Development of Entrepreneurial Identity Among Young People: Analysis of the Effectiveness of an Educational Program on Entrepreneurial Potential

Abstract

Purpose*:* The efficiency of an educational program on entrepreneurial competence, *Training the Potential Entrepreneur. Generation of an Educational Model for Entrepreneurial Identify* (PEIEO), is evaluated in this study.

Design/methodology/approach*:* Pre and post intervention tests were administered to an Experimental Group (EG) and a Control Group (CG). Moreover, four hypotheses are proposed (H1, H2, H3, H4) and tested on a sample of 1036 Spanish students. The following instruments were applied: Attitude Towards Entrepreneurship-Spanish adaption; Measurement Scale of Personal Initiative in Educational Settings; and Scale of General Self-Efficacy. ANCOVA and the Student's t-test were applied to the results.

Findings*:* The results show that training in entrepreneurial identity increases the entrepreneurial potential of young people (H1). A notable increase in proactivity and being a self-starter was observed with regard to personal initiative within the EG, and for self-efficacy (H3) both of which were predictors of entrepreneurial identity. Gender was likewise a predictor (H4).

Practical implications*:* Young people attending the PEIEO training program in entrepreneurial potential increased their levels of entrepreneurial identity, thereby confirming the effectiveness of the program.

Originality/value: The program (PEIEO) is based on the development of entrepreneurial potential, a dimension that generates entrepreneurial identity (creativity, leadership, achievement, and personal control).

Keywords: Entrepreneurial Potential, Personal Initiative, Self-Efficacy, Gender, Educational Program

Paper type: Research paper

Introduction

Under the auspices of their legal frameworks and socio-political pressures, multiple initiatives to develop educational programs that impact the entrepreneurial competence of students at different educational stages have emerged in various countries (Colombelli *et al*., 2022, Fallath & Aved, 2023; Garrido-Yserte *et al*., 2020; Hebles *et al*., 2019; Song & Yang, 2022). The importance of promoting entrepreneurial competence is based on multiple studies that highlight the phenomenon of entrepreneurship as one of the current needs of young people to achieve their independence (de la Torre et al., 2023; Luis Rico et al., 2015), which must be addressed from the level of education. Entrepreneurial competence, moreover, is essential to facilitate the transition between formal education and the world of work (Adeniyi et al., 2024; Martinez-Mediano et al., 2013). In this sense, we consider entrepreneurial competence as the set of knowledge, procedures, and attitudes that allow students to adapt to a society immersed in a dynamic and changing economic and social environment. Therefore, a comprehensive education from a multidisciplinary perspective will allow students to develop cognitive and emotional intelligence, which is fundamental for promoting entrepreneurial skills. García Cabrera et al., 2014; Valliere & Nicholls-Nixon, 2024).

In that context, it has been shown in previous studies that the effectiveness of an entrepreneurial education program strongly depends on a close link between managerial skills and the development of both the psychological and the social dimensions of the entrepreneur, which emphasizes the need to integrate entrepreneurial identity as a key factor in the design of educational courses (Bernal & Cárdenas, 2017; Cárdenas, 2015; Cárdenas & Montoro, 2017; Cho *et al*., 2020; Lee, & Cheol-Gyu, 2022; Muzaffar, 2023; Syed *et al*., 2020).

Research Context

A series of reforms of the Spanish educational system have taken place over recent years: *Ley Orgánica 2/2006, de 3 de mayo, de Educación* (LOE, 2006) [Organic Law 2/2006, of 3rd of May, on Education]; *Ley Orgánica 8/2013, de 9 de diciembre, para la mejora de la calidad educativa*(LOMCE, 2013) [Organic Law 8/2013, of 9 December, for the improvement of educational quality], now repealed; and the present-day *Ley Orgánica 3/2020, de 29 de diciembre, por la que se modifica la Ley Orgánica 2/2006, de 3 de mayo, de Educación* (LOMLOE,2020) [Organic Law 3/2020, of 29 December, in amendment of the Organic Law 2/2006, of 3 of May, on Education]. These legislative measures are convergent with the guidelines of supra-national bodies concerned with education, training, and social, scientific, and technical advances (European Commission, 2018; OECD, 2019; UNESCO, 2022). They unquestionably promote entrepreneurial competence as a key competence, attributing a decisive role to it in the education of active, resilient, innovative citizens, capable of driving the changes that are needed to move towards more sustainable societies.

Conscious of that conceptual and practical link, a training program on entrepreneurial competence was prepared, based on the development of entrepreneurial potential as a dimension that generates entrepreneurial identity through the following indicators: Creativity, Leadership, Achievement, and Personal Control. We understand *Creativity* as a cognitive, affective, and multidimensional process that facilitates the generation of novel and useful results, essentially a combination of originality and usefulness, and linked to the ability to use new approaches and divergent solutions to address challenges, both in personal, educational and business contexts (Cárdenas *et al.,* 2023; Quattrini, 2023). *Leadership* is defined as the ability to guide, influence, and direct a group towards the achievement of common goals and is manifested through various leadership styles such as authoritarian, democratic, laissez-faire, bureaucratic, charismatic, transactional, and transformational, each with its own characteristics and approaches to achieving organizational and personal success (Cárdenas *et al.,* 2023; Tolentino, 2020). *Achievement*, according to achievement goal theory, is reflected in the interpretation of success, driving the search for knowledge and skills (learning goals) or performance in comparison with others (performance goals), which influences entrepreneurial behavior (Anderman, 2020; Cárdenas *et al.,* 2023). *Personal Control* competence refers to the extent to which people perceive that they have the ability to influence the events in their lives, and can be divided into internal and external locus of control, the former implying that actions are determined by the individual and the latter by external circumstances. This competence is related to personal agency and autonomy, especially in entrepreneurial education contexts (Cárdenas *et al.,* 2023; Toti *et al.,* 2021).

The program was called Programa Educativo para el Desarrollo del Potencial Emprendedor en Adolescentes (PEIEO) [Educational Program for the Development of Entrepreneurial Potential in Adolescents] and was organized into 40 activities, 10 for each of the indicators reflecting personal, social, and work-related aspects (Bernal & Liñán, 2018; Cárdenas et al., 2023). It was timetabled to cover 12 1-hour sessions, during which work was simultaneously conducted with 4 indicators. It was also aligned with the objectives of the PEIEO project: '*Formación del Potencial Emprendedor. Generación de un Modelo Educativo de Identidad Emprendedora*' [Training the Potential Entrepreneur. Generation of an Educational Model for Entrepreneurial Identity] under Reference PID2019-104408GB-I00, State Plan 2017-2020 for R&D+i projects (Knowledge Generation), financed by the Spanish Ministry of Science and Innovation and the State Agency for Investigation. In this study, the efficiency of the training program is evaluated.

Theoretical Framework

The consideration of entrepreneurship as the gestation and launch process of new firms can explain the significant expansion of the study of entrepreneurship and its productive dimensions (Audretsch *et al*., 2022; Liñán *et al.,* 2018). However, the scientific literature has gradually revealed the multidimensional nature of entrepreneurship, lending attention to the predictive factors of

entrepreneurial action, as well as the relational, psychological, and socio-educational mix of the entrepreneur (Escolar-Llamazares, *et al*, 2019; Lanero *et al*., 2015; Liñán *et al*., 2018; Luis-Rico *et al.*, 2020; Santos *et al*., 2010, 2014). Through that perspective, individual characteristics related to the study of entrepreneurial conduct have been acquiring different values (Duan, 2022; Hee & Yang, 2021; Syed *et al*., 2020). The theoretical concept of entrepreneurial identity or the identity of the entrepreneurially minded person who unites productive and knowledge-related dimensions for business creation and management, underpinned by psychological, social, educational, and relational aspects, has been gaining ground (Baluku *et al*., 2020; Bogatyreva *et al*., 2019; Jiatong *et al*., 2021; Qin *et al*., 2019). The productive or business-related dimensions of entrepreneurship are evident at the time of the action, whereas the personal dimensions are related to entrepreneurial potential, with an important bidirectional association with entrepreneurial intention of entrepreneurial intention.

Building on the above, the theory of entrepreneurial intention is consolidated as a predictive model of behavior and conduct, supported by the *Theory of Planned Behavior* (TPB) of Ajzen (2011). The development of practical applications of that theory has driven researchers to determine the factors that intervene in entrepreneurial intention as predictors of action, whose dimensions have given rise to different integrated models (Esfandiar *et al*., 2019; Krueger, 2017) where the attitude or personal perception towards entrepreneurship, behavioral control, and the beliefs regarding their difficulty determine their levels of entrepreneurial intention (Montoya *et al*., 2016; Pérez-Macías *et al*., 2022; Sánchez *et al*., 2005; Soria-Barreto *et al*., 2016).

Different models and specific limitations of entrepreneurial potential, specifying the predictive dimensions of successful entrepreneurial action, such as those of Rab *et al*. (2005), who identify specific factors such as personality traits, technical skills, previous experience, or characteristics of the business environment that influence success in entrepreneurship. Their findings show that the development of some entrepreneurial characteristics was significantly lower among German youth compared to Americans. These findings highlight the importance of understanding and encouraging entrepreneurial potential in educational contexts. Santos *et al*. (2014) investigate factors such as innovation, technology or the business context and their influence on entrepreneurial success, and present a theoretical model of the construct of entrepreneurial potential and the main psychosocial aspects that contribute to preparing an individual to participate in activities typically associated with entrepreneurship. In turn, Muñiz *et al*. (2014) focus on aspects such as the educational environment, institutional support or business networks and provide a more complete understanding of the key components of the entrepreneurial personality in young people. The common aspects between these authors can be grouped around the characteristics of the business environment, technical skills and experience, innovation and technology, and institutional support and business networks. These factors are seen as predictors and enablers of successful entrepreneurial action.

However, our investigation draws on the contribution of Athayde (2009), who established the attitudes towards entrepreneurship, linked to four individual qualities with an in-built development and learning component: leadership, creativity, achievement, and personal control. This linkage suggests that attitudes toward entrepreneurship are not only a mental predisposition toward entrepreneurial activity, but are also intrinsically related to certain personal characteristics that are important for entrepreneurial success.

To explain this link, it is argued that attitudes toward entrepreneurship are influenced by individual perceptions of leadership capacity, the ability to generate creative ideas, the motivation to achieve goals, and the sense of control over one's own life and environment. These individual qualities, in turn, can influence the way a person perceives and approaches entrepreneurial opportunities, as well as their ability to carry out entrepreneurial actions effectively (Athayde, 2009).

We consider that Athayde (2009) may have chosen to focus on these four specific qualities due to their particular relevance to entrepreneurship and their potential to be developed and enhanced through entrepreneurial education and experience. Furthermore, these qualities have been identified as especially relevant to the context in which the research was carried out.

Regarding the omission of other elements of the Theory of Planned Behavior (TPB), such as subjective norms and perceived control, we have considered that these individual qualities were the most relevant aspects for our research on attitudes towards entrepreneurship. We instead focus on personal characteristics that can be more directly influenced and developed through educational and business development programs, rather than external factors such as the opinions of others or perceived control over the situation (Colombelli et al., 2022; de la Torre-Cruz et al., 2023; Tolentino, 2020).

Bearing the above in mind, it is interesting to note the way in which greater protagonism has been given to entrepreneurial education through those models. They assume leadership in the learning of entrepreneurial competence as a set of attitudes and skills that assist individuals with their personal and social development (Gao & Qin, 2022; Lackéus, 2015; Lin *et al*., 2023). In this vein, we focus in this study on the impact of an educational program that contributes to the development of entrepreneurial identity among students at the educational stages of Obligatory Secondary Education and Vocational Training within the Spanish educational system. In particular, we focus on the effects of leadership, creativity, achievement, and personal control both for the improvement of ***entrepreneurial potential***, and for demonstrating their link to cognitive factors associated with entrepreneurial intention, such as ***personal initiative*** and ***self-efficacy*** (Bernal-Guerrero *et al*., 2021; Durán-Aponte & Arias-Gómez, 2015; Pérez-Macías *et al*., 2022; Soria-Barreto *et al*., 2016), which are the principal predictors present in the integrated models of entrepreneurial intention (Esfandiar *et al*., 2019; Krueger, 2017).

Building on the theoretical arguments outlined above, the following hypotheses are proposed:

H1. Training in aspects related to entrepreneurial identity, such as creativity, leadership, achievement, and personal control will have a positive association with the *entrepreneurial potential* of the adolescents who participate in the PEIEO program.

H2. Training in aspects related to entrepreneurial identity, such as creativity, leadership, achievement, and personal control will have a positive association with the *personal initiative* of the adolescents who participate in the PEIEO program.

H3. Training in aspects related to entrepreneurial identity, such as creativity, leadership, achievement, and personal control will have a positive association with the *self-efficacy* of the adolescents who participate in the PEIEO program.

In this study we also take into consideration the role of gender in entrepreneurship. In the 2016 GEM report, Total early-stage Entrepreneurial Activity (TEA) among women stood at around 4.7%, two points below the female European TEA (Fernández-Laviada, 2016). In the most recent GEM report of 2021-2022, it increased up to 5.6%, placing itself above the male rate (5.4), nevertheless, the gap in high-added value entrepreneurship remains, which calls for the adoption of corrective measures, as the Observatorio del Emprendimiento de España (2022) [Entrepreneurship Observatory in Spain] and the results of Ward *et al.* (2019) in their study on university students, have both underlined. In very specific studies on the reasons why women attain lower TEA rates than men, reference is made to a greater fear of failure and the perception that there are fewer opportunities for entrepreneurship (OEE, 2021). It is along those lines that gender is considered in this study, given its relevance in the development of a training model to drive both entrepreneurial potential and identity (Costa & Pita, 2021; Ward *et al.*, 2019; Yurrebaso *et al*., 2020; Zisser *et al*., 2019).

Building on the theoretical arguments outlined above, the following hypothesis is proposed:

H4. Women adolescents will obtain lower scores for entrepreneurial potential, personal initiative, and self-efficacy, both before and after having followed the training of the PEIEO program

Methodology

An experimental methodology was conducted in this study, in order to confirm the efficacy of the PEIEO training program at stimulating entrepreneurial competence, based on the development of entrepreneurial potential. To do so, there was an Experimental Group (EG) that followed the program and a Control Group (CG) that did not. In both groups, the dimensions of the study were evaluated at two points: pre-test and post-test.

The following ethical committee approved the investigation: the Andalusian Health Service Research Ethics Committee of the University Hospitals Virgen Macarena and Virgen del Rocío, in the Health and Families Department of the Regional Government of Andalusia. C.P. ABG21-C.I.0851-N-21.

Participants

Stratified probabilistic sampling was applied to the selection of the sample. The stratification variables were as follows: the Autonomous Community, the number of students enrolled in Obligatory Secondary Education, Intermediate and Higher Vocational Training, and Sixth Form studies, the type of educational center (private/public), and gender. Considering these variables, the number of centers forming part of the study were as follows: 15 in Andalusia; 4 in the Community of Madrid; 5 in Castilla-Leon; 5 in the Autonomous Community of Valencia; 1 in Castilla-La Mancha; 5 in La Rioja; 5 in the Basque Country; and 1 in Navarre. Finally, 1036 students participated, of whom 440 (42.5%) formed part of the CG and 596 (57.5%) formed part of the EG. The CG consisted of 223 (50.7%) men and 217 (49.3%) women whose average age was 18.74 (SD=5.63) years old, whereas the EG consisted of 299 (50.2%) men and 297 (49.8%) women, whose average age was 18.59 (SD=6.19) years old. In Table 1, the descriptive statistics of the sample are presented in relation to other variables of interest such as educational level, the type of educational center (public/private) at which they were studying, the Autonomous Community to which they belonged, and the educational levels of their parents.

Table 1: *Descriptive statistics of the sample: Control Group (CG) and Experimental Group (EG).*

Group					
			Se		
	Obligatory Secondary Education	Sixth-Form	Vocational Education Basic/intermediate	Vocational Education Higher	Total
CG	175 (39.8%)	6 (1.4%)	102 (23.2%)	157 (35.7%)	440
EG	253 (42.4%)	25 (4.2%)	128 (21.5%)	190 (31.9%)	596
			Type of Center		
	Public sector	Voluntary-aided	Private sector		
GC	334 (78.2%)	91 (20.7%)	5 (1.1%)		440

GE	427 (71.6%)	112 (18.8%)	57 (9.6%)					596
	Autonomous Communities							
	Andalusia	Madrid	Castilla-León	Valencia	Castilla La Mancha	La Rioja	Basque Country	
GC	187 (42.5%)	68 (15.5%)	37 (8.4%)	35 (8.0%)	0 (0.0%)	16 (3.6%)	97 (22.0%)	440
GE	311 (52.2%)	105 (17.6%)	50 (8.4%)	35 (5.9%)	21 (3.5%)	63 (10.6%)	11 (1.8%)	596
	Educational level of father							
	Misplaced	No qualifications	Primary	Obligatory Secondary Education	Vocational	Sixth-Form	University	
GC	135 (30.7%)	16 (3.6%)	34 (7.7%)	71 (16.1%)	65 (14.8%)	38 (8.6%)	81 (18.4%)	440
GE	172 (28.9%)	32 (5.4%)	52 (8.7%)	116 (19.5%)	70 (11.7%)	65 (10.4%)	92 (15.4%)	596
	Educational level of mother							
	Misplaced	No qualification	Primary	Obligatory Secondary Education	Vocational	Sixth-Form	University	
GC	117 (26.6%)	16 (3.6%)	38 (8.6%)	67 (15.2%)	62 (14.1%)	37 (8.4%)	103 (23.4%)	440
GE	146 (24.5%)	21 (3.5%)	56 (9.4%)	116 (19.5%)	84 (14.1%)	60 (10.1%)	113 (19.0%)	596

Note: GC= Control Group; GE= Experimental Group

Instruments

Three questionnaires were administered in this study:

Test de potencial emprendedor: adaptación al español [Attitude Towards Entrepreneurship: adaptation to Spanish *ATE-S*] (prepared by Bernal Guerrero *et al*., 2021). The questionnaire comprises 22 items that are answered on a 1-to-6 point Likert-type scale (0 = Strongly agree to 5 = Strongly disagree). The test evaluated 5 factors that are Creativity with 4 items (Cronbach's α = .806) (example Item 1: *I think I show a lot of imagination in my school work*); leadership with 4 items (Cronbach's α = .870) (example Item *2: I am good at making people work in groups*); Intuition for problem solving with 5 items (Cronbach's α = .809) (example Item 3: *Making mistakes is a good way to learn*); motivation for success with 5 items (Cronbach's α = .797) (example Item 4: *I work very hard to achieve success in my projects*); and personal control with 5 items (Cronbach's α = .833) (example Item 5: *I believe that my future professional success depends largely on what I do*). In addition, there was one second-order factor: entrepreneurial potential with 22 items (Cronbach's α = .853). This test is validated in the study of Bernal Guerrero et al. (2021), who point out that ATE-S presents adequate psychometric properties, confirming a five-factor structure with a second-order factor (entrepreneurial potential). Moreover, the model presents a good fit (GFI=.998; CFI=.994; TLI=.987; RMSEA=.069; SMRA=.08). This scale has been used in subsequent studies such as Cárdenas-Gutiérrez et al. (2023). With this instrument we measure the dependent variable *entrepreneurial potential*.

Escala para la medición de la iniciativa personal en el ámbito educativo (EMIPAE) [Scale for the measurement of personal initiative in the educational field] prepared by Ulacia (2013). The questionnaire consists of 17 items that are answered on a 1-to-5 point Likert-type Scale (1=Totally disagree to 5=Totally

agree). The following 3 factors were evaluated in the test: proactivity-prosociality with 8 items (Cronbach's α = .72) (example Item 2: *I am willing to share my experiences and knowledge with my teachers and classmates*); personal initiative with 4 items (Cronbach's α = .57) (example Item 1: *I am especially good at putting into practice the ideas that occur to me in the classroom/workshop/laboratory*); and persistence with 5 items (Cronbach's α = .73) (example Item 7: *When I am doing a task in the classroom/workshop/laboratory and I make a mistake or encounter some difficulty, it is difficult for me to get back to what I was doing*). This scale has been used in subsequent studies such as Gorostiaga *et al.* (2018). With this instrument we measure the dependent variable *personal initiative*.

Escala de autoeficacia general: adaptación para población española [General Scale: adaptation for the Spanish population] prepared by Sanjuán Suárez *et al*. (2000). The questionnaire evaluates self-efficacy through 10 items on a 1-to-10 point Likert-type scale as a function of respondent degree of agreement. The scale presented a Cronbach's α reliability = .87. Example Item 1: *I can find a way to get what I want even if someone opposes me*; Item 6: *When I find myself in difficulties, I can remain calm because I have the necessary skills to handle difficult situations*, and Item 10: *When faced with a problem, I usually come up with several alternatives on how to solve it*. This scale has been used in subsequent studies such as Baessler and Schwarcer (1996) and Espada *et al.* (2012). With this instrument we measure the dependent variable *self-efficacy.*

Procedure

Before the interventions, the teaching team as well as the subject and study-module tutors of secondary education and Vocational training were informed of the investigation. Having agreed upon their participation, an informative session on the implementation of the program was then organized, so that the research team could consult with the teaching staff on its implementation at the educational centers. Both the control and the experimental groups were selected at the same centers.

Subsequently, the students were informed of the objective of the investigation, the procedures, and the anonymized treatment of the data. They were also informed that participation was voluntary and that they could leave the study at any point in time with no prejudicial consequences. To ensure validity, the pre-test was completed during the last week of January 2022 both with the CG and the EG (one week before the intervention -implementation of PEIO program-). The PEIEO program was then solely imparted to the EG. The program consisted of 40 activities linked to entrepreneurial attitudes, ten activities for each one of the indicators impacting on personal, social, and work-related aspects (leadership, creativity, achievement, personal control, intuition, and problem-solving initiative). These 40 activities that lasted from the beginning of February 2022 to the 1st week of June 2022 (4 moths and one weed). Finally, a post-test was administered to both (the CG and the EG) groups during the second week of June 2022 (one week after completing the PEIO program). The pre-test and

post-test were administered through Google Forms at two separate times to avoid tiring the students. The estimated time for completion of each test was 35 minutes.

Data Analysis

ANCOVA tests were conducted on the Difference in Scores (DS) between the pre-test and the post-test results, controlling possible differences between the scores, to confirm the three first hypotheses on the efficacy of the program in the different constructs. The ANCOVA test was used due to its robustness against possible violations of the assumptions that it should fulfill (Blanca *et al*., 2017; Olejnik & Algina, 1984), using, in addition, the bootstrapping method with the creation of 1000 samples, so as to approximate the distribution in the sampling of a statistic, as Efron (1979) proposed, using a bias-corrected and accelerated (BCa) confidence interval. Regarding the last objective of establishing the differences as a function of gender between the different constructs, the Student-*t* test for independent samples was used given that it is also considered a robust test for non-normal and heteroscedastic variables (Montilla & Kromrey, 2010), applying bootstrapping resampling, as for the earlier case.

Results

The first Hypothesis (H1) suggested that training in aspects related to entrepreneurial identity, such as creativity, leadership, and orientation towards success and personal control, significantly increase entrepreneurial identity. The averages of both groups, both in the pre-test and the post-test are presented in Table 1, to confirm the efficacy of the PEIEO program on the improvement of entrepreneurial potential. It was observed that both groups increased their scores, but the EG did so to a greater extent for all factors.

Table 2: *Descriptive statistics for the Control Group (CG) and the Experimental Group (EG) in relation to differences between Entrepreneurial Potential pre-test and post-test scores.*

	Control Group n = 440		Experimental Group n= 596	
	M	SD	M	SD
DS ATE	7.89	12.74	9.82	12.51
DS Creativity	2.89	3.01	3.23	3.10
DS Leadership	0.96	3.94	1.39	4.44
DS Problem-solving Initiative	2.22	3.05	2.87	3.09
DS Motivation	1.38	3.73	1.50	4.07
DS Personal control	0.44	2.69	0.82	3.03

Note: DS = Difference in scores; M=Mean; SD=Standard Deviation; ATE = Attitude towards Enterprise Test: Spanish Adaptation

The ANCOVA test results, controlling for possible pre-test differences, indicated the efficacy of the program ($p.< 0.05$) on entrepreneurial potential and on each of its factors (Table 2). Even so, in all cases those factors presented low size-effects, which indicated that the program (controlling for possible differences in

the pre-test) could explain a reduced percentage of observed improvements. Nevertheless, it can be underlined that the observed potential was high > 0.94, which pointed to a type II error rate, accepting a null hypothesis when false, of only 6%.

Table 3: *ANCOVA results (controlling for Entrepreneurial Potential pre-test scores).*

Origin	Sum of squares Type III	gl	Quadratic average	F	Sig.
DS ATE					
Group	966.89	1	966.89	17.64	0.000
Pretest ATE	107236.47	1	107236.47	1956.08	0.000
Group * Pretest ATE	710.97	1	710.97	12.97	0.000
DS Creativity					
Group	67.63	1	67.63	46.89	0.000
Pretest Creativity	8100.13	1	8100.13	5615.56	0.000
Group * Pretest Creativity	46.69	1	46.69	32.37	0.000
DS Leadership					
Group	143.10	1	143.10	20.75	0.000
Pretest Leadership	10968.20	1	10968.20	1590.10	0.000
Group * Pretest Leadership	110.65	1	110.65	16.04	0.000
DS Problem-solving initiative					
Group	57.36	1	57.36	23.42	0.000
Problem-solving initiative Pretest	7090.84	1	7090.84	2895.31	0.000
Group * Pretest Problem-solving initiative	40.23	1	40.23	16.42	0.000
DS Motivation					
Group	93.99	1	93.991	18.34	0.000
Pretest Motivation	10404.06	1	10404.06	2030.40	0.000
Group * Pretest Motivation	78.90	1	78.90	15.40	0.000
DS Personal control					
Group	130.95	1	130.947	79.82	0.000
Pretest Personal control	6718.12	1	6718.125	4095.38	0.000
Group * Pretest Personal control	107.93	1	107.929	65.79	0.000

DS=Difference in scores; gl= general linear group; F=F-statistic; Sig.= Significance; ATE = Attitude towards Enterprise Test: Spanish Adaptation

The averages Discounting the effect of the pretest are shown in Table 3 where it can be seen that the differences between both groups are also statistically significant (ATE: F= 31.36, p. < 0.001, η^2_p= 0.029, power=1.00; creativity: F= 56.22, p. < 0.001, η^2_p= 0.052, potential=1.00; leadership: F= 9.33, p. = 0.002, η^2_p= 0.009, power =0.86; problem-solving Initiative: F= 32.41, p. < 0.001, η^2_p= 0.030, power =1.00; Motivation: F= 7.36, p. = 0.007, η^2_p= 0.007, power =0.77; personal control: F= 53.54, p. < 0.001, η^2_p= 0.049, power =1.00).

Table 4: *Mean averages for the Control Group (CG) and the Experimental Group (EG) (discounting the pre-test effect on entrepreneurial potential).*

	CG n= 440		EG n= 596		The covariable evaluations yielded the following values:
	M	SD	M	SD	

DS ATE	7.53	0.35	10.14	0.30	Pretest ATE = 85.40.
DS Creativity	2.77	0.06	3.34	0.05	Pretest Creativity = 15.81.
DS Leadership	0.92	0.12	1.43	0.11	Pretest Leadership = 14.06.
DS Problem-Solving Initiative	2.27	0.07	2.83	0.06	Pretest Problem-Solving Initiative = 16.07
DS Motivation	1.24	0.11	1.62	0.09	Pretest Motivation = 20.56
DS Personal control	0.33	0.06	0.92	0.05	Pretest Personal control = 18.89

M=Mean; SD=Standard Deviation; DS=Difference in scores; ATE = Test of Entrepreneurial Potential

The second Hypothesis 2 (H2) suggested that training in aspects related with entrepreneurial identity such as creativity, leadership, achievement, and personal control, significantly increase personal initiative. Both the pre-test and the post-test averages of both groups are presented in Table 4, in order to test the efficacy of the PEIEO program on the improvement of personal initiative in the field of education. An unbalanced behavior was observed in the evolution of those variables, noting increases for the self-starter variable in both groups and in the proactivity variable in the EG, whereas all the other scores were slightly lower.

Table 5: *Descriptive statistics of the Control Group (CG) and the Experimental Group (EG) in relation to differences between pre-test and post-test scores for personal initiative.*

	GC n = 440		GE n= 596	
	M	SD	M	SD
DS Proactivity	-0.58	7.03	0.80	8.81
DS Self-starter	2.80	5.16	3.56	5.18
DS Persistence	-2.55	6.20	-1.92	7.03

M=Mean; SD=Standard Deviation; DS=Difference in scores

The ANCOVA test, controlling for possible differences in the pre-test, indicated the effectiveness of the program ($p.< 0.05$) in relation to the factors proactivity and being a self-starter, but not ($p.> 0.05$) in relation to persistence (Table 5). Even so, in both cases, they presented small effect sizes, which indicated that the program (controlling for possible pre-test-related differences) explained a reduced percentage of the improvements observed in both factors. Nevertheless, it may be pointed out that the observed power of both factors, proactivity and being a self-starter, was high > 0.86 which pointed to a Type II error rate, accepting a null hypothesis when false, of only 14%.

Table 6: *ANCOVA (controlling for pre-test scores) results for personal initiative.*

Origin	Type III sum of squares	gl	Quadratic mean	F	Sig.
SD Proactivity					
Group	1227.23	1	1227.23	56.42	0.000
Pretest Proactivity	43464.50	1	43464.50	1998.26	0.000
Group * Pretest Proactivity	897.40	1	897.40	41.26	0.000
DS Being a Self-starter					
Group	148.44	1	148.44	13.09	0.000
Pretest Self-starter	15649.21	1	15649.	1379.99	0.000
Group * Pretest Self-starter	105.83	1	105.83	9.33	0.002
DS Persistence					
Group	117.86	1	117.86	4.09	0.043
Pre-test Persistence	16068.18	1	16068.179	558.08	0.000

Group * Pre-test Persistence	68.44	1	68.441	2.38	0.123

DS=Difference in scores; gl= general linear group; F=F-statistic; Sig.= Significance

The averages, discounting the effect of the pretest, are shown in Table 6 where it can be seen that the differences between both groups were also statistically significative (Proactivity: F= 43.37, *p*. < 0.001, η^2_p= 0.040, power=1.00; Self-starter: F= 9.53, *p*. = 0.002, η^2_p= 0.009, power=0.87). However, there were no differences for the factor Persistence (F= 3.76, *p*. = 0.053, η^2_p= .004, power=0.49) in the same way as seen earlier.

Table 7: *Mean averages discounting the pre-test effect on Personal Initiative for the Control Group (CG) and the Experimental Group (EG).*

	GC n= 440		GE n= 596		The covariable evaluations yielded the following values:
	M	DT	M	DT	
PD Proactivity	-0.86	0.22	1.07	0.19	Pretest Proactivity = 31.36
PD Self-starter	2.86	0.16	3.51	0.14	Pretest Self-starter = 17.59
PD Persistence	-2.56	0.26	-1.91	0.22	Pretest Persistence = 13.23

M=Mean; SD=Standard Deviation; DS=Difference in scores

The third Hypothesis (H3) suggested that training in aspects related to entrepreneurial identity such as creativity, leadership, orientation towards success and personal control significantly increase self-efficacy (SELFEFF). The averages of both groups in both the pre-test and the post-test are presented in Table 7, in order to test the efficacy of the PEIEO program in relation to the improvement of self-efficacy. It was observed that both groups increased their scores for self-efficacy, but the EG did so in greater measure.

Table 8: *Descriptive statistics of Control Group (CG) and Experimental Group (EG) on Self-efficacy. Difference in pre-test and post-test scores.*

	GC n= 440		GE n= 596	
	M	SD	M	SD
DS Self-Efficacy	5.00	8.55	8.10	9.74

The ANCOVA test, controlling for possible pre-test differences, yielded results that supported the efficacy of the program (*p.*< 0.05) in relation to self-efficacy (Table 8). Even so, the results presented a small size effect, which indicated that the program (controlling for possible pre-test differences) explained a lower percentage of the observed improvements (4%). Nevertheless, it may be pointed out that the observed power was high > 0.99, which leaves a Type II error rate, accepting a null hypothesis when it is false, of at least 1%.

Table 9: *ANCOVA (controlling for pre-test scores) results for Self-efficacy.*

Origin	Type III sum of squares	gl	Quadratic mean	F	Sig.
DS Self-Efficacy					
Group	1799.42	1	1799.42	56.62	0.000
Pretest Self-Efficacy	50437.83	1	50437.83	1587.19	0.000
Group * Pretest Self-Efficacy	1294.74	1	1294.74	40.74	0.000

DS=Difference in scores; gl= general linear group; F=F-statistic; Sig.= Significance

Discounting the pre-test effect, the averages of the pre-test results are shown in Table 9 where it can be seen that the differences between both groups were also

statistically significative (Self-efficacy: F= 59.73, *p*. < 0.001, η^2_p= 0.055, power=1.00)

Table 10: *Mean averages for the Control Group (CG) and the Experimental Group (EG) (discounting the pre-test effect on self-efficacy).*

	CG n = 440		EG n= 596		The covariable evaluations yielded the following values:
	M	DT	M	DT	
DS Self-efficacy	5.18	.27	7.92	.23	Pretest Self-efficacy = 37.85

Finally, the fourth Hypothesis 4 (H4) suggested that women will obtain lower scores for entrepreneurial potential, personal initiative, and SELFEFF both before and after the intervention to improve Entrepreneurial Potential.

The descriptive statistics of both groups by gender are presented in Table 10. It was observed that in the pre-test of the three scales, women presented higher scores except for personal control in the EG, problem-solving initiative in the CG, persistence in the CG, and self-efficacy in the EG. Even so, this tendency was reversed in the post-test where the men had slightly higher scores than the women in almost all the factors, a higher increase between the pre-test and the post-test having been recorded among the men in both groups.

Table 11: *Descriptive statistics by gender for both the Control Group (CG) and the Experimental Group (EG).*

			Pre-test		PD		Post-test	
	Sex	N	M	SD	M	SD	M	SD
ATE								
GC	Men	223	83.71*	10.41	9.59*	12.53	93.30	7.66
	Women	217	86.39*	9.89	6.16*	12.75	92.54	7.61
GE	Men	299	84.63*	8.54	10.98*	12.11	95.61	7.48
	Women	297	86.71*	8.76	8.65*	12.81	95.36	7.28
Creativity								
GC	Men	223	15.35*	2.68	3.25*	2.89	18.60	1.29
	Women	217	16.03*	2.78	2.53*	3.10	18.57	1.20
GE	Men	299	15.59*	2.48	3.63*	3.06	19.22	1.17
	Women	297	16.22*	2.43	2.83*	3.11	19.05	1.29
Personal control								
GC	Men	223	18.70	2.40	0.61	2.59	19.32	1.20
	Women	217	18.87	2.33	0.26	2.79	19.13	1.42
GE	Men	299	19.00	2.18	0.77	3.13	19.77	1.52
	Women	297	18.93	2.12	0.89	2.92	19.82	1.25
Motivation								
GC	Men	223	19.65*	3.32	2.17*	3.85	21.82	2.23
	Women	217	21.21*	2.71	0.56*	3.43	21.76	2.13
GE	Men	299	20.02*	2.91	2.26*	4.08	22.29	2.39
	Women	297	21.32*	2.74	0.73*	3.92	22.05	2.34
Leadership								
GC	Men	223	13.78	3.14	1.30	3.93	15.08	2.55
	Women	217	14.27	2.95	0.61	3.92	14.88	2.48
GE	Men	299	14.03	2.88	1.48	4.36	15.52	2.82
	Women	297	14.14	2.93	1.30	4.52	15.44	2.73
Problem-solving initiative								
GC	Men	223	16.22	2.53	2.25	2.95	18.48	1.57
	Women	217	16.01	2.40	2.20	3.15	18.21	1.79
GE	Men	299	15.98	2.28	2.84	3.11	18.81	1.68
	Women	297	16.10	2.27	2.91	3.08	19.01	1.36
Proactivity								
GC	Men	223	29.93*	5.85	0.62*	7.00	30.55	3.97
	Women	217	32.25*	5.78	-1.82*	6.85	30.43	3.90
GE	Men	299	30.54*	5.31	2.30*	8.74	32.83*	5.44

	Women	297	32.60*	5.40	-0.71*	8.65	31.89*	5.35
Self-starter								
GC	Men	223	17.21*	3.87	3.42*	5.07	20.62	3.50
	Women	217	18.10*	3.74	2.18*	5.19	20.27	3.54
GE	Men	299	17.45	3.33	3.66	5.15	21.11	3.37
	Women	297	17.66	3.62	3.45	5.21	21.11	3.22
Persistence								
GC	Men	223	13.39	3.68	-2.75	6.01	10.63	4.98
	Women	217	13.06	4.15	-2.35	6.39	10.71	4.85
GE	Men	299	12.99	3.70	-1.67	6.84	11.32	5.75
	Women	297	13.49	3.85	-2.17	7.23	11.32	5.63
Self-efficacy								
GC	Men	223	37.84	5.89	5.47	8.00	43.31	6.06
	Women	217	38.22	6.32	4.53	9.07	42.74	6.29
GE	Men	299	38.02	6.03	7.52	9.81	45.54	5.97
	Women	297	37.40	6.26	8.68	9.64	46.08	5.19

Upon analysis, statistically significant differences were observed in the ATE pre-test both in the CG (*p.*=0.006; *d*=0.31; power=0.34) and in the EG (*p.*=0.003; *d*=0.25; power=0.24) and for the differential scores, in the CG (*p.*=0.005; *d*=0.25; power=0.24) and in the EG (*p.*=0.023; *d*= 0.17; power= 0.13). These results indicated that women, began with a significantly higher level of entrepreneurial potential than men, but after the course, the men had significantly improved that competence, reaching similar scores to those of the women in the post-test. Likewise, it must be pointed out that the effect sizes were small (*d*< 0.20) and the statistical power was also limited (<0.80).

Statistically significant differences were also found in the pre-test for the creativity factor both in the CG (*p.*=0.009; *d*=0.5; power=0.70) and in the EG (*p.*=0.002; *d*=0.5; power=0.70) and for the differences between the pre- and the post-test scores: CG (*p.*=0.013; *d*=0.39; power=0.49) and EG (*p.*=0.002; *d*=0.33; power=0.38). On that basis, women began with a significantly higher level of creativity, but over the course, men significantly improved that factor more than the women, so that they both reached similar post-test values. Likewise, it must be pointed out that the size-effects were medium and moderate and the statistical power of the differences between the pre- and the post-test scores was especially limited.

Statistically significant differences were also found in the pre-test for the factor Motivation, for both the CG (*p.*=0.000; *d*=0.78; power=0.97) and the EG (*p.*=0.000; *d*=0.5; power=0.70), and for the differences between the pre- and post-test scores: GC (*p.*=0.000; *d*=0.67; power=0.91) and GE (*p.*=0.000; *d*=0.57; power=0.80). These results indicate that women began with a significantly higher level of motivation, but over the course, men significantly improved their scores for that factor, reaching similar post-test values to the women. Likewise, it must be pointed out that the moderate size effects (0.50>*d*< 0.80) and the statistical power were also quite reasonable.

Significative differences were found in the questionnaire on personal initiative, in the pre-test of the proactivity factor, both for the CG (*p.*=0.000; *d*= 0.6; power= 0.84) and for the EG (*p.*=0.000; *d*=0.4; power=0.51), and in the differences between the pre- and post-test scores for the CG (*p.*=0.000; *d*= 0.15; power =

0.12) and for the EG (*p.*=0.000; *d*= 0.25; power=0.24), and for the post-test scores of the EG (*p.*=0.033; *d*= 0.2; power=0.17). These results showed that women began with significantly higher scores for proactivity, but men significantly improved over the course, whereas the scores of the women worsened, both men and women in the EG reaching statistically higher post-test scores. Likewise, it must be pointed out that the size effects were moderate and the statistical power somewhat limited.

The same may be said of the factor self-starter, both in the CG (*p.*=0.015; *d*= 0.33; power=0.38) and in the differences between the pre- and post-test scores (*p.*=0.011; *d*=0.2; power=0.17) of that group. The results indicated that women began with significantly higher levels as self-starters, but men significantly improved their scores over the course for that factor, reaching similar values to the women in the post-test. Likewise, it must be pointed out that the size effects were moderate and the statistical power somewhat limited.

Discussion of results

The results have shown that intentional training actions within the dimensions related to entrepreneurial identity (creativity, leadership, achievement, personal control, and problem-solving initiative) increase the entrepreneurial potential of young people (H1), in line with the results of Bernal-Guerrero *et al*. (2021), Duan (2022) and Cho *et al*. (2020). This means that in our study, as in the studies of other researchers, students who participate in an entrepreneurial competences program such as our PEIEO program, significantly improve their entrepreneurial potential compared to students who do not receive this type of training.

Likewise, the results show a significant increase in the dimensions of proactivity and particularly of being a self-starter within personal initiative (H2) in students who participated in the PEIEO program (EG) versus those who did not (CG). In the same way, the results show a significant increase in the dimensions of self-efficacy (H3) in students who participated in the PEIEO program (EG) versus those who did not (CG). Therefore, both personal initiative and self-efficacy reveal themselves as predictors of entrepreneurial intention, in line with the results of Esfandiar *et al*. (2019) and Krueger (2017) who show that entrepreneurial potential training programs led to an increase in entrepreneurial intention among the young people who followed the course. In our case, the PEIO program has increased students' personal initiative and self-efficacy demonstrating its efficacy.

The consideration of gender as a predictor of the results for the dimensions under analysis (H4) underlined the need to review the entrepreneurial potential training program. Studies on gender and entrepreneurship have found lower levels of entrepreneurial intention among women, which leads to the idea that training actions can help close that gap (Fernández-Laviada, 2016; Observatorio del emprendimiento en España, 2022; OEE, 2021; Ward *et al.,* 2019). In view of the results reached in the present investigation, seems that the androcentric model must be reconsidered, both within the educational system and the educational

program for entrepreneurial potential, because women in our pre-test began with higher levels than men in the dimensions under analysis, but the differential increase after the students had completed the program was higher among men. The thesis that the difficulties and differences of female entrepreneurism are linked to socio-cultural and institutional factors within the business environment more so than to their personal and individual characteristics is therefore reinforced. However, we should recall that those differences disappear once entrepreneurial behavior is learned, as shown in the study of Yurrebaso *et al*. (2020) among young entrepreneurs who have followed entrepreneurial training courses. Moreover, given that education is one of the factors that defines the socio-economic interactions of a country, the results of this work may contribute to the general literature on economics and education and, in particular, to the literature on education for entrepreneurship.

Finally, the observation that the training actions impact on improvement of *entrepreneurial potential, personal initiative, self-efficacy* and, consequently, entrepreneurial intention, suggests that there is a need to drive the construction of entrepreneurial intention training models. And to generalize their curricular integration, as a practical application among educational policy makers. In addition, if we consider the impact of entrepreneurial potential on entrepreneurial intention, and the one of the latter on entrepreneurial identity and subsequent action, the inclusion of educational programs that cover entrepreneurial potential-related dimensions within obligatory secondary education gains even greater relevance. In consequence and as a practical application, the results have emphasized the urgent need to implement national and community-level educational policies that aim to increase entrepreneurial competence throughout obligatory secondary education. To do so, there is an evident need to design training programs, such as the one that has been examined in this study to evaluate its efficiency (Cárdenas *et al.,* 2023).

As limitations, we point out that the results of the Personal Initiative factor of the Scale for the measurement of personal initiative in the educational field (EMIPAE) must be taken with caution given the relatively low Cronbach alpha of one of the factors, even though they reach the minimum suggested by Guilford (1954) for research purposes.

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