

Evaluating a Pedagogical Approach to Develop Collaborative Entrepreneurship Skills in Technical Students

Dr. Blanca Esthela Moscoso, Universidad Central del Ecuador

Dr. Moscoso is a Professor at the Universidad Central del Ecuador. Her research focuses on entrepreneurship education and its role in fostering innovation, business development, and professional competencies in higher education contexts. She has co-authored several books and peer-reviewed journal publications on topics such as entrepreneurship education, project management, marketing, and business development. Her academic work integrates teaching, research, and applied perspectives aimed at strengthening entrepreneurial capacities and supporting the development of sustainable business initiatives. She has also contributed to interdisciplinary academic projects related to management education and professional training.

Dr. Miguel Andres Guerra, Universidad San Francisco de Quito USFQ

Miguel Andres is an Associate Professor in the Polytechnic College of Science and Engineering at Universidad San Francisco de Quito USFQ. He holds a BS in Civil Engineering from USFQ, a M.Sc. in Civil Engineering in Construction Engineering and Project Management from Iowa State University, a Ph.D. in Civil Engineering with emphasis in Sustainable Construction from Virginia Tech, and two Graduate Certificates from Virginia Tech in Engineering Education and Future Professoriate and from USFQ in Structures for Construction Professionals. Miguel Andres's research includes Architectural and Civil Engineering Project Management, Sustainable and Resilient Urban Infrastructure, and the development of engineers who not only have strong technical and practical knowledge but the social awareness and agency to address global humanitarian, environmental, and social justice challenges. For him, social justice is a concept that should always be involved in discussions on infrastructure. Related to STEM education, Miguel Andres develops disruptive pedagogies for STEM courses as a tool for innovation, and assessing engineering students' agency to address climate change. Currently, Miguel Andres is working on a framework to support and conduct undergraduate research.

Felipe Andrés Serrano

Developing Collaborative Competencies for Technical Majors Entrepreneurship

Abstract

This study examines a pedagogical model designed to strengthen collaborative entrepreneurship competencies among students in technical fields, addressing the limited emphasis on entrepreneurial skills in traditional technical education. While entrepreneurship is widely recognized as a key driver of a nation's economic and social progress, technical programs often overlook the collaborative dimensions of entrepreneurship—such as leadership, teamwork, communication, and conflict mediation. To bridge this gap, the research tested Moscoso's pedagogical model, a existing method that integrates these competencies into the learning process. The objectives included designing the model, evaluating its effectiveness through student feedback, and proposing practical strategies for its implementation. Grounded in a theoretical framework that explores the entrepreneurial profile and collaborative competencies, the study employed a quantitative, non-experimental, cross-sectional methodology. A 50-item Likert-scale questionnaire was administered to a random sample of 74 students to assess their collaborative entrepreneurship skills. Results showed an intermediate level of development, with the highest average scores in mediation communication, followed by leadership and team communication. Statistical analysis confirmed a positive and significant relationship between the dimensions of the model and the enhancement of these competencies, supporting the hypothesis that the approach effectively fosters professional growth. The findings suggest that implementing this pedagogical model can improve graduates' workplace performance, and future research should expand its application to a wider range of entrepreneurial competencies and a more diverse student population.

Keywords: Entrepreneurship, Collaborative Skills, Pedagogical Approach, Technical Professions, Ecuador.

INTRODUCTION

The global entrepreneurship landscape has significantly evolved, playing a vital role in economic growth through teamwork in entrepreneurial activities [1]. The literature highlights that entrepreneurship extends beyond merely starting businesses; it is an inherent trait of humans, demonstrated in their capacity to take risks, spot opportunities, and adjust to changes in the labor market [2–6]. In this context, the demand for entrepreneurial education has been growing, emphasizing its importance in cultivating a global entrepreneurial culture [7]. On an international scale, entrepreneurship is acknowledged as a fundamental skill for fostering the most competitive and dynamic economies [8]. Nevertheless, South America, including Ecuador, faces considerable challenges in the entrepreneurial realm. While strides have been made in democracy and macroeconomic stability, progress in education and knowledge development has been slow [9]. In comparison to other South American countries, Ecuador's ventures remain mainly trade-focused and show limited growth. Despite public policy initiatives aimed at promoting entrepreneurship, the absence of innovation and the human capital deficit, particularly in education quality, have restricted their effectiveness [10].

In South America, a distinctive phenomenon occurs where high levels of entrepreneurship coexist with a disconnect between academic training and entrepreneurial ventures, leading to nascent

companies with minimal innovation [11]. The link between opportunity and the need for entrepreneurship is emphasized, suggesting that countries where entrepreneurship is driven by the identification of opportunities experience higher income levels [12]. This perspective indicates that entrepreneurship education is crucial for the creation of new businesses. Despite the rise in entrepreneurship in Ecuador, research shows that most local enterprises emerge out of necessity, exhibit limited growth, and are focused on commerce. The human capital gap, particularly in terms of education quality, has been identified as a key factor contributing to the region's lack of innovation [10]. Although there is considerable interest in fostering entrepreneurship through public policies, the misalignment between the type of entrepreneurship promoted and the country's actual needs highlights an area that requires attention.

The research aims to address the gap in entrepreneurial education in Ecuador, starting to fill the void in the country's entrepreneurial training. The central question raised was: What does the design of a pedagogical model to develop collaborative entrepreneurship competencies in students of technical careers entail? To answer this, the model's impact was assessed through a questionnaire given to students, measuring its effectiveness in developing key collaborative skills for entrepreneurship. The study concentrated on improving entrepreneurial education at the university level, recognizing the need to enhance the national education system. This approach is intended to equip students with an entrepreneurial mindset to confront technical and socio-economic challenges after their professional training. The focus on entrepreneurship education is based on the idea that the most innovative and competitive societies are made up of enterprising and creative individuals [13]. The goal is to help create graduates who are not only ready to manage businesses but also have the entrepreneurial abilities to drive innovation and foster economic development in Ecuador.

BACKGROUND

Technical careers are essential for understanding the principles, techniques, and practices that enable effective resource management within companies. This field plays a crucial role in enhancing business competitiveness, fostering innovation, and ensuring product quality in the marketplace [14]. In developing countries, the increasing demand for professionals in technical fields underscores the need for universities to equip graduates with strong competencies [15–19]. The profile of technical career graduates spans various specializations, from accounting to quantitative analysis. One key competency student must cultivate is leadership. The Multifactor Leadership Questionnaire (MLQ) defines a leader as someone who values team input, can inspire and motivate, and ensures that all members are engaged in the work with enthusiasm, focusing on achieving the team's goals every day [20]. Another vital skill is team communication, which, as highlighted by [21–25], stresses that effective and high-quality communication within a team promotes a positive organizational environment. Lastly, team mediation is an essential skill for students to develop, serving as a conflict resolution strategy that proves invaluable in addressing the evolving challenges of modern society [26].

In Ecuador, the typical duration of technical careers is five years, structured around four key components: basic, humanistic, professional, and complementary/optional training. National universities mainly focus on preparing professionals with practical expertise in essential fields,

contributing to economic progress and enhancing the productive sector. Despite these objectives, some studies indicate that current programs do not always fully achieve their intended outcomes. For example, research at a national university found that students in technical fields performed at an average level, suggesting potential shortcomings in how competencies and skills are taught by the institutions [27–30]. Additionally, the concept of entrepreneurship and the entrepreneur profile should be approached from various angles, ranging from creators of productive organizations to leaders and risk-takers in the marketplace [7]. Key competencies for entrepreneurship, such as the ability to take risks, tolerate uncertainty, and manage emotions while thinking innovatively, are vital [31]. In this context, it is crucial to examine the different views on entrepreneurial competencies, which include cognitive, procedural, attitudinal, and axiological skills [32]. This highlights that entrepreneurship, as a competency, involves motivation, cognition, and procedural aspects, and its development is vital for transforming ideas into successful ventures. Furthermore, the lack of clear consensus in the literature regarding the essential competencies for entrepreneurs stems from the challenges in identifying these key skills. This creates a solid foundation for addressing the challenges and opportunities in the education of both technical professionals and entrepreneurs. The literature emphasizes the importance of developing both soft and hard skills in students, underscoring the need for comprehensive education to prepare them for the challenges they will face in the business world.

The discussion may center on how the literature regarding training in technical careers and entrepreneurship corresponds to the situation observed in Ecuador and comparable environments. It also allows for examining potential strategies to overcome the gaps identified in current academic programs, particularly regarding the development of essential competencies, considering the viewpoints of various researchers [33]. Within this framework, it is relevant to consider the value of incorporating experiential learning methods to strengthen practical training and encourage continuous improvement across different areas, as proposed by [31]. Furthermore, the discussion explores the connection between technical education and entrepreneurial activity, analyzing how the competencies developed during academic studies shape graduates' potential to succeed as entrepreneurs. Updating academic curricula to reflect evolving market needs and fostering the preparation of individuals capable of managing uncertainty and taking calculated risks becomes essential [34]. The analysis may also address inconsistencies in how different authors define entrepreneurship and entrepreneurial competencies. Understanding these conceptual variations is key, as they influence how competencies are identified, evaluated, and incorporated into academic programs.

The dual perspective of terminal goals and procedural components presented by [35] can also be used as a point of analysis to understand how instrumental, cognitive, attitudinal, and axiological dimensions interact to create a unified and complementary framework within entrepreneurship. In connection to Ecuador's specific context, the discussion may examine how effective pre-professional internships are in helping students engage with real-world applications of the theory they learn [33]. It may also consider potential actions to strengthen academic quality, taking into account the obstacles identified in the study conducted at an Ecuadorian university. The paragraph may close with concrete suggestions to improve training in technical fields and entrepreneurship, incorporating insights and recommendations from different authors and the studies reviewed in the theoretical framework. Emphasis can be placed on the necessity of innovative teaching methods, the ongoing adjustment of academic programs to market needs, and the development of competencies that equip students to manage the evolving challenges of the business sector [36].

METHODOLOGY

The study adopts an applied research orientation, following the Concytec (2018) classification, which categorizes research based on its applied orientation and its capacity to provide scientifically grounded solutions to specific social or technical problems. This study is categorized as a non-experimental, descriptive–projective design. It is situated within a quantitative methodological framework and proposes theoretically grounded responses to the central problem identified. The research is directed toward the assessment, comparison, and interpretation of a pedagogical model intended to strengthen collaborative entrepreneurship competencies, as well as the establishment of precedents for its implementation. The investigation was carried out in a university in Ecuador, with the target population consisting of students enrolled in technical programs. The sample comprised 74 participants, selected under inclusion criteria requiring formal enrollment, while excluding individuals who opted not to participate. Data was collected through a survey method, using a structured questionnaire as the primary instrument. This tool incorporated items addressing the implemented intervention and the students’ theoretical and practical learning in relation to the proposed pedagogical model. The questionnaire was informed by instruments previously validated in peer-reviewed literature. Specifically, the study employed the Multifactor Leadership Questionnaire (MLQ) and the Scale for Effective Communication in Teams (SECTS), both adapted for application within an educational context.

The Qualtrics platform was employed for data filtering and cleansing, enabling numerical comparison of responses obtained through the Likert scales. Data analysis involved applying the procedures corresponding to the validated questionnaires, and Pearson’s correlation coefficient was used for the section specifically developed within this study. The dataset was subsequently exported to statistical software for comprehensive analysis. Research Quality: The rigor of the study is supported by the instrument’s validity, established through expert review, and its reliability, measured using Cronbach’s alpha. The obtained reliability coefficient (0.907) demonstrates a high level of internal consistency. Although the research followed all ethical standards, certain limitations persist, including potential response bias from participants and restricted generalizability to broader populations or different educational settings. The study adhered to ethical principles such as responsibility, honesty, and confidentiality. Participants’ dignity was safeguarded, their well-being and fairness were prioritized, and integrity and equal treatment were ensured throughout the research process. Intellectual property rights were respected, and the presentation of results was conducted with full transparency.

Table 1. *List of collaborative competencies with their respective questionnaires and their objective.*

	LEADERSHIP	TEAM COMMUNICATION	MEDIATION COMMUNICATION
Questionnaire applied to measure the progress of collaborative competence	Multifactorial leadership Questionnaire - MLQ	Scale for Effective Communication in Team Sports -SECTS	Scale for effective Communication in team sports -SECTS

Objective of this study	Distinguish the characteristics of effective and effective leaders in class groups	It measures communication in a team, including verbal and nonverbal forms of social communication.	To know the satisfaction of the participants after the mediation process in class.
-------------------------	--	--	--

RESULTS

The survey results offer a diagnostic overview of students' current levels in collaborative entrepreneurship competencies. The independent variable corresponds to the pedagogical model, which comprises the dimensions of leadership (3 indicators), team communication (2 indicators), and mediation within teams (2 indicators). The dependent variable reflects students' performance in collaborative entrepreneurship competencies, structured into theoretical understanding (5 indicators) and practical application (5 indicators). The statistical outcomes for each indicator are presented accordingly.

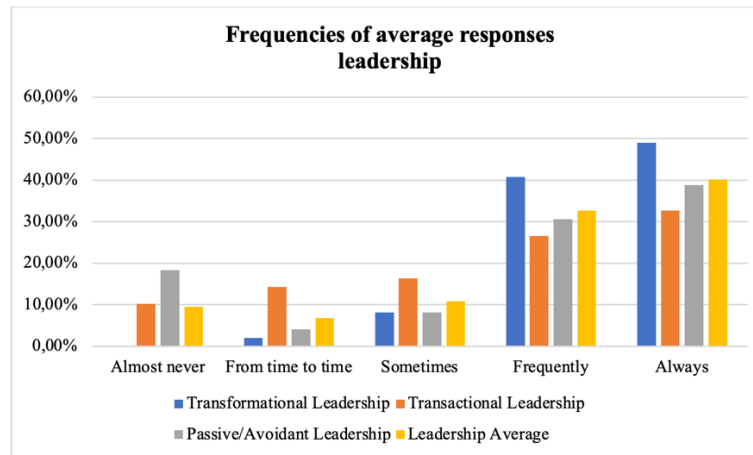
Table 2. *Average values obtained in the variable pedagogical model of collaborative entrepreneurship competencies.*

Questionnaire & Answers				
Questionnaire		Average per question	Standard deviation	Variance
Item	Questions			
Transformational		4.262	0.483	0.288
Transactional		3.455	0.987	0.501
Passive/Evasive		3.613	0.611	0.312
AVERAGE Leadership		3.777	0.694	0.367
Questionnaire		Average per question	Standard deviation	Variance
Item	Questions			
Acceptance		5.478	0.916	0.905
Distinctiveness		1.549	0.953	0.909
AVERAGE Team Communication		3.514	0.935	0.907
Questionnaire		Average per question	Standard deviation	Variance
Item	Questions			
Positive Conflict		5.497	1.398	2.101
Negative Conflict		3.495	1.484	1.953
AVERAGE Mediation communication in a team		4.496	1.441	2.027

The table reports the mean values corresponding to the variable “pedagogical model of collaborative entrepreneurship competencies.” For the leadership dimension, the mean score is 3.777 on a 5-point scale, with a standard deviation of 0.694 and a variance of 0.367. In the case of team communication, the average is 3.514 on a 7-point scale, accompanied by a standard deviation of 0.935 and a variance of 0.907. The team mediation communication dimension presents a mean value of 4.496, a standard deviation of 1.441, and a variance of 2.027. The table also displays the response frequencies for each dimension. The data indicates that only 42.37% of participants assigned the highest score to the leadership items. For team communication and team mediation

communication, the proportions selecting the maximum rating were 27.37% and 25.99%, respectively.

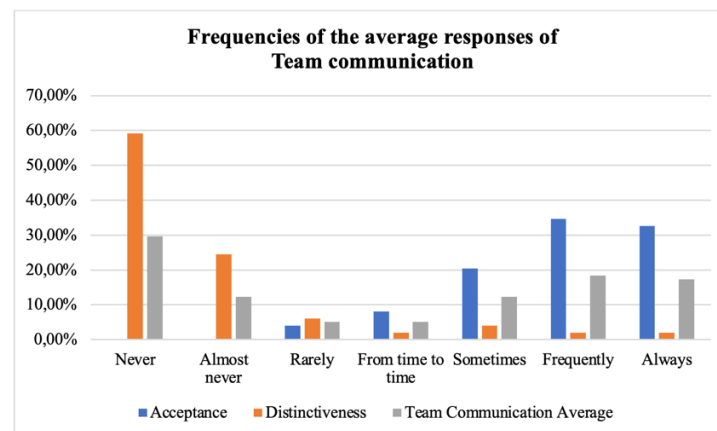
Figure 1. *Frequencies of Average Leadership Responses*



The Leadership dimension is composed of three indicators: transformational, transactional, and passive/evasive leadership. For the Transformational Leadership indicator, the mean score was 4.262 on a 5-point scale. A total of 42.37% of students reported experiencing transformational leadership consistently, 41.91% indicated observing it with some regularity, and 15.72% reported low or no occurrence. Regarding Transactional Leadership, the average score reached 3.455 out of 5. In terms of response distribution, 37.75% selected the option corresponding to regular occurrence, whereas 26.26% reported minimal or no frequency. For the Passive/Evasive Leadership indicator, the mean score was 3.613 on a 5-point scale. With respect to response frequency, 35.99% of students chose the categories associated with frequent or constant occurrence.

A descriptive statistical analysis of student responses was carried out to evaluate the team communication dimension. The summary of these results is presented in the following table.

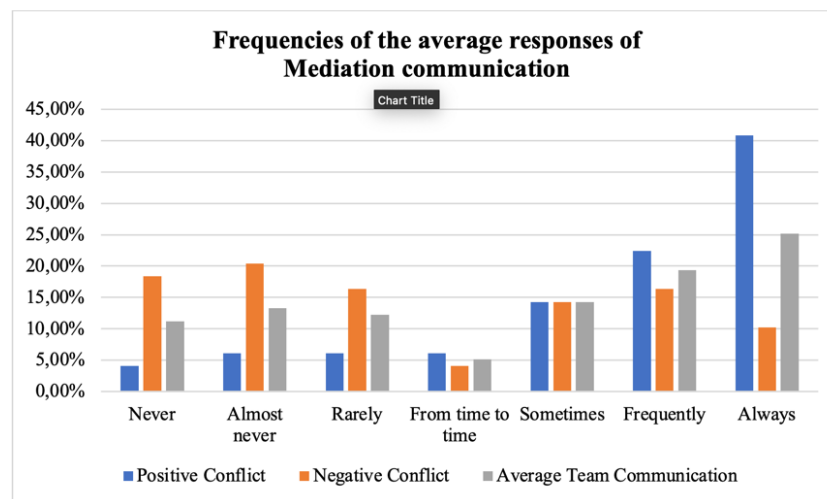
Figure 2. *Average Team Communication Response Frequencies*



For the items pertaining to the team communication indicator, specifically the Acceptance component, the results show a mean score of 5.478 out of a possible 7 points. Regarding response distribution, 41.32% of students selected “always” or “almost always,” 31.45% rated this behavior as occurring frequently, and 27.23% reported that it occurs occasionally. In relation to the Distinctiveness component within the team communication indicator, the mean score was 1.549 out of 7. The response frequencies reveal that 63.24% of participants indicated they never or almost never apply this dimension, while only 2.32% reported using it always or almost always.

A descriptive statistical analysis was also conducted for the dimension of mediation communication within teams. The corresponding response scores are summarized in the table below.

Figure 3. *Average Response Frequencies of Mediation Communication*



The mean score obtained for the mediation communication dimension was 4.496 out of a possible 7 points. In terms of response frequencies, 26.52% of students reported always employing effective mediation communication, whereas 23.84% stated that they never use it and 14.75% indicated almost never. For the items associated with the Positive Conflict indicator within the mediation communication dimension, the pretest results yielded an average score of 5.497 out of 7. Regarding answer distribution, 38.38% selected “always” or “almost always,” 22.54% reported frequent occurrence, and 3.14% indicated that they never or very rarely encounter this type of conflict. With respect to the Negative Conflict indicator, the mean score recorded was 3.495 out of 7 points. Examining the response frequencies, 35.69% of students chose “always” or “almost always,” 31.01% reported frequent occurrence, and 19.12% stated that they never or almost never experience this form of conflict.

To ensure analytical understanding, the study’s constructs in specific variables. Table 1 outlines the definitions and coding for the primary independent and dependent variables, including the Collaborative Competencies (C. Colab) and their respective sub-indicators (V1, V2, etc.), which are further analyzed in the next sections.

Table 3. *Variables and study constructs*

Variable Code	Variable Name	Conceptual Definition	Dimensions / Indicators
C. Colab	Collaborative Competencies	The set of integrated knowledge and social skills required for collective venture creation.	Leadership, Communication, Conflict Mediation.
V1	Transformational Leadership	The ability of the student to inspire and motivate team members toward a shared vision.	Idealized influence, Inspirational motivation.
V2	Team Communication	The flow of information and feedback within the technical project group.	Active listening, Assertiveness.
V3	Conflict Mediation	The capacity to navigate disagreements and reach consensus during the entrepreneurial process.	Negotiation, Empathy.

Normality Test

The Kolmogorov–Smirnov normality test was applied, producing an absolute difference value of 0.088 and a corresponding test statistic of 0.088. These findings indicate that the data for the variable follow a normal distribution. The specific results of the test are presented below.

Table 4. *Kolmogorov-Smirnov Normality Test*

	Values	V1.C. Colab
Number		49
Parameters Normala, b	Stocking	3.306
	Deviation Estd.	0.664
More Extreme Differences	Absolute	0.088
	Positive	0.078
	Negative	-0.088
Test Statistics		0.088
Asim. Sig (2-tails) ^c		0.842D

The Kolmogorov–Smirnov test was applied to evaluate the normality of the V1 variable, C. Colab, using a sample of 49 observations. The estimated normal parameters showed a mean of 3.306 and a standard deviation of 0.664. The test yielded a statistic of 0.088, with an asymptotic significance (two-tailed) of 0.842. Since the p-value exceeds the 0.05 threshold, there is insufficient evidence to reject the null hypothesis of normality, indicating that the distribution of the variable is consistent with a normal pattern.

Correlation Analysis

Table 5. Correlation of Variables

	N	Minimal	Maximum	Average	Desv. Standard
V1. C.Colab	74	1.781	4.106	3.513	0.708
V2. C.Colab	74	1.556	6.857	3.785	1.050

A two-tailed Pearson correlation analysis was performed to examine the relationship between the two main variables in the study, revealing a strong association supported by the confidence interval estimation. Specifically, a notably robust correlation was identified, with a Pearson coefficient of 0.533 at a 0.01 significance level, as the p-value was below 0.001. The descriptive statistics indicate that variable 1 presents a mean of 3.306 and a standard deviation of 0.664, whereas variable 2 shows a mean of 3.857 and a standard deviation of 1.167. Furthermore, Pearson correlation analyses were conducted between the dimensions of the pedagogical model Leadership, Team Communication, and Mediation Communication and variable 2, which corresponds to the development of students' collaborative competencies.

Table 6. Pearson's correlation analysis between the dimensions of variable 1 Pedagogical Model with respect to variable 2, Development of collaborative competencies in students.

		V2.C. Colab	Leadership	C. Equipmen t	C. Mediation
V2. C.Colab	Pearson's correlation	1	0.533**	0.458**	0.509**
	Sig. (2-tails)		<0.001	<0.001	<0.001
	Number	49	49	49	49
Leadership	Pearson's correlation	0.533**	1	0.804**	0.880**
	Sig. (2-tails)	<0.001		<0.001	<0.001
	Number	49	49	49	49
C. Equipment	Pearson's correlation	0.458**	0.804**	1	0.781**
	Sig. (2-tails)	<0.001	<0.001		<0.001
	Number	49	49	49	49
C. Mediation	Pearson's correlation	0.509**	0.880**	0.781**	1
	Sig. (2-tails)	<0.001	<0.001	<0.001	
	Number	49	49	49	49
**. The correlation is significant at the level of 0.01 (2-tails)g.					

A Pearson correlation analysis was performed to examine the relationships between the dimensions of the variable—Leadership, Team Communication, and Mediation Communication—and Variable 2, which reflects students' development of collaborative competencies. The analysis produced correlation coefficients of 0.533 for Leadership, 0.458 for Team Communication, and 0.509 for Mediation Communication, all of which were significant at the 0.01 level, with p-values below 0.001. These results highlight the importance of establishing a pedagogical model aimed at strengthening students' collaborative entrepreneurship competencies.

DISCUSSION

There is a pressing need to strengthen collaborative entrepreneurship competencies among students in technical programs through comprehensive pedagogical strategies. A considerable proportion of students express interest in engaging in future entrepreneurial initiatives, which exposes the existing gaps in knowledge and the limited development of essential entrepreneurial abilities required for success in the business sector. One of the central challenges of competency-based pedagogical frameworks lies in teaching students how to translate ideas into concrete outcomes [35]. Recognizing this shortcoming is essential, and efforts must be directed toward cultivating these competencies to ensure the achievement of intended goals and sustained success. The academic formation process underscores the relevance of developing entrepreneurial capacities through reflective and practical experiences. The proposed approach conceives training as a dynamic and socially constructed environment in which interaction with the context, individuals, and real-world situations promotes, models, and strengthens entrepreneurial dispositions. This integration of knowledge, skills, abilities, and values requires innovative educational strategies that help students develop a strategic outlook toward challenges and opportunities, enabling them to identify and pursue objectives while maintaining the motivation necessary to achieve the tasks they undertake [35].

An examination of the collaborative competency domain reveals important findings across the leadership, communication, and mediation dimensions. In the leadership component, although several students display characteristics aligned with transformational leadership, there remains a clear need to intentionally strengthen and develop these attributes. Transformational leadership, defined by its motivational, visionary, strategic, adaptable, entrepreneurial, and innovative qualities, drives meaningful change within organizations and among team members [37]. With respect to transactional leadership, the analysis shows that only one-third of students perceive themselves as possessing this competence, while 40.82% report using it only occasionally or not at all. The assessment of team communication further indicates limited application of this skill, with 41.84% of students rarely engaging in effective communicative practices. For the Acceptance component, which reflects openness and sincerity within the team, only 32.65% assigned high value. Meanwhile, 89.79% reported low cohesion in the Distinctiveness dimension. Nevertheless, as highlighted by [38], achieving shared goals depends on collaborative work where individuals influence one another through empathy, negotiation, leadership, and ongoing feedback regarding their roles in meeting collective objectives. This underscores the importance of reinforcing team communication skills throughout university training. In the area of mediation and conflict resolution, fewer than half of participants demonstrated adequate competent development. Effective mediation requires creativity, cooperative negotiation, and motivation; a skilled mediator guides conflict toward calmness, harmony, empathy, and constructive self-assessment of behaviors and attitudes [39]. Although 63.27% of students exhibit respect in managing disagreements, 38.78% continue to struggle with effectively handling interpersonal differences within their teams.

Interpretation of the results

The results reaffirm the pressing need to enhance collaborative entrepreneurship competencies among students enrolled in technical programs. The evident gaps in knowledge and skill development related to entrepreneurship emphasize the importance of implementing

comprehensive pedagogical interventions. These findings align with prior studies that highlight the critical role of entrepreneurship education within higher education settings [40].

Implications

From a research standpoint, the findings offer empirical support for the effectiveness of a pedagogical model grounded in collaborative entrepreneurship competencies, thereby contributing to the expansion of knowledge in this domain. The three dimensions (leadership, team communication, and mediation communication) exhibit positive and significant correlations both among themselves and with the dependent variable, indicating that they function in a complementary and synergistic manner in fostering collaborative entrepreneurship competencies. From an applied perspective, the study presents a concrete and implementable framework for entrepreneur training within technical programs, with the potential to generate beneficial economic, social, and environmental outcomes for the country.

Recommendations

For teachers, it is advisable to integrate the proposed pedagogical model into their course planning, employing the recommended strategies and instructional resources. It is also important to engage in continuous evaluation of both the implementation process and its outcomes, offering feedback to students and refining the model according to specific contextual needs. For students, active engagement in the activities outlined by the pedagogical model is encouraged, as these opportunities foster collaborative learning and the development of entrepreneurial competencies. Students are also urged to reflect on their strengths and areas for improvement, clarify their interests and objectives, and seek to apply their knowledge and skills in real-world projects that contribute value to society. For academic administrators, it is recommended to facilitate the model's adoption by ensuring the availability of necessary material, human, and financial resources. Furthermore, it is important to promote visibility and recognition of the experiences and accomplishments of instructors and students involved in the model, thereby cultivating an institutional culture that supports entrepreneurship.

CONCLUSIONS

The results demonstrate that although students show a strong interest in future entrepreneurial participation, they do not yet possess the competencies required to operate effectively in professional environments. This underscores the necessity of reinforcing collaborative entrepreneurship skills within technical education to ensure their applicability beyond the academic setting. In terms of collaborative competencies, some students display initial signs of transformational leadership, yet these traits remain insufficiently developed and require systematic strengthening. The analysis of team communication reveals clear disparities among students, particularly regarding acceptance and distinctiveness, which signals the importance of implementing instructional strategies that promote constructive and efficient interaction within groups.

The mediation communication dimension also shows uneven development. Although a greater number of students demonstrate some capacity for conflict mediation, the proportion remains inadequate given the relevance of this skill for achieving positive outcomes in entrepreneurial activities. Strengthening this competency is crucial, as appropriate management of disagreements significantly influences project success. Overall, the evidence supports the need for a pedagogical

model that systematically incorporates collaborative entrepreneurship competencies throughout the curriculum. While specialized courses may contribute to conceptual understanding, meaningful competency development requires sustained integration across all academic subjects to ensure consistent practice and reinforcement.

BIBLIOGRAPHY

- [1] Moscoso, B. E., and Fernández, C. J., 2023, “Modelo Pedagógico Para Desarrollar Competencias Colaborativas de Emprendimiento En Estudiantes de Administración de Empresas En Una Universidad Del Ecuador, 2022,” *Ciencia Latina Revista Científica Multidisciplinar*, **7**(1), pp. 479–499.
- [2] Cartuche, D., Guerra, M. A., and Murzi, H., 2023, “Work in Progress: Influence of COVID-19 in Cultural Dimensions in Civil Engineering Students In,” *2023 ASEE Annual Conference & Exposition*.
- [3] Cartuche, D., Guerra, M. A., and Murzi, H., 2023, “Board 2A: WIP: Opportunities in Cultural Dimensions between Architecture and Civil Engineering Students in Ecuador,” *2023 ASEE Annual Conference & Exposition*.
- [4] Guerra, M. A., Murzi, H., Woods Jr, J., and Diaz-Strandberg, A., 2020, “Understanding Students’ Perceptions of Dimensions of Engineering Culture in Ecuador,” *ASEE Conferences*.
- [5] Murzi, H., Ulloa, B. C. R., Gamboa, F., Woods, J. C., Guerra, M., Soto, K. D. M., and Azar, R. H., 2021, “Cultural Dimensions in Academic Disciplines, a Comparison between Ecuador and the United States of America,” *2021 ASEE Virtual Annual Conference Content Access*.
- [6] Ramón Amores, S. F., Bustamante García, V. E., Obando Sevilla, O. V., Saltos Chevez, N. L., Cabrera Toscano, E. F., and López Chaquinga, E. G., 2018, “El emprendimiento: Un reto para los estudiantes universitarios en la contemporaneidad,” *Revista de Filosofía, Letras y Ciencias de la Educación*, **3**(4), pp. 1–12.
- [7] Pereira, F., 2007, “La evolución del espíritu empresarial como campo del conocimiento. Hacia una visión sistémica y humanista,” **20**(34), pp. 11–37.
- [8] Kyrö, P., and Ristimäki, K., 2008, “Expanding Arenas and Dynamics of Entrepreneurship Education,” *The Finnish Journal of Business Economics*, **3**(2008), pp. 259–265.
- [9] Acs, Z. J., and Amorós, J. E., 2008, “Entrepreneurship and Competitiveness Dynamics in Latin America,” *Small Bus Econ*, **31**(3), pp. 305–322.
- [10] Kantis, H., ed., 2004, *Desarrollo emprendedor: América Latina y la experiencia internacional*, Banco Interamericano de Desarrollo, Washington, D.C.
- [11] Tinoco, F., and Laverde, F., 2011, “Hacia un modelo de educación para el emprendimiento: una mirada desde la teoría social cognitiva,” **24**(43), pp. 13–33.
- [12] Martínez Guerrero, M. A., and Verjel Rivera, M. A., 2014, “Retención estudiantil en el programa de administración de empresas de la Universidad Francisco de Paula Santander Ocaña, análisis de causas y plan de mejoramiento.”
- [13] Guerra Triviño, O., Hernandez Castillo, D., and Triviño Ibarra, C., 2015, “Incubadora de empresas: vía para el emprendimiento en las universidades,” *Revista Universidad y Sociedad*, **7**(2), pp. 110–114.
- [14] Grey, C., 2002, “What Are Business Schools for? On Silence and Voice in Management Education,” *Journal of Management Education*, **26**(5), pp. 496–511.

- [15] Wilkinson, A., Townsend, K., and Suder, G., eds., 2015, *Handbook of Research on Managing Managers*, Edward Elgar Publishing.
- [16] Ubidia, C., Guerra, M., Guerra, V., and Gallardo, C., 2022, "Work in Progress: Collaborative Environments in Architecture and Civil Engineering Education—Case Study," *2022 ASEE Annual Conference & Exposition*.
- [17] Acosta, J., and Guerra, M. A., 2022, "Validating Guerra's Blended Flexible Learning Framework for Engineering Courses," *2022 ASEE Annual Conference & Exposition*.
- [18] Mariño, M., Ubidia, C., Guerra, M., and Jativa, F., 2022, "WIP: Designing a First-Year Hands-on Civil Engineering Course to Reduce Students Dropout and Improve the Overall College Experience," *2022 ASEE Annual Conference & Exposition*.
- [19] Guerra, M. A., and Gopaul, C., 2021, "IEEE Region 9 Initiatives: Supporting Engineering Education During COVID-19 Times," *IEEE Potentials*, **40**(2), pp. 19–24.
- [20] Gomes, R., Simões, C., Morais, C., and Resende, R., 2021, "Psychometric Properties of the Multidimensional Sport Leadership Scale Comparison to Multifactorial Leadership Questionnaire," *International Journal of Sport Psychology*, (52), pp. 189–212.
- [21] Ekmekcioglu, E. B., Aydintan, B., and Celebi, M., 2018, "The Effect of Charismatic Leadership on Coordinated Teamwork: A Study in Turkey," *LODJ*, **39**(8), pp. 1051–1070.
- [22] Velásquez, H., Guerra, M., and Jimenez, M., 2022, "Exploring Interdisciplinary Contributions to More Sustainable Solutions in the Built Environment and Infrastructure Development Students," *2022 ASEE Annual Conference & Exposition*.
- [23] Bonilla, J. M., Valarezo, M. S., Villacrés, B. D., and Guerra, M. A., 2023, "Board 44A: Work in Progress: Unannounced Frequent Examinations to Contribute Student Learning and Building Academic Integrity," *2023 ASEE Annual Conference & Exposition*.
- [24] Paucarina, S. E., Batallas, J. D., Guerra, M. A., and Guerra, V., 2023, "Board 44B: Work in Progress: TikTok Format Videos to Improve Communicating Science in Engineering Students," *2023 ASEE Annual Conference & Exposition*.
- [25] Bedón, A., Velásquez, H., Guerra, M. A., and Jiménez, M., 2022, "Exploring Interdisciplinary Contributions to More Sustainable Solutions in the Built Environment and Infrastructure Development Students," *2022 ASEE Annual Conference & Exposition*.
- [26] Martínez, D. M., 2020, "La mediación como estrategia de resolución de conflictos pacífica en el ámbito escolar," *educ*, **24**(1), pp. 222–244.
- [27] Urgilés, G., 2013, "Diseño curricular para elevar la calidad académica de la carrera de Administración de Empresas y Marketing de la Universidad Politécnica Estatal del Carchi," *Universidad Técnica de Ambato*.
- [28] CERVANTES, A. E., and Guerra, M. A. A., 2023, "Work in Progress: Impact on Students Dropout Rates of Introducing a First-Year Hands-on Civil Engineering Course," *2023 ASEE Annual Conference & Exposition*.
- [29] Granja, N., Guerra, V., and Guerra, M. A., 2022, "Give Me a Coffee Break! Pilot Study on Improving Exam Performance and Reducing Student Stress," *2022 ASEE Annual Conference & Exposition*.
- [30] Toscano, R. E., Guerra, V., and Guerra, M. A., 2023, "Work in Progress: Introducing a Coffee Break to Improve Exam Performance and Reducing Student Stress in Construction Majors," *2023 ASEE Annual Conference & Exposition*.
- [31] Gibb, P. A., 2005, *Creating the Entrepreneurial University Worldwide Do We Need a Wholly Different Model of Entrepreneurship?*

- [32] Ortega Sánchez, R. M., and González Jiménez, K., 2017, “Calidad en la enseñanza en educación superior del Centro Universitario del Norte, Universidad de Guadalajara, México,” *RIEOEI*, **74**(1), pp. 9–22.
- [33] Hidalgo, L. F., Trelles, I., Castro, Á., and Loor, B., 2018, “Formación en emprendimiento en el Ecuador. Pertinencia y fundamentación epistemológica,” *Revista Espacios*, **39**(7), pp. 1–12.
- [34] Boldureanu, G., Ionescu, A. M., Bercu, A.-M., Bedrule-Grigoruță, M. V., and Boldureanu, D., 2020, “Entrepreneurship Education through Successful Entrepreneurial Models in Higher Education Institutions,” *Sustainability*, **12**(3), p. 1267.
- [35] Batista, N., Valcárcel, N., Real, G., and Albán, A., 2007, “Desarrollo de La Competencia de Emprendimiento; Una Necesidad En La formación Integral Del Estudiante.,” (1), pp. 2–15.
- [36] García, M., and Cárdenas, E., 2018, “La inserción laboral en la educación superior. La perspectiva latinoamericana,” *Educación XX1*, **21**(2).
- [37] Tirado, M., and Heredia, F., 2022, “Liderazgo transformacional en la gestión educativa: Una revisión literaria,” *Revista Conrado*, **18**(85), pp. 246–251.
- [38] Bearman, C., Rainbird, S., Brooks, B. P., and Owen, C., 2018, “A Literature Review of Methods for Providing Enhanced Operational Oversight of Teams in Emergency Management,” *International Journal of Emergency Management*, **14**(3).
- [39] Merchán, M. L., Cadena, R., and Carlos, N., 2019, “La mediación de conflictos escolares. Incidencia en el desarrollo de la inteligencia emocional,” *Revista Conrado*, **15**(69), pp. 399–404.
- [40] Arias, A. P. A., 2011, “Lineamientos para el diseño de un perfil del administrador de empresas de la universidad nacional sede Manizales: basado en un enfoque por competencias laborales,” Universidad Nacional de Colombia sede Manizales.