic mindfulness will predict academic resilience among female pre-service RME teachers.

4..1.1 Constructs Reliability and Convergent Validity

The measurement models were examined for the test of construct reliability, convergent validity and discriminant validity of the reflective measures of the latent variables (Hair et al., 2014). Tables 1 and 2 present the values for the test of construct reliability, convergent validity and discriminant validity of the variables.

Table 1: Constructs Reliability and Convergent Validity

Variable	Item	Loading	α	rho_a	rho_c	AVE
AM	8	0.554-0.666	0.773	0.775	0.834	0.586
AR	14	0.568-0.771	0.906	0.911	0.919	0.588

In Table 1, the factor loadings for academic mindfulness ranged from 0.554 to 0.666. In addition, the factor loadings for academic resilience ranged from 0.568 to 0.771. These values were above 0.50, indicating the evidence for convergent validity. Thus, all the items represent the underlying constructs (Hair et al., 2014, 2017; Vinzi et al., 2010). Furthermore, the internal consistencies of the latent variables were good because their Cronbach's Alpha values ranged from 0.773 to 0.906, and composite reliabilities (rho_a and rho_c) values ranged from 0.775 to 0.834 for academic mindfulness, and the composite reliabilities (rho_a and rho_c) values for academic resilience ranged from 0.911 to 0.919. These reliabilities were above the threshold of 0.7 (Hair et al., 2017). Again, the average variance extracted (AVE) values ranged from 0.586 to 0.588, which were above the acceptable threshold value of 0.5, thus depicting acceptable levels of convergent validity for all the constructs (Hair et al., 2014; Henseler et al., 2009).

Table 2: Discriminant Validity

Construct	AM	AR
Fornell-Larcker Criterion		
AM	**0.721**	
AR	0.420	**0.771**
Heterotrait-Monotrait (HTMT) Ratio		
AM		
AR	**0.458**	

From Table 2, the discriminant validity of the model was established because the square roots of the AVE values (i.e., diagonal values in bold) for all the main constructs in the model were greater than the corresponding inter-construct correlations (i.e., all values below the bold values). The values of the square roots

of the AVE were 0.721 for academic mindfulness and 0.771 for academic resilience (Fornell & Larcker, 1981; Hair et al., 2017). In addition, using the Heterotrait-Monotrait (HTMT) Ratio, the discriminant validity was confirmed because the HTMT ratio values were below the threshold of .850 or .90 (Collier, 2020; Henseler et al., 2015). Figure 1 shows the PLS-SEM algorithm.

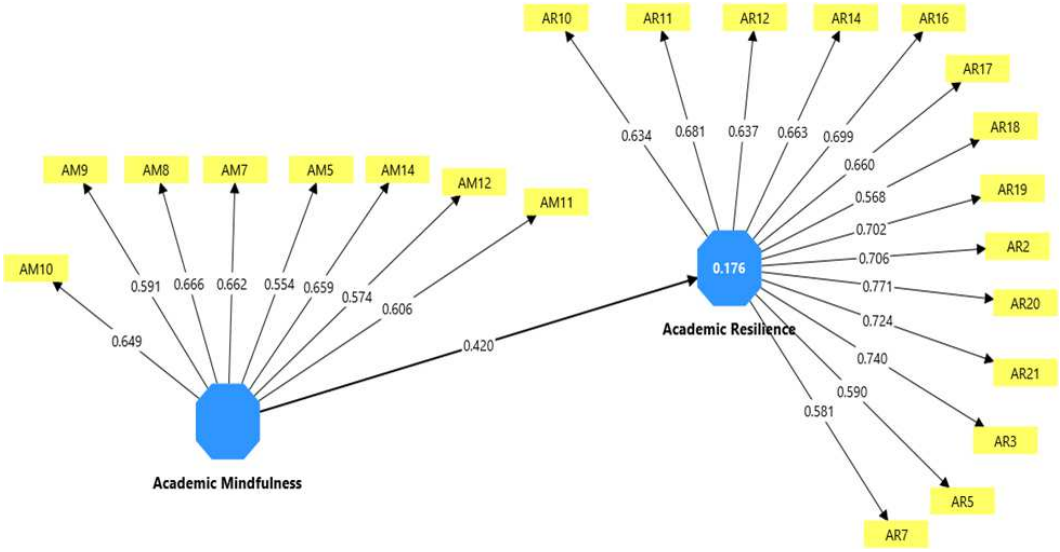


Figure 1: PLS-SEM Algorithm

4.1.2 Path Coefficient Results

After confirming that the measurement models meet the conditions of construct and indicator reliability, as well as convergent and discriminant validity, the hypothesis that *academic mindfulness will predict academic resilience among female pre-service RME teachers* was examined. The structural model was assessed by means of the coefficient of determination (R^2) and the standardised beta coefficient (β) for the hypothesised effect. The significance of the effect was evaluated using bootstrapping (Hair et al., 2014; Kock, 2015). The coefficient of determination (R^2) reflects the predictor variable's (academic mindfulness) ability to predict the dependent variable (academic resilience). The effect size (f^2) quantifies the extent to which academic mindfulness will predict academic resilience among pre-service RME teachers. In this study, the size effect (f^2) is divided into three categories, namely: small (0.02), medium (0.15), and large effect (0.35), as stated by Hair et al., (2013). The results are displayed in Table 3.

Table 3. Path Coefficient Results for Academic Mindfulness as a Predictor of Academic Resilience Among Female Pre-service RME Teachers

Constructs	β	SD	T Statistics	P	f^2	R^2	5.0%	95.0%
AM->AR	0.420	0.072	5.821	0.000	0.314	0.176	0.251	0.525

Table 3 presents the path coefficient results for academic mindfulness as a predictor of academic resilience among female pre-service RME teachers. It can be

observed that academic mindfulness is a significant predictor of academic resilience among female pre-service RME teachers (β = 0.420, t = 5.821, p < 0.05; p = 0.000). Hence, the result is statistically significant. It can also be observed that academic mindfulness explains 17.6% of the variance in academic resilience (R^2 = 0.176). The magnitude of the effect was large (f^2 = 0.314). The positive standardised coefficient (β = 0.420) suggests that a unit increase in the academic mindfulness of the female pre-service RME teachers would increase their academic resilience by the same proportion. Figure 2 shows the PLS-SEM bootstrapping results.

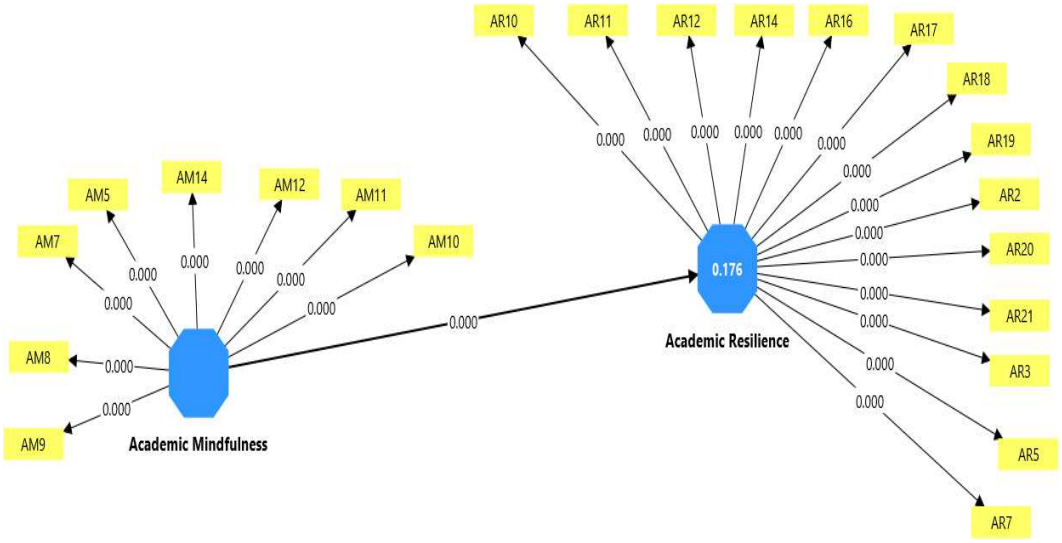


Figure 2: PLS-SEM Bootstrapping Results

4.2 Hypothesis Two: Self-regulated learning will predict academic resilience among female pre-service RME teachers.

4.2.1 Constructs Reliability and Convergent Validity

As done in the first hypothesis, the measurement models were examined for the test of construct reliability, convergent validity and discriminant validity of the reflective measures of the latent variables (Hair et al., 2014). Tables 4 and 5 present the values for the test of construct reliability, convergent validity and discriminant validity of the variables.

Table 4: Constructs Reliability and Convergent Validity

Variable	Item	Loading	A	rho_a	rho_c	AVE
SRL	10	0.537-0.808	0.868	0.912	0.920	0.553
AR	14	0.567-0.796	0.906	0.882	0.893	0.558

In Table 4, the factor loadings for self-regulated learning ranged from 0.537 to 0.808. In addition, the factor loadings for academic resilience ranged from 0.567 to 0.796. These values were above 0.50, indicating the evidence for convergent validity. Thus, all the items represent the underlying constructs (Hair et al., 2014, 2017; Vinzi et al., 2010). Furthermore, the internal consistencies of the latent

variables were good because their Cronbach's Alpha values ranged from 0.868 to 0.906, and composite reliabilities (rho_a and rho_c) values ranged from 0.912 to 0.920 for self-regulated learning, and the composite reliabilities (rho_a and rho_c) values for academic resilience ranged from 0.882 to 0.893. These reliabilities were above the threshold of 0.7 (Hair et al., 2017). Moreover, the average variance extracted (AVE) values ranged from 0.553 to 0.558, which were above the acceptable threshold value of 0.5, thus depicting acceptable levels of convergent validity for all the constructs (Hair et al., 2014; Henseler et al., 2009).

Table 5: Discriminant Validity

Construct	SRL	AR
Fornell-Larcker Criterion		
SRL	**0.673**	
AR	0.565	**0.676**
Heterotrait-Monotrait (HTMT) Ratio		
SRL		
AR	**0.593**	

From Table 5, the discriminant validity of the model was established because the square roots of the AVE values (i.e., diagonal values in bold) for all the main constructs in the model are greater than the corresponding inter-construct correlations (i.e., all values below the bold values). The values of the square roots of the AVE were 0.673 for self-regulated learning and 0.676 for academic resilience (Fornell & Larcker, 1981; Hair et al., 2017). In addition, using the Heterotrait-Monotrait (HTMT) Ratio, the discriminant validity was confirmed because the HTMT ratio values were below the threshold of .850 or .90. Figure 3 shows the PLS-SEM algorithm.

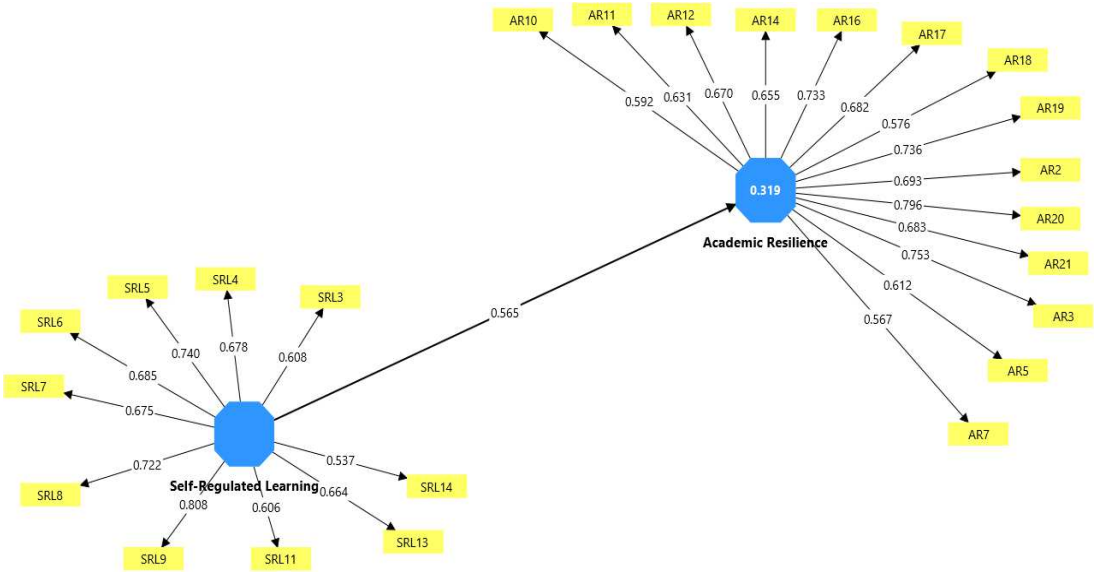


Figure 3: PLS-SEM Algorithm

4.2.2 Path Coefficient Results

After confirming that the measurement models meet the conditions of construct and indicator reliability, as well as convergent and discriminant validity, the hypothesis that *self-regulated learning will predict academic resilience among female pre-service RME teachers* was examined. The structural model was assessed by means of the coefficient of determination (R^2) and the standardised beta coefficient (β) for the hypothesised effect. The significance of the effect was evaluated using bootstrapping (Hair et al., 2014; Kock, 2015). The coefficient of determination (R^2) reflects the predictor variable's (self-regulated learning) ability to predict the dependent variable (academic resilience). The effect size (f^2) quantifies the extent to which self-regulated learning will predict academic resilience among pre-service RME teachers. In this study, the size effect (f^2) is divided into three categories, namely: small (0.02), medium (0.15), and large effect (0.35), as stated by Hair et al., 2013). The results are displayed in Table 6.

Table 6: Path Coefficient Results for Self-Regulated Learning as a Predictor of Academic Resilience Among Female Pre-service RME Teachers

Constructs	β	SD	T Statistics	P	f^2	R^2	5.0%	95.0%
SRL->AR	0.565	0.064	8.838	0.000	0.468	0.319	0.404	0.662

Table 6 presents the path coefficient results for self-regulated learning as a predictor of academic resilience among female pre-service RME teachers. We can observe that self-regulated learning is a significant predictor of academic resilience among female pre-service RME teachers ($\beta = 0.565$, $t = 8.838$, $p < 0.05$; $p = 0.000$). Hence, the result is statistically significant. It can also be observed that self-regulated learning explains 31.9% of the variance in academic resilience ($R^2 = 0.319$). The magnitude of the effect was large ($f^2 = 0.468$). The positive standardised coefficient ($\beta = 0.565$) suggests that a unit increase in the self-regulated learning of the female pre-service RME teachers would increase their academic resilience by the same proportion. Figure 4 shows the PLS-SEM bootstrapping results.

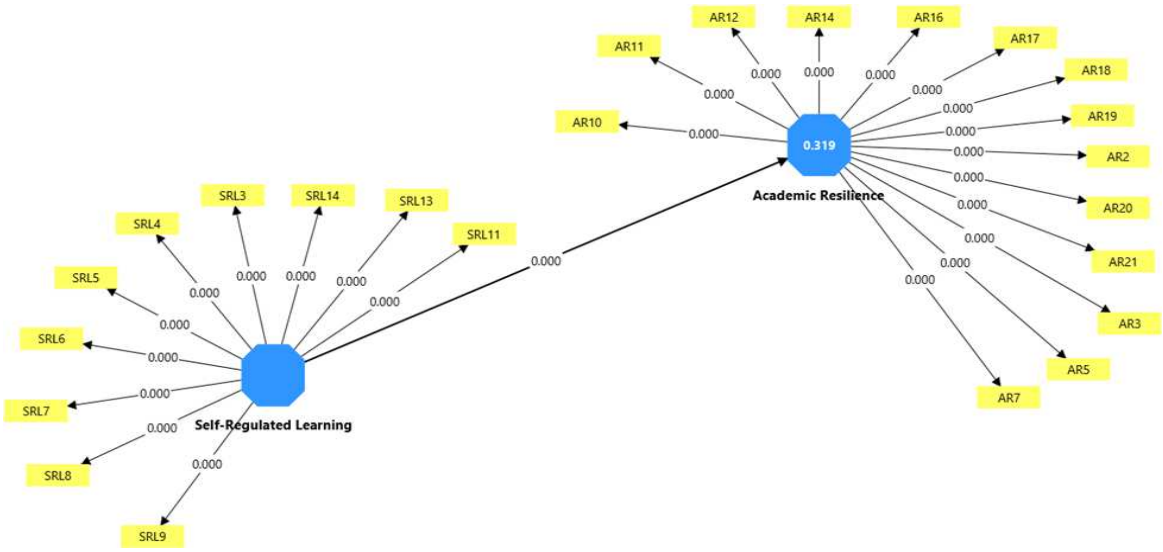


Figure 4: PLS-SEM Bootstrapping Results.

4.3 Hypothesis Three: School engagement will predict academic resilience among female pre-service RME teachers

4.3.1 Construct Reliability and Convergent Validity

As done in hypotheses one and two, the measurement models were examined for the test of construct reliability, convergent validity and discriminant validity of the reflective measures of the latent variables (Hair et al., 2014). Tables 7 and 8 present the values for the test of construct reliability, convergent validity and discriminant validity of the variables.

Table 7: Construct Reliability and Convergent Validity

Variable	Item	Loading	α	rho_a	rho_c	AVE
SE	5	0.606-0.728	0.705	0.715	0.806	0.654
AR	14	0.551-0.790	0.906	0.914	0.920	0.755

In Table 7, the factor loadings of school engagement ranged from 0.0.606 to 0.728. In addition, the factor loadings for academic resilience ranged from 0.551 to 0.790. These values were above 0.50, indicating the evidence for convergent validity. Thus, all the items represent the underlying constructs (Hair et al., 2014, 2017; Vinzi et al., 2010). Additionally, the internal consistencies of the latent variables were good because their Cronbach's Alpha values ranged from 0.705 to 0.906, and composite reliabilities (rho_a and rho_c) values ranged from 0.715 to 0.806 for school engagement, and the composite reliabilities (rho_a and rho_c) values for academic resilience ranged from 0.914 to 0.920. These reliabilities were above the threshold of 0.7 (Hair et al., 2017). Moreover, the average variance extracted (AVE) values ranged from 0.654 to 0.755, which were above the

acceptable threshold value of 0.5, thus depicting acceptable levels of convergent validity for all the constructs (Hair et al., 2014; Henseler et al., 2009).

Table 8: Discriminant Validity

Construct	SE	AR
Fornell-Larcker Criterion		
SE	**0.674**	
AR	0.661	**0.675**
Heterotrait-Monotrait (HTMT) Ratio		
SE		
AR	**0.785**	

From Table 8, the discriminant validity of the model was established because the square roots of the AVE values (i.e., diagonal values in bold) for all the main constructs in the model were greater than the corresponding inter-construct correlations (i.e., all values below the bold values). The values of the square roots of the AVE were 0.674 for school engagement and 0.675 for academic resilience (Fornell & Larcker, 1981; Hair et al., 2017). In addition, using the Heterotrait-Monotrait (HTMT) Ratio, the discriminant validity was confirmed because the HTMT ratio values were below the threshold of .850 or .90 (Collier, 2020; Henseler et al., 2015). Figure 5 shows the PLS-SEM algorithm.

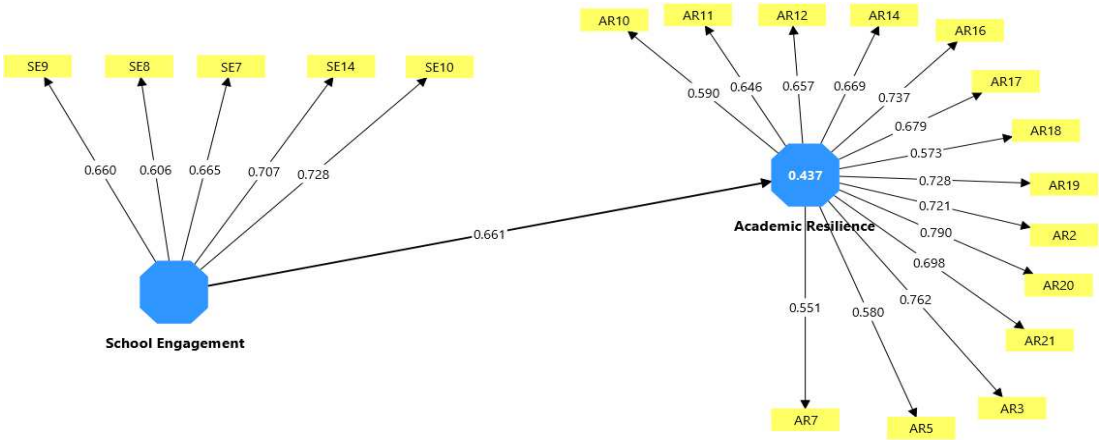


Figure 5: PLS-SEM Algorithm

4.3.2 Path Coefficient Results

Subsequently, after confirming that the measurement models meet the conditions of construct and indicator reliability, as well as convergent and discriminant validity, the hypothesis that *school engagement will predict academic resilience among female pre-service RME teachers* was examined. The structural model was assessed by means of the coefficient of determination (R^2) and the standardised beta coefficient (β) for the hypothesised effect. The significance of the effect was evaluated using bootstrapping (Hair et al., 2014; Kock, 2015). The coefficient of determination (R^2) reflects the predictor variable's (school

engagement) ability to predict the dependent variable (academic resilience). The effect size (f^2) quantifies the extent to which school engagement will predict academic resilience among pre-service RME teachers. In this study, the size effect (f^2) is divided into three categories, namely: small (0.02), medium (0.15), and large effect (0.35), as stated by Hair et al., (2013). The results are displayed in Table 9.

Table 9: Path Coefficient Results for School Engagement as a Predictor of Academic Resilience Among Female Pre-service RME Teachers

Constructs	β	SD	T Statistics	P	f^2	R^2	5.0%	95.0%
SE->AR	0.661	0.052	12.792	0.000	0.775	0.437	0.523	0.739

Table 9 presents the path coefficient results for school engagement as a predictor of academic resilience among female pre-service RME teachers. We can observe that school engagement is a significant predictor of academic resilience among female pre-service RME teachers ($\beta = 0.661$, $t = 12.792$, $p < 0.05$; $p = 0.000$). Hence, the result is statistically significant. It can also be observed that school engagement accounts 43.7% of the variance in academic resilience ($R^2 = 0.437$). The magnitude of the effect was large ($f^2 = 0.775$). The positive standardised coefficient ($\beta = 0.661$) suggests that a unit increase in the school engagement or college engagement of the female pre-service RME teachers would increase their academic resilience by the same proportion. Figure 6 shows the PLS-SEM bootstrapping results.

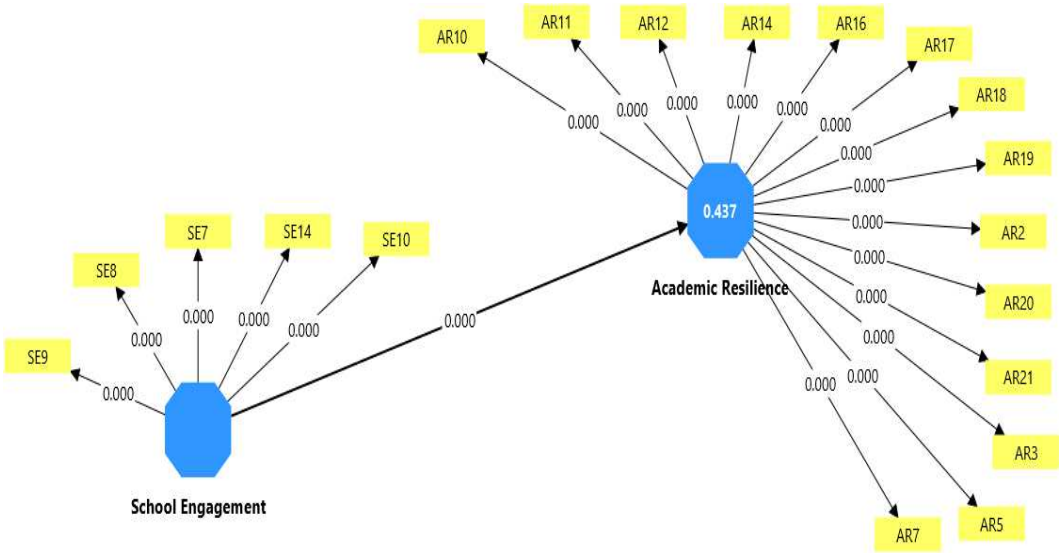


Figure 6: PLS-SEM Bootstrapping Results

5. Discussion

The overarching purpose of the study was to determine the predictive roles of academic mindfulness, self-regulated learning, and students' engagement on

academic resilience among pre-service Religious and Moral Education teachers in two female Colleges of Education in Ghana. Foremost, the results revealed that academic mindfulness is a significant predictor of academic resilience among female pre-service RME teachers. To this end, the mindfulness of an individual significantly influences the person's resilience. The findings of this study imply that female pre-service RME teachers who possess high levels of mindfulness could be able to maintain a decentred attitude toward difficult situations, which fosters resilience and may lead to general well-being. Again, mindfulness in female pre-service RME teachers makes them better able to respond and adapt to challenging situations. The findings of the current study are supported extensively by the available literature. For example, Vidal-Melia et al. (2022) studied among higher education students using the quantitative approach. The study found that academic mindfulness positively predicted academic resilience, which improved the students' academic performance. Again, Keye and Pidgeon (2013) studied among 140 Australian high school students and found a positive relation between academic mindfulness and resilience, where academic mindfulness predicted students' resilience ability in the ever-increasing uncertain school environment.

Secondly, the results revealed that self-regulated learning is a significant predictor of academic resilience among female pre-service RME teachers. This implies that resilience, which is a key factor for managing academic stress, substantially improves in an academic context where learners self-regulate their learning. It is important to note that female pre-service RME teachers who appreciably self-regulate themselves in school-related activities are likely to withstand school-related adversities. With self-regulated learning ability among female pre-service RME teachers, they may learn from their mistakes through self-regulated learning and develop tolerance towards negative situations through resilience. Findings from this current study resonate with those of some scholars who have researched the subject under discussion. For instance, at Razi University, Momeni and Karimi (2010) studied a sample of 317 high school students. In this study, it was found that self-regulated learning abilities in students predicted their resilience potential. Furthermore, it was found in a study conducted by Ataii et al. (2021) in Iran that self-regulated learning positively and significantly predicted the academic resilience of the students.

Finally, school engagement is a significant predictor of academic resilience among female pre-service RME teachers. The current study's findings are corroborated by a study by Romano et al., (2021). Among a convenience sample of 205 Italian high school students, it was found that academic engagement predicted students' academic resilience. In the Accra Metropolis, Ghana, Mahama, Amoako, Nandzo and Eshun (2024) found that school engagement was a significant predictor of academic resilience.

6. Implications of the Study

6.1 Theoretical Implications

Theoretically, the study contributes to the theoretical literature by simultaneously examining three distinct yet theoretically interrelated predictors, namely, academic mindfulness, self-regulated learning, and school engagement within a unified SDT framework. Most prior studies investigated these constructs in isolation or in pairwise combinations. By integrating all three within a single explanatory model, the study advances a more comprehensive theoretical account of academic resilience. Specifically, it theorises and empirically validates the SDT motivational cascade: mindfulness fosters autonomous self-regulation, autonomous self-regulation sustains engagement, and the combined operation of these resources produces resilience. This layered theoretical model offers a more nuanced understanding of the psychological pathways to academic resilience than previously available in the literature, particularly for pre-service teachers in Ghana.

Secondly, the finding that school engagement is the strongest predictor of academic resilience ($\beta = 0.661$, $R^2 = 0.437$, $f^2 = 0.775$) carries important theoretical implications. Within SDT, engagement is conceptualised not merely as behavioural compliance but as a proximal motivational outcome of basic psychological need satisfaction (Reeve, 2012; Reeve & Cheon, 2021). The predominance of engagement as a predictor suggests that for pre-service RME teachers in female Colleges of Education, the degree to which students are behaviourally, cognitively, and emotionally invested in their academic activities is the most proximate resource for resilience. This finding enriches theoretical models of academic resilience (Martin & Marsh, 2008) by foregrounding engagement, not just dispositional attributes, as a key constituent mechanism. It calls for a reconceptualisation of resilience models to more explicitly incorporate multidimensional engagement as a dynamic, situationally embedded predictor. Thirdly, the significant predictive role of academic mindfulness on academic resilience ($\beta = 0.420$, $R^2 = 0.176$, $f^2 = 0.314$) provides support for the SDT-mindfulness integration proposed by Brown and Ryan (2003) and elaborated by Niemiec et al. (2008). Their theoretical proposition that mindfulness enhances autonomous motivation and reduces ego-defensive processes that undermine self-regulation receives empirical corroboration in this study. The present findings, therefore, contribute to a growing body of theory linking mindfulness to resilience through motivational and self-regulatory pathways, extending this theoretical logic from Western and Asian university contexts (Vidal-Melia et al., 2022; Keye & Pidgeon, 2013) to a Ghanaian pre-service teacher education context.

In addition, self-regulated learning's significant predictive relationship with academic resilience ($\beta = 0.565$, $R^2 = 0.319$, $f^2 = 0.468$) extends SDT-informed accounts of self-regulation (Zimmerman, 2000; Pintrich, 2004; Boekaerts, 1997) to the domain of resilience outcomes. Theoretically, this suggests that the motivational quality of self-regulatory behaviour, specifically its degree of autonomous endorsement, is a critical mechanism through which students develop the psychological tenacity to persist amid adversity. The finding contributes to social-cognitive theories of resilience by identifying self-regulated learning not

merely as a performance-enhancing strategy, but as a buffer against academic adversity, particularly in resource-constrained and gender-specific educational settings. Finally, the study offers a methodological contribution by employing PLS-SEM with a census-based sample of female pre-service RME teachers. This approach allows for robust estimation of path coefficients and effect sizes in a setting where sample sizes are inherently constrained by the population. By establishing measurement model validity through construct reliability, convergent validity and discriminant validity (Fornell-Larcker criterion and HTMT ratio), the study provides a methodologically rigorous template for future quantitative investigations of academic resilience predictors in similar educational contexts.

6.2 Managerial Implications

The managerial implications of this study are far-reaching and speak directly to educational administrators, academic leaders, curriculum developers, and policymakers responsible for the governance and improvement of Colleges of Education in Ghana and comparable sub-Saharan African contexts. First, given that school engagement is the strongest predictor of academic resilience among pre-service RME teachers, educational administrators and college managers should prioritise the design of institutional environments that foster high levels of behavioural, emotional, and cognitive engagement. This implies that college authorities should invest in creating academically stimulating, inclusive, and relationally rich campus cultures. Specific managerial actions may include the introduction of peer learning communities, mentorship programmes pairing senior and junior students, and regular academic activity schedules that give students meaningful roles in their own learning. Staff development programmes that equip lecturers with engagement-centred pedagogical competencies, such as collaborative learning, inquiry-based instruction, and reflective practices, should also be institutionalised.

Secondly, the significant predictive role of self-regulated learning on academic resilience implies that college managers and curriculum developers should embed self-regulation training systematically into the pre-service teacher education curriculum. This could take the form of dedicated learning-skills modules or workshops at the commencement of each academic year, designed to equip students with goal-setting strategies, self-monitoring techniques, help-seeking behaviours, and strategic adaptation skills. Institutions may also consider designing assessment formats that reward process-oriented learning, such as learning journals, reflective portfolios, and progressive projects, rather than exclusively privileging end-of-semester examinations. Such assessment designs inherently scaffold self-regulatory behaviour. Thirdly, the finding that academic mindfulness predicts resilience has direct implications for college management regarding student support services and wellbeing programming. We recommend that college authorities should consider the formalisation of mindfulness-based interventions, such as brief mindfulness exercises integrated into academic schedules, stress management workshops, and mindfulness retreats before examination periods as standard components of student support frameworks. It is

also recommended that the Student Affairs and Counselling units within these colleges should be resourced and empowered to deliver evidence-based mindfulness programming. Since the study was conducted in all-female institutions, mindfulness interventions should be contextually sensitive to the unique social, emotional, and gendered pressures that female pre-service teachers face, including balancing domestic responsibilities with academic demands.

Fourth, the results underscore the importance of an integrated approach to student development in female Colleges of Education. Rather than addressing academic performance, mental well-being, and professional preparation as separate institutional concerns, administrators should foster a holistic support ecosystem that simultaneously attends to mindfulness, self-regulation, and engagement. This may necessitate structural changes, including the creation of interdepartmental committees responsible for coordinating academic support, counselling, and extracurricular development efforts in an aligned and purposeful manner.

Fifth, the study's findings carry implications for the Ghana Tertiary Education Commission (GTEC) and the Ghana Education Service (GES) at the policy level. The evidence that academic resilience among pre-service teachers is substantially predicted by psychological and behavioural factors, not merely academic ability or content knowledge, should inform national teacher education policy. We recommend that policymakers should advocate for the inclusion of psycho-educational competencies, including mindfulness, self-regulated learning, and school engagement, within the standards and competency frameworks for teacher education institutions. Furthermore, the accreditation criteria for Colleges of Education could be broadened to include indicators of institutional commitment to students' psychological well-being and engagement, alongside traditional academic quality metrics.

Sixth, lecturers and academic staff in these institutions occupy a pivotal managerial role as frontline educators who shape the learning environment. The findings suggest that lecturers should be trained to create autonomy-supportive classroom environments in which students experience choice, have their perspectives acknowledged, and feel a genuine sense of belonging. This autonomy-supportive climate, consistent with SDT principles, directly nurtures engagement, supports self-regulation, and ultimately builds resilience. We recommend that professional development workshops focused on need-supportive pedagogy should therefore be an institutional priority for the training of lecturers in Colleges of Education across Ghana. Finally, since this study was conducted in two female Colleges of Education, the findings have particular relevance for the management of gender-specific educational institutions. The communal, relatedness-rich culture of single-sex educational settings may be leveraged as a strategic asset for building resilience. We recommend that college managers should be intentional in harnessing the collegial ethos of these institutions through collaborative programmes, sisterhood networks, and community-building events as a means of strengthening the relational dimension of school engagement and, consequently, academic resilience among pre-service teachers.

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Author Contributions
Andrews Acquah, Theophilius Eshun, Emmanuel Adom Ashun, Davis Mawuena Aweso and Joel Amponsah are jointly responsible for conceptualisation, data collection, write-up and final proofreading. Andrews Acquah is responsible for data analysis, report writing and discussion.

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Data Availability
The datasets used for this study are available. The authors are willing to provide the datasets upon a reasonable request.

Informed Consent
Written informed consent was obtained from participants to participate in the study and to have their data published.

Disclosure statement
No potential conflict of interest was reported by the authors.

Declarations
Ethics approval and consent to participate
The study was reviewed by the Ethical Review Board, University of Education, Winneba (UEW), Ghana, which determined that it involved minimal risk to participants and therefore gave ethical approval. All research procedures were conducted in accordance with the ethical guidelines and regulations of the Ethical Review Board, University of Education, Winneba (UEW), Ghana, and adhered to the principles outlined in the Declaration of Helsinki. All participants gave their informed consent to participate in the study before being able to fill in the questionnaire.

Consent for publication
Not applicable.

Competing interests
The authors declare no competing interests.

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