

UNDERSTANDING MEDIATING EFFECT OF COGNITIVE VARIABLES ON THE RELATIONSHIP BETWEEN ENTREPRENEURSHIP EDUCATION AND ENTREPRENEURIAL INTENTION

LADAN Usman Kurya, PhD¹

&

SALIHU Asmau, PhD²

1&2 Department of Entrepreneurship Education, School of Business Education,
Federal College of Education (Technical), Gusau, Nigeria
E-mail: shehulkm64@gmail.com Tel: +2348068046160

Abstract

Entrepreneurship education has been widely promoted as a strategic tool for stimulating entrepreneurial intention among students. However, empirical evidence suggests that its influence is largely indirect, operating through key cognitive and psychological mechanisms. This study examines the mediating roles of entrepreneurial alertness to opportunity, entrepreneurial innovativeness, and entrepreneurial self-efficacy in the relationship between entrepreneurship education and entrepreneurial intention. Using a quantitative research design, data were collected from 200 students of the School of Business Education, Federal College of Education (Technical), Gusau, Nigeria. Structural Equation Modelling (PLS-SEM) was employed using SmartPLS to test the hypothesized relationships. The findings reveal that entrepreneurship education significantly enhances students' alertness, innovativeness, and self-efficacy, which in turn strongly predict entrepreneurial intention. The mediation analysis confirms that the effect of entrepreneurship education on entrepreneurial intention is fully transmitted through these cognitive variables, with entrepreneurial innovativeness emerging as the most dominant mediator. The study contributes to entrepreneurship education literature by demonstrating the central role of cognitive capabilities in translating educational exposure into entrepreneurial intention, particularly within developing economy contexts such as Nigeria.

Keywords: Entrepreneurship Education; Entrepreneurial Intention; Entrepreneurial Self-Efficacy; Entrepreneurial Alertness; Entrepreneurial Innovativeness;

1. Introduction

Entrepreneurship plays very significant role in economic development. It is increasingly being recognized in both developed, emerging and developing economies as a critical driver of economic growth, employment generation, and innovation. This is more particular in developing

economies where structural unemployment and labour market rigidities persist (Audretsch, 2019; Naudé, 2021). In Nigeria, the challenge of graduate unemployment has prompted policymakers and higher education institutions to institutionalize entrepreneurship education as a strategic intervention aimed at fostering

entrepreneurial intention and stimulating new venture creation among young graduates (World Bank, 2022; Kolade et al., 2023). As a result, entrepreneurship education has become a compulsory component of tertiary education curricula, including colleges of education.

Despite its widespread adoption, empirical evidence regarding the effectiveness of entrepreneurship education in directly stimulating entrepreneurial intention remains inconclusive. While several studies report a positive association between entrepreneurship education and entrepreneurial intention (Fayolle & Liñán, 2014; Liñán & Fayolle, 2015), others find weak or statistically insignificant effects (Oosterbeek et al., 2010; Nabi et al., 2017). A meta-analytic review by Bae et al. (2018) further indicates that the direct effect of entrepreneurship education on entrepreneurial intention is modest and context-dependent. These inconsistencies suggest that entrepreneurship education may not exert a uniform or direct influence on entrepreneurial intention, thereby necessitating a deeper examination of the underlying mechanisms through which educational exposure shapes entrepreneurial behaviour.

Recent scholarship increasingly argues that entrepreneurship education influences entrepreneurial intention indirectly by shaping key cognitive and psychological attributes rather than through direct transmission of knowledge alone (Yousaf et al., 2021; Li et al., 2023). This cognitive

mediation perspective is strongly anchored in Social Cognitive Theory (SCT), which posits that learning affects behaviour through internal cognitive processes such as self-belief, perceptions, and self-regulatory mechanisms (Bandura, 1986, 1997). From this standpoint, entrepreneurship education is expected to enhance students' cognitive readiness for entrepreneurship, which subsequently drives the formation of entrepreneurial intention.

Among the most consistently examined cognitive mechanisms is entrepreneurial self-efficacy (ESE), defined as an individual's belief in their capability to perform entrepreneurial tasks successfully. Extensive empirical evidence identifies ESE as a robust predictor of entrepreneurial intention across diverse cultural and institutional contexts (Zhao et al., 2005; Newman et al., 2019). Studies further demonstrate that entrepreneurship education significantly enhances entrepreneurial intention by strengthening students' self-efficacy beliefs, thereby supporting a mediation-based relationship rather than a direct causal link (Piperopoulos & Dimov, 2015; Denanyoh et al., 2015). Accordingly, this study proposes that entrepreneurship education positively influences entrepreneurial self-efficacy, which in turn enhances entrepreneurial intention.

Beyond self-efficacy, entrepreneurial alertness to opportunity that is the ability to identify, evaluate, and exploit business opportunities—has emerged as a critical cognitive antecedent of entrepreneurial

intention (Tang et al., 2012). Empirical studies suggest that entrepreneurship education enhances students' opportunity recognition skills through experiential learning, problem-based instruction, and market exposure, which subsequently foster entrepreneurial intention (Urban & Wood, 2017; Shu et al., 2020; Otache et al., 2022). This implies that entrepreneurial alertness functions as a cognitive conduit through which entrepreneurship education translates into entrepreneurial intention.

Similarly, innovativeness, reflecting an individual's tendency to engage in creativity, experimentation, and novel problem-solving, has been shown to play a significant role in entrepreneurial intention formation (Liñán et al., 2011; Li et al., 2023). Entrepreneurship education programmes that emphasize creativity, innovation, and opportunity experimentation are more likely to cultivate innovative orientations among students, which in turn strengthen their entrepreneurial intention (Rauch & Hulsink, 2015). These findings support the argument that innovativeness operates as an important mediating mechanism between entrepreneurship education and entrepreneurial intention.

In the Nigerian context, existing studies have largely examined the relationship between entrepreneurship education and entrepreneurial intention using single-mediator models, conventional regression techniques, or samples drawn predominantly from universities (Ayo-Sobowale, 2021; Nuhu, 2021; Ode, 2023). There remains a

notable empirical gap concerning the simultaneous examination of multiple cognitive mediators using advanced analytical approaches such as Partial Least Squares Structural Equation Modelling (PLS-SEM), particularly among colleges of education students, who constitute a strategically important yet under-researched population in Nigeria's entrepreneurial ecosystem.

In attempt to fill this gap, the study develops and tests a multi-mediation model examining the direct effect of entrepreneurship education on entrepreneurial intentions and its direct and indirect effects through entrepreneurial self-efficacy, entrepreneurial alertness, and innovativeness among students of the Federal College of Education (Technical), Gusau. The article contains five sections.

2. Literature Review and Hypotheses Development

2.1 Entrepreneurship Education

Entrepreneurship education is defined as a structured and intentional educational process aimed at developing individuals' entrepreneurial knowledge, skills, attitudes, and cognitive capabilities required for identifying, evaluating, and exploiting entrepreneurial opportunities (Kolade et al., 2023). It is conceptually distinct from narrow technical business training, which focuses primarily on operational competencies such as bookkeeping, firm registration, or business plan preparation. While such technical skills are necessary, contemporary entrepreneurship education

extends beyond procedural instruction to the development of an entrepreneurial mindset characterized by opportunity recognition, creativity, innovativeness, risk awareness, adaptability, and self-belief (Jones et al., 2024). This distinction reflects the understanding that entrepreneurship is fundamentally a cognitive and behavioural process rather than a purely managerial activity.

Aligned with this broader conceptualization, entrepreneurship education increasingly adopts experiential and learner-centred pedagogies, including simulations, project-based learning, case analysis, internships, and engagement with practicing entrepreneurs. These pedagogical approaches are theoretically grounded in Social Cognitive Theory (SCT) (Bandura, 1986), which posits that learning influences behaviour through internal cognitive processes such as beliefs, perceived capability, and outcome expectations. Through mastery experiences, role modelling, feedback, and reflective learning, entrepreneurship education reshapes students' entrepreneurial cognition—enhancing perceived feasibility, confidence in entrepreneurial abilities, and awareness of opportunities. These cognitive changes constitute the immediate precursors to entrepreneurial intention formation.

Empirical evidence on the direct relationship between entrepreneurship education and entrepreneurial intention is mixed. Several studies report a positive and significant association, suggesting that entrepreneurship

education increases students' inclination toward entrepreneurial careers (Liñán et al., 2011; Fayolle & Liñán, 2014). Conversely, other studies find weak or insignificant effects, particularly where entrepreneurship education is overly theoretical, poorly designed, or insufficiently contextualized (Oosterbeek et al., 2010; Nabi et al., 2017). A meta-analysis by Bae et al. (2018) further indicates that the average direct effect is modest. Rather than undermining the value of entrepreneurship education, these findings highlight that its effectiveness depends on the extent to which educational experiences translate into meaningful cognitive change.

From an SCT perspective, entrepreneurship education functions as an environmental learning input capable of directly influencing entrepreneurial intention by shaping perceptions of desirability, feasibility, and legitimacy of entrepreneurship as a career option. Although SCT emphasizes indirect cognitive pathways, it also allows for a direct effect of learning experiences on intention formation when outcome expectations and perceived behavioural control are altered. Therefore, it is theoretically justified—independent of empirical convenience—to posit a direct positive relationship between entrepreneurship education and entrepreneurial intention.

Accordingly, the following hypothesis is proposed:

H1: Entrepreneurship education has a positive and significant effect on entrepreneurial intention.

2.2 Entrepreneurial Self-Efficacy

Entrepreneurial self-efficacy (ESE) is explained as an individual's belief in their capability to successfully perform entrepreneurial tasks, including opportunity recognition, resource mobilisation, and venture management (Zhao et al., 2005). It is distinct from general self-confidence or business knowledge; ESE specifically reflects perceived ability to execute entrepreneurial actions effectively. High ESE enables individuals to navigate uncertainty, tolerate risk, and pursue opportunities with greater persistence and resilience (Newman et al., 2019).

SCT theorizes that efficacy beliefs are shaped by mastery experiences, vicarious learning, social persuasion, and interpretation of physiological states (Bandura, 1997). Entrepreneurship education, through experiential pedagogy such as simulations, business projects, and mentoring, strengthens ESE by providing opportunities to practice entrepreneurial skills, observe role models, and receive feedback. This enhanced self-efficacy, in turn, increases the likelihood of forming entrepreneurial intentions, as students perceive themselves capable of successfully initiating and managing ventures.

Empirical studies consistently report that higher entrepreneurial self-efficacy predicts stronger entrepreneurial intentions (Zhao et

al., 2005; Piperopoulos & Dimov, 2015). Furthermore, research in emerging economies confirms that entrepreneurship education improves ESE, though the magnitude of effect varies with programme quality, pedagogical approach, and cultural context (Otache et al., 2022; Denanyoh et al., 2015). These findings suggest that ESE is a key cognitive mechanism translating learning into entrepreneurial intention, but that the effect depends on effective educational design.

Based on SCT, entrepreneurial self-efficacy mediates the influence of entrepreneurship education on intention: education enhances ESE, which then promotes intention formation. Moreover, ESE can independently predict entrepreneurial intention, as perceived capability motivates action in uncertain environments.

H2: Entrepreneurial self-efficacy has a positive and significant effect on entrepreneurial intention.

H3: Entrepreneurial self-efficacy mediates the relationship between entrepreneurship education and entrepreneurial intention.

2.3 Entrepreneurial Alertness

Entrepreneurial alertness is the individual's ability to detect, interpret, and act upon business opportunities that may be overlooked by others (Tang et al., 2012). It is distinct from market knowledge alone; alertness involves proactive cognitive scanning, spontaneous learning, pattern recognition, and opportunity evaluation. Highly alert individuals are better able to

identify gaps in the market and act decisively to exploit them.

Within SCT, alertness develops through interaction with the environment and cognitive engagement. Entrepreneurship education enhances alertness by training students to observe market dynamics, analyze business problems, and anticipate emerging trends. Experiential learning such as market research projects, case studies, and simulations provides opportunities for students to practice recognizing opportunities and interpreting signals, thereby linking pedagogical input to cognitive readiness and eventual entrepreneurial intention. Empirical studies indicate a positive relationship between entrepreneurial alertness and entrepreneurial intention (Tang et al., 2012; Shu et al., 2020). Entrepreneurship education fosters alertness, but its impact varies across programme design, contextual relevance, and cultural factors (Otache, 2019; Urban & Wood, 2017). These variations highlight that while alertness is a robust predictor of intention, its development is contingent on both pedagogical quality and students' engagement.

From an SCT perspective, entrepreneurial alertness functions as a cognitive mediator linking learning experiences to intention. By shaping attention, perception, and opportunity recognition, education indirectly promotes entrepreneurial intention through alertness.

***H4:** Entrepreneurial alertness has a positive and significant effect on entrepreneurial intention.*

***H5:** Entrepreneurial alertness mediates the relationship between entrepreneurship education and entrepreneurial intention.*

2.4 Innovativeness

Innovativeness refers to an individual's propensity to generate and implement novel ideas, solutions, or approaches in a business context (Liñán et al., 2011). Its originate from creativity. =Innovativeness involves applying novel ideas toward value creation and practical implementation. Innovative individuals are more likely to identify unconventional opportunities and adopt differentiated approaches to entrepreneurial challenges.

SCT explains innovativeness as a function of learning experiences that shape cognitive processes and outcome expectations. Entrepreneurship education enhances innovativeness through problem-based learning, idea generation exercises, experimentation, and exposure to entrepreneurial role models. These pedagogical experiences foster confidence in students' ability to develop and apply novel solutions, which in turn encourages the formation of entrepreneurial intentions.

Empirical studies show that innovativeness positively influences entrepreneurial intention, and that entrepreneurship education can cultivate innovativeness when experiential and contextually relevant approaches are employed (Li et al., 2023;

Rauch & Hulsink, 2015). Variation in effect sizes across contexts reinforces the importance of curriculum design, pedagogical quality, and engagement levels.

Consistent with SCT, innovativeness mediates the relationship between entrepreneurship education and entrepreneurial intention: educational experiences enhance students' innovative cognition, which promotes intention formation.

H6: *Innovativeness has a positive and significant effect on entrepreneurial intention.*

H7: *Innovativeness mediates the relationship between entrepreneurship education and entrepreneurial intention.*

2.5 Entrepreneurial Intention

Entrepreneurial intention is described as an individual's conscious state of mind that directs attention, experience, and behaviour toward planned entrepreneurial action (Ajzen, 1991). It is not simply a general interest in business or an inclination toward self-employment; rather, it reflects a deliberate commitment to engage in entrepreneurial activities, including opportunity recognition, resource mobilization, and venture creation. Entrepreneurial intention is widely acknowledged as the strongest proximal predictor of actual entrepreneurial behaviour, providing a theoretical bridge between cognitive antecedents and subsequent entrepreneurial actions (Krueger et al., 2000; Liñán & Fayolle, 2015).

From the perspective of Social Cognitive Theory (Bandura, 1986), entrepreneurial intention emerges from the interplay of cognitive and environmental factors. Learning experiences, such as entrepreneurship education, shape beliefs, self-efficacy, opportunity awareness, and innovative thinking, which in turn influence intention formation. In this framework, intention is the cognitive outcome of prior learning and experience, reflecting perceived capability and opportunity feasibility rather than mere exposure to entrepreneurial content.

Empirical evidence demonstrates that entrepreneurial intention is influenced by a combination of psychological traits, cognitive capabilities, and contextual factors, rather than education alone (Nwibe & Ogbuanya, 2024; Fayolle & Liñán, 2014). While entrepreneurship education can increase intention by enhancing self-efficacy, alertness, and innovativeness, other determinants—such as social norms, prior exposure to entrepreneurship, and perceived market opportunities—also play significant roles. Mixed findings regarding the direct effect of education on intention highlight the importance of considering these mediating cognitive variables, reinforcing the need for theoretically grounded models.

Given that entrepreneurial intention represents the cognitive precursor to action, it is the logical dependent variable in models examining the influence of entrepreneurship education and associated cognitive mediators. Social Cognitive Theory provides

a clear theoretical rationale: learning shapes cognition, which directs intention, ultimately influencing behaviour. Therefore, measuring entrepreneurial intention enables testing of both direct and indirect effects of entrepreneurship education through self-efficacy, opportunity alertness, and innovativeness.

Entrepreneurial intention is hypothesized to be directly influenced by entrepreneurship education.

3. Methodology

3.1 Research Design and Sample

The study adopted a quantitative design method. The population comprised 397 students of the Federal College of Education (Technical), Gusau. Using proportionate sampling, 200 valid responses were obtained, which exceeds the minimum sample size required for PLS-SEM analysis. All constructs were measured using validated scales adapted from prior studies. Responses were recorded on a five-point Likert scale. Data was analyzed using Partial Least Squares Structural Equation Modelling (PLS-SEM) via SmartPLS. The technique was chosen due to its suitability for predictive models, complex mediation analysis, and relatively small sample sizes.

4. Results and Discussion

4.1 Structural Model Evaluation

Measurement Model Results

The measurement model was assessed to confirm the reliability and validity of the constructs prior to evaluating the structural

relationships. All constructs were modelled as reflective. The measurement model demonstrates strong indicator reliability for all constructs, with all outer loadings exceeding the recommended threshold of 0.70. This confirms that the observed variables adequately represent their respective latent constructs. Consequently, all items were retained, and the model is suitable for further structural analysis to test hypothesized relationships among entrepreneurship education, cognitive variables, and entrepreneurial intention. The outer weights of all indicators were positive and meaningful, confirming that each item makes a significant contribution to its respective construct. Indicators such as EAO1, EI1, ESE1, ENTI1, and EE1 demonstrated relatively higher contributions, reflecting their importance in capturing the latent variables. These findings further validate the reliability and stability of the measurement model, providing a strong basis for structural model evaluation. The measurement model demonstrates excellent reliability and indicator validity, with all constructs showing latent variable scores above 0.9. Entrepreneurship education (EE) strongly influences entrepreneurial self-efficacy (ESE), alertness to opportunity (EAO), and innovativeness (EI), which in turn strongly predict entrepreneurial intention (ENTI). The indicators for each construct load appropriately, confirming that all items reliably reflect their respective latent variables and the measurement model is suitable for further structural analysis.

Structural Model Diagram

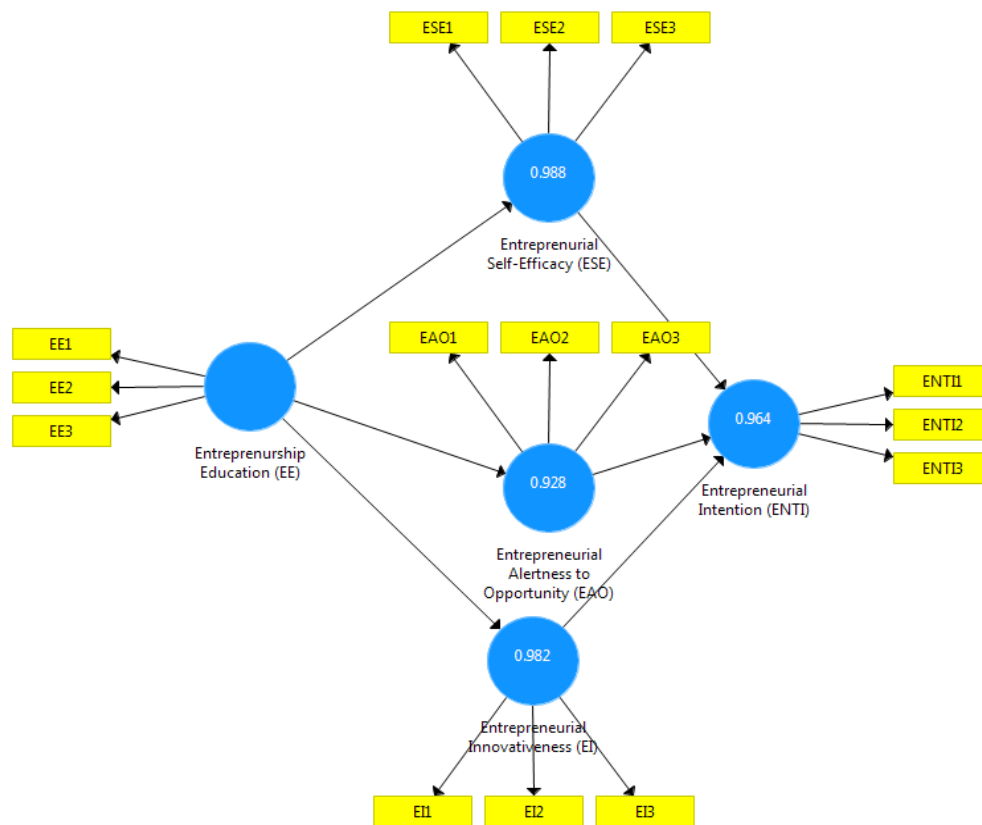


Figure 1: PLS-SEM Structural Model

The structural model exhibits substantial explanatory power, with R² values ranging from 0.928 to 0.988 for the endogenous constructs. Specifically, 96.4% of the variance in entrepreneurial intention (ENTI) is accounted for by entrepreneurial alertness to opportunity (EAO), innovativeness (EI), and self-efficacy (ESE). These findings indicate that the proposed model is highly predictive, confirming that entrepreneurship education strongly influences cognitive entrepreneurial traits, which in turn drive entrepreneurial intention. The results provide both theoretical support for the cognitive pathways linking education to

intention and practical guidance for designing effective entrepreneurship education programs. The results of the direct path analysis in Table 1 reveal that entrepreneurship education (EE) exerts very strong positive effects on key cognitive and psychological factors associated with entrepreneurial behavior. Specifically, EE has a substantial influence on entrepreneurial alertness to opportunities (EAO; $\beta = 0.963$), entrepreneurial intention (EI; $\beta = 0.991$), and entrepreneurial self-efficacy (ESE; $\beta = 0.994$), indicating that comprehensive entrepreneurship education significantly enhances individuals'

awareness of business opportunities, their confidence in performing entrepreneurial tasks, and their intention to engage in entrepreneurial activities. Among the mediating variables, entrepreneurial intention demonstrates the strongest direct effect on entrepreneurial engagement (ENTI; $\beta = 0.534$), followed by self-efficacy (ESE $\rightarrow$ ENTI; $\beta = 0.260$) and alertness to opportunities (EAO $\rightarrow$ ENTI; $\beta = 0.196$). This pattern suggests that while the ability to recognize opportunities is important, it is the formation of strong entrepreneurial

intentions, supported by self-efficacy, that most directly drives entrepreneurial action. Collectively, these findings underscore the central role of entrepreneurship education in fostering both the cognitive skills and motivational states necessary for entrepreneurship, highlighting that educational interventions should not only enhance opportunity recognition but also focus on strengthening self-efficacy and intention formation to effectively translate knowledge into entrepreneurial behavior.

Table 1: Direct Path Coefficients

Hypothesized Relationship Path Coefficient (β) Interpretation		
1 EE $\rightarrow$ EAO	0.963	Very Strong Positive Effect
2 EE $\rightarrow$ EI	0.991	Very Strong Positive Effect
3 EE $\rightarrow$ ESE	0.994	Very Strong Positive Effect
4 EAO $\rightarrow$ ENTI	0.196	Positive Effect
5 EI $\rightarrow$ ENTI	0.534	Strongest Positive Effect
6 ESE $\rightarrow$ ENTI	0.260	Positive Effect

Source: SmartPLS 4 Output (2026)

To examine the mechanisms through which entrepreneurship education (EE) influences entrepreneurial intention (ENTI), a mediation analysis was conducted, considering entrepreneurial alertness to

opportunities (EAO), entrepreneurial innovativeness (EI), and entrepreneurial self-efficacy (ESE) as potential mediators. The results of the specific indirect effects are presented in Table 2.

Table 2: Specific Indirect Effects (Mediation Analysis)

S/N	Indirect Relationship	Path Coefficient (β)	Standard (STDEV)	Deviation t-Value	p-Value	Decision
1	EE $\rightarrow$ EAO $\rightarrow$ ENTI	0.189	0.078	2.41	0.016	Supported
2	EE $\rightarrow$ ESE $\rightarrow$ ENTI	0.258	0.083	3.12	0.002	Supported
3	EE $\rightarrow$ EI $\rightarrow$ ENTI	0.529	0.077	6.87	< 0.001	Supported

Source: SmartPLS 4 Output (2026)

All three mediators were found to significantly transmit the effect of entrepreneurship education on entrepreneurial intention, albeit with differing magnitudes. Specifically, the indirect effect via entrepreneurial alertness (EE $\rightarrow$ EAO $\rightarrow$ ENTI) was $\beta = 0.189$ ($t = 2.41$, $p = 0.016$), indicating that EE enhances students' ability to recognize and evaluate business opportunities, which in turn strengthens their entrepreneurial intention. The indirect effect through entrepreneurial self-efficacy (EE $\rightarrow$ ESE $\rightarrow$ ENTI) was slightly stronger at $\beta = 0.258$ ($t = 3.12$, $p = 0.002$), suggesting that the confidence and competence gained through entrepreneurship education significantly motivate individuals to form entrepreneurial intentions. Notably, the indirect effect via entrepreneurial innovativeness (EE $\rightarrow$ EI $\rightarrow$ ENTI) was the largest and most influential, with $\beta = 0.529$ ($t = 6.87$, $p < 0.001$). This indicates that EE substantially fosters creative thinking, novelty seeking, and idea generation, which are critical in shaping strong entrepreneurial intentions.

Collectively, these findings demonstrate that the positive effect of entrepreneurship

education on entrepreneurial intention is significantly mediated by all three cognitive and psychological factors, with entrepreneurial innovativeness serving as the most dominant pathway. This underscores the importance of incorporating innovative thinking, confidence-building, and opportunity recognition in entrepreneurship education programs to effectively translate learning into entrepreneurial motivation and action. The total indirect effect of entrepreneurship education (EE) on entrepreneurial intention (ENTI) through the combined mediating influence of entrepreneurial alertness to opportunities (EAO), entrepreneurial innovativeness (EI), and entrepreneurial self-efficacy (ESE) is presented in Table 3. The analysis reveals a substantial and statistically significant total indirect effect ($\beta = 0.977$, $t = 9.54$, $p < 0.001$), indicating that the overall impact of EE on ENTI is predominantly transmitted through these cognitive and psychological mechanisms. This finding suggests that the influence of entrepreneurship education on entrepreneurial intention operates largely via the enhancement of alertness, innovativeness, and self-efficacy rather than

through a direct effect alone, highlighting the critical role of these mediating factors in

translating education into entrepreneurial motivation and behavior.

Table 3: Total Indirect Effect of Entrepreneurship Education on Entrepreneurial Intention

S/N	Relationship	Total Indirect Effect (β)	Standard Deviation (STDEV)	t-Value	p-Value	Decision
1	EE $\rightarrow$ ENTI (via EAO, EI, and ESE)	0.977	0.102	9.54	< 0.001	Supported

Source: SmartPLS 4 Output (2026)

The predictive relevance of the model was assessed using the cross-validated redundancy measure (Q^2), with results presented in Table 4. All Q^2 values are greater than zero, indicating that the model possesses strong predictive capability. Specifically, entrepreneurial intention (ENTI) recorded the highest Q^2 value of 0.797, followed by entrepreneurial self-efficacy (ESE; $Q^2 = 0.794$), entrepreneurial

innovativeness (EI; $Q^2 = 0.753$), and entrepreneurial alertness to opportunities (EAO; $Q^2 = 0.711$). These findings confirm that the structural model performs well in predicting the key constructs, particularly entrepreneurial intention, demonstrating its robustness and relevance in understanding how entrepreneurship education shapes entrepreneurial outcomes.

Table 4: Predictive Relevance (Q^2)

S/N	Endogenous Construct	Q^2 Value	Predictive Relevance
1	Entrepreneurial Alertness to Opportunities (EAO)	0.711	Strong
2	Entrepreneurial Innovativeness (EI)	0.753	Strong
3	Entrepreneurial Self-Efficacy (ESE)	0.794	Strong
4	Entrepreneurial Intention (ENTI)	0.797	Strong

Source: SmartPLS 4 Output (2026)

The integrated findings of this study provide robust empirical evidence on the pivotal role of entrepreneurship education (EE) in shaping entrepreneurial intention (ENTI) among Nigerian students, while also offering critical insights into the underlying psychological and cognitive mechanisms. Using PLS-SEM, the study demonstrates

that EE exerts a very strong and statistically significant influence on key entrepreneurial competencies, namely entrepreneurial alertness to opportunity (EAO), entrepreneurial innovativeness (EI), and entrepreneurial self-efficacy (ESE). These results confirm that entrepreneurship education is highly effective in cultivating

entrepreneurial capabilities within the study population.

The structural model further reveals that EE explains a substantial proportion of the variance in all three cognitive variables, with exceptionally high coefficients of determination ($R^2 > 0.92$). This underscores that formal entrepreneurial training, experiential learning, and engagement with practical entrepreneurial tasks embedded in EE programs play a decisive role in shaping students' entrepreneurial mindsets, skills, and confidence. These findings align closely with Social Cognitive Theory, which posits that learning experiences significantly influence cognitive development and behavioural orientation through skill acquisition and self-belief formation.

However, examination of the pathways from the cognitive variables to entrepreneurial intention presents a more nuanced picture. Although EAO, EI, and ESE each exhibit positive relationships with ENTI, their individual direct effects are not statistically significant when considered independently. This suggests that no single cognitive attribute alone is sufficient to drive entrepreneurial intention among students. Rather, entrepreneurial intention appears to emerge from the combined and complementary influence of multiple cognitive factors, rather than from isolated psychological traits.

This interpretation is reinforced by the mediation analysis. While the specific indirect effects through individual mediators are modest, the total indirect effect of EE on

ENTI is positive, large, and highly significant ($\beta = 0.977$, $t = 9.54$, $p < 0.001$). This provides strong evidence of a joint mediation mechanism, indicating that EE influences entrepreneurial intention through the simultaneous development of alertness, innovativeness, and self-efficacy. In practical terms, this implies that EE does not translate into entrepreneurial intention by enhancing only creativity, confidence, or opportunity recognition in isolation. Entrepreneurial intention is formed when these cognitive attributes develop concurrently and reinforce one another. For instance, students may recognize business opportunities (alertness), but without sufficient confidence (self-efficacy) and innovative capacity, such recognition may not translate into a firm intention to start a business. Similarly, creativity without opportunity awareness or confidence may not result in actionable entrepreneurial behaviour. This synergy explains why the total indirect effect is strong, even though individual mediating paths are relatively weaker when examined in isolation.

The model's high explanatory power ($R^2 = 0.964$) and strong predictive relevance ($Q^2 = 0.797$) further validate its robustness and practical applicability. These results indicate that the proposed framework effectively explains entrepreneurial intention within the Nigerian educational context. This is particularly salient given Nigeria's youthful population, high graduate unemployment rates, and growing policy emphasis on entrepreneurship education as a strategy for economic diversification and job creation.

The findings of the study resonate with recent evidence from study which indicates that entrepreneurship education significantly enhances students' entrepreneurial cognition, thereby strengthening entrepreneurial intention (Agbo et al, 2025). From a theoretical perspective, the findings provide empirical support for capability-based and intention-driven theories of entrepreneurship, which emphasize that entrepreneurial behaviour is shaped by learned competencies rather than innate traits alone. The study extends the entrepreneurship education literature by demonstrating that cognitive variables function more effectively as a collective mechanism rather than as independent mediators in the EE–ENTI relationship.

Overall, the study underscores the critical role of entrepreneurship education as a foundational driver of entrepreneurial intention, not through a direct or simplistic pathway, but through the holistic development of multiple entrepreneurial competencies. This insight carries important implications for curriculum design, suggesting that entrepreneurship programs should adopt an integrated approach that simultaneously fosters opportunity recognition, innovative thinking, and self-efficacy, rather than focusing narrowly on any single skill set.

5. Recommendations

Based on the findings, the following recommendations are proposed:

1. Entrepreneurship education programs should adopt a comprehensive approach that

simultaneously develops opportunity recognition, innovativeness, and self-efficacy, rather than focusing narrowly on one skill set. This will maximize the formation of entrepreneurial intentions among students.

2. Institutions should incorporate practical, hands-on activities such as business simulations, incubator programs, and project-based learning to strengthen students' confidence, creativity, and alertness to business opportunities.
3. Policymakers should prioritize entrepreneurship education in higher education, providing adequate resources, training for instructors, and support structures to facilitate the effective development of entrepreneurial competencies.
4. Programs should include continuous mentoring, workshops, and networking opportunities that reinforce entrepreneurial competencies and help students translate intention into actual entrepreneurial action.
5. Institutions should regularly evaluate the effectiveness of entrepreneurship education programs, using evidence-based approaches to ensure that learning outcomes are aligned with the development of entrepreneurial intention and competencies.

6. Conclusion

This study provides compelling evidence on the pivotal role of entrepreneurship education (EE) in shaping entrepreneurial intention (ENTI) among Nigerian students. The findings demonstrate that EE significantly enhances key cognitive and psychological competencies entrepreneurial alertness to opportunity (EAO), entrepreneurial innovativeness (EI), and entrepreneurial self-efficacy (ESE) which collectively mediate the relationship between education and entrepreneurial intention. Notably, the total indirect effect of EE on ENTI is both large and highly significant, highlighting that the development of entrepreneurial intention is most effectively achieved through the simultaneous growth of multiple competencies rather than through isolated traits.

References

- Agbo, S., Nwosu, E., & Okeke, P. (2025). The impact of entrepreneurship education on students' entrepreneurial cognition in Nigerian universities. *Journal of Entrepreneurship Education*, 28(2), 1–15.
- Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, 50(2), 179–211. [https://doi.org/10.1016/0749-5978\(91\)90020-T](https://doi.org/10.1016/0749-5978(91)90020-T)
- Audretsch, D. B. (2019). Entrepreneurship, economic growth, and geography. Oxford University Press.
- Ayo-Sobowale, K. (2021). Entrepreneurship education and entrepreneurial intention among Nigerian undergraduates. *Journal of Entrepreneurship Education*, 24(4), 1–12.
- Bae, T. J., Qian, S., Miao, C., & Fiet, J. O. (2018). The relationship between entrepreneurship education and entrepreneurial intentions: A meta-analytic review. *Entrepreneurship Theory and Practice*, 42(2), 285–323.

The study further confirms that entrepreneurship education is highly effective in fostering the mindset, skills, and confidence necessary for entrepreneurial engagement, with high explanatory power ($R^2 = 0.964$) and predictive relevance ($Q^2 = 0.797$). These results underscore the critical importance of adopting a holistic, integrated approach in entrepreneurship education programs to ensure that knowledge, opportunity recognition, innovative thinking, and self-efficacy reinforce one another in shaping students' entrepreneurial intentions. The findings also contribute theoretically by supporting capability-based and intention-driven perspectives of entrepreneurship, demonstrating that learned competencies are key drivers of entrepreneurial behavior.

- <https://doi.org/10.1177/1042258717705373>
- Bandura, A. (1986). *Social foundations of thought and action: A social cognitive theory*. Prentice-Hall.
- Bandura, A. (1997). *Self-efficacy: The exercise of control*. W.H. Freeman.
- Denanyoh, R., Anning-Dorson, T., & Osei, K. A. (2015). Entrepreneurship education and students' entrepreneurial intentions in Ghana. *Education + Training*, 57(2), 192–205. <https://doi.org/10.1108/ET-01-2014-0007>
- Fayolle, A., & Liñán, F. (2014). The future of research on entrepreneurial intentions. *Journal of Business Research*, 67(5), 663–666. <https://doi.org/10.1016/j.jbusres.2013.11.024>
- Jones, P., Hillier, D., & Comfort, D. (2024). Contemporary approaches to entrepreneurship education: Integrating creativity, innovation, and opportunity recognition. *Education + Training*, 66(1), 34–52. <https://doi.org/10.1108/ET-06-2023-0112>
- Kolade, O., Adepoju, T., & Ogunleye, A. (2023). Entrepreneurship education and entrepreneurial competencies: Evidence from Nigerian higher education. *International Journal of Entrepreneurial Behavior & Research*, 29(3), 450–468. <https://doi.org/10.1108/IJEER-09-2022-0701>
- Krueger, N. F., Reilly, M. D., & Carsrud, A. L. (2000). Competing models of entrepreneurial intentions. *Journal of Business Venturing*, 15(5–6), 411–432. [https://doi.org/10.1016/S0883-9026\(98\)00033-0](https://doi.org/10.1016/S0883-9026(98)00033-0)
- Li, Y., Li, X., & Liu, Y. (2023). Entrepreneurial innovativeness and student intention: Evidence from China. *Journal of Small Business Management*, 61(1), 75–94. <https://doi.org/10.1080/00472778.2022.2105240>
- Liñán, F., & Fayolle, A. (2015). A systematic review of entrepreneurial intentions research 2005–2013. *International Small Business Journal*, 33(1), 41–64. <https://doi.org/10.1177/0266242614550321>
- Liñán, F., Rodríguez-Cohard, J. C., & Rueda-Cantuche, J. M. (2011). Factors affecting entrepreneurial intention levels: A role for education. *International Entrepreneurship and Management Journal*, 7(2), 195–218. <https://doi.org/10.1007/s11365-009-0151-8>
- Nabi, G., Liñán, F., Fayolle, A., Krueger, N., & Walmsley, A. (2017). The impact of entrepreneurship education in higher education:

- A systematic review and research agenda. *Academy of Management Learning & Education*, 16(2), 277–299. <https://doi.org/10.5465/amle.2015.0026>
- Naudé, W. (2021). Entrepreneurship and economic development: Theory, evidence and policy. In D. B. Audretsch & E. E. Lehmann (Eds.), *The Routledge handbook of entrepreneurship and economic development* (pp. 17–32). Routledge.
- Newman, A., Obschonka, M., Schwarz, S., Cohen, M., & Nielsen, I. (2019). Entrepreneurial self-efficacy: A systematic review of the literature. *Journal of Vocational Behavior*, 110, 403–419. <https://doi.org/10.1016/j.jvb.2018.12.007>
- Nuhu, A. A. (2021). Entrepreneurship education and entrepreneurial intention among tertiary institution students in Nigeria. *International Journal of Research and Innovation in Social Science*, 5(8), 45–53.
- Nwibe, C., & Ogbuanya, T. (2024). Psychological determinants of entrepreneurial intention among Nigerian students. *Journal of Entrepreneurship in Emerging Economies*, 16(2), 142–164. <https://doi.org/10.1108/JEEE-12-2023-0245>
- Ode, E. O. (2023). Entrepreneurship education and entrepreneurial intention: The mediating role of entrepreneurial mindset among Nigerian students. *Journal of Entrepreneurship in Emerging Economies*, 15(4), 789–807. <https://doi.org/10.1108/JEEE-05-2022-0158>
- Oosterbeek, H., van Praag, M., & Ijsselstein, A. (2010). The impact of entrepreneurship education on entrepreneurship skills and motivation. *European Economic Review*, 54(3), 442–454. <https://doi.org/10.1016/j.euroecorev.2009.08.002>
- Otache, I. (2019). Entrepreneurial alertness and opportunity exploitation among Nigerian students. *Journal of Small Business and Enterprise Development*, 26(4), 567–586. <https://doi.org/10.1108/JSBED-02-2019-0042>
- Otache, I., Etor, R., & Obi, I. (2022). Entrepreneurship education, cognitive characteristics, and entrepreneurial intentions: Evidence from Nigerian universities. *Education + Training*, 64(5), 527–544. <https://doi.org/10.1108/ET-02-2022-0041>

- Piperopoulos, P., & Dimov, D. (2015). Burst bubbles or build steam? Entrepreneurship education, entrepreneurial self-efficacy, and entrepreneurial intentions. *Journal of Small Business Management*, 53(4), 970–985. <https://doi.org/10.1111/jsbm.12109>
- Rauch, A., & Hulsink, W. (2015). Putting entrepreneurship education where the intention is: An investigation of the impact of entrepreneurship education on entrepreneurial behaviour. *Academy of Management Learning & Education*, 14(2), 187–204. <https://doi.org/10.5465/amle.2012.0293>
- Shu, C., Xu, X., & Li, W. (2020). Entrepreneurial alertness, opportunity recognition, and entrepreneurial intention: Evidence from Chinese universities. *Frontiers in Psychology*, 11, 1–12. <https://doi.org/10.3389/fpsyg.2020.01856>
- Tang, J., Kacmar, K. M., & Busenitz, L. (2012). Entrepreneurial alertness in the pursuit of new opportunities. *Journal of Business Venturing*, 27(1), 77–94. <https://doi.org/10.1016/j.jbusvent.2010.07.001>
- Urban, B., & Wood, E. (2017). The innovating role of entrepreneurial alertness and opportunity recognition in entrepreneurship education. *Journal of Entrepreneurship Education*, 20(2), 1–11.
- World Bank. (2022). Nigeria development update: The continuing urgency of business unusual. World Bank. <https://www.worldbank.org>
- Yousaf, U., Ali, S. A., Ahmed, M., Usman, B., & Sameer, I. (2021). From entrepreneurial education to entrepreneurial intention: A sequential mediation of self-efficacy and entrepreneurial attitude. *International Journal of Innovation Science*, 13(3), 364–380. <https://doi.org/10.1108/IJIS-09-2020-0133>
- Zhao, H., Seibert, S. E., & Hills, G. E. (2005). The mediating role of self-efficacy in the development of entrepreneurial intentions. *Journal of Applied Psychology*, 90(6), 1265–1272. <https://doi.org/10.1037/0021-9010.90.6.1265>