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How entrepreneurial learning shapes entrepreneurial intentions: evidence from the theory of planned behavior in higher education

ABSTRACT

This study aims to examine the influence of entrepreneurial learning on entrepreneurial intention among students of the Department of (IESMS) at the University of Tlemcen, while assessing the mediating effects of self efficacy, subjective norms, and perceived behavioral control within the framework of the Theory of Planned Behavior. A quantitative, non experimental research design was employed using survey data collected from 412 students. Data were analyzed through mediation analysis using Hayes' PROCESS macro for SPSS (Model 4) to assess the direct and indirect relationships between entrepreneurial learning and entrepreneurial intention. The findings indicate a limited direct effect of entrepreneurial learning on entrepreneurial intention, whereas stronger indirect effects were observed through enhanced self efficacy, subjective norms, and perceived behavioral control. The results highlight the importance of experiential and transformative learning approaches in strengthening entrepreneurial motivation among students. This study may contribute to entrepreneurship education, higher education policy, and entrepreneurial ecosystem development by informing curriculum design and institutional support mechanisms in developing country universities. The originality of this research lies in integrating multiple psychological mediators to explain how entrepreneurial learning shapes entrepreneurial intention in developing country university contexts

Keywords: Entrepreneurial Learning; Entrepreneurial Intention; Theory of Planned Behavior; higher education; developing countries.

Cómo el aprendizaje emprendedor moldea las intenciones emprendedoras: evidencia de la teoría del comportamiento planificado en la educación superior

RESUMEN

El presente estudio tiene como objetivo examinar la influencia del aprendizaje emprendedor sobre la intención emprendedora en estudiantes del Departamento de (IESMS) de la Universidad de Tlemcen, evaluando simultáneamente los efectos mediadores de la autoeficacia, las normas subjetivas y el control conductual percibido en el marco de la Teoría del Comportamiento Planificado. Se adoptó un diseño de investigación cuantitativo, no experimental, basado en datos de encuesta recogidos a partir de una muestra de 412 estudiantes. Los datos fueron analizados mediante análisis de mediación utilizando el macro PROCESS de Hayes para SPSS (Modelo 4), con el fin de estimar las relaciones directas e indirectas entre el aprendizaje emprendedor y la intención emprendedora. Los resultados evidencian un efecto directo limitado del aprendizaje emprendedor sobre la intención emprendedora, mientras que se observan efectos indirectos más robustos a través del incremento de la autoeficacia, las normas subjetivas y el control conductual percibido. Estos hallazgos subrayan la relevancia de enfoques de aprendizaje experienciales y transformadores para fortalecer la motivación emprendedora en el estudiantado. El estudio puede contribuir al campo de la educación emprendedora, las políticas de educación superior y el desarrollo de ecosistemas emprendedores, al ofrecer implicaciones para el diseño curricular y los mecanismos de apoyo institucional en universidades de países en desarrollo. La originalidad de esta investigación reside en la integración de múltiples mediadores psicológicos para explicar cómo el aprendizaje emprendedor configura la intención emprendedora en contextos universitarios de países en desarrollo.

Palabras clave: Aprendizaje emprendedor; intención emprendedora; Teoría del Comportamiento Planificado; educación superior; países en desarrollo.

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Como a aprendizagem empreendedora molda as intenções empreendedoras: evidências da teoria do comportamento planeado no ensino superior.

RESUMO

Este estudo visa examinar a influência da aprendizagem empreendedora na intenção empreendedora entre estudantes do Departamento de Gestão de Sistemas de Informação e Comunicação (IESMS) da Universidade de Tlemcen, avaliando os efeitos mediadores da autoeficácia, das normas subjetivas e do controlo comportamental percebido dentro da estrutura da Teoria do Comportamento Planeado. Foi empregue um desenho de investigação quantitativa, não experimental, utilizando dados de questionários recolhidos junto de 412 estudantes. Os dados foram analisados através de uma análise de mediação utilizando a macro PROCESS de Hayes para o SPSS (Modelo 4) para avaliar as relações diretas e indiretas entre a aprendizagem empreendedora e a intenção empreendedora. Os resultados indicam um efeito direto limitado da aprendizagem empreendedora na intenção empreendedora, enquanto efeitos indiretos mais fortes foram observados através do aumento da autoeficácia, das normas subjetivas e do controlo comportamental percebido. Os resultados destacam a importância das abordagens de aprendizagem experiencial e transformadora no

fortalecimento da motivação empreendedora entre os estudantes. Este estudo pode contribuir para a educação empreendedora, políticas de ensino superior e desenvolvimento de ecossistemas empreendedores, fornecendo informação para o planeamento curricular e mecanismos de apoio institucional em universidades de países em desenvolvimento. A originalidade desta investigação reside na integração de múltiplos mediadores psicológicos para explicar como a aprendizagem empreendedora molda a intenção empreendedora em contextos universitários de países em desenvolvimento.

Palavras-chave: Aprendizagem Empreendedora; Intenção Empreendedora; Teoria do Comportamento Planeado; ensino superior; países em desenvolvimento.

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INTRODUCTION

Entrepreneurship has long been recognized as a key driver of economic growth, job creation, and innovation. Scholars and policymakers highlight its importance in fostering resilience and competitiveness in both developed and developing economies (Sharma et al., 2024). Higher education institutions (HEIs) play a fundamental role in shaping students' entrepreneurial ambitions by equipping them with the necessary skills, knowledge, and exposure to entrepreneurial ecosystems (Gopinath & Sreekanth, 2024). A growing body of research suggests that entrepreneurship education fosters students' motivation, self-efficacy, and intention to engage in business ventures (Lemus et al., 2023).

The effectiveness of HEIs in developing entrepreneurial intention depends on several factors, including curriculum quality, access to experiential learning, institutional support, and the broader economic environment (Ndofirepi, 2022). Universities that integrate business incubators, mentorship programs, and startup competitions provide students with real-world exposure and reduce the perceived risks of entrepreneurship, thereby enhancing their willingness to pursue independent business ventures (Bozward et al., 2023; Narmaditya et al., 2022). These institutional initiatives contribute to creating environments that encourage entrepreneurial thinking and innovation.

The impact of entrepreneurship education extends beyond theoretical learning, as hands-on experiences play a critical role in fostering an entrepreneurial mindset. Studies have consistently demonstrated that a well-structured entrepreneurship curriculum positively influences students' self-efficacy toward business creation, their perceived behavioral control, and their confidence in overcoming business challenges (Leuwol, 2023). Additionally, creativity has been identified as a key mediator in this relationship, with innovative thinking enhancing students' ability to recognize and seize entrepreneurial opportunities (Astiana et al., 2022).

Entrepreneurial self-efficacy and opportunity recognition are further reinforced through business-related internships, industry collaborations, and access to entrepreneurial networks, which serve as crucial mechanisms for translating entrepreneurial intention into action (Dar et al., 2023). Beyond formal education, psychological, human, and social capital also play a crucial role in fostering entrepreneurial ambition. The ability to persist in the face of failure, together with access to strong professional networks and mentorship, significantly increases students' likelihood of pursuing business creation (Saputra et al., 2024; Almeida & Sousa Filho, 2023).

Social capital built through university support systems, peer influence, and entrepreneurial role models further strengthens students' access to resources and business opportunities

(Lemus et al., 2023). Likewise, the external environment surrounding HEIs plays a vital role in shaping entrepreneurial ambition. Entrepreneurial intention does not emerge in isolation but is influenced by broader socioeconomic and policy conditions that shape students' willingness and ability to start businesses (Rodrigues et al., 2023). Cultural norms, access to government support, and exposure to entrepreneurial ecosystems contribute significantly to students' perceptions of entrepreneurship as a viable career path (Rahim et al., 2023).

Research indicates that students from entrepreneurial family backgrounds or those who have early exposure to business activities are more inclined to develop entrepreneurial aspirations (Lu et al., 2024). Mass Entrepreneurship and Innovation (MEI) education has been increasingly promoted as a large-scale strategy to stimulate entrepreneurial activity in universities (Lu et al., 2024). However, its effectiveness varies across different cultural and economic settings. Some studies suggest that while MEI enhances students' entrepreneurial self-efficacy, its impact depends on contextual factors such as access to financial resources, mentorship opportunities, and industry partnerships (Ndofirepi, 2022).

The Theory of Planned Behavior (Ajzen, 1991) provides a widely accepted framework for understanding how psychological and social factors shape entrepreneurial decision-making. According to this theory, attitudes toward the behavior, subjective norms, and perceived behavioral control are key determinants of entrepreneurial intention, which ultimately influences entrepreneurial behavior (Aliedan et al., 2022). Entrepreneurship education strengthens students' attitudes toward business creation by exposing them to the benefits and challenges of self-employment (Sharma et al., 2024).

Subjective norms, including support from family, friends, and mentors, also play a critical role in shaping students' likelihood of pursuing entrepreneurship (Rahim et al., 2023). Likewise, perceived behavioral control is strengthened through self-efficacy, access to business resources, and practical exposure to entrepreneurial activities (Leuwol, 2023). Although entrepreneurial intention is a strong predictor of entrepreneurial behavior, studies suggest that intention alone is insufficient for actual business creation, as students also require institutional support, financial resources, and regulatory frameworks that facilitate business startups (Bozward et al., 2023).

Algeria presents significant opportunities for entrepreneurial development, with higher education institutions playing a pivotal role in fostering a new generation of entrepreneurs. Universities across the country have increasingly embraced initiatives such as business incubators, entrepreneurship centers, and partnerships with industry to create a more dynamic entrepreneurial ecosystem. Business incubators provide aspiring entrepreneurs with infrastructure, mentorship, and technical support to transform innovative ideas into viable business ventures (Amghar, 2023).

These incubators function as innovation hubs by offering students access to co-working spaces, prototyping laboratories, and guidance from experienced entrepreneurs and business professionals. Similarly, entrepreneurship centers promote students' entrepreneurial competencies through structured training programs, networking events, and business competitions that stimulate creativity and innovation. At the same time, collaborations between universities and industry provide students with opportunities to test business models, gain practical experience, and secure financial support from private investors (Metaiche, 2024).

Algeria also possesses considerable entrepreneurial potential in high-growth sectors such as technology, renewable energy, and agribusiness (Rahmane et al., 2019). With a young and increasingly skilled workforce, the country is well positioned to become a regional hub for te

chnological innovation and digital entrepreneurship (Ait Bara & Baar, 2024). The rapid expansion of mobile internet and digital services has created favorable conditions for startups specializing in fintech, e-commerce, artificial intelligence, and cybersecurity.

Furthermore, the global transition toward sustainable energy presents an important opportunity for Algeria due to its abundant natural resources and strategic geographic location. Investments in solar and wind energy, together with government incentives for green entrepreneurship, could accelerate economic diversification while generating new business opportunities. Agribusiness also offers strong prospects through innovations in precision agriculture, food processing, and sustainable irrigation systems (Bouchenafa, 2025).

By capitalizing on these emerging opportunities, Algeria has the potential to cultivate a thriving entrepreneurial culture that promotes long-term economic growth, employment generation, and international competitiveness (Benhah, 2024). In this context, understanding the factors that influence university students' entrepreneurial intention becomes increasingly relevant, as HEIs constitute one of the main mechanisms for developing entrepreneurial competencies and supporting the creation of innovative and sustainable businesses.

LITERATURE REVIEW

THEORETICAL FRAMEWORK

Higher education institutions (HEIs) serve as key catalysts in nurturing entrepreneurial ambition among students. A wealth of research has explored how entrepreneurship education, institutional support, psychological traits, and socioeconomic conditions shape students' desire to become entrepreneurs. Findings consistently affirm that exposure to entrepreneurship education enhances students' motivation to establish their own ventures, although the magnitude of this influence varies according to contextual factors (Huang et al., 2024).

Entrepreneurship education has emerged as one of the most significant contributors to fostering entrepreneurial intention. Huang et al. (2024) emphasize that a balanced combination of theoretical knowledge and hands-on learning experiences strengthens students' entrepreneurial motivation, with creativity serving as a bridge between education and entrepreneurial drive. Similarly, Sharma et al. (2024) found that entrepreneurial competencies developed through structured coursework are strongly associated with students' willingness to launch their own businesses. These findings reinforce the importance of well-designed entrepreneurship education programs.

Beyond formal education, psychological, human, and social capital significantly shape students' entrepreneurial aspirations. Saputra et al. (2024) underscore the pivotal role of psychological capital, particularly self-efficacy and resilience, in fostering entrepreneurial ambition. In addition, human and social capital, developed through skill-building opportunities and professional networking facilitated by universities, further strengthen students' entrepreneurial drive. Consequently, HEIs should cultivate not only technical competencies but also students' psychological and social readiness for entrepreneurship.

Another emerging area of research concerns the influence of Mass Entrepreneurship and Innovation (MEI) education. Lu et al. (2024) highlight that MEI programs positively affect students' entrepreneurial inclination, particularly when combined with previous entrepreneurial experience or a family business background. This evidence suggests that experiential learning and family involvement should become integral components of entrepreneurship education, as they reinforce the practical application of entrepreneurial competencies.

The role of emotional intelligence in entrepreneurial intention remains a subject of ongoing debate. Some studies suggest that emotional intelligence enhances creativity and strengthens entrepreneurial motivation (Gopinath & Sreekanth, 2024). Conversely, other research argues that its direct influence on entrepreneurial intention is relatively weak (International Journal of Educational Management, 2023). These contrasting findings indicate the need for additional empirical research to clarify the extent to which emotional intelligence contributes to entrepreneurial ambition.

The university environment itself represents another important determinant of entrepreneurial intention. Lemus et al. (2023) found that a university culture promoting entrepreneurship through mentorship, funding opportunities, and business incubation is positively associated with students' entrepreneurial aspirations. Their study also identified gender differences, showing that male students are more influenced by institutional support structures, whereas female students benefit more from targeted entrepreneurship education. These findings suggest the importance of developing gender-sensitive entrepreneurial strategies.

Cross-national comparisons provide further evidence regarding the influence of external conditions on entrepreneurial intention. Kara et al. (2023) demonstrated that students' perceptions of entrepreneurship education and the availability of external support structures significantly influence entrepreneurial motivation in both China and Mexico. These findings highlight the relevance of cultural and economic contexts in determining the effectiveness of entrepreneurship education and reinforce the need for localized educational approaches.

Practical exposure to entrepreneurship through internships and experiential learning has also been identified as a strong predictor of entrepreneurial intention. Narmaditya et al. (2022) demonstrated that internship experiences cultivate an entrepreneurial mindset by immersing students in real business environments. Likewise, Bozward et al. (2023) argue that university-led initiatives, including mentorship and professional networking, produce lasting positive effects on students' entrepreneurial ambitions by strengthening their confidence and practical competencies.

Self-efficacy, defined as an individual's belief in their capacity to achieve specific goals, has been consistently associated with entrepreneurial intention. Leuwol (2023) found that self-efficacy functions as a mediator between entrepreneurship education and entrepreneurial intention. Likewise, Dar et al. (2023) demonstrated that self-efficacy improves opportunity recognition, which subsequently strengthens entrepreneurial motivation. These findings indicate that entrepreneurship programs should prioritize developing students' confidence in their entrepreneurial capabilities.

Social entrepreneurship has emerged as another growing area of entrepreneurship research. Almeida and Sousa Filho (2023) argue that mentoring relationships and social networks play a fundamental role in fostering social entrepreneurial intentions, whereas traditional curricula and teaching methods appear to exert a more limited influence. This evidence suggests that universities should complement classroom instruction with strong mentoring systems and collaborative networks that encourage socially oriented entrepreneurial initiatives.

The Theory of Planned Behavior (TPB) continues to be one of the most widely adopted theoretical frameworks for explaining entrepreneurial intention. Ndofirepi (2022) and Aliedan et al. (2022) confirmed that university support directly influences students' perceived behavioral control and subjective norms, which subsequently shape entrepreneurial aspirations. These findings reaffirm the explanatory power of TPB in understanding how higher education institutions contribute to the development of entrepreneurial mindsets among university students.

Despite the extensive body of research examining higher education's contribution to entrepreneurship, several important gaps remain. First, the role of emotional intelligence in entrepreneurial motivation requires additional empirical validation. Second, although entrepreneurship education is widely recognized as a determinant of entrepreneurial intention, limited evidence exists regarding its long-term influence on actual business creation. Third, relatively few studies have examined how HEIs promote social entrepreneurship.

Furthermore, cross-cultural perspectives remain insufficiently explored. Although Kara et al. (2023) compared entrepreneurship education across different countries, additional research is needed to understand how cultural, economic, and policy environments shape entrepreneurial intentions worldwide. Similarly, research on gender-specific entrepreneurship education strategies remains inconclusive despite evidence suggesting that institutional support and educational interventions affect male and female students differently (Lemus et al., 2023).

Entrepreneurship Education in Algeria: A New Perspective

In recent years, Algeria's higher education system has increasingly integrated entrepreneurial learning into university curricula, raising important questions regarding the effectiveness of these initiatives and their practical outcomes. This study differs from previous research by employing a novel analytical framework, focusing on a distinct period, and examining entrepreneurship education within the Algerian context. Consequently, it provides a new perspective on how entrepreneurial education shapes students' entrepreneurial intentions.

Entrepreneurial intention is widely recognized as the first stage of the entrepreneurial process; however, without corresponding action, it remains only an unrealized aspiration. This study seeks to understand the mechanisms that facilitate the transition from entrepreneurial intention to entrepreneurial behavior within Algerian higher education institutions. While entrepreneurial intention reflects an individual's willingness to establish a business, entrepreneurial behavior refers to taking concrete actions toward venture creation and development.

Previous studies (Krueger et al., 2000; Ajzen, 1991) indicate that the transition from entrepreneurial intention to entrepreneurial action depends on multiple interacting factors, including personal motivation, institutional support, and access to entrepreneurial resources. Nevertheless, limited evidence exists regarding how these factors interact within the Algerian context. Addressing this gap represents one of the principal contributions of the present study to the entrepreneurship literature.

One of the most important factors facilitating the transformation of entrepreneurial ambition into entrepreneurial action is the role of HEIs in creating enabling environments. Universities that provide practical learning opportunities through business incubators, mentorship programs, and experiential training substantially increase the probability that students will act upon their entrepreneurial intentions. Research further suggests that these initiatives strengthen entrepreneurial competencies while reducing the perceived risks associated with business creation.

Psychological and behavioral variables also play an essential role in bridging the gap between entrepreneurial intention and entrepreneurial behavior. According to Ajzen's (1991) Theory of Planned Behavior, perceived behavioral control, defined as an individual's confidence in successfully performing entrepreneurial tasks, constitutes one of the strongest predictors of entrepreneurial action. Other studies similarly identify self-efficacy, resilience, and risk tolerance as critical characteristics of individuals who successfully transform entrepreneurial intentions into business creation (Ajzen, 1991).

To illustrate the proposed conceptual model, this study presents a framework (Figure 1) describing the principal factors influencing entrepreneurial intentions and entrepreneurial behavior. The relationships among these constructs are represented through directional paths reflecting their hypothesized causal effects. Based on this framework, the following hypotheses are proposed:

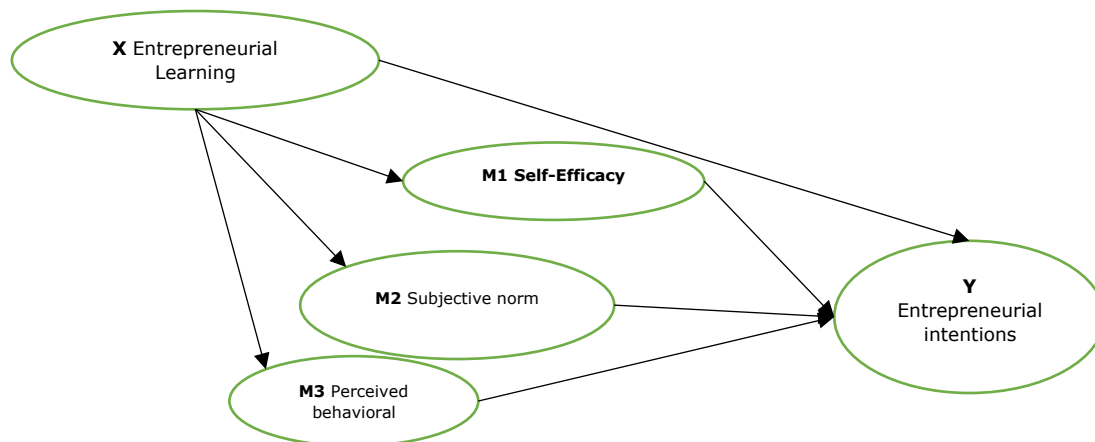
H1: Entrepreneurial learning (X) has an indirect effect on entrepreneurial intention (Y) through the mediating effects of self-efficacy (M1), subjective norms (M2), and perceived behavioral control (M3) among students of the Department of IESMS, University of Tlemcen.

H2: Entrepreneurial learning (X) has a direct effect on entrepreneurial intention (Y) among students of the Department of IESMS, University of Tlemcen.

By testing these hypotheses, the present study seeks to deepen understanding of how Algerian higher education institutions can strengthen students' entrepreneurial aspirations and facilitate the transformation of those aspirations into successful entrepreneurial ventures.

Figure 1

Model Diagram



Source: Created by the author

Methodology

Study Design and Sample

Study Design

A cross sectional survey design is recommended for examining the relationships among entrepreneurial learning, its mediators, and entrepreneurial intention. Cross sectional designs are appropriate for assessing theoretical models such as the Theory of Planned Behavior (TPB) (Ajzen, 1991) and are commonly used in entrepreneurship research (Liñán & Chen, 2009). Moreover, this methodology aligns closely with the framework presented in Lent et al.'s (1994) Toward a Unifying Social Cognitive Theory of Career and Academic Interest, Choice, and Performance (Lent et al., 1994).

Sampling:

For a study comparing the means of three groups with a medium effect size (0.25), the necessary sample size per group is 52 cases, leading to a total sample size of 156 cases (Cohen, 1992)

A sample of at least 156 participants is advisable to ensure sufficient statistical power to detect mediation effects (Cohen, 1992). Participants should be selected using stratified random sampling or convenience sampling methods, ensuring they represent the target population (e.g., university students engaged in entrepreneurship education).

Data Collection

A survey was conducted among students enrolled in the Department of Economics, Management, and Business Sciences at the University of Tlemcen. The study employed a stratified random sampling technique, targeting a total of 450 students. Out of the distributed questionnaires, 412 were successfully collected and deemed usable for analysis. To ensure the reliability and validity of the study, standardized and well established measurement scales were either developed or adapted for each construct. All constructs were measured using a 7 point Likert scale, ranging from 1 (Strongly Disagree) to 7 (Strongly Agree):

- **Section 1 : Entrepreneurial Learning (X):** A scale to measure the extent and quality of entrepreneurial learning experiences (Rae, 2006)
- **Section 2 : Self Efficacy (M1):** Instruments that gauge an individual's perceived confidence in executing entrepreneurial behaviors, reflecting their judgments about capability and control in entrepreneurial contexts (Lent et al., 1994).
- **Section 3 : Subjective Norms (M2):** Items that measure perceived social pressure or support for entrepreneurial activities (Ajzen, 1991).
- **Section 4 : Perceived behavioral control (M3):** Scales that assess self efficacy and control over entrepreneurial tasks (Ajzen, 1991) (Ajzen, 1991).
- **Section 5 : Entrepreneurial Intention (Y):** Validated measures capturing the strength of individuals' entrepreneurial intentions (Liñán & Chen, 2009).

Statistical Analysis

Model Specification: In this study, we utilize a parallel multiple mediation model to explore how entrepreneurial learning (X) impacts entrepreneurial intention (Y) through three distinct mediators: Self Efficacy (M1), subjective norms (M2), and perceived behavioral control (M3). First, we examine how entrepreneurial learning influences each mediator individually (Path a). Next, we assess how each mediator affects entrepreneurial intention while accounting for the influence of entrepreneurial learning (Path b). We also consider the direct effect (c') of entrepreneurial learning on entrepreneurial intention after controlling for the mediators, as well as the total effect (c), which encompasses both direct and indirect influences. This approach allows us to understand the unique contribution of each mediator in the relationship between entrepreneurial learning and intention. This structure is mathematically represented as:

$$M_i = \alpha_i + a_i X + \epsilon_{M_i}, \quad \text{for } i = 1, 2, 3,$$

$$Y = \beta_0 + c' X + b_1 M_1 + b_2 M_2 + b_3 M_3 + \epsilon_Y.$$

This structure allows for the decomposition of the total effect of X on Y into: The direct effect (c'), and the indirect effects ($a_i \times b_i$ for each mediator). This model structure facilitates the decomposition of the total effect of X on Y into direct and indirect effects, in line with mediation analysis techniques (Preacher & Hayes, 2008).

Estimation Procedures: Ordinary Least Squares (OLS) regression is used in this study to estimate each equation, as it works by minimizing the sum of squared residuals, making it particularly effective for analyzing linear relationships between continuous variables (Hayes, 2022). Additionally, bootstrapping is employed with 5,000 resamples to generate robust estimates of the indirect effects. This technique is valuable because it bypasses the need for

normality assumptions concerning the distribution of indirect effects, thus providing more reliable results (Preacher & Hayes, 2008).

Software: The analysis should be conducted using the PROCESS macro for SPSS (version 4.2 or later), which is designed for mediation, moderation, and conditional process analysis (Hayes, 2022).

1.1. Model Evaluation and Diagnostics

Model Fit and Variance Explained: While the focus is on mediation, reporting R^2 values for each regression equation provides an indication of the proportion of variance explained by the predictors (Tabachnick & Fidell, 2013)

Assumptions Checking: Before delving into the Ordinary Least Squares (OLS) regression analysis, it is essential to confirm that the underlying assumptions hold true, as these safeguard the validity of our findings. Initially, it's important to establish the reliability of our measurement instruments by performing a Cronbach's alpha test, Spearman Brown test and Guttman test. Next, the assumption of linearity mandates that the relationship between the independent and dependent variables is linear, as any deviation from linearity could introduce bias into our estimates. Equally important is verifying homoscedasticity ensuring that the residuals have a consistent variance across all levels of the predicted values, which is crucial for maintaining efficient estimations (Tabachnick & Fidell, 2013). Additionally, assessing the normality of residuals is vital for sound inferential statistics; should any departures from normality be detected, bootstrapping techniques can help mitigate these issues. Finally, it is critical to evaluate multicollinearity among the predictors especially among the mediators using Variance Inflation Factors (VIFs) to ensure that each predictor is contributing uniquely to the model (Field, 2013). By meticulously checking these assumptions, we enhance both the robustness and the interpretability of our regression analysis

Stability Assessment: Parameter stability is evaluated through the standard errors, covariance matrices, and bootstrapped confidence intervals. These diagnostics help confirm the robustness and precision of the estimated effects (MacKinnon et al., 2004).

RESULT AND DISCUSSION

Diagnostics

The reported Cronbach's alpha values of 0.844 (raw) and 0.834 (standardized) Table (1) indicate that, overall, the 16 item instrument demonstrates good internal consistency reliability. However, this aggregate figure should be interpreted with caution due to the potential multidimensionality of the instrument. The distinct subgroups of items, some of which show very high or very low inter item correlations, suggest that further subscale specific analyses and structural validations are necessary. By conducting additional psychometric evaluations, researchers can ensure that both the overall scale and its constituent parts reliably and validly measure the intended construct. The 16 item scale is reliable with an overall Cronbach's Alpha of about 0.84, and each item contributes acceptably to the overall measurement. Table (3) No item appears to be problematic enough to consider removal, although a closer look at items with lower item-total correlations may be beneficial for further refinement. Correlation Between Forms (0.708): This is a moderately strong correlation, indicating the two halves measure related constructs effectively. Guttman Coefficient (0.780): This also supports good internal consistency Table (2).

Linearity : Table (4) The analysis reveals significant overall effects for each interaction ($M1 * X$, $M2 * X$, and $M3 * X$), with each showing substantial between-group differences ($p <$

.001). This suggests that the interaction between each independent variable and the mediators plays a critical role in explaining the variance in the dependent variable. The linear relationships in all interactions are particularly strong, with highly significant linear components ($p < .001$) and large F values, confirming that the linear associations are robust. Additionally, there are no significant deviations from linearity in any of the interactions ($p > .05$), indicating that the relationships are well captured by a linear model without requiring adjustments for nonlinearity. The ANOVA results further support these findings, demonstrating significant relationships between the dependent variable (Y) and each mediator ($M1$, $M2$, $M3$), with all models showing strong linear effects ($p < .001$). Specifically, for $Y * M1$, the linear component was highly significant ($F = 85.879$, $p < .001$), with no deviation from linearity ($p = .751$). Likewise, for $Y * M2$, the linear effect was significant ($F = 101.597$, $p < .001$), and no nonlinear deviation was observed ($p = .113$). The $Y * M3$ interaction also showed a significant linear relationship ($F = 147.188$, $p < .001$) with no significant deviation from linearity ($p = .333$). Overall, these results suggest that the linear model effectively captures the relationships, demonstrating strong predictive power with no evidence of significant nonlinearity.

Homoscedasticity and Normality of Residuals: Table (5) The residual diagnostics indicate a robust and reliable regression model. Predicted values range from 1.0471 to 5.0277 (mean = 1.6250, $SD = 0.66845$), reflecting moderate variability in the fitted responses. Standardized predicted values span -0.865 to 5.090 (mean = 0.000, $SD = 1.000$), and the standard errors of prediction vary between 0.023 and 0.100 (mean = 0.037, $SD = 0.013$). Adjusted predicted values similarly range from 1.0432 to 5.0720 (mean = 1.6251, $SD = 0.66930$). Residuals themselves extend from -1.14354 to 1.11167 (mean = 0.00000, $SD = 0.35797$), evidencing no systematic bias. Standardized residuals lie between -3.179 and 3.090 (mean = 0.000, $SD = 0.995$), and studentized residuals between -3.253 and 3.114 (mean = 0.000, $SD = 1.004$); although most observations fall well within the customary ± 3 bounds, a small number of borderline cases warrant further scrutiny. Deleted residuals range from -1.19735 to 1.12874 (mean = -0.00005 , $SD = 0.36424$), and studentized deleted residuals from -3.292 to 3.148 (mean = 0.001, $SD = 1.007$), suggesting that omission of any single case would not materially alter the model. The Mahalanobis distances have a mean of 3.990 (range 0.656–30.857, $SD = 4.022$), signalling a handful of potential multivariate outliers. However, Cook's distances remain very low (max = 0.100, mean = 0.004, $SD = 0.009$), and centered leverage values are modest (range 0.002–0.075, mean = 0.010, $SD = 0.010$), confirming that no individual observation exerts undue influence. In sum, the diagnostic statistics affirm that the model exhibits stability, accuracy, and absence of influential or biased observations (Dependent variable: Y ; see Figure 3).

Multicollinearity: Table (6) The multicollinearity analysis indicates that the regression model does not suffer from significant multicollinearity. The tolerance value for X is 0.817, which is well above the critical threshold of 0.2, confirming that X does not exhibit problematic multicollinearity with the other predictors in the model. Additionally, the VIF for X is 1.225, further demonstrating that collinearity concerns are negligible. Similarly, the other predictors — $M1$ (VIF = 1.550), $M2$ (VIF = 1.462), and $M3$ (VIF = 1.383) — all display VIF values substantially below the conventional threshold of 5, indicating that these variables do not share excessive variance with each other. The corresponding tolerance values ($M1 = 0.645$, $M2 = 0.684$, $M3 = 0.723$) remain comfortably above 0.2, reinforcing the absence of multicollinearity issues. Overall, the tolerance and VIF statistics suggest that all predictors (X , $M1$, $M2$, $M3$) contribute unique and non redundant information to the regression model. Consequently, the coefficient estimates are stable, reliable, and unaffected by multicollinearity. The absence of severe multicollinearity in the model ensures that the regression results produce robust, unbiased, and interpretable estimates, thus allowing for

confident conclusions regarding the individual contributions of each predictor to the dependent variable Y.

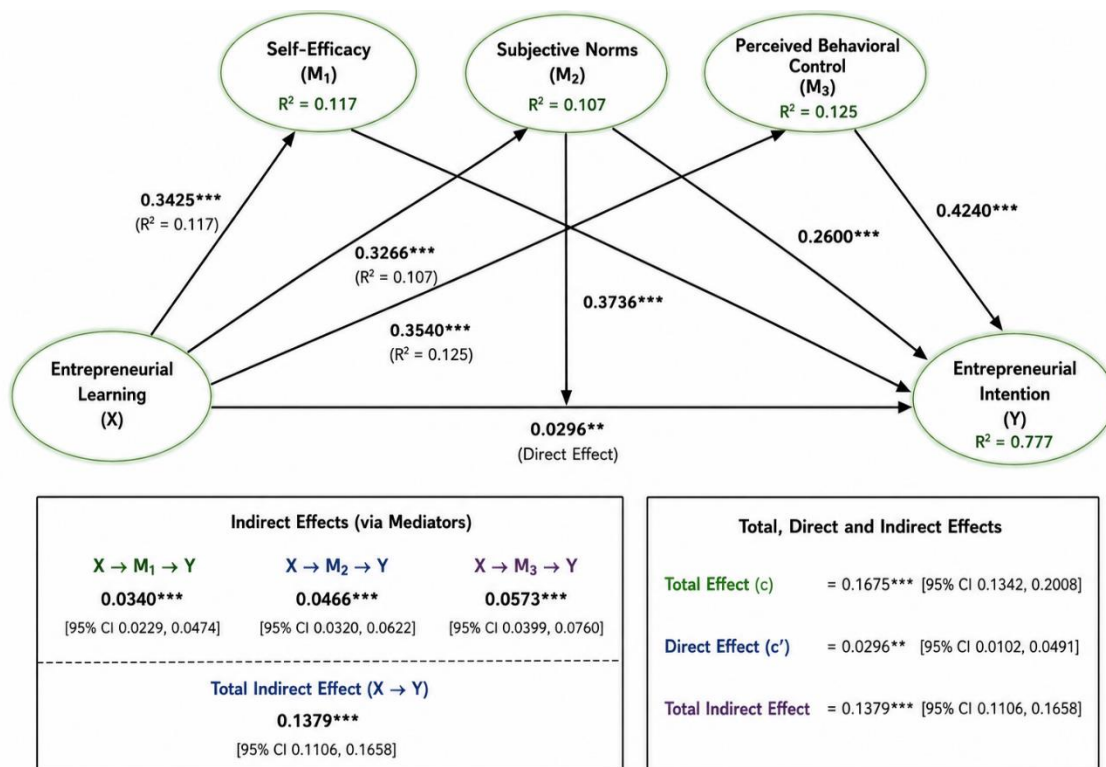
Mediation Model Results

To explore these relationships, the analysis employs the PROCESS macro for SPSS (Model 4) (Hayes, 2022) on a dataset comprising 412 participants. The results reported in Table (7) and synthesized visually in Figure 2 are structured to allow a stepwise examination of the hypothesized mediation model. Initially, the analysis estimates the effect of entrepreneurial learning within the university setting (X) on each mediator separately, namely Self Efficacy (M1), Subjective Norms (M2), and Perceived Behavioral Control (M3). This step isolates the specific contribution of university based learning to each psychological and social cognitive mechanism.

Subsequently, the model assesses the joint effects of the independent variable and all mediators on the dependent variable, entrepreneurial intention (Y). This stage allows for the identification of both direct and conditional relationships, clarifying how much of the influence of entrepreneurial learning is transmitted through the mediating constructs versus remaining as a direct effect. Finally, the total effect of X on Y is decomposed into its direct component (the effect not transmitted through mediators) and its indirect components through M1, M2, and M3, thereby enabling a formal test of multiple mediation pathways.

Figure 2

Results of the Direct and Indirect Effects



Note: *** $p < .001$, ** $p < .01$

$N = 412$, Bootstrap samples = 5,000, 95% CI

Source: Created by the author based on the study results

Figure 2 provides a concise structural representation of these estimated relationships, illustrating how entrepreneurial learning operates as an upstream determinant of entrepreneurial intention through both direct and parallel indirect mechanisms. The diagram highlights that entrepreneurial learning strengthens Self Efficacy, enhances perceived supportive social norms, and increases perceived behavioral control, each of which contributes to the formation of entrepreneurial intention. At the same time, the persistence of a direct path from X to Y suggests that entrepreneurial learning may also exert influence through additional unobserved mechanisms, such as identity formation, motivational internalization, or opportunity recognition processes not explicitly captured in the model.

This structured approach not only clarifies the statistical decomposition of effects but also deepens theoretical understanding of how educational experiences translate into entrepreneurial outcomes. In particular, the findings align with established theoretical frameworks such as the Theory of Planned Behavior (Ajzen, 1991), which emphasizes the central role of attitudes, subjective norms, and perceived behavioral control in shaping intentional behavior, as well as social cognitive theory, which highlights the importance of self efficacy in guiding action. Overall, the results underscore the multifaceted and psychologically mediated nature of entrepreneurial intention formation within higher education contexts.

Effects on Mediators (M1, M2, and M3)

The analysis shows the following results for each mediator:

- **Self Efficacy (M1):**

Entrepreneurial learning (X) exerts a significant positive effect on self efficacy, with an unstandardized coefficient of 0.1304 (SE = 0.0177, $t = 7.3814$, $p < .001$). The model accounts for 11.73% of the variance in self efficacy ($R^2 = 0.1173$). Interpretation: A one unit increase in entrepreneurial learning is associated with a 0.13 unit increase in perceived capability to perform entrepreneurial tasks.

- **Subjective Norms (M2):**

Entrepreneurial learning significantly predicts subjective norms, $b = 0.1285$ (SE = 0.0184, $t = 6.9959$, $p < .001$), explaining 10.66% of its variance ($R^2 = 0.1066$). Interpretation: Each additional unit of entrepreneurial learning elevates perceived social support or pressure to engage in entrepreneurship by approximately 0.13 units.

- **Perceived Behavioral Control (M3):**

The effect on perceived behavioral control is similarly positive and significant, $b = 0.1284$ (SE = 0.0168, $t = 7.6647$, $p < .001$), with 12.53% of variance explained ($R^2 = 0.1253$). Interpretation: A one unit increase in learning experiences boosts individuals' sense of control over entrepreneurial activities by about 0.13 units.

the Outcome Variable (Y: Entrepreneurial Intention) : When regressing entrepreneurial intention (Y) on entrepreneurial learning (X) and the three mediators:

- **Direct Effect of X on Y:** Entrepreneurial learning (X) has a significant direct effect on entrepreneurial intention, with a coefficient of **0.0296** (SE = 0.0099, $t = 2.9987$, $p = .0029$). This indicates that for every one unit increase in entrepreneurial learning, entrepreneurial intention increases by approximately 0.03 units. The standardized coefficient is **0.0777**, suggesting a modest direct influence.
- **Effect of M1 (Self Efficacy):** Self efficacy has a strong positive effect on entrepreneurial intention, with a coefficient of **0.2608** (SE = 0.0292, $t = 8.9257$, $p <$

.001). This suggests that improving self efficacy by one unit boosts intention by about 0.26 units. The standardized coefficient is **0.2600**.

- **Effect of M2 (Subjective Norms):** Subjective norms show a significant positive relationship with entrepreneurial intention, yielding a coefficient of **0.3626** (SE = 0.0275, $t = 13.2048$, $p < .001$). This implies a 0.36 unit increase in intention for every unit increase in norms. The standardized coefficient is **0.3736**.
- **Effect of M3 (Perceived Behavioral Control):** Perceived control has the strongest effect, with a coefficient of **0.4463** (SE = 0.0290, $t = 15.4100$, $p < .001$). A one unit increase in PBC leads to a 0.45 unit increase in intention. The standardized coefficient is **0.4240**.

The combined model explains 77.71% of the variance in entrepreneurial intention ($R^2 = 0.7771$), indicating an excellent fit. Among predictors, perceived control (M3) exerts the largest influence, followed by subjective norms (M2) and self efficacy (M1). The relatively small direct effect of X underscores the centrality of these mediator , This suggests that the impact of entrepreneurial learning primarily operates through its influence on these key psychological factors, consistent with the Theory of Planned Behavior.(Ajzen, 1991)

Decomposition of Total, Direct, and Indirect Effects

The analysis decomposes the influence of entrepreneurial learning (X) on entrepreneurial intention (Y) into the following components:

- **Total Effect of X on Y(c):** The total effect is 0.1675 (SE = 0.0169, $t = 9.8886$, $p < .001$), with a standardized effect of 0.4388. This indicates that entrepreneurial learning significantly enhances entrepreneurial intention when mediators are not considered.
- **Direct Effect of X on Y (c') (controlling for M1, M2, M3):** The direct effect is much smaller at 0.0296 (SE = 0.0099, $t = 2.9987$, $p = .0029$), with a standardized effect of 0.0777. This shows that even when controlling for mediators, entrepreneurial learning still positively influences entrepreneurial intention, although to a lesser extent.
- **Total Indirect Effect of X on Y:** The total indirect effect is 0.1379 (BootSE = 0.0141), with a 95% confidence interval of [0.1106, 0.1658]. The standardized indirect effect is 0.3612, highlighting that the majority of the influence of entrepreneurial learning operates through the mediators.
- **Specific Indirect Effects:**
 - Via M1 (Self Efficacy): 0.0340, 95% CI [0.0229, 0.0474], standardized = 0.0891.
 - Via M2 (Subjective Norms): 0.0466, 95% CI [0.0320, 0.0622], standardized = 0.1220.
 - Via M3 (Perceived Behavioral Control): 0.0573, 95% CI[0.0399, 0.0760], standardized = 0.1501.

The bootstrap confidence intervals for all indirect effects do not include zero, confirming their statistical significance. Interestingly, the contributions of the three mediators are similar in magnitude, ranging from 0.0340 to 0.0573, indicating that none stands out as markedly more important than the others.

The significant total effect (0.1675) can be attributed mainly to the total indirect effect (0.1379) rather than the direct effect (0.0296). This suggests that entrepreneurial learning in universities shapes entrepreneurial intention primarily by influencing Self Efficacy, subjective norms, and perceived behavioral control. These findings highlight the role of educational experiences in fostering key cognitive and normative factors essential for entrepreneurial decision making.

The pattern of results supports partial mediation, aligning with the Theory of Planned Behavior, which emphasizes Self Efficacy, subjective norms, and perceived control as key determinants of intention (Ajzen, 1991). The near equivalent contributions of the mediators suggest a balanced mediation process, consistent with prior research on the educational foundations of entrepreneurial intention (Rae, 2006).

Discussion

Our framework integrates Rae's (2006) concept of entrepreneurial learning, which reflects the depth and quality of an individual's entrepreneurial experiences and education. Meanwhile, (Lent et al., 1994) Social Cognitive Career Theory (SCCT) and Ajzen's (1991) theory of planned behavior underpins the mediators, where Self Efficacy (M1), perceived social expectations (M2), and confidence in one's entrepreneurial abilities (M3) play a crucial role in shaping intention. Finally, entrepreneurial intention (Y) is assessed using validated scales from Liñán and Chen (Liñán & Chen, 2009), which measure the strength of an individual's commitment to starting a business. Through this approach, we aim to gain a deeper understanding of the cognitive and social factors driving entrepreneurial aspirations.

Effects on the Mediators:

Entrepreneurial Learning / Self Efficacy (M1):

The results indicate that entrepreneurial learning significantly influences M1. With an unstandardized coefficient of 0.1304 ($p < .001$) and an R^2 of approximately 0.12, about 12% of the variance in Self Efficacy is explained by learning experiences. In practical terms, this means that richer and more comprehensive entrepreneurial learning environments help cultivate more positive evaluations of entrepreneurship. The standardized coefficient of 0.0177 suggests that as students experience quality entrepreneurial learning, their favorable Self Efficacy toward entrepreneurship improve noticeably.

Entrepreneurial Learning / Subjective Norms (M2):

Similarly, the influence of entrepreneurial learning on subjective norms is statistically significant (coefficient = 0.1285, $p < .001$; $R^2 \approx 0.13$). This relationship implies that students who engage in robust entrepreneurial education also tend to perceive greater social support or pressure to pursue entrepreneurial activities. The standardized effect (0.0184) reinforces the idea that learning not only shapes personal Self Efficacy but also alters how individuals perceive their social environment with respect to entrepreneurship.

Entrepreneurial Learning / Perceived Behavioral Control (M3):

For perceived behavioral control, the influence is again significant (coefficient = 0.1284, $p < .001$; $R^2 \approx 0.13$). This mediator reflects students' beliefs about their capabilities. A standardized coefficient of 0.0168 indicates that a positive learning environment significantly boosts self confidence in managing entrepreneurial tasks. It is clear that quality entrepreneurial education equips students with a sense of competence that is crucial for considering starting a venture.

Predicting Entrepreneurial Intention (Y)

When examining the full model predicting entrepreneurial intention, the mediators and entrepreneurial learning together explain 77.71% of the variance in intention ($R^2 = 0.7771$). The breakdown is particularly revealing:

- **Direct Effect of Learning on Intention:** The direct pathway from entrepreneurial learning to intention is small but significant ($b = 0.0296$, $SE = 0.0099$, $t = 2.9987$, p

= .0029; standardized β = 0.0777). This indicates that entrepreneurial learning alone, without considering the mediators, has a relatively minor influence on entrepreneurial intention.

- **Indirect Effects via Mediators:** The mediators—M1 (Self Efficacy), M2 (subjective norms), and M3 (perceived behavioral control)—play a crucial role. Their coefficients (b = 0.2608, 0.3626, and 0.4463 respectively) and standardized effects (β = 0.2600, 0.3736, and 0.4240) show strong associations with entrepreneurial intention. Improvements in these mediators significantly heighten students' entrepreneurial intentions.

The Mediation Process and Its Implications

The mediation analysis shows that the total effect of entrepreneurial learning on entrepreneurial intention (b = 0.1675, SE = 0.0169, t = 9.8886, p < .001; standardized β = 0.4388) is largely driven by indirect effects. The direct effect is much smaller (b = 0.0296, standardized β = 0.0777), emphasizing that entrepreneurial learning primarily operates through its impact on mediators.

The total indirect effect is 0.1379, with individual indirect effects via M1 (0.0340), M2 (0.0466), and M3 (0.0573). All indirect effects are statistically significant as their bootstrapped confidence intervals do not include zero. Among the mediators, perceived behavioral control (M3) shows the strongest mediating effect, followed by subjective norms (M2) and Self Efficacy (M1).

This indicates that entrepreneurial learning works by enhancing students' confidence, shaping favorable Self Efficacy, and reinforcing social support for entrepreneurial action.

The mediation is partial, as the direct effect remains statistically significant but substantially smaller than the indirect effects.

Integrated Interpretation

1. Entrepreneurial learning significantly enhances Self Efficacy, subjective norms, and perceived behavioral control (all p < .001), supporting its role in influencing key psychological drivers of intention.
2. These mediators, in turn, strongly predict entrepreneurial intention, with perceived behavioral control (M3) exerting the greatest influence.
3. The total indirect effect (0.1379) constitutes approximately 82% of the total effect, reinforcing the notion of partial mediation.
4. The magnitudes of the specific indirect effects suggest that while all mediators are important, enhancing perceived behavioral control yields the largest gains in entrepreneurial intention.

Discussion of the Hypotheses

H1: Entrepreneurial learning (X) has a indirect effect on entrepreneurial intention (Y) through its influence on the mediators Self Efficacy(M1), subjective norms (M2), and perceived behavioral control (M3 intentions among students at the Department of (IESMS), University of Tlemcen.

Our mediation analysis revealed significant positive effects of entrepreneurial learning on all three mediators, Subsequently, the analysis of the effects on entrepreneurial intention (Y) demonstrated that the mediators substantially influenced students' intentions, Building on Social Cognitive Career Theory (Lent, Brown, & Hackett, 1994) and Ajzen's Theory of Planned Behavior (TPB) (1991), the findings reveal that entrepreneurial learning indirectly influences

entrepreneurial intention through its impact on self efficacy, subjective norms, and perceived behavioral control. Within the SCCT framework, entrepreneurial learning serves as a source of self efficacy development. Students who engage in entrepreneurial education build stronger beliefs in their capabilities to perform entrepreneurial tasks. These enhanced self efficacy beliefs are crucial determinants of career interests, goals, and actions, as SCCT asserts that individuals are more likely to form career intentions when they believe they can succeed in a given domain. Simultaneously, according to the Theory of Planned Behavior, entrepreneurial learning strengthens students' subjective norms. Through structured learning environments, mentorships, and exposure to entrepreneurial role models, students come to perceive that significant others such as peers, educators, family, and professional networks — approve of entrepreneurial pursuits. This perceived social support increases the normative pressure to engage in entrepreneurial activities, thereby enhancing the likelihood of intention formation. Entrepreneurial learning also substantially improves student's perceived behavioral control, a key construct in TPB that reflects individuals' perceptions of the ease or difficulty of performing entrepreneurial behavior. Educational interventions that provide students with entrepreneurial competencies, knowledge of processes, and strategic problem solving skills enhance their perceived ability to manage the challenges of entrepreneurship. Overall, the mediation findings demonstrate that entrepreneurial learning influences entrepreneurial intention indirectly by strengthening self efficacy, fostering supportive subjective norms, and enhancing perceived behavioral control.

H2: Entrepreneurial learning (X) has a direct effect on entrepreneurial intention (Y) among students at the Department of (IESMS), University of Tlemcen. In addition to the indirect effects, our model tested the direct path from entrepreneurial learning (X) to entrepreneurial intention (Y). The direct effect was statistically significant but relatively modest. While entrepreneurial learning directly enhances students' entrepreneurial intentions, the magnitude of this effect is considerably smaller compared to the indirect pathways through self efficacy, subjective norms, and perceived behavioral control. This finding suggests that simply exposing students to entrepreneurial content exerts some direct influence on their entrepreneurial aspirations, but the effect becomes much more powerful when entrepreneurial education also works to strengthen students' internal confidence, positive attitudes, and perceptions of social encouragement. For Algerian universities, particularly at the Department of (IESMS), this underscores the critical need to go beyond traditional instruction. Success in fostering entrepreneurial intention requires an environment that nurtures belief in students' abilities, creates a supportive entrepreneurial culture, and strengthens students' sense of agency over entrepreneurial outcomes.

CONCLUSION AND POLICY SUGGESTIONS

Conclusions

This study set out to examine how entrepreneurial learning (X) influences entrepreneurial intention (Y) through the mediating effects of self-efficacy (M1), subjective norms (M2), and perceived behavioral control (M3). Entrepreneurial learning was understood as more than the acquisition of knowledge, encompassing the quality and depth of educational experiences, including formal instruction, practical activities, mentorship, and reflective learning, as proposed by Rae (2006). The findings demonstrate that these learning experiences constitute a fundamental mechanism for strengthening students' entrepreneurial intentions.

The study is grounded in the Theory of Planned Behavior developed by Ajzen (1991), which explains entrepreneurial behavior as the result of attitudes toward the behavior, subjective norms, and perceived behavioral control. The empirical findings confirm the explanatory power of this framework by showing that entrepreneurial learning positively influences each of these mediating variables. Consequently, entrepreneurship education contributes not only to knowledge acquisition but also to the psychological and social conditions necessary for entrepreneurial decision-making.

Regarding self-efficacy (M1), the results indicate that high-quality entrepreneurial learning significantly improves students' attitudes toward entrepreneurship. Students who participate in dynamic learning environments that combine theoretical and practical experiences develop more favorable perceptions of entrepreneurship as a desirable and achievable career option. These findings reinforce the importance of designing educational experiences that actively promote positive entrepreneurial attitudes.

The findings also demonstrate that entrepreneurial learning strengthens subjective norms (M2) by increasing students' perceptions of social support for entrepreneurial activities. Exposure to entrepreneurial role models, collaborative learning environments, mentorship programs, and peer interactions creates a supportive social climate that encourages entrepreneurial aspirations. This result highlights the importance of fostering entrepreneurial ecosystems within higher education institutions that extend beyond traditional classroom instruction.

Similarly, entrepreneurial learning exerts a significant positive influence on perceived behavioral control (M3). Students who engage in comprehensive entrepreneurship programs report higher levels of confidence in their ability to perform entrepreneurial tasks and overcome the challenges associated with business creation. This increased sense of competence enhances their belief that entrepreneurial success is attainable, thereby reinforcing entrepreneurial intention.

One of the most important findings of this research is that the influence of entrepreneurial learning on entrepreneurial intention occurs primarily through indirect pathways. Although a direct relationship exists between entrepreneurial learning and entrepreneurial intention, the mediating effects of self-efficacy, subjective norms, and perceived behavioral control account for most of the total effect. This finding demonstrates that entrepreneurship education generates its greatest impact by transforming students' psychological dispositions and strengthening their perceptions of social and institutional support.

The case of students from the Department of IESMS at the University of Tlemcen provides practical evidence supporting the proposed conceptual model. Students who participated in entrepreneurship education programs combining theoretical instruction, practical workshops, mentorship, and networking activities reported stronger entrepreneurial attitudes, greater perceived social support, and higher confidence in their entrepreneurial abilities. These outcomes were associated with significantly stronger entrepreneurial intentions, consistent with the theoretical propositions advanced by Liñán and Chen (2009).

The experience of the University of Tlemcen illustrates the importance of creating comprehensive entrepreneurial ecosystems within higher education institutions. Educational environments that integrate experiential learning with institutional support mechanisms enable students to translate entrepreneurial aspirations into realistic business plans. This evidence demonstrates that entrepreneurship education becomes more effective when practical experiences are complemented by mentoring, networking opportunities, and institutional encouragement.

The findings also emphasize the need for a holistic approach to entrepreneurship education. Universities should move beyond traditional knowledge transmission and incorporate strategies that simultaneously strengthen entrepreneurial attitudes, expand supportive social networks, and enhance students' confidence in their entrepreneurial capabilities. Such an approach is consistent with the theoretical foundations established by Rae (2006) and Ajzen (1991), while also responding to the practical demands of contemporary entrepreneurial education.

In conclusion, this study provides comprehensive evidence that entrepreneurial learning promotes entrepreneurial intention primarily through the mediating effects of self-efficacy, subjective norms, and perceived behavioral control. The empirical findings confirm that entrepreneurship education is most effective when it combines experiential learning with institutional and social support mechanisms. The University of Tlemcen case demonstrates the practical relevance of this multidimensional framework, highlighting the importance of designing entrepreneurship education programs that empower students to transform entrepreneurial intentions into successful entrepreneurial action.

Policy Suggestions

The Algerian university system has made significant progress in promoting entrepreneurial learning through several strategic initiatives. These include the development of a National Entrepreneurship Curriculum Framework (Biskri & Youb, 2024), the promotion of University–Industry–Government collaborations (Boualef, 2011), and the establishment of Regional Entrepreneurship Hubs (Benkataf, 2021). Together, these initiatives have strengthened the entrepreneurial ecosystem within higher education institutions and created new opportunities for students to develop entrepreneurial competencies through education, innovation, and collaboration.

To further enhance entrepreneurial learning outcomes, universities and policymakers should prioritize the implementation of comprehensive monitoring and evaluation mechanisms. Longitudinal tracking of graduates' entrepreneurial trajectories would enable institutions to rigorously assess the long-term impact of entrepreneurship education while providing evidence for the continuous improvement of educational programs. Such evaluation systems would ensure that entrepreneurship policies remain responsive to students' needs and labor market demands.

In addition, the Ministry of Higher Education should establish data-driven monitoring dashboards capable of systematically measuring key entrepreneurial performance indicators, including start-up creation rates, access to investment capital, business survival, and job generation. The integration of these analytical tools would strengthen the relationship between educational practices and entrepreneurial performance while supporting evidence-based policymaking. Ultimately, these measures would empower Algerian youth with the competencies, confidence, and resources necessary to promote sustainable innovation and long-term economic growth.

Implications for Educational Practice

The integration of the proposed theoretical model with the empirical evidence obtained from the University of Tlemcen offers important implications for entrepreneurship education. The findings demonstrate that effective entrepreneurship programs should extend beyond the simple transmission of theoretical knowledge and instead provide learning environments that actively foster positive entrepreneurial attitudes, supportive social networks, and strong entrepreneurial self-confidence. These dimensions represent essential conditions for strengthening entrepreneurial intention.

Educational institutions and policymakers can use these findings to redesign entrepreneurship curricula that combine academic instruction with experiential learning, mentoring, networking opportunities, and institutional support. Such comprehensive educational strategies are more likely to inspire, motivate, and empower students to pursue entrepreneurial careers. Consequently, universities can play a central role in developing future entrepreneurs who possess not only technical knowledge but also the psychological and social competencies required for successful venture creation.

Limitations of the Research

Although the sample size employed in this study was statistically adequate, it may not fully capture the diversity of students' entrepreneurial attitudes and behaviors within real-world settings. The findings were derived from a specific group of participants and therefore may not entirely represent the heterogeneous characteristics of students enrolled in different universities or regions. Consequently, the generalizability of the results should be interpreted with appropriate caution.

Furthermore, the research was conducted within a single geographical and cultural context, which limits the applicability of the findings to other educational and socioeconomic environments. Student experiences, cultural backgrounds, regional differences, and socioeconomic conditions within Algeria may substantially influence entrepreneurial attitudes and intentions. Future research should therefore include more representative samples drawn from multiple regions and educational institutions to better reflect the diversity of the Algerian higher education system.

Finally, although this study adopted the Theory of Planned Behavior as its primary conceptual framework, numerous alternative theoretical perspectives could provide additional insights into entrepreneurial behavior. Future investigations should examine complementary psychological, social, and institutional variables, as well as employ longitudinal research designs capable of monitoring changes in entrepreneurial attitudes and intentions over time. Expanding both the theoretical and methodological scope of entrepreneurship research would contribute to a more comprehensive understanding of the mechanisms that shape entrepreneurial intention and entrepreneurial behavior.

Abbreviations

(HEIs) Higher education institutions
(SCCT) Social Cognitive Career Theory
(TPB) Theory of planned behavior
(IESMS) Institute of Economic Sciences and Management Sciences

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APPENDIX:

Table (1)

Cronbach's alpha

test Reliability Statistics			
Cronbach's Alpha	Cronbach's Alpha Based N	of	
.844	on Standardized Items	Items	
	.834	16	

Table (2)

Spearman Brown test, Guttman

Reliability Statistics		
Correlation Between Forms		.708
Spearman	Equal Length	.829
Brown	Unequal	.829
Coefficient	Length	
Guttman Split Half Coefficient		.780
a. The items are: X1, X2, X3, M1_1, M1_2, M1_3, M2_1, M2_2.		
b. The items are: M2_3, M3_1, M3_2, M3_3, Y_1, Y_2, Y_3, Y_4.		

Table (3)

*Item Total Statistics**

Construct	Items	Corrected Item-Total Correlation Range	Cronbach's Alpha if Item Deleted Range	Reliability Assessment
Entrepreneurial Learning (X)	3	0.743-0.743	0.816-0.816	Strong
Self Efficacy (M1)	3	0.313-0.478	0.835-0.843	Acceptable
Subjective Norms (M2)	3	0.268-0.459	0.836-0.844	Moderate
Perceived Behavioral Control (M3)	3	0.302-0.512	0.834-0.843	Acceptable
Entrepreneurial Intention (Y)	4	0.336-0.515	0.833-0.842	Acceptable

Table (4)

ANOVA Table

Relationship	df (Between, Within)	F value	Sig.	η^2	Effect Size
Entrepreneurial Intention (Y) × Entrepreneurial Learning (X)	(6, 405)	17.706	.000	0.208	Moderate
Entrepreneurial Intention (Y) × Self Efficacy (M1)	(4, 407)	85.879	.000	0.458	Large
Entrepreneurial Intention (Y) × Subjective Norms (M2)	(4, 407)	101.597	.000	0.500	Large
Entrepreneurial Intention (Y) × Perceived Behavioral Control (M3)	(3, 408)	147.188	.000	0.520	Large
Self Efficacy (M1) × Entrepreneurial Learning (X)	(6, 405)	10.873	.000	0.139	Moderate
Subjective Norms (M2) × Entrepreneurial Learning (X)	(6, 405)	9.064	.000	0.118	Moderate
Perceived Behavioral Control (M3) × Entrepreneurial Learning (X)	(6, 405)	10.656	.000	0.136	Moderate

Table (5)

Residuals Statisticsa

Diagnostic Indicator	Minimum	Maximum	Mean	Std. Deviation	Interpretation
Predicted Value	1.047	5.028	1.625	0.668	Acceptable prediction range
Residual	1.144	1.112	0.000	0.358	Mean residual ≈ 0 , indicating unbiased estimation
Standardized Residual	3.179	3.090	0.000	0.995	Within acceptable threshold (± 3)
Studentized Residual	3.253	3.114	0.000	1.004	Few marginal extreme cases, acceptable
Mahalanobis Distance	0.656	30.857	3.990	4.022	No problematic multivariate outliers detected
Cook's Distance	0.000	0.100	0.004	0.009	No influential observations (all < 1)
Centered Leverage Value	0.002	0.075	0.010	0.010	No excessive leverage points

Figure (3)

Histogram

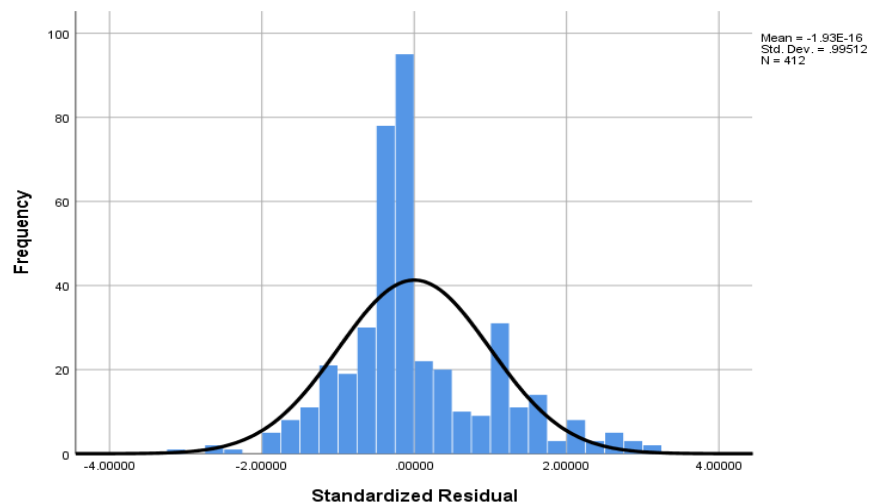


Table (6)

VIF

Predictor	B	SE	β	t	p value	Tolerance	VIF
Constant	0.052	0.051	—	1.028	.305	—	—
Self Efficacy (M1)	0.261	0.029	0.260	8.926	< .001	0.645	1.550
Subjective Norms (M2)	0.363	0.027	0.374	13.205	< .001	0.684	1.462
Perceived Behavioral Control (M3)	0.446	0.029	0.424	15.410	< .001	0.723	1.383
Entrepreneurial Learning (X)	0.030	0.010	0.078	2.999	.003	0.817	1.225

Table (7)

Run MATRIX procedure:

1 Mediation Analysis Results Using PROCESS Model 4 (N = 412)

Path / Effect	Effect	SE	t	p	95% CI	Standardized Effect
Total Effect (X → Y)	0.1675	0.0169	9.889	< .001	[0.1342, 0.2008]	0.4388
Direct Effect (X → Y)	0.0296	0.0099	2.999	.003	[0.0102, 0.0491]	0.0777
Total Indirect Effect	0.1379	0.0141	—	—	[0.1106, 0.1658]	0.3612
X → M1 → Y (Self Efficacy)	0.0340	0.0063	—	—	[0.0229, 0.0474]	0.0891
X → M2 → Y (Subjective Norms)	0.0466	0.0078	—	—	[0.0320, 0.0622]	0.1220
X → M3 → Y (Perceived Behavioral Control)	0.0573	0.0092	—	—	[0.0399, 0.0760]	0.1501

2 Effects of Entrepreneurial Learning on Mediators

Mediator	β	t	p	R ²
Self Efficacy (M1)	0.3425	7.381	< .001	0.117
Subjective Norms (M2)	0.3266	6.996	< .001	0.107
Perceived Behavioral Control (M3)	0.3540	7.665	< .001	0.125