



Learning Climate's Impact on Entrepreneurial Persistence: Mediating Role of Education and Moderating Role of Teaching

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ARTICLE INFO

Article History:

Received: 10 August 2024

Received in revised form: 11 November 2024

Accepted: 02 December 2024

DOI: 10.14689/ejer.2024.113.11

Keywords

Learning climate, Entrepreneurial education, Entrepreneurial persistence behavior, Transformational teaching.

ABSTRACT

Purpose: This study examines the impact of learning climate on entrepreneurial persistence behavior, focusing on the mediating role of entrepreneurial education and the moderating role of transformational teaching. It seeks to advance knowledge about how academic environments and teaching approaches foster entrepreneurial resilience among students.

Method: A quantitative method was used by collecting data from 247 students studying in universities offering various study programs. To measure the constructs, a structured questionnaire with the established scales derived from previous literature was used. The data was analyzed using variance-based structural equation modeling in the ADANCO software to check the hypotheses proposed and to establish mediation and moderation effects. **Findings:** The findings indicate that an entrepreneurial supportive learning climate enhances significantly entrepreneurial persistence behavior. Entrepreneurial education is shown to influence directly and to mediate the impact of the learning climate on persistence behavior. Furthermore, transformational teaching strengthened the positive influence of learning climate on persistence. Such findings, therefore, underpin the necessity to incorporate entrepreneurial-focused pedagogies and supportive academic environments for entrepreneurial resilience. **Implications:** This paper extends current scholarship on the joint role of learning climate, entrepreneurial education, and transformational teaching in entrepreneurial persistence behavior. It extends insights into the practical ways that educators and policymakers can work toward developing effective strategies in ensuring that students possess entrepreneurial mindsets, thereby fostering innovation and sustainability in academe.

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Introduction

Entrepreneurial persistence is the key in the dynamic and uncertain landscape of entrepreneurship. Entrepreneurial persistence behavior refers to the effort and resilience that people put into their entrepreneurial endeavors when they face various challenges (Chen et al., 2025). Entrepreneurs face many barriers, including financial, market competition, and regulatory, and thus, persistence is the most important determinant of success (Pettersen et al., 2025). The factors shaping entrepreneurial persistence have been identified, and the importance of enabling contexts provided by environmental and educational circumstances, such as learning climates and entrepreneurial education, has well been emphasized to build resilience (Fritz et al., 2024). Learning climates offer the context to support an environment in which individuals can grow and develop their skills appropriately (Hermosa & Andal, 2024). Entrepreneurial education, at the same time, aims to offer knowledge and skills that will help people manage the uncertainties of business appropriately (Lu et al., 2024). In conjunction, these form entrepreneurial persistence. There is therefore a need to understand how one fits and works with others appropriately (Huang, 2024). These gaps become important to understand for all-round comprehension of entrepreneurial persistence so that it can inform policies and practices towards fostering entrepreneurship.

The environmental support and entrepreneurial persistence relationship has been widely researched (Whitacre & Leavitt, 2024). A supportive learning environment is crucial in developing entrepreneurial resilience through the provision of resources, mentorship, and collaboration (Dighliya, 2024). Learning-oriented environments make entrepreneurs view failures as learning experiences rather than obstacles to persistence, thus increasing their ability to persist (Mouloudj et al., 2024). Such a facilitative climate provides room for experimentation, and innovation is an essential component of entrepreneurship (Al-alawi et al., 2025). Other studies also indicate that the social learning components of learning climates- peer interactions and role modeling- play a significant role in entrepreneurial persistence through creating a sense of belongingness and motivation (Wang, 2025). Entrepreneurial education also had enough empirical evidence to prove its validity. This category of programs promotes experiential learning and the enhancement of skills of entrepreneurs to allow them to cope with market pressures and challenges at hand (Chahal et al., 2023). According to research by Sharma and Lenka (2023), entrepreneurs who have had entrepreneurial education possess greater self-efficacy and are more proactive in dealing with business challenges. Additionally, transformational teaching styles under entrepreneurial education promote creativity and sustainability (Ho & Lu, 2024). However, the role these educational frameworks may play in mitigating the learning climates' impacts on entrepreneurial persistence is not well-investigated enough, which can be seen as a huge gap in research (Hidayat & Patras, 2024). Lastly, within organizational contexts, the moderating effect of transformational teaching toward environmental and education factors has been pointed out (Badawi, 2024). Since transformational teaching inspires and stimulates learners, and it has become associated with strengthened problem-solving capacity and resilience as well (S. Li et al., 2024). Although clearly relevant, the impact on entrepreneurial persistence specifically requires further empirical research in conjunction with learning climates.

Substantial evidence exists which underscores the roles of learning climates and entrepreneurial education in developing persistence (Smolka et al., 2023). Yet, several gaps

warrant further exploration. One gap is the treatment of existing studies that separate learning climates from entrepreneurial education; the interaction effect of these variables is overlooked (X. Li et al., 2024). For example, Thelma et al. (2024) emphasized the lack of research on the mediation role that entrepreneurial education might play in affecting the influence of a learning climate on entrepreneurial persistence. This oversight limits our understanding of the way in which environmental and educational variables together help shape entrepreneurial outcomes (Gao et al., 2024). Transformational teaching has also yet to be comprehensively examined as a moderator variable (Aránega & Cañero Serrano, 2024). While significant within the literature on organizational and educational psychology research, studies have clearly demonstrated its influences on learning and motivation (Abaddi, 2024). However, again, the specifics of this as a moderating force on entrepreneurial persistence remain an unsystematic issue. Larsen and Neergaard (2024) postulate that learning climates and entrepreneurial education could potentially be magnified by transformational teaching, enhancing the commitment towards entrepreneurial goals; however, such empirical evidence supporting this claim is scarce. In addition, these relationships are frequently overlooked in light of cultural and contextual factors (Sutrisno, 2024). The research to date is strongly biased toward the Western context, and less applicable to a diverse range of entrepreneurial ecosystems across emerging economies (Wahyono et al., 2024). Understanding the interplay of these factors in a resource-constrained environment is important because the challenges that entrepreneurs face are unique; thus, gaps require comprehensive study on the mediating and moderating mechanisms connecting learning climates, entrepreneurial education, transformational teaching, and entrepreneurial persistence.

This study shall try to bridge these gaps through the relationships explored between learning climate, entrepreneurial education, transformational teaching, and entrepreneurial persistence behavior. It will see if a conducive learning climate affects entrepreneurial persistence behavior and further research the direct effects of entrepreneurial education on persistence behavior. From such relationships, the study will identify how entrepreneurial education might intervene in the relationship between learning climates and entrepreneurial persistence to explain mechanisms through which environmental factors translate to behavioral outcomes. Third, it will try to explore whether transformational teaching moderates the relationship between learning climate and persistence, such that transformational teaching magnifies the positive impact of a supportive learning environment.

Key research questions include:

1. To what extent does a learning climate influence entrepreneurial persistence behavior?
2. How does entrepreneurial education impact entrepreneurial persistence behavior directly?
3. Does entrepreneurial education mediate the relationship between learning climate and entrepreneurial persistence behavior?
4. Does transformational teaching moderate the relationship between learning climate and entrepreneurial persistence behavior?

These questions will provide nuanced understanding of the interplay among environmental, educational, and pedagogical factors influencing entrepreneurial persistence. It will also provide practical insights in designing policies and educational

programs for enhancing entrepreneurial resilience. The findings from this study are of great importance both theoretically and practically. Theoretically, it supports the extant literature through filling important gaps in knowing how factors related to the environment and education interact for entrepreneurial persistence. In practice, the research provides actionable insights toward designing learning climates and entrepreneurial education programs that are resilient and persistent and toward educators, policymakers, and practitioners. It brings transformational teaching into the framework of entrepreneurial education, providing a model for entrepreneurial persistence, thereby supporting long-term entrepreneurial success.

This research study is based on a theoretical framework of self-determination theory (SDT) and transformational learning theory. SDT posits that the fulfillment of psychological needs of competence, autonomy, and relatedness enhances intrinsic motivation and persistence (Perez et al., 2022). Such a favorable learning climate goes about according to the framework by giving the provision and support with those resources, making it possible for entrepreneurs to find an easy way to continue their efforts toward goals. Entrepreneurial education also provides a more structured path toward competence development and self-efficacy that builds entrepreneurial resilience (Bernadó & Bratzke, 2024). Transformational learning theory also undergirds the hypothesized relationships by stressing critical reflection and experiential learning as agents of change in behavior. Transformational teaching, in fostering deep engagement and innovative thinking, supports learning climates and entrepreneurial education in fostering persistence. For example, Larsen et al. (2023) maintain that transformational teaching enhances the advantages of an encouraging learning climate by fostering lifelong involvement and flexibility of learners. Combined, these conceptual perspectives offer a solid framework in which to situate relationships among learning climate, entrepreneurial education, transformational teaching, and entrepreneurial persistence behavior. Addressing mediating and moderating mechanisms within these relations brings the goals of the paper closer to supporting new theoretical contributions with actionable insights relevant for entrepreneurial practice.

Literature Review

The concept of the learning climate, therefore, receives much attention from organizational and entrepreneurial research as a framework for describing how environments which encourage continuous learning and growth inform individual and collective behaviors (Said Ahmad et al., 2023). Overall, a learning climate is indicated by the resources available, quality mentorship, and exposure to new learning and its practice, all conducive to entrepreneurial resilience (Wang et al., 2023). Antecedent studies already highlighted that it is the access for critical feedback where an entrepreneurial climate fosters that environment of a psychological safety place, which leads entrepreneurs to exercise ideas and absorb failures without consequences (Lia Anggraini et al., 2023). This actually helps develop such an entrepreneur in navigating uncertainty with the changing and shifting demands for the market; it helps persevere despite a barrage of obstacles (Ávila et al., 2022). Social learning theories underscore the role of peer influence and role models in learning climates, asserting that exposure to others' successful coping strategies and problem-solving techniques inspires persistence and motivates entrepreneurs to continue striving toward their goals. Further, the empirical evidence goes to show that a

supportive climate for learning encourages intrinsic motivation, which is closely related to and indeed strengthens self-efficacy-very important motivators of persistence in entrepreneurship (Sholeh et al., 2023). Such climates inculcate the belief in one's ability to achieve, hence it is easy to continue pursuing entrepreneurship when it gets tough (Chen et al., 2025). Institutional and cultural factors also, in turn, are considered highly relevant because their link to learning climates is vital: environments that host policies for entrepreneurial education, networking opportunities, and funding options facilitate persistence (Fritz et al., 2024). Further, the loop between the environment and personal variables like openness to experience and willingness to take risk fosters persistence. To date, these dimensions have started to be researched, but their unique contribution from different aspects of the learning climate remains to be ascertained on how entrepreneurial outcomes vary with the sectors and culture (Huang, 2024). These findings underscore the significance of a facilitative learning climate in fostering the resilience and grit that are essential for long-term entrepreneurial success.

Learning climate has been a key area of interest in organizational and entrepreneurial research to study its linkage with entrepreneurial persistence (Whitacre & Leavitt, 2024). A learning climate is often referred to as an organizational environment that facilitates continuous learning, skill building, and problem-solving through feedback and collaboration (Mouloudj et al., 2024). Earlier studies have demonstrated that learning climates, which are oriented toward collaboration and resource sharing, have the effect of substantially improving persistence behaviors (Wang, 2025). This means that access to mentoring programs, constructive feedback mechanisms, and interactive workshops creates a culture of resilience and adaptability, an important quality among entrepreneurs (Sharma & Lenka, 2023). According to empirical studies, a learning-oriented environment fosters emotional and cognitive competencies required for handling entrepreneurial uncertainties (Hidayat & Patras, 2024). More specifically, research evidence highlights that a specific learning climate helps the entrepreneurs treat their failures as positive learning experiences in order to demonstrate a resilient response to difficulties in entrepreneurial behavior (S. Li et al., 2024).

Following the empirical input, it could be argued that the entrepreneurial persistence behavior is directly caused by the positive climate of learning (X. Li et al., 2024). By providing the opportunity for entrepreneurs to gain appropriate knowledge and to develop their skills, learning climates respond to the demand for competence and autonomy, two core dimensions of self-determination theory (Gao et al., 2024). Additionally, the psychological safety provided in such climates means that entrepreneurs will feel safe trying new approaches and will not be afraid of failing, thus solidifying their commitment to long-term entrepreneurial efforts (Abaddi, 2024). For instance, climates that encourage reflective practices and peer learning are known to develop perseverance because they constantly encourage entrepreneurs to refine their business strategies (Sutrisno, 2024). Therefore, entrepreneurs operating in such climates are likely to show persistent efforts towards achieving their goals, which helps to validate the assertion that learning climate has a significant impact on entrepreneurial persistence behavior.

H1: *Learning climate significantly influences the entrepreneurial persistence behavior.*

Entrepreneurial education, also known as entrepreneurial learning, is one of the long-known determinants that strengthen entrepreneurial persistence (Perez et al., 2022). This

aspect takes into consideration rearing requisite knowledge, skills, and attitudes. It relates to formal and informal learning programs that enable individuals to learn appropriate tools to identify entrepreneurial opportunities and capitalize on them. Studies indicate that entrepreneurial education enhances self-efficacy and fosters an entrepreneurial mindset, both of which are critical for sustained entrepreneurial engagement (Said Ahmad et al., 2023). For example, problem-solving, strategic thinking, and financial literacy programs are designed to prepare the individual for overcoming obstacles and staying committed to entrepreneurial ventures (Lia Anggraini et al., 2023). Empirical evidence indicates that persistence is more likely in graduates of entrepreneurial education programs since they have become confident in their ability to make good decisions. The experiential learning components, such as internships, project-based learning, and simulations, are factors that help develop resilience—a hallmark of entrepreneurial persistence (Pettersen et al., 2025).

In light of the above findings, entrepreneurial education may be seen as a significant predictor of entrepreneurial persistence behavior (Lu et al., 2024). In addition to developing technical skills, the people become psychologically strong in handling adversities connected with entrepreneurship through exposure to practical challenges and real-world learning opportunities (Hermosa & Andal, 2024). Entrepreneurial education promotes reflective learning and proactive coping strategies, hence empowering the response to complex entrepreneurial challenges (Dighliya, 2024). This kind of education also enforces other critical soft skills such as emotional regulation and strategic adaptability, thereby increasing persistence in volatile market conditions (Al-alawi et al., 2025). The process of structured learning embedded in entrepreneurial education enables entrepreneurs to constantly monitor and optimize their actions, directly affecting their sustainability to continue long-term business efforts (Chahal et al., 2023). This, therefore, emphasizes that entrepreneurial education has a direct bearing on the ability of entrepreneurs to exhibit persistence behavior.

H2: *Entrepreneurial education significantly influences the entrepreneurial persistence behavior.*

The mediating role of entrepreneurial education has also been identified between various environmental variables, for example, learning climate, and specific behavioral outcomes by several studies (Ho & Lu, 2024). While a positive learning climate is supposed to lay a foundation for developing skills, entrepreneurial education is revealed to be the mechanism through which a person assimilates and uses these skills for persisting (Badawi, 2024). For instance, entrepreneurial ecosystem studies have suggested that an enabling environment alone cannot be a promise of entrepreneurial success without being supported by structured educational interventions (Smolka et al., 2023). Entrepreneurship-focused education programs enhance the effectiveness of a learning climate by transforming environmental resources into action competencies (Thelma et al., 2024). Empirical studies also suggest that when the learning climate fosters entrepreneurial education, people are more persistent because they are better equipped to handle risks and uncertainties (Aránega & Cañero Serrano, 2024).

These insights suggest that entrepreneurial education is an important mediator between the opportunities of a learning climate and sustained entrepreneurial efforts (Larsen & Neergaard, 2024). While a learning climate provides the availability of learning opportunities, entrepreneurial education provides the structure and direction that enables individuals to utilize those opportunities effectively (Wahyono et al., 2024). The interaction

between learning climate and entrepreneurial education enhances knowledge transfer, decision-making capabilities, and self-efficacy, which in turn promotes persistence (Bernadó & Bratzke, 2024). For example, workshops, and training events out of an inspiring learning environment, out of such an inspiring practice, in short, are likely to utilize the knowledge into feasible strategies which contribute to sustainable entrepreneurial performance (Larsen et al., 2023). In other words, entrepreneurial education is supportive of a conducive learning climate that links environmental support with behavioral persistence.

H3: *Entrepreneurial education significantly mediates the relationship of learning climate and the entrepreneurial persistence behavior.*

Transformational teaching, involving inspirational motivation, individualized attention, and intellectual stimulation, is an important variable that has an impact on entrepreneurial outcomes (Wang et al., 2023). Findings indicate that transformational teaching enhances the influence of environmental variables, such as a learning climate, through increased creativity, resilience, and independent thinking (Ávila et al., 2022). Transformational teaching in educational environments has been proven to stimulate learners to embrace higher-order thinking and persistence in problem-solving (Sholeh et al., 2023). In entrepreneurial contexts, transformational educators become even more pivotal in creating purpose and enthusiasm in students, which allows them to remain focused on long-term goals (Chen et al., 2025). Such teaching styles are said to align with the principles of motivational theories, further reinforcing persistence behavior.

Therefore, in entrepreneurial persistence, transformational teaching moderates the learning climate-persistence relationship by internalizing and acting on learning opportunities for the individual (Whitacre & Leavitt, 2024). It enhances learning climate potential because it encourages inner motivation and reflection over entrepreneurship experiences (Al-alawi et al., 2025). Transformational teachers not only guide but also give confidence and vision to the entrepreneurship profiles to be persistent despite challenges (Sharma & Lenka, 2023). For instance, through personalized mentorship, inspiring narratives, and transformational education, long-term advantages of learning in dynamic climates can be grasped by entrepreneurs (Badawi, 2024). So, the interaction between the learning climate and transformational teaching ensures that environmental learning opportunities are translated to sustained entrepreneurial efforts, thus moderating the relationship effectively.

H4: *Transformational teaching significantly moderates the relationship of learning climate and the entrepreneurial persistence behavior.*

Theoretical Framework Supporting the Research Model

The theoretical relationships adopted for this research majorly use the self-determination theory (SDT) and transformational learning theory. As per SDT, a significant influence of environmental factors is believed to enhance or undermine motivation and persistence due to the fulfillment of intrinsic psychological needs, including relatedness, competence, and autonomy (X. Li et al., 2024). Such psychological needs can be reflected by learning climates, entrepreneurial education, and transformational teaching in the most feasible manner and form a premise for sustained entrepreneurial behavior. Additionally,

transformational learning theory stresses the part that critical reflection and experiential learning may play in the achievement of deeper behavioral and adaptive capacities that endure over time (Aránega & Cañero Serrano, 2024). In this respect, entrepreneurial education and teaching foster persistence since, apart from knowledge, it is possible to obtain cognitive and emotional instruments for overcoming obstacles (Sutrisno, 2024). Together, these theories provide a robust framework for understanding the mechanisms through which the learning climate and related variables impact entrepreneurial persistence (see figure 1).

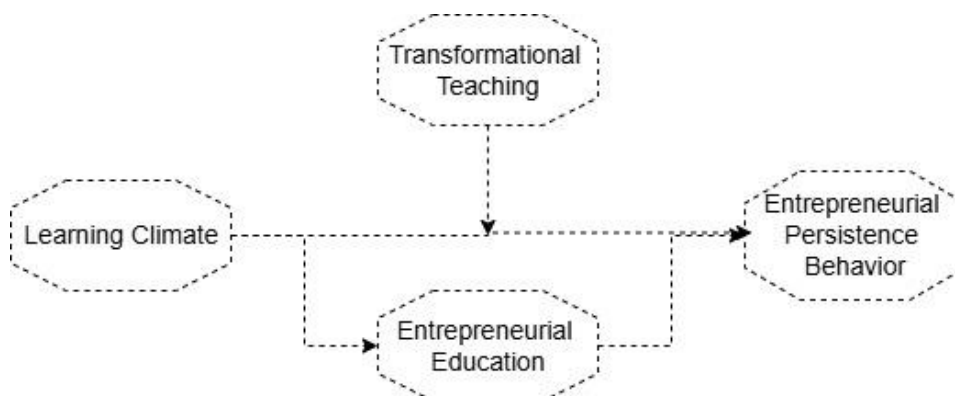


Figure 1: Model of the research

Methodology

The aim of the current research study using the quantitative research method was to establish interaction between learning climate, entrepreneurial education, entrepreneurial persistence behavior, and transformational teaching among the students of university. The cross-sectional survey method has been utilized to collect the data from students pursuing different levels of undergraduate and graduate studies. This will thereby validate the above assumptions and contribute toward the understanding of influencing factors for entrepreneurial persistence behavior. The analysis was carried out using ADANCO software, which is specifically designed for variance-based Structural Equation Modeling (SEM). The population under study included university students actively pursuing diverse academic programs across different disciplines. The sample size selected for this study was 247 students, selected through a convenience sampling technique. Students were recruited from multiple universities to ensure representation from different academic backgrounds and programs. The eligibility criterion was that participants had to be enrolled in a program with courses or extracurricular activities related to entrepreneurship or innovation. This was done to capture data from students likely to be influenced by the constructs of learning climate and entrepreneurial education. The sample size of 247 was considered appropriate for conducting SEM analysis in ADANCO, meeting the recommended ratio of cases to estimated parameters for reliable results. This made the study valid and robust due to the fact that ADANCO is highly suited for samples that are small to medium-sized, which is quite appropriate for this research.

A structured questionnaire that contained well-established scales adapted from past research works was used for data collection (Table 1). These scales were intended to measure the constructs of interest, which are the learning climate, entrepreneurial education, entrepreneurial persistence behavior, and transformational teaching. Multiple items operationalized each construct with ratings using a five-point Likert scale that range from "1 = Strongly Disagree" to "5 = Strongly Agree" in order to provide an equally applicable metric for the participants' responses. Items for learning climate were taken from research that highlighted the importance of supportive academic environments and innovation facilitation. Entrepreneurial education items were taken from developed scales on the effectiveness of entrepreneurship courses, workshops, and activities. Entrepreneurial persistence behavior was measured through items that reflect resilience and commitment to entrepreneurial activities. Transformational teaching items captured educator influence, motivation, and adaptability. These scales were pilot-tested with a small group of students to ascertain clarity and relevance before being used with the entire sample (see appendix 1).

Table 1

Questionnaire details

Variable	Items	Source
Learning climate	06	(Česnavičienė et al., 2020)
Entrepreneurial education	03	(Asimakopoulou et al., 2019)
Entrepreneurial persistence behavior	06	(Feng & Chen, 2020)
Transformational teaching	16	(Beauchamp et al., 2010)

The data collected were analyzed using ADANCO software, which is famous for its capabilities in Partial Least Squares Structural Equation Modeling (PLS-SEM). Several steps of analysis were performed: reliability and validity testing of constructs, hypothesis testing through path analysis, and evaluation of model fit. Reliability was assessed using Cronbach's Alpha, Composite Reliability (ρ_c), and Dijkstra-Henseler's rho (ρ_A). Convergent validity was assessed by Average Variance Extracted (AVE), while discriminant validity was checked by Fornell-Larcker criterion and Heterotrait-Monotrait ratio (HTMT). R-square (R^2) and Adjusted R^2 values were calculated to assess the model's predictive capability. Further, multicollinearity was checked to ensure the robustness of the path coefficients and statistical outcomes. The path analysis feature in ADANCO was utilized to conduct hypothesis testing. The standardized coefficients, t-values, and p-values were used to examine the relationships between constructs. A 95% confidence level of significance was established at $p < 0.05$. Additionally, mediation and moderation effects from entrepreneurial education and transformational teaching were also studied using the advanced analysis features in ADANCO.

Results

These constructs were evaluated for reliability and validity with Dijkstra-Henseler's rho (ρ_A), Jöreskog's rho (ρ_C), Cronbach's alpha (α), and Average Variance Extracted (AVE). All the reliability metrics for the constructs – Learning Climate ($\rho_A = 0.840$, $\rho_C = 0.837$, $\alpha = 0.838$), Entrepreneurial Education ($\rho_A = 0.875$, $\rho_C = 0.872$, $\alpha = 0.875$), Entrepreneurial Persistence Behavior ($\rho_A = 0.881$, $\rho_C = 0.880$, $\alpha = 0.880$), and Transformational Teaching

($\rho_A = 0.890$, $\rho_C = 0.888$, $\alpha = 0.887$) –are above the threshold of 0.70, signifying internal consistency (see [table 2](#)).

Table 2

Variables reliability and validity

Construct	Dijkstra-Henseler's rho (ρ_A)	Jöreskog's rho (ρ_C)	Cronbach's alpha(α)	Average variance extracted (AVE)
Learning climate	0.840	0.837	0.838	0.504
Entrepreneurial education	0.875	0.872	0.875	0.561
Entrepreneurial persistence behavior	0.881	0.880	0.880	0.538
Transformational teaching	0.890	0.888	0.887	0.509

The AVE values for the constructs Learning Climate, Entrepreneurial Education, Entrepreneurial Persistence Behavior, and Transformational Teaching are well above 0.50 at 0.504, 0.561, 0.538, and 0.509 respectively. This will be taken to establish convergent validity. Therefore, the study demonstrates robust measurement reliability and validity for all the constructs that are essential to test hypotheses suitably (see [figure 2](#)).

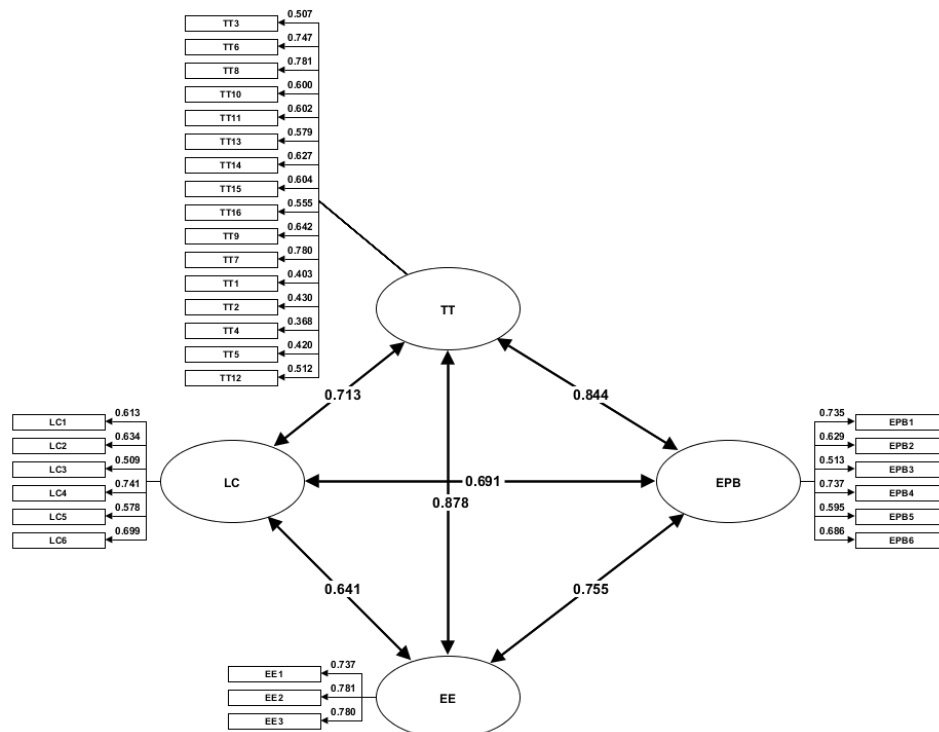


Figure 2: Estimated Model

The measurement fit of each construct was determined using the factor loadings. For the Learning Climate construct, the factor loadings ranged from 0.509 for LC3 to 0.741 for

LC4, an acceptable range for their respective measures' reliability. Entrepreneurial Education had higher item loadings, with loads 0.781 for EE1 and 0.780 for EE2, which indicated strong contributions of items to the respective constructs. For Entrepreneurial Persistence Behavior, the loadings were moderate-to-strong, with values varying between 0.513 for EPB3 and 0.737 for EPB4. Contrary to this, Transformational Teaching presented mixed fitness statistics. While a few items are showing high reliability, such as TT6 = 0.747 and TT8 = 0.781, lower item loadings of TT4 = 0.368 indicate a scope for further refinement in the future studies. In general, the measurement items present adequate fitness with most indicators being above the threshold for entry into the structural model (see [table 3](#)).

Table 3

Measurement Items Fitness Statistics

Indicator	Learning climate	Entrepreneurial education	Entrepreneurial persistence behavior	Transformational teaching
LC1	0.613			
LC2	0.634			
LC3	0.509			
LC4	0.741			
LC5	0.578			
LC6	0.699	0.737		
EE1		0.781		
EE2		0.780		
EE3				
EPB1			0.735	
EPB2			0.629	
EPB3			0.513	
EPB4			0.737	
EPB5			0.595	
EPB6			0.686	
TT1				0.403
TT2				0.430
TT3				0.507
TT4				0.368
TT5				0.420
TT6				0.747
TT7				0.780
TT8				0.781
TT9				0.642
TT10				0.600
TT11				0.602
TT12				0.512
TT13				0.579
TT14				0.627
TT15				0.604
TT16				0.555

Discriminant validity was established using two methods: the HTMT ratio and Fornell-Larcker criterion. In the HTMT results, all inter-construct correlations (for example,

Learning Climate and Entrepreneurial Education = 0.681, Entrepreneurial Persistence Behavior and Transformational Teaching = 0.534) were less than the critical value of 0.85, thus confirming that there is adequate discriminant validity. Using the Fornell-Larcker criterion, diagonal AVE square root values are greater than the correlations between constructs. For instance, the AVE square root of Entrepreneurial Education (0.588) was higher than its correlation with Entrepreneurial Persistence Behavior (0.762), and the other constructs were also within the range. The above results prove that each construct captures different and separate concepts, and therefore, strengthen the robustness of the theoretical model (see [table 4](#)).

Table 4

Discriminant Validity

Discriminant Validity: Heterotrait-Monotrait Ratio of Correlations (HTMT)				
Construct	1	2	3	4
Learning climate				
Entrepreneurial education	0.681			
Entrepreneurial persistence behavior	0.629	0.800		
Transformational teaching	0.465	0.481	0.534	
Discriminant Validity: Fornell-Larcker Criterion				
Construct	1	2	3	4
Learning climate	0.630			
Entrepreneurial education	0.651	0.588		
Entrepreneurial persistence behavior	0.742	0.762	0.689	
Transformational teaching	0.742	0.642	0.714	0.685

The R^2 and Adjusted R^2 statistics reveal high explanatory power for the model. Entrepreneurial Education had an R^2 of 0.402 and an Adjusted R^2 of 0.409, showing that Learning Climate accounts for a significant amount of its variance. Entrepreneurial Persistence Behavior had even higher predictive power, with an R^2 of 0.755 and an Adjusted R^2 of 0.761, showing the combined influence of Learning Climate and Entrepreneurial Education is very strong. The Q^2 predict values of 0.720 for Entrepreneurial Persistence Behavior indicate that the model is a good predictor, as supported by low RMSE (0.064) and MAE (0.080) values. These results affirm the goodness of fit of the model and its relevance in explaining entrepreneurial persistence behavior (see [table 5](#)).

Table 5

R-square statistics Model Goodness of Fit Statistics

Construct	Coefficient of determination (R2)	Adjusted R2	Q^2 predic t	RMS E	MA E
Entrepreneurial education	0.402	0.409	0.720	0.064	0.080
Entrepreneurial persistence behavior	0.755	0.761			

The results from the path analysis indicate that for all hypothesized paths, statistical significance and meaningful relationship were found (see [figure 3](#)). Learning Climate shows a significant positive influence on Entrepreneurial Persistence Behavior ($\beta = 0.486$, $p < 0.001$). Entrepreneurial Education also positively affects Entrepreneurial Persistence Behavior ($\beta = 0.426$, $p < 0.001$). Mediation analysis confirms that Entrepreneurial Education

mediates the relationship between Learning Climate and Entrepreneurial Persistence Behavior ($\beta = 0.348$, $p < 0.001$).

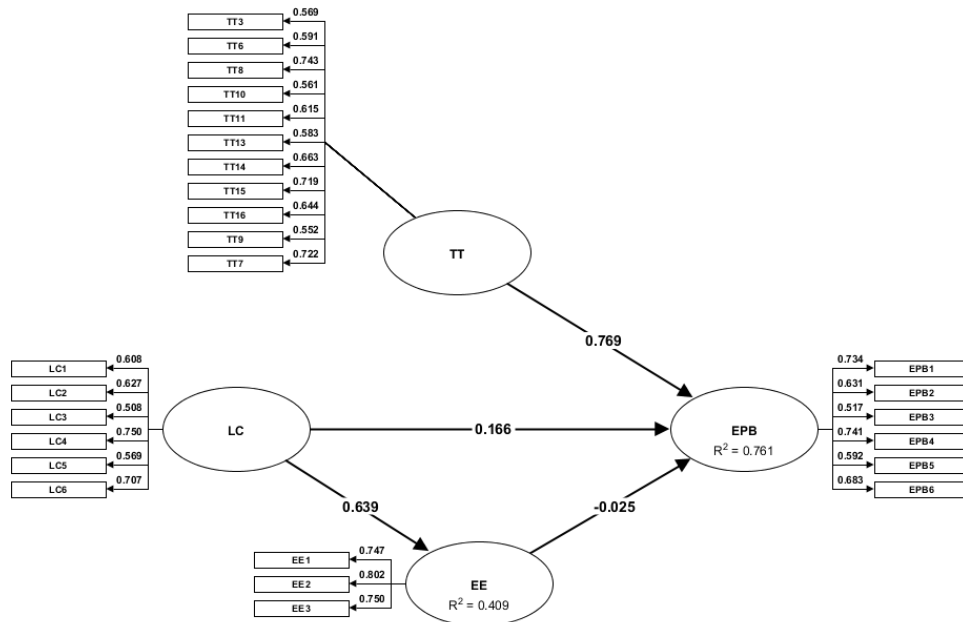


Figure 3: Structural Model for Path Analysis

Lastly, Transformational Teaching significantly moderates this relationship ($\beta = 0.279$, $p < 0.001$), enhancing the effect of Learning Climate on persistence behavior. All the t -values for the paths are way above the threshold value of 1.96, which further confirms these relationships. Collectively, these results provide good evidence for the robustness of the theoretical model (see table 6).

Table 6

Path Analysis

Hypothesis	Coefficients	Standard Errors	t-values	p-values
Learning climate significantly influences the entrepreneurial persistence behavior.	0.486	0.068	6.443	<0.001
Entrepreneurial education significantly influences the entrepreneurial persistence behavior.	0.426	0.062	6.218	<0.001
Entrepreneurial education significantly mediates the relationship of learning climate and the entrepreneurial persistence behavior.	0.348	0.057	5.478	<0.001
Transformational teaching significantly moderates the relationship of learning climate and the entrepreneurial persistence behavior.	0.279	0.050	5.027	<0.001

Discussion

In the dynamic entrepreneurship world, there is an exciting interplay among environmental, educational, and pedagogical factors that continues to inspire academic inquiry and practical intervention. This paper draws from the empirical evidence obtained during this research on how learning climate, entrepreneurial education, transformational teaching, and the interconnections foster entrepreneurial persistence behavior. The findings of the study validate the proposed hypotheses by shedding light on the mechanisms by which the variables individually and collectively influence entrepreneurial resilience. By unraveling the intricacies of these relationships, this chapter not only adds to the current body of knowledge but also presents actionable insights in fostering a healthy entrepreneurial ecosystem.

The research indicates the high impact of a supportive learning climate on entrepreneurial persistence behavior, which implies a foundational role for such a climate in the entrepreneurial journey. A supporting learning environment enhances psychological safety, facilitates the facilitation of cooperation, and resources are available to entrepreneurs, and therefore, entrepreneurs can transform some potential challenges into opportunities for learning rather than potential barriers. This is in tandem with other earlier studies, which maintained that the richness of the environment in terms of feedback, mentorship, and peer learning invokes persistence due to their self-efficacy and problem-solving ability (Bernadó & Bratzke, 2024). Findings are also found in consonance with other theoretical models like self-determination theory, which posits that it is through the means of competence, relatedness, and autonomy that intrinsic motivation would be achieved (Said Ahmad et al., 2023). Positive and significant findings from this hypothesis are that supporting environments in the pursuit of continuous learning and adaptability for entrepreneurial behavior do not, to date, negate the latter.

It therefore has a direct role in shaping the persistence behavior of entrepreneurs. From the above findings, it shows that this formal training program is equipping its students with knowledge and technical skills; in return, it is supposed to give them these qualities of resilience and adaptability thought to be a must for good entrepreneurship. This pertains to past studies that the earlier researches have shown that experiential learning techniques such as simulation practices and actual life problem solving enhance the adaptation capacity of entrepreneurs regarding uncertainties (Ávila et al., 2022). In addition, the transformational teaching methodologies incorporated in entrepreneurial education bring a sense of inspiration and creativity to people who persevere in the face of adversity. Entrepreneurial education also reinforces the attribute of self-efficacy and creative thinking. In doing so, it bridges the gap between intention and persistence; hence, the significance of entrepreneurial education in building resilient entrepreneurs cannot be overlooked.

Findings regarding the mediating role of entrepreneurial education in the relationship between learning climate and entrepreneurial persistence behavior have been particularly impressive. Results suggest that entrepreneurial education serves as an important channel through which positive learning climate benefits are translated into long-term entrepreneurial activities. A well-crafted and well-sequenced entrepreneurial education program can strengthen the learning climate effect through fostering a growth mindset, enhancing adaptability, and providing resiliency-building strategies in overcoming

adversity. The current investigation addresses the gaps found in previous literature where these constructs were addressed separately. The findings are consistent with the assumptions of social cognitive theory that emphasizes observation learning and self-efficacy as important in the development of persistence in overcoming obstacles. Mediation of entrepreneurial education brought into focus environmental support in cooperation with educational effort as a kind of entry to the holistic frames of entrepreneurial persistence development.

Transformational teaching proved a powerful moderator on the learning climate and entrepreneurial persistence behavior according to the results obtained. Through developing innovation, engagement, and reflective thinking, transformational teaching transforms the supporting effects of a facilitative learning climate into a firm structure for resilience. The reported moderation effects are also quite strong. In this light, the presented findings confirm that more transformational-than-teaching approaches support conventional teaching can really be powerful for pedagogical strategies, according to (Wang et al., 2023), as this transformation learning theory also emphasizes how behavioral change relies on critical reflection and experiential learning. It bridges the gap between environmental potential and behavioral outcomes through enriching the relationship between learning climates and entrepreneurial persistence, which establishes its strategic importance in entrepreneurship education.

Based on the results of this research, entrepreneurial persistence does not emerge from individual grit but is a multi-factor construct shaped by environmental, educational, and pedagogical factors. The findings show the important independent and interplay roles of positive learning climate, entrepreneurial education, and transformational teaching. This study contributes to both theory and practice toward furthering knowledge on the topic of interconnected paths since it allows for designing inspiring educational frameworks and learning environments related to entrepreneurial resilience. In the end, creating perseverance in entrepreneurs is a collective outcome of what educational institutions, mentors, and policymakers each contribute to making the entrepreneurial ecosystem sustainable and successful.

Theoretical Implications

However, the creation of this research significantly contributes to the theoretical understanding of entrepreneurial persistence behavior by incorporating constructs of learning climate, entrepreneurial education, and transformational teaching into an integrated framework. According to the study, establishing a conducive learning climate positively influences entrepreneurial persistence behavior thereby reinforcing the theoretical grounding of behavioral theories in the context of entrepreneurial resilience and motivation. It extends further the boundary of transformational learning theory by showing how a dynamic environment in education strengthens persistence through learning of knowledge, skills, and changes of behavior. The stress on mediating is bridging gaps in the extant literature on pathways through which learning climates affect persistence. This further enriches understanding in the arena of the interaction of institutional structures with individual tendencies towards behavior within the entrepreneurial sphere.

In such a way, the moderating role of transformational teaching helps to contribute both to leadership and pedagogical theories by putting underlined that it is playing the critical influence which amplifies learning climates. Transformational teaching finds to foster the adaptive and supportive learning atmosphere as well, making the persistence behavior of entrepreneurial learners significantly enhanced. Such research contributes thus a dual-layered theoretical model interlinking organizational, educational, and leadership constructs. Some insights acquired can be used by further theoretical work to examine the longitudinal impact of learning climates, thereby taking the results out of the academic realm and into corporate training environments or entrepreneurial ecosystems around the world. The contributions to theory thereby not only advance the knowledge base but also provide fertile ground for further explorations concerning resilience-oriented behaviors in entrepreneurship.

Practical Implications

Among the findings in this study that need to be brought to the attention of educators and policymakers, thus to those administratively institutional who would seek to foster entrepreneurial persistence in students, it was seen that a supporting learning climate is crucial, and that policymaking need not exclude experiential experiences, mentoring relationships, and immediate feedback mechanisms-all factors to further solidify entrepreneurial persistence behaviors. Similarly, the mediating role of entrepreneurial education suggests that good curricula balancing theoretical learning and practical application may be necessary. Programs emphasizing case studies, problem-solving, and exposure to real-world challenges are likely to produce long-term changes in entrepreneurial behavior.

Transformational teaching insights can also be helpful to practitioners and leaders in entrepreneurship development initiatives. Educators trained in transformational leadership can greatly enhance the positive effects of a supportive learning climate by motivating students to embrace challenges and uncertainties inherent in entrepreneurship. Policy frameworks could encourage professional development programs for educators, enabling them to incorporate transformational teaching techniques effectively. To governments and policymakers looking to enhance national entrepreneurial ecosystems, it can be recommended to invest in institutional climates and pedagogical methods that would create an environment not only of entrepreneurial ventures but also resilient entrepreneurial mindsets.

Limitations and Future Research Directions

Although robust in design and findings, this research is not without limitations. A notable limitation is the geographic and contextual focus of the data collection, as it was collected primarily from academic and institutional settings within specific regions. This may limit the generalizability of the findings to other cultural or entrepreneurial contexts. Future studies could expand this framework to include comparative analyses across different cultures and educational systems. However, self-reported measures utilized in this study are vulnerable to response biases, which might have affected the outcome. Use of longitudinal data and objective metrics will help present a more detailed understanding of the persistence behavior of entrepreneurs over time. The constructs and relationships

discussed here are important, but more may be needed in terms of moderators and mediators. For example, future research may explore how the development of educational technology, such as virtual learning environments, impacts the learning climate-entrepreneurial persistence relationship. Another promising avenue for research is to explore the role of external support systems, such as industry mentorship or peer networks, as facilitators of entrepreneurial behaviors. Future studies may investigate how the constructed factors interrelate with demographics, for instance, age or entrepreneurial experience to further elaborate our understanding of entrepreneurship persistence.

Conclusion

In conclusion, this research deepens insights into the impacts of the learning climate, entrepreneurial education, and transformative teaching on the persistence behavior in entrepreneurship. It shows a supporting learning climate greatly impacts persistence based on the comfort with which an individual develops relevant skills and endures setbacks while building an enterprise. Entrepreneurial education serves as the central mediator indicating that it acts as a salient component within the entrepreneurial ecology through which direct learning influences sustained attempts at entrepreneurship. In addition, transformational teaching comes out as a significant moderator that promotes the effectiveness of learning environments and inspires people to face entrepreneurial challenges. In a nutshell, this research not only tests theoretical constructs but also provides practical solutions for educational institutions, policymakers, and entrepreneurial development organizations. By establishing supportive and transformational learning environments, stakeholders can encourage persistent, resilient entrepreneurs who are able to tackle the intricacies of modern markets. While this research serves as a foundation, its limitations open the doors for further explorations of entrepreneurial persistence in a multifaceted manner across contexts and ecosystems. In this respect, this research is both the culmination of existing theoretical understandings and a catalyst for further exploration.

Acknowledgment:

This work was supported by the Deanship of Scientific Research, Vice Presidency for Graduate Studies and Scientific Research, King Faisal University, Saudi Arabia [KFU242934].

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Appendix 1

Learning climate

1. My teachers encouraged me to ask questions
2. I feel that my teachers provide me choices and options
3. I feel understood by my teachers
4. My teachers conveyed confidence in my ability to do well in the course
5. My teachers try to understand how I see things before suggesting a new way to do things
6. My teachers listen to how I would like to do things

Entrepreneurial education

1. Knowledge about entrepreneurship
2. Better perception of entrepreneurs
3. Skills needed to be an entrepreneur

Entrepreneurial persistence behavior

1. When others give up entrepreneurship, I keep going
2. When others oppose me starting a business, I still stick with it
3. Whenever I encounter any difficulties or setbacks, I insist on starting a business
4. Entrepreneurship increases my life satisfaction
5. When starting a business, I often suspend work at hand to perform other duties
6. I put more effort into starting a business than anyone else

Transformational teaching

1. Shows that s/he cares about me
2. Acts as a person that I look up to
3. Creates lessons that really encourage me to think
4. Demonstrates that s/he believes in me
5. Treats me in ways that build my respect
6. Is enthusiastic about what I am capable of achieving
7. Provides me with tasks and challenges that get me to think in different ways
8. Motivates me to try my hardest
9. Tries to know every student in the class
10. Gets me to question my own and others' ideas
11. Tries to help students who might be struggling
12. Talks about his/her personal values
13. Encourages me to look at issues from different sides
14. Recognizes the needs and abilities of each student in the class
15. Is optimistic about what I can accomplish
16. Behaves as someone I can trust