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Family factors and their relationship with improving the entrepreneurial potential of secondary school students in Spain

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Keywords

Entrepreneurial education
Entrepreneurial competence
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Family

Abstract

The study examines, on the one hand, the mediating role of entrepreneurial skills in the relationship between knowledge and entrepreneurial potential; and, on the other hand, the effect of parental educational attainment and its interaction with knowledge and skills. A total of 537 (47.3% women; *M* = 18.15 years; *SD* = 5.36) students from lower secondary school, upper secondary school, and vocational training took part. Scales measuring entrepreneurial knowledge, skills, and attitudes were administered, and the data were analyzed using correlations, tests for comparing means, mediation, and multiple regression. The results showed no differences in knowledge and skills according to gender or year group, although male students and vocational training students demonstrated greater leadership. Knowledge was not directly associated with entrepreneurial potential but was indirectly associated with it through skills. No effects of paternal educational attainment were observed, whilst maternal educational attainment did show an association in interaction with skills. Educational implications and future lines of research are discussed.

Factores familiares y potencial emprendedor en estudiantes de educación secundaria en España

Palabras clave

Educación emprendedora
Competencia emprendedora
Conocimientos
Habilidades
Familia

Resumen

El estudio analiza, por un lado, el papel mediador de las habilidades emprendedoras en la relación entre conocimientos y potencial emprendedor; y, por otro, el efecto del nivel educativo parental y su interacción con conocimientos y habilidades. Participaron 537 (47.3% mujeres; *M* = 18.15 años; *DT* = 5.36) estudiantes de Educación Secundaria obligatoria y postobligatoria (Bachillerato y Formación Profesional). Se aplicaron escalas de conocimientos, habilidades y actitudes emprendedoras, y se realizaron correlaciones, pruebas de comparación de medias, mediación y regresión múltiple. Los resultados mostraron ausencia de diferencias en conocimientos y habilidades según género y la etapa educativa, aunque los hombres y el alumnado de Formación Profesional presentaron mayor liderazgo. Los conocimientos no se asociaron directamente con el potencial emprendedor, pero sí de forma indirecta a través de las habilidades. Tampoco se observaron efectos del nivel educativo paterno, mientras que el materno sí mostró asociación en interacción con las habilidades. Se discuten implicaciones educativas y líneas futuras de investigación.

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Entrepreneurship is the ability to identify opportunities, create value, and turn ideas into actions (European Commission, 2025). In education, this perspective goes beyond simply starting businesses and links entrepreneurship to the development of relevant skills and attitudes (Clark et al., 2024). Research shows that entrepreneurial education can foster knowledge, skills, and attitudes, although its effects depend on the quality of the programs and their evaluations (Martínez-Gregorio et al., 2021).

The operationalisation of entrepreneurial potential through attitudes is grounded in the Theory of Planned Behaviour (TPB), which states that attitudes constitute a relevant antecedent of behavioural intention (Ajzen, 1991). In the entrepreneurial context, this framework is useful for explaining the predisposition toward entrepreneurial behaviour; therefore, it is appropriate to understand entrepreneurial potential as an attitudinal disposition toward entrepreneurship (Aragón-Sánchez et al., 2017).

Family and school are key contexts for adolescent socialisation. In particular, parental educational attainment is considered a structural indicator of cultural capital and the educational resources available in the home, which are typically associated with academic performance (Hill & Tyson, 2009; Jin et al., 2024; Kim, 2022). In the field of entrepreneurship, the literature shows that the family environment can influence entrepreneurial attitudes, aspirations, and self-efficacy through socialisation and modelling processes (Anderson & Miller, 2003; Dou et al., 2021; Zellweger et al., 2011). However, evidence regarding the specific role of the educational levels of the father and mother in entrepreneurial potential during adolescence, as well as their interaction with entrepreneurial knowledge and skills, remains limited. Therefore, an analysis of family influences on entrepreneurship is necessary, with the present study filling an existing gap in the scientific literature.

The relationship between business knowledge and skills and the promotion of entrepreneurial potential in schools

The development of entrepreneurial competence equips students to adapt to change and uncertainty, creating opportunities for growth, fostering autonomy (Bernal-Guerrero & Cárdenas-Gutiérrez, 2021), enhancing their capacity for innovation, and preparing them to take risks (Peña et al., 2023).

Education, through the acquisition of knowledge and business skills, develops entrepreneurial competence and potential (Núñez-Canal et al., 2023) because declarative knowledge has limited effects if it is not linked to applied and self-regulatory competencies (Nabi et al., 2018). However, when such knowledge is integrated with the appropriate development of entrepreneurial skills, the relationship with entrepreneurial potential becomes significant, given that practical competencies act as mediating variables between entrepreneurial education and entrepreneurial intention or behaviour (Shi et al., 2020). Therefore, it follows that there is a need to work on both knowledge and skills in tandem to develop adequate entrepreneurial potential, in line with comprehensive models of entrepreneurial education (Lackéus, 2020).

Entrepreneurial competence is a set of knowledge, attitudes, and skills that enable the identification of opportunities, transformation of ideas into actions, and generation of economic and social value (Azqueta et al., 2024). Knowledge encompasses legal, financial, economic, and business management dimensions (OECD, 2023). Legal knowledge includes the legal and administrative structure of the company and its operation within the market's regulatory and institutional framework. Specifically, managerial knowledge describes the functions of planning, organising, directing, and controlling business management (Fayolle & Gailly, 2015). Meanwhile, entrepreneurial skills are classified as instrumental, interpersonal, imaginative, and systemic, in line with models of cross-cutting and entrepreneurial competencies (Lackéus, 2020). Among the most notable are initiative, sustained effort, teamwork, creativity, decision-making, conflict resolution, time management, effective communication, and risk-taking. All of these have been identified as predictors of entrepreneurial intentions and behaviour (Global Entrepreneurship Monitor, 2023). Consequently, entrepreneurial potential fosters the consolidation of entrepreneurial behaviour and identity by reinforcing self-efficacy and the perception of entrepreneurship's feasibility and desirability (Newman et al., 2019). Furthermore, it contributes to the development of skills that shape entrepreneurial identity and underpin entrepreneurial knowledge, considering the influence of socio-educational and family contexts (Sieger et al., 2021).

The effect of family educational attainment and its interaction with knowledge and skills on entrepreneurial potential

The family-school relationship serves as a central analytical framework for understanding skill development during adolescence. Parental involvement is positively associated with academic performance, although the magnitude of the effect varies depending on the type of involvement and the educational stage (Kim, 2022). Likewise, some reviews indicate that the relational components of parental involvement –educational expectations or emotional support– are linked to academic indicators and psychosocial adjustment variables in secondary education (Jeynes, 2017).

Therefore, family educational attainment is a structural indicator of cultural capital and the educational resources available at home, which are traditionally associated with academic outcomes and the development of academic competencies (Jin, 2024). From the perspective of human and cultural capital, higher levels of parental education are typically associated with more structured learning environments, higher academic expectations, and greater access to educational resources (OECD, 2023). Consequently, it is relevant to analyse whether this structural indicator is linked to the development of entrepreneurial knowledge, skills, and attitudes.

In the field of entrepreneurship, research confirms that family factors influence the formation of entrepreneurial attitudes and aspirations through socialisation and modelling of entrepreneurial behaviours (Anderson & Miller, 2003). Likewise, emotional family support, the transmission of values associated

with autonomy, and optimism regarding the viability of one's own projects are linked to the development of entrepreneurial self-efficacy and higher expectations of access to resources (Zellweger et al., 2011).

Therefore, the need to integrate formal entrepreneurial education with informal learning contexts –especially the family– is emphasised to maximise its impact on the development of skills and entrepreneurial potential (Sinaga et al., 2024). Consequently, educational institutions must integrate entrepreneurship into the curriculum and promote specific training for teachers in entrepreneurial competencies (European Commission, 2025). Thus, analysing entrepreneurial potential in adolescence requires consideration of school processes and family-school interactions as contexts that facilitate competency development. Consequently, the need for this study stems from the importance of understanding the influence of parents on the development of entrepreneurial competencies in adolescents and the relationships and differences in this influence based on sociodemographic factors.

The present study

This study has three objectives: Objective 1 (O1) is to describe scores on Entrepreneurial Potential, Skills, and Knowledge according to gender, educational level (secondary school, high school, and vocational training), and type of school (public, private, and state-subsidised); Objective 2 (O2) is to analyse the mediating role of entrepreneurial skills in the relationship between knowledge and entrepreneurial potential; and Objective 3 (O3) is to analyse the effect of the educational level of the father and mother and its interaction with knowledge and skills on entrepreneurial potential. The hypotheses associated with the study's objectives are as follows: entrepreneurial skills mediate the relationship between knowledge and entrepreneurial potential (Hypothesis 1); and parental educational attainment is positively associated with entrepreneurial potential through the knowledge and skills of sons and daughters (Hypothesis 2).

Method

Design

A quantitative cross-sectional study based on self-reports was performed. The design is non-experimental and correlational, aimed at analysing associations between individual variables (entrepreneurial knowledge and skills) and contextual variables (parental educational level) in relation to students' entrepreneurial potential. Additionally, mediation and moderation models were estimated to examine indirect effects and interactions, which were interpreted in terms of statistical associations due to the cross-sectional design.

Participants

A total of 537 students (47.3% females) participated in the study. The average age was 18.15 years (*SD* = 5.36; range: 12-64). The wide age range is due to the inclusion of vocational training students, which allows the participation of adults undergoing retraining. Although most were adolescents, 0.93% (*n* = 5) were older participants (50-64 years), which increased the mean and dispersion of the sample and should be considered when interpreting the results. Respondents came from Andalusia (48.05%), Madrid (27.75%), Valencia (13.41%), La Rioja (6.33%), and Castile and León (4.47%). A 64% percent attend public schools, 31% attend state-subsidised private schools, and 4.5% attend private schools in the country. Of these, 51.21% were enrolled in ESO, 30% in Advanced Vocational Training (FP), 16% in Basic and Intermediate Vocational Training (FP), and 2.24% in Baccalaureate.

Regarding parental educational attainment, 17.32% hold a vocational training (FP) certificate, 16.20% have completed ESO, and 13.97% have university degrees. There was a 28.12% missing data rate. Regarding the mothers' educational level, 20% had a university degree, 19.37% had completed ESO, and 14.90% had completed vocational training. A 25% missing data rate was reported.

Instruments

Three instruments were used to assess knowledge, skills, and entrepreneurial potential, as well as to collect basic sociodemographic information such as gender (1 = *Male*, 2 = *Female*), age, educational level (1 = Lower secondary education, 2 = *Upper secondary education*, 3 = *Basic vocational training*, 4 = *Advanced vocational training*), and family educational level (1 = *No formal education*, 2 = *Elementary school*, 3 = *Lower secondary education*, 4 = *Vocational training*, 5 = *Upper secondary education*, 6 = *University*).

Entrepreneurial knowledge was assessed using the *Basic Business Knowledge Scale* (CON; Bernal-Guerrero et al., 2020), consisting of 18 items distributed across three dimensions: business management, legal aspects, and strategic knowledge (example item: "The process and procedures for establishing a business"). Items were answered on a Likert scale ranging from 1 = *Strongly disagree*) to 5 = *Strongly agree*). In this sample, the scale demonstrated a more appropriate structure as a global measure; therefore, a total score was used (see Appendix 1). The internal consistency was excellent (α = .95).

Entrepreneurial skills were measured using the *Basic Scale of Entrepreneurial Skills* (HAB; Bernal-Guerrero et al., 2021), consisting of 13 items covering three dimensions: operations and marketing, socio-entrepreneurial organisation, and economic-financial aspects (example item: "Establishing a company and completing the formalities to carry out the business activity"). Items were answered on a Likert scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. In this sample, an overall score was used, given the suitability of the unifactorial solution and its high internal consistency (α = .94).

Entrepreneurial potential was assessed using the *Attitude Toward Enterprise Test-Spanish* (ATE-S; Bernal-Guerrero et al., 2021), which consists of 22 items across five dimensions: creativity, personal control, achievement motivation, leadership, and intuition for problem-solving. Entrepreneurial potential is

operationalised as an attitudinal disposition, consistent with the Theory of Planned Behaviour (Ajzen, 1991), where attitudes are a precursor to intention and entrepreneurial potential. An example of a question is: "I believe that a good imagination helps me perform better in school." The items were answered on a Likert scale ranging from 1 = *Strongly disagree* to 5 = *Strongly agree*. The original factor structure showed a satisfactory fit, and the overall internal consistency was adequate (α = .9).

Procedure

Data were collected during the 2022-2023 academic year, following authorisation from the administration of the participating schools and informed consent from the families. Participation was voluntary and anonymous in nature. For participants under the age of majority, informed consent was obtained from their parents or legal guardians. Participants of legal age signed their consent forms. Students completed the questionnaires during school hours, in the classroom, and under the supervision of the research team members. The estimated time to complete the questionnaires was 60 min. The study was conducted in accordance with the ethical principles established in the Declaration of Helsinki and ensured the confidentiality of the collected data. Participants were guaranteed the right to withdraw from the study at any time, without consequences.

Data analysis

Frequency analyses were conducted to describe the participants' characteristics using SPSS v.26 (IBM, 2019). We also analysed the relationship between quantitative variables using Pearson's correlation analysis and analysed variance using t-tests and ANOVAs to examine differences in entrepreneurial potential based on gender, educational stage (secondary education, high school, and vocational training), and type of school (public, private, and state-subsidised) (O1). Effect size was estimated using Cohen's *d*, with values of .2, .5, and .8 indicating small, moderate, and large effects, respectively (Cohen, 1988). Additionally, the Bonferroni correction was applied to post-hoc comparisons.

To address H2 regarding the mediating role of skills, a simple mediation analysis was conducted using a structural equation model (SEM). Knowledge was established as the predictor variable (X), skills as the mediator variable (M), and entrepreneurial potential as the dependent variable (Y). A robust estimation method using Diagonally Weighted Least Squares (DWLS) was employed, as it is recommended for ordinal data because it provides more robust estimates of parameters and standard errors than maximum likelihood methods when multivariate normality cannot be assumed (Li, 2016). JASP v. 0.18.3 software (JASP Team, 2024) was used.

Finally, to analyse the effect of age and parental educational level and their interaction with knowledge and skills in predicting entrepreneurial potential, a multiple regression model (O3) was conducted. As a null model, variables such as age, parental education level, and knowledge and skills were included. Subsequently, the interaction between parental education level and perceived skills and knowledge was added to describe its mediating potential. This analysis allowed for the calculation of the change in R^2 (% of explained variance). The tolerance values were greater than .2, and the variance inflation factors (VIF) were below the critical threshold of 5, indicating the absence of severe multicollinearity issues among the predictors in the null model. After including the interaction terms, higher values of the multicollinearity indicators were observed, which is expected when variables are correlated and have not undergone a mean-centred transformation. However, multicollinearity does not alter the estimation of interaction effects or the model's explained variance (Hayes, 2018); therefore, the interpretation focused on statistically significant interaction terms and the model's overall fit. Thus, the variables were retained in their original metric to facilitate the interpretation of the coefficients.

The data were reviewed to detect any missing values or inconsistencies. Missing data were handled using listwise deletion and mean imputation according to the previously established criteria.

Results

To address O1, descriptive analyses were conducted on the scores reported by the students (Table 1). Regarding the scores for the constructs, similar means were observed for both entrepreneurial knowledge and skills.

No statistically significant differences by gender were observed in knowledge, skills, or entrepreneurial potential,

Table 1

Scores, means, standard deviations, and minimum and maximum values of the study variables

	M	*SD*	Min	Max
Knowledge	3.3	0.9	1	5
Skills	3.5	0.9	1	5
Creativity	4	0.7	1	5
Leadership	3.7	0.8	1	5
Problem-solving	4	0.7	1.8	5
Motivation	4.1	0.7	1.4	5
Self-discipline	4.4	0.6	1	5
Entrepreneurial potential	4.1	0.5	1.6	5

except in the leadership dimension, where men scored higher than women (t (535) = 2.99, p = .003, d = .26). No significant differences were found in knowledge (F (3, 533) = 1.13, p = .34, η^2p = .006), skills (F (3, 533) = 2.08, p = .1, η^2p = .012), or entrepreneurial potential (F (3, 533) = 1.59, p = .19, η^2p = .009). However, differences were observed in the creativity (F (3, 533) = 2.68, p = .046, η^2p = .015), and motivation (F (3, 533) = 2.73, p = .043, η^2p = .015) subscales. After Bonferroni correction, only the difference in motivation between the ESO and Advanced Vocational Training groups remained, favouring the latter (DifM = 0.87, t = 2.74, p = .038, d = .27). Regarding creativity, although no comparison reached statistical significance, a moderate difference was observed between the Baccalaureate and Advanced Vocational Training groups, favouring the latter (DifM = 0.37, t = 1.9, d = .57).

The analyses of variance (ANOVA) conducted to evaluate the effect of school type on the variables entrepreneurial potential, knowledge, and skills did not reveal statistically significant differences. For entrepreneurial potential, a value was observed (F (2, 534) p = .12, η^2p = .008), indicating a low proportion of variance. No differences were found in knowledge (F (2, 534) = .27 p = .77, η^2p = .001), or skills (F (2, 534) p = .077, η^2p = .01). Taken together, these results suggest that the type of educational institution has no significant effect.

To address O2, as a preliminary step to analysing the mediating role of skills in the relationship between knowledge and entrepreneurial potential, Pearson correlations between quantitative variables were examined. As shown in Table 2, age was inversely related to the mother's (r = -.23, p < .001) and father's (r = -.13, p < .05) educational level. Likewise, both skills (r = .44, p < .001) and knowledge (r = .41, p < .001) were significantly associated with entrepreneurial potential, and perceived knowledge was significantly related to the overall skills score (r = .69, p < .001). Furthermore, the mother's educational level was associated with the motivation dimension (r = .14, p < .01) and, to a lesser extent, with personal control (r = .1, p < .05). Finally, the correlations among the entrepreneurial potential factors were statistically significant with one another and with the total score (p < .001 in all cases).

Subsequently, the mediating role of skills in the relationship between knowledge and overall entrepreneurial potential was analysed using the PROCESS macro. The simple mediation model explained 46.9% of the variance in skills and 21.6% in entrepreneurial potential. As shown in Table 3, the results indicate that there was no direct effect of significance (the effect of knowledge on entrepreneurial potential) (B = .11, z = 1.73, p > .05).

The indirect effect through perceived skills was statistically significant (B = .12, z = 2.58, p = .01). This implies that skills

Table 2

Pearson correlations between age, family educational level, and scores on skills, knowledge, and entrepreneurial potential

Variable	1	2	3	4	5	6	7	8	9	10	11
1. Age	—										
2. Educational level (father)	-.13*	—									
3. Educational level (mother)	-.23***	.57***	—								
4. Skills	-.06	.04	.04	—							
5. Knowledge	.06	.05	.01	.69***	—						
6. Entrepreneurial potential	.06	-.04	-.07	.44***	.40***	—					
7. Creativity	.09*	-.03	-.06	.35***	.33***	.82***	—				
8. Leadership	-.01	.03	.02	.42***	.40***	.74***	.55***	—			
9. Problem-solving	.06	-.04	-.03	.38***	.36***	.84***	.6***	.56***	—		
10. Motivation	.08	-.07	-.14**	.37***	.33***	.86***	.65***	.47***	.63***	—	
11. Self-control	.010	-.08	-.11*	.29***	.21***	.78***	.58***	.36***	.63***	.69***	—

*p < .05, **p < .01, ***p < .001

Table 3

Parameters of mediation model

								95% CI	
Effect	Predictor	Mediator	VD	B	*SE*	z	*p*	Lower	Upper
DE	Knowledge	-	Entrepreneurial Potential	0.11	0.06	1.73	.084	-.01	.24
IE	Knowledge	Skills	Entrepreneurial Potential	0.12	0.05	2.58	.01	.03	.21
TE	Knowledge	-	Entrepreneurial Potential	0.23	0.03	7.85	< .001	.17	.29

Note. DE = Direct Effect; IE = Indirect Effect; TE = Total Effect; B = unstandardised coefficient; *SE* = Standard Error.

Table 4

Summary of the regression model

Model	R	R^2	Adj. R^2	RMSE	ΔR^2	ΔF	$df1$	df^2	p
M_0	.51	.27	.26	.46	.27	26.11	5	362	< .001
M_1	.55	.3	.29	.45	.04	4.97	4	358	< .001

Note. M_0 includes: Mother's educational level, Knowledge, Skills, Age, Father's educational level. M_1 includes: Mother's educational level, Knowledge, Skills, Age, Father's educational level, Mother's educational level * Skills, Father's educational level * Skills, Father's educational level * Knowledge, Mother's educational level * Knowledge.

act as a mediator in the relationship between knowledge and entrepreneurial potential, indicating that a greater amount of knowledge is related to greater entrepreneurial potential, partly because of its influence on skills.

Finally, the total effect of knowledge on entrepreneurial potential was statistically significant (B = .23, z = 7.9, p < .001). Although the direct effect is not significant, the overall impact is relevant when considering the mediating role of the skills. This reinforces the importance of developing both knowledge and skills to foster entrepreneurship, thereby supporting H1's assertion.

In addition, the coefficients for the individual effects showed a positive and significant effect of skills on entrepreneurial potential (Estimate = .18, SE = .07, z = 2.62, p = .009), such that higher skills were associated with greater entrepreneurial potential. Likewise, knowledge had a positive and significant effect on skills (Estimator = .66, SE = .07, z = 10.39, p < .001), indicating that higher knowledge scores were associated with greater skill development. Taken together, these results support the relevance of skills in the relationship between knowledge and entrepreneurial potential.

To address H3, a hierarchical multiple regression was conducted to analyse the effect of age, paternal and maternal educational levels, and their interaction with knowledge and skills on entrepreneurial potential. Table 4 presents two linear regression models: a baseline or null model ($H2_0$) and an interaction model ($H2_1$). The $H2_0$ model included age, the educational level of the father and mother, knowledge, and skills as predictors, and showed an adjusted R^2 of .26, explaining 25.5% of the variance in entrepreneurial potential, with a statistically significant overall fit (F (5, 362) = 26.11, p < .001).

After incorporating the interactions into the $H2_1$ model, the adjusted R^2 rose to 30.4%, with the model remaining significant (F (9, 358) = 17.35, p < .001). The improvement over the $H2_0$ model was confirmed by the change in R^2 (ΔR^2 = .039), which indicated an additional explained variance of nearly 4%, with this increase being statistically significant (ΔF (4, 358) = 4.97, p < .001). Consequently, the inclusion of interactions significantly improved the explanatory power of the model.

In the $H2_1$ interaction model, several changes occurred in the initial prediction pattern after the interactions were added. On the one hand, it is noteworthy that skills (β = .09; t = .42; p > .05) and knowledge (β = -.17; t = -.76; p > .05), on their own, no longer significantly influence entrepreneurial potential. On the other hand, the variable for maternal educational level, on its own, became statistically significant, showing a negative coefficient (β = -.68; t = - 2.76; p < .01). This result indicates that a lower maternal educational level, on its own, is associated with greater entrepreneurial potential.

Regarding the interactions included in the $H2_1$ model, the interaction between skills and the maternal educational level stands out. This interaction shows a positive and statistically significant effect (β = .78, t = 2.04, p < .05), indicating that the relationship between skills and the dependent variable increases as the maternal educational level rises. In other words, skills have a stronger association with outcomes as the maternal educational level increases. However, the interaction between maternal educational level and knowledge was not significant (Table 5).

Regarding interactions with paternal educational level, it is noteworthy that the effects were not significant in the interaction with knowledge (β = .62, t = 1.71, p > .05) or skills (β = - .21, t = -.54, p > .05), indicating that the relationship between knowledge and skills and entrepreneurial potential does not vary according to paternal educational level. Nevertheless, the interaction with knowledge, despite not reaching statistical significance, shows a tendency to positively influence the a priori inverse effect of paternal education on entrepreneurial potential. This relationship may serve as a basis for future investigations into these patterns of relationships. Taken together, these interactions highlight how the level of maternal education modulates the effects of skills, age, and knowledge on entrepreneurial potential. Overall, despite the influence of the other factors, considering the interactions specified in the model, it was noted that maternal educational level and its interaction with skills were the only statistically significant influences and that, as a result, they explained 30.4% of the variance in entrepreneurial potential. This result suggests the importance of maternal education and the mediating role of skills in predicting entrepreneurial potential.

Discussion

This study aimed to analyse the influence of educational and family factors on the development of entrepreneurial potential among secondary school students. The discussion is organised according to the stated objectives: (O1) descriptive and comparative analysis; (O2) the mediating role of skills, along with the testing of H1; and (O3) the effect of parental educational level in relation to H2.

Regarding O1, which aimed to describe and compare scores on knowledge, skills, and entrepreneurial potential according to sociodemographic and educational variables, the results showed notable homogeneity across gender, educational stage,

Table 5

Regression model coefficients

Model		B	*SE*	β	*t*	*p*	95% CI	
							Lower	Upper
M_0	(Intercept)	3.06	0.16		18.84	< .001	2.74	3.37
	Knowledge	0.09	0.04	0.15	2.26	.025	.01	.16
	Skills	0.24	0.04	0.39	6.02	< .001	.16	.31
	Age	0.01	0.01	0.06	1.19	.23	-.004	.02
	Father's educational level	-0.01	0.02	-0.03	-.5	.62	-.049	.03
	Mother's educational level	-0.01	0.02	-0.07	-1.25	.21	-.065	.01
M_1	(Intercept)	4.34	0.35		12.36	< .001	3.65	5.03
	Knowledge	0-.10	0.14	-0.17	-.76	.45	-.35	.15
	Skills	0.06	0.14	0.1	.42	.68	-.22	.33
	Age	0.004	0.01	0.04	.91	.36	-.005	.01
	Father's educational level	-0.12	0.09	-0.33	-1.36	.17	-.29	.05
	Mother's educational level	-0.25	0.09	-0.68	-2.76	.006	-.42	-.07
	Mother's Education Level * Skills	0.06	0.03	0.78	2.04	.04	.002	.13
	Father's Education Level * Skills	-0.02	0.03	-0.21	-.54	.59	-.08	.05
	Father's Education Level * Knowledge	0.05	0.03	0.62	1.71	.09	-.008	.11
	Mother's Education Level * Knowledge	-0.01	0.03	-0.06	-.15	.88	-.06	.06

Note. Father's ed. level = Father's educational level; Mother's ed. level = Mother's educational level; *SE* = standard error.

and school type. No significant differences were observed in knowledge, skills, or entrepreneurial potential, suggesting that these variables were relatively uniformly distributed across the analysed sample.

However, specific differences were identified in the dimensions of leadership, creativity, and motivation of the two groups. Males scored significantly higher on leadership than did females. These findings support the development of inclusive entrepreneurship education that incorporates both training in personality traits and the design and implementation of personalised educational strategies to foster entrepreneurship. Additionally, vocational training students were distinguished in terms of motivation. This analysis aligns with recent studies showing higher motivation and creativity among vocational training students (Azqueta et al., 2024; Gielnik et al., 2019;). Previous research has confirmed a strong connection between mindset and entrepreneurial intentions among vocational training students (Handayati et al., 2020). They view entrepreneurial training as a means of facilitating their transition into the workforce (Higgins & Refai, 2017). Experiential learning and project-based pedagogy implemented in vocational education enable knowledge transfer and experimentation in the field.

Regarding H2, which aimed to analyse the mediating role of entrepreneurial skills in the relationship between knowledge and entrepreneurial potential, the results clearly showed a significant indirect but not direct effect of knowledge on entrepreneurial potential. This pattern indicates that knowledge alone is not sufficient to increase entrepreneurial potential; rather, it must be channelled through skill development. In this sense, skills act as a key explanatory mechanism, enabling the transformation of knowledge into effective entrepreneurial dispositions.

Based on these results, H1 is confirmed, as it is empirically demonstrated that entrepreneurial skills mediate the relationship between knowledge and entrepreneurial potential. This finding is consistent with theoretical models that highlight the need to integrate declarative knowledge and applied competencies (Nabi et al., 2018; Núñez-Canal et al., 2023), reinforcing the idea that entrepreneurial education should be oriented toward a competency-based approach and not be exclusively theoretical.

Regarding H3, which focuses on analysing the effect of parental educational level and its interaction with knowledge and skills, recent research indicates that the education families have received impacts young people's behaviour, both directly and indirectly, with parents serving as the primary agents of entrepreneurial literacy (Yesmin et al., 2024). Our results show a complex and partially divergent pattern with respect to the proposed hypothesis. On the one hand, we find that paternal educational level does not have significant effects, either directly or through interaction, suggesting that this variable has little influence on entrepreneurial potential. However, maternal educational level does show significant effects, especially in interaction with skills, indicating that the impact of these skills on entrepreneurial potential increases as the maternal educational

level rises. However, the direct effect of parental educational level was neither positive nor consistent with the initial hypothesis. In fact, the model shows a negative coefficient for the maternal educational level when considered in isolation. Consequently, H2 is not confirmed, since no direct positive relationship is observed between parental educational level and entrepreneurial potential, as proposed in this study. However, the results suggest a more complex contextual effect, where maternal educational level acts as a moderating variable in combination with skills.

These findings are partially consistent with the literature highlighting the role of the family environment in socialization and entrepreneurial education (Anderson & Miller, 2003; Dou et al., 2021; Sinaga et al., 2024; Zellweger et al., 2011), although they qualify the notion of a direct relationship between parental educational attainment and entrepreneurial potential. Adolescents can implicitly and explicitly acquire entrepreneurial attitudes through the family environment (Prabandari et al., 2024). In this regard, the results suggest that family influence may operate more through relational and competency-based processes than through structural indicators, such as educational attainment. Regarding family background, it has been shown that the educational resources available at home influence young people's behaviour (Noh, 2022). Furthermore, the discrepancy between the correlational analyses and multivariate models can be explained by the strong relationship between knowledge and skills, which affects the estimation of unique effects in models with multiple predictors (Hayes, 2018). In this vein, future research could delve deeper into the specific influence of the level and type of maternal and paternal education, incorporating other relevant contextual variables, as well as longitudinal designs and analytical strategies that allow for improved handling of missing data and reduced multicollinearity in models with such interactions.

Limitations and practical implications

The first limitation is that the cross-sectional design prevents the establishment of causal relationships between the variables analysed; therefore, the results should be interpreted in terms of association. Second, the use of self-report measures may have increased method-related variance and the influence of social desirability on the responses. Furthermore, parental educational attainment had a significant percentage of missing data, which could have affected the stability of the estimates and interpretation of the observed effects. Finally, other potentially relevant contextual variables, such as socioeconomic status, family occupation, or educational resources available at home, were not included, and these could be related to both the development of entrepreneurial knowledge and skills and students' entrepreneurial potential. Consequently, the generalisability of the results is limited to samples with similar characteristics.

From an applied perspective, the results suggest the advisability of designing educational interventions that integrate entrepreneurial knowledge and skills, avoiding exclusively theoretical approaches, and favouring proposals oriented toward practical application. Furthermore, the findings highlight the importance of considering the family context in designing entrepreneurial education programs, particularly regarding the role that parental educational attainment may play in shaping entrepreneurial potential.

Conclusions

The main contribution of this study lies in analysing the relationship between parental educational attainment and entrepreneurial potential, as well as the role of entrepreneurial knowledge and skills in this relationship. Likewise, gender-based analyses allow for the identification of potential differences in certain dimensions; however, these results should be interpreted with caution and without normative interpretations, given that the cross-sectional design and the use of self-reports do not allow for causal inferences or the derivation of specific training recommendations for one group or another.

Ethical statement

The Biomedical Research Ethics Committee of Andalusia, Spain, approved this research with the following code: (C.P.ABG21-X.1.0851-N-21). Date of approval 16 January 2021.

Authors contributions

Conceptualization: R.S.-P.; A.M.-G.; A.A.
Methodology: P.G.-G.; R.S.P.
Data curation: R.S.-P.; A.M.-G.; A.A.
Investigation: R.S.P.; A. M.-G.; A.A.
Formal analysis: A.A.
Writing – Original draft: A.M.G.; A.A.; R.S.-P.

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Declaration of interests

The authors declared no potential conflicts of interest with respect to the research, aytgirsguom abd/or publication of this article.

Data availability statement

The data that support the findings of this study are available on request from the first author.

References

Ajzen, I. (1991). The theory of planned behavior. *Organizational Behavior and Human Decision Processes*, *50*(2), 179-211. https://doi.org/10.1016/0749-5978(91)90020-T

Anderson, A. R., & Miller, C. J. (2003). "Class matters": human and social capital in the entrepreneurial process. *The Journal of Socio-Economics*, *32*(1), 17-36. https://doi.org/10.1016/S1053-5357(03)00009-X

Aragón-Sánchez, A., Baixauli-Soler, S., & Carrasco-Hernandez, A. J. (2017). A missing link: the behavioral mediators between resources and entrepreneurial intentions. *International Journal of Entrepreneurial Behavior & Research*, *23*(5), 752-768. https://doi.org/10.1108/IJEBR-06-2016-0172

Azqueta, A., Sanz, R., Núñez-Canal, M., & Montoro-Fernández, E. (2024). Evaluación del impacto de un programa de formación del potencial emprendedor en estudiantes de educación secundaria. *Estudios sobre Educación, 47*, 201-225. https://doi.org/10.15581/004.47.009

Bernal-Guerrero, A., Cárdenas-Gutiérrez, A., & Montoro-Fernández, E. (2020). Basic business knowledge scale for secondary education students. Development and validation with Spanish teenagers. *PLoS ONE, 15*(7), Article e0235681. https://doi.org/10.1371/journal.pone.0235681

Bernal-Guerrero, A., & Cárdenas-Gutiérrez, A. (2021). La educación de la competencia emprendedora como iniciativa y autonomía personal. *Cuestiones Pedagógicas, 2*(30), 27-42. https://doi.org/10.12795/CP.2021.i30.v2.02

Bernal-Guerrero, A., Cárdenas-Gutiérrez, A., & Athayde, R. (2021). Test de potencial emprendedor: adaptación al español (ATE-S). *Bordón, 73*(1), 19-38. https://doi.org/10.13042/Bordon.2021.71417

Clark, D. R., Pidduck, R. J., Lumpkin, G. T., & Covin, J. G. (2024). Is it okay to study entrepreneurial orientation (EO) at the individual level? Yes! *Entrepreneurship Theory and Practice, 48*(1), 349-391. https://doi.org/10.1177/10422587231178885

Dou, J., Li, E., & Holt, D. (2021). Transgenerational entrepreneurship in entrepreneurial families: what is explicitly learned and what is successfully transferred? *Entrepreneurship and Regional Development, 33*(5-6), 427-441. https://doi.org/10.1080/08985626.2020.1727090

European Commission/Eurydice (2025). *Key competences for lifelong learning*. European Union.

Fayolle, A., & Gailly, B. (2015). The impact of entrepreneurship education on entrepreneurial attitudes and intention: hysteresis and persistence. *Journal of Small Business Management*, *53*(1), 75-93. https://doi.org/10.1111/jsbm.12065

Gielnik, M.M., Frese, M., Bischoff, K. M., Muhangi, G., & Omoo, F. (2019). Positive impact of entrepreneurship training on entrepreneurial behavior in a vocational training setting. *Africa Journal of Management*, *2*(3), 330-348. https://doi.org/10.1080/23322373.2016.1206804

Global Entrepreneurship Monitor. (2023). *Global report 2022/2023*. GEM Consortium.

Handayati, P., Wulandari, D., Soetjipto, B. E., Wibowo, A., & Narmaditya, B. S. (2020). Does entrepreneurship education promote vocational students' entrepreneurial mindset? *Heliyon*, *6*(11), Article e05426. https://doi.org/10.1016/j.heliyon.2020.e05426

Higgins, D., & Refai, D. (2017). Creating meaningful entrepreneurial practice: crafting pedagogical awareness. In P. Jones, G. Maas & L. Pittaway, *Entrepreneurship education: new perspectives on research, policy & practice. Contemporary Issues in Entrepreneurship Research* (pp. 171-195). Emerald Group Publishing. https://doi.org/10.1108/S2040-724620177

Hill, N. E., & Tyson, D. F. (2009). Parental involvement in middle school: a meta-analytic assessment of the strategies that promote achievement. *Developmental Psychology*, *45*(3), 740-763. https://doi.org/10.1037/a0015362

JASP Team (2024). JASP (Version 0.18.3) [Software].

Jeynes, W. H. (2017). A meta-analysis: the relationship between parental involvement and Latino student outcomes. *Education and Urban Society*, *49*(1), 4-28. https://doi.org/10.1177/0013124516630596

Jin, H., Jiao, S., Ma, X., & Xia, Y. (2024). Cultural capital as a predictor of school success: evidence and gender differences in Chinese middle schools. *Humanities and Social Sciences Communications*, *11*, Article 858. https://doi.org/10.1057/s41599-024-03382-x

Kim, S. (2022). Fifty years of parental involvement and achievement research: a second-order meta-analysis. *Educational Research Review*, *37*, Article 100463. https://doi.org/10.1016/j.edurev.2022.100463

Lackéus, M. (2020). Comparing the impact of three different experiential approaches to entrepreneurship in education. *International Journal of Entrepreneurial Behavior & Research*, *26*(5), 937-971. https://doi.org/10.1108/IJEBR-04-2018-0236

Li, C. H. (2016). Confirmatory factor analysis with ordinal data: comparing robust maximum likelihood and diagonally weighted least squares. *Behavior Research Methods, 48*(3), 936-949. https://doi.org/10.3758/s13428-015-0619-7

Martínez-Gregorio, S., Badenes-Ribera, L., & Oliver, A. (2021). Effect of entrepreneurship education on entrepreneurship intention and related outcomes in educational contexts: a meta-analysis. *The International Journal of Management Education*, *19*(3), Article 100545. https://doi.org/10.1016/j.ijme.2021.100545

Nabi, G., Walmsley, A., Liñán, F., Akhtar, & Neame, C. (2018). Does entrepreneurship education in the first year of higher education develop entrepreneurial intentions? The role of learning and inspiration. *Studies in Higher Education, 43*(3), 452-467. https://doi.org/10.1080/03075079.2016.1177716

Newman, A., Obschonka, M., Schwarz, S., Cohen, M., & Nielsen, I. (2019). Entrepreneurial self-efficacy: a systematic review of the literature on its theoretical foundations, measurement, antecedents, and outcomes, and an agenda for future research. *Journal of Vocational Behavior*, *110*, 403-419. https://doi.org/10.1016/j.jvb.2018.05.012

Núñez-Canal, M., Sanz Ponce, R., Azqueta, A., & Montoro-Fernández, E. (2023). How effective is entrepreneurship education in schools? An empirical study of the new curriculum in Spain. *Education Sciences*, *13*(7), Article 740. https://doi.org/10.3390/educsci13070740

Noh, M. (2022). Effect of parental financial teaching on college students' financial attitude and behavior: the mediating role of self-esteem. *Journal of Business Research, 143*, 298-304. https://doi.org/10.1016/j.jbusres.2022.01.054

OCDE. (2023). *OECD SME and Entrepreneurship Outlook 2023*. OECD Publishing.

Peña, A, Pegalajar, C., & Montes, A. (2023). El reto de la educación en emprendimiento en la universidad: percepciones del estudiantado de educación. *Revista de Investigación Educativa, 41*(1), 205-222. https://doi.org/10.6018/rie.516571

Prabandari, S., Yulianti, I., Satria, D., & Kurniasari, I. (2024). A study of emerging entrepreneurs: do parent quality shaping entrepreneur intention? *Revista de Gestão e Secretariado, 15*(3), Article e3578. https://doi.org/10.7769/gesec.v15i3.3578.

Rockwood, N. J., & Hayes, A. F. (2020). Mediation, moderation, and conditional process analysis: Regression-based approaches for clinical research. In A. G. C. Wright & M. N. Hallquist (Eds.), *The Cambridge handbook of research methods in clinical psychology* (pp. 396–414). Cambridge University Press. https://doi.org/10.1017/9781316995808.037

Shi, Y., Yuan, T., Bell, R., & Wang, J. (2020). Investigating the relationship between creativity and entrepreneurial intention: the moderating role of creativity in the theory of planned behavior. *Frontiers in Psychology*, *11*, Article 01209. https://doi.org/10.3389/fpsyg.2020.01209

Sieger, P., Fueglistaller, U., Zellweger, T., & Braun, I. (2021). *Global student entrepreneurship 2021: Insights from 58 countries*. St.Gallen/Bern.

Sinaga, S., Ilham, L., Alamsyah, M., Nasrudin, A., Ananda, Y., & Samsidar, S. (2024). Role of entrepreneurship education and family environment on entrepreneurial skills of vocational business students. *Journal Pendidikan Dan Kewirausahaan, 12*(1), 256-268. https://doi.org/10.47668/pkwu.v12i1.1095

Yesmin, M. N., Hossain, M. A., Islam, M. S., Rahman, M. M., Jahan, N., & Kim, M. (2024). Entrepreneurial intentions and the role of educational and social support: do the self-efficacy and the theory of planned behavior variables matter? *Management Journal*, *59*(4), 366-385. https://doi.org/10.1108/RAUSP-03-2024-0053

Zellweger, T., Sieger, P., & Halter, F. (2011). Should I stay or should I go? Career choice intentions of students with family business background. *Journal of Business Venturing, 26*(5), 521-536. https://doi.org/10.1016/j.jbusvent.2010.04.001

Appendix

Summary of the calibration of the instrument scores in the study sample

Scale	Original Structure Dimension (*n* items)	Result in the Sample	Type of Analysis Conducted	Fit Indices	Reliability
CON (Basic Entrepreneurial Knowledge)	3 dimensions: management (9), legal (5), strategic (6) – 18 items total	Original structure does not fit adequately	EFA → unifactorial solution	$\chi^2(135) = 729$, $p < .001$; CFI = .91; TLI = .9; SRMR = .04; RMSEA = .09	α = .953; ω = .953
HAB (Entrepreneurial Skills)	3 dimensions: operations/marketing (6), socio-legal (4), economic-financial (3) – 13 items total	Original structure does not fit adequately	EFA → unifactorial solution	$\chi^2(65) = 383.693$, $p < .001$; CFI = .93; TLI = .92; SRMR = .04; RMSEA = .09	α = .943; ω = .944
ATE-S (Entrepreneurial Potential)	5 dimensions: creativity (4), personal control (5), achievement (5), leadership (4), intuition (4) – 22 items total	Original structure confirmed	CFA → model 5-Factors	$\chi^2(199) = 403$, $p < .001$; CFI = .979; TLI = .975; IFI = .979; RMSEA = .044	Total: α = .895; ω = .904; Factors: ω = .70–.80 (except Personal Control ω = .574)