

*Research article***Budding entrepreneurs. The role of University in spreading early entrepreneurial mindset in school kids****Michela Floris*, Angela Dettori and Elisabetta Reginato**

Department of Economics and Business, University of Cagliari, Cagliari, Italy

*** Correspondence:** Email: micfloris@unica.it.

Abstract: Purpose of the paper: In a society facing epochal challenges, all educational levels are called to propose new answers and strategies. This paper suggests the collaboration between Universities and Primary Schools as a means to spread entrepreneurial mindsets in children and to conceive useful answers to social challenges. Methodology: This research is based on an in-depth analysis of an ongoing project that engages one University and three Primary Schools, involving 175 children aged from 6 to 10 years. To evaluate the project's efficacy, families and teachers were invited to fill out a questionnaire, and a statistical analysis has been done. Results: Findings show the efficacy of the project in terms of the improvement of social orientation, creativity, self-esteem, perseverance, autonomy, and proactivity of children. These skills have been registered within the educational context and the social life of children, underlining a positive effect on society. Research limitations: The main drawbacks refer to two distinct sides: the study and the evaluation of the project's efficacy. Regarding the study, focusing on a single project inhibits the possibility of generalizing results. Further studies can consider enlarging the sample, by analyzing similar projects oriented to primary schools, or propose comparative studies focused on different school levels, to deepen the knowledge of the best age to launch entrepreneurial projects. Concerning the evaluation of the project's efficacy, as it has been done in the short term, results could be affected by the initial enthusiastic appreciation of the proposed activities. However, to assess the long-term efficacy, further studies can replicate the analysis to observe the project's effects on the children's life, jointly considering school and family. Academic and practical implications: Theoretically, this study contributes to the literature on entrepreneurial education in primary schools by introducing the influential role of University. For practitioners, this research offers best practices to inspire other successful cases to spread an early entrepreneurial mindset. Originality of the paper: The study elucidates the relevance of the early entrepreneurial mindset as a means to face the current social

challenges and suggests developing that entrepreneurial mindset by building a bridge between University and Primary schools. Specifically, through the in-depth analysis of a project, this study spotlights how Universities can support primary schools in overcoming difficulties due to resources constraint and lack of adequate entrepreneurial and managerial competencies by promoting extracurricular projects managed by researchers in Management and Entrepreneurship.

Keywords: entrepreneurial mindset; entrepreneurial competencies; entrepreneurial education; university; primary schools

JEL Codes: A20, A21, J24, L26, M21

1. Introduction

Recent changes in political, social, economic, and cultural settings and hyper turbulence (McCann and Selsky, 1984) are concurring to generate epochal challenges for societies (Somprach et al., 2014). Global trends in the labor market, mobility, and migration, gender and sexuality, poverty, different disabilities, also in learning contexts, and other dynamics are calling into action institutions and communities. For this reason, changing past mindsets and improving culture can help in facing the new phenomenon, by managing the increasing diversity, by facing technological challenges (Hartikainen et al., 2023), and by reducing social and economic inequalities (Löw, 2020; Mucci, 2019, Rustiana et al., 2022). The latter are among the 17 Sustainable Development Goals (SDGs) associated with the 2030 Agenda whose implementation implies conferring a new role to those institutions that can effectively contribute to creating the basis for a new culture. These institutions are schools and universities where children, adolescents, and youth can find suitable strategies for building a better sustainable society (Amirkhanyan et al., 2019; Canrinus et al., 2019; Acosta Castellanos, and Queiruga-Dios, 2022). In this sense, teachers are invited to create a fertile learning environment able to develop soft skills and ensure the spread of positive student outcomes based on an entrepreneurial mindset (Floris and Floris, 2021). The entrepreneurial mindset can be defined as the ability to make sense and act under uncertain conditions (McGrath and MacMillan, 2000), guaranteeing equity, non-discrimination, self-efficacy, ethical behaviors, and value creation (Floris and Dettori, 2020; Floris and Pillitu, 2019). More in detail, due to the above-mentioned challenges, the role of universities and schools is changing. They represent places that not only impart and develop subjects but also spur children, adolescents, and young to be competent adults, able to promote values in their social contexts and develop sustainable societies (Cuesta-Claros et al., 2022). Focusing on universities, engaged in their third mission and, recently, in their fourth mission (Cooper, 2009, 2017; Boffo and Cocorullo, 2019), the role of scholars is moving towards a social justice orientation, focused on the “transformation of socio-economic-cultural inequalities” (Cooper, 2015, p. 240). This change calls into action academics in a quadruple helix of university-industry-government-civil society (Cooper, 2017; Cai and Lattu, 2022), called the fourth dimension that is often described as the end-user, customer, or community (Campbell and Carayannis, 2016; Carayannis et al., 2018; Morawska-Jancelewicz, 2022). According to this perspective, the lack of theoretical and empirical studies that explore the challenges of the quadruple helix model (Höglund and Linton, 2018; Patrício and Ferreira, 2023) is stimulated. Moreover, it is particularly exciting

concerning entrepreneurial education (Rebernik, 2009), considering also in terms of social innovation promotion (Morawska-Jancelewicz, 2022), as a result of the progressive transformation of societies from managerial to entrepreneurial economies (Audretsch et al., 2007a, 2007b; Volkmann et al., 2021). that need creativity and individual entrepreneurial mindsets as keys of success. In line with this perspective, entrepreneurship education may shift graduates from job searchers to job creators transforming educated young people from social liabilities to social assets who will power the country's economic progress (Yan et al., 2022). This situation is particularly relevant in specific areas, characterized by unemployment, poverty, difficulties in accessing financial resources, marginality, and geographical isolation. Specifically, building and developing an entrepreneurial mindset can create entrepreneurial ecosystems able to promote the development of entrepreneurship or self-employment.

Many scholars (Filion, 1994; Gasse, 1985) have highlighted that childhood and adolescence are the ideal stages to construct and enhance an entrepreneurial mindset, particularly useful to create a better society, especially in terms of problem-solving, innovation, and team-building skills (Heinonen, 2007), altruism (Gilder, 1981), perseverance, self-efficacy, social orientation (Farrington et al., 2012), opportunity recognition (Fisher et al., 2008), and entrepreneurship development (Lanivich et al., 2021). However, notwithstanding these assumptions, "how" an entrepreneurial mindset can be taught remains a significant challenge (Daspit et al., 2023; Rodriguez and Lieber 2020; Floris and Dettori, 2020; Floris and Pillitu, 2019; Jones, 2019; San Tan and Ng, 2006). Stimulated by this debate, making an articulated reflection on the university's fourth mission and problematizing these concepts (Alvesson, and Sandberg, 2011), this paper aims to answer the following question:

"Can the collaboration between University and Primary School spread an early entrepreneurial mindset to effectively face current social challenges?"

Following the assumption of Filion (1994) and Gasse (1985), this study analyses and discusses a project carried out by the collaboration between University and Primary School. The project was launched in an Italian region characterized by marginality, isolation, unemployment, and low level of entrepreneurial initiatives, and thus, particularly interesting in developing early entrepreneurial mindsets and attitudes, to create the bases for an entrepreneurial ecosystem that requires self-esteem, creativity, proactiveness, innovativeness, and other entrepreneurial skills that need to be developed since childhood to ensure the goal achievement. Through the calculation of the Efficacy Index, the study evaluates the project's effectiveness. This index was measured by means of a questionnaire filled by teachers and families, as the primary data source, and by semi-structured interviews as secondary sources of information.

Theoretically, the contribution of this study is threefold. First, findings contribute to the call for empirical studies about the quadruple helix model (Höglund and Linton, 2018), focusing on those that concern entrepreneurial education (Rebernik, 2009). Second, the findings contribute to the literature on entrepreneurial education in primary schools by introducing the influential role of University-Primary Schools collaboration. Third, the proposed Efficacy Index (EI) and the Overall Efficacy Index (OEI) can be useful tools to evaluate the efficacy of the projects.

For practitioners, this study suggests best practices to inspire other successful cases to spread an early entrepreneurial mindset.

The main drawbacks regard the project efficacy evaluation based only on one case. This case, however, represents a good starting point for further studies which are invited to repeat the assessment of the efficacy of similar projects, also in a long-term perspective.

2. Literature background

2.1. Building the entrepreneurial mindset

The entrepreneurial mindset is the ability to make sense, and act under uncertain conditions (McGrath and MacMillan, 2000). This ability is essential to increase competitiveness because it is growth-oriented and leads individuals to promote flexibility, creativity, innovation, and renewal (Ireland et al., 2003). Ireland et al. (2003) argue that an entrepreneurial mindset includes four main factors: the ability to identify opportunities; entrepreneurial alertness; the use of real options logic; the use of an entrepreneurial framework. The entrepreneurial mindset can be observed through the lens of two main perspectives. The first refers to business activities, while the second, spotlights the relevance of creative and innovative problem-solving, as a skill (Sarasvathy & Venkataraman, 2011). Several scholars state that teaching these skills is one of the best ways to prepare students to face societal complexity and future labor market requirements (Sahlberg and Oldroyd, 2010; Zupan et al., 2018; Sampene et al., 2022). Society, in fact, is changing and people and communities have to adequate their life to the present and upcoming conditions. In this scenario, school and university play a fundamental role in developing knowledge and skills and promoting sociocultural changes to respond to and anticipate social needs (Palumbo and Manna, 2019; Woods et al., 2019). The entrepreneurial mindset, defined by McGrath and McMillan (2000), like the capability to act and take initiatives under uncertain conditions, sounds able to synthesize the conglomerate of skills to face the changing society (Ngwoke et al., 2020).

Nowadays obtaining these skills is more urgent than in the past, due to the economic crisis, in which entrepreneurial skills can create value (Rae, 2010; Rustiana, 2022), by encouraging entrepreneurial intentions and activity (Kautonen et al., 2015; Kibler et al., 2014; Rauch and Hulsink, 2015), and removing entrepreneurial mindset from the constraining business context, involving the entire individual's life (Gibb, 2002). Societies are progressively shifting from managerial to entrepreneurial economies (Audretsch et al., 2007a, 2007b; Volkmann et al., 2021) and require entrepreneurial competencies (Floris and Floris, 2021).

2.1.1. The development of entrepreneurial competencies

There is broad agreement about the fact that entrepreneurial skills can be taught in schools and universities (Dubey, 2022; Chilenga et al., 2022), and thus spread into societies. However, the “how” remains a fascinating task that stimulates scholarly interest and debates (Motta and Galina, 2023; Cascavilla et al., 2022; Jones, 2019; San Tan and Ng, 2006). In this view, the educational context is relevant as well as the educational approach adopted (Kanselaar, 2002; Piaget, 1975; Lev Vygotsky, 1934; Bell and Liu, 2019). At the heart of the entire learning process has to be inserted the learner and the learning is the result of the interaction with a problematic context where learners construct their knowledge (Bruner, 1966; Piaget, 1936, 1975, 1976; Vygotsky, 1978a, 1978b).

As argued by Von Glasersfeld (2001), teaching and learning cannot always take place in the same way, and learning follows two different paths: “word for word” learning, and “conceptual learning.” The first relates to the ability to repeat some concepts, and it is simple to verify and evaluate. The second “is literally connected with the activity of conceptualization” (Von Glasersfeld, 2001, p. 162) and requires an intellectual effort to construct concepts and specific meanings.

Following the second path—conceptual learning, learners are stimulated to construct their knowledge that is not transferred passively but is personally built and generates failures or successes of personal actions. Accordingly, teaching can be considered a social activity and learning an individual process, stimulated by education. In this scenario, learners are the most active actors in their knowledge and skills construction, and teachers have to adapt their pedagogical approach to stimulate learners' critical thinking (Adey, 2005, 2006; Shayer and Adhmi, 2007). The main difficulty in this perspective can be found in the teachers' previous knowledge (McGuinness, 1999) that can contemporarily represent an obstacle or an incentive towards the construction of new concepts that implies the activation of learners' critical thinking skills.

Constructing and enhancing entrepreneurial competencies and spreading an entrepreneurial mindset in children implies a complete revision of the traditional top-down pedagogical approaches where the teacher imparts information and learners have to learn. Revisiting this approach means stimulating learners to construct their knowledge from their reality and contributing to the creation of critical thinking skills that allow them to understand what they live and experience. Thus, the educational and learning process shifts from a top-down to a bottom-up approach, involving teachers and learners in a circular constructionist relationship. In light of these statements, the development of a productive entrepreneurial mindset requires an approach that involves teachers and learners in the construction of new skills, embracing the idea of 'doing in order to understand, and understanding in order to do' (Avenier, 2000), by applying constructed knowledge and acquired skills in daily life (Berkovich and Eyal, 2019).

2.1.2. Difficulties and opportunities in developing an early entrepreneurial mindset

As already underlined, childhood and adolescence can be considered the right stages for constructing an entrepreneurial mindset by fostering positive attitudes toward developing the spirit of initiative and creating social and economic value (Filion, 1994; Gasse, 1985; Zupan et al., 2018). According to this, recent European policies have also outlined the relevance of enhancing social competencies, creativity, innovation, and entrepreneurship at all levels of education (Bourgeois, 2011; Bourgeois and Balcon, 2016). The OECD (Lackeus, 2015) and the European Union (Commission, 2006) report the relevance of acquiring an entrepreneurial mindset, conceiving the "sense of initiative and entrepreneurship" as one of the eight key competencies of life-long learning strategies (Bacigalupo et al., 2016).

Specifically, referring to the individual's ability to shape ideas into actions, the European Union sustains the relevance of including entrepreneurship in each nation's education policy (Sánchez, 2013), acquiring entrepreneurial skills like creativity, innovation, social orientation, risk-taking, opportunities identification, ethical values, and others. These skills can help to create social and economic value (Kautonen et al., 2015; Rae, 2010; Rauch and Hulsink, 2015).

However, notwithstanding the relevance of the topic (Moberg, 2014a; Rosendahl Huber et al., 2014), primary school teachers are often reluctant to introduce it within curricular activities (Commission, 2006; Lackeus, 2015). In fact, rather than recognizing its value, teachers often negatively react to the construction of an entrepreneurial mindset, based on entrepreneurial competencies, within their classrooms (Falk-Lundqvist et al., 2011), underestimating its importance in early education (Floris and Pillitu, 2019). Moreover, constructing an early entrepreneurial mindset is problematic because it needs definitional clarity, specific skills, attitudes, abilities, adequate organizational structures, and knowledge, which teachers seldom possess or that curricula and programs do not consider (Johannisson, 2010;

Komulainen et al., 2011; Surlemont, 2007). In this regard, primary education deserves particular attention (Gibb, 2008; Handscombe et al., 2008) to influence educational objectives and methods (Mwasalwiba, 2010) and emphasize cognitive and soft skills earlier than in later education (Cunha and Heckman, 2007; Rosendahl Huber et al., 2014). Obtaining an early entrepreneurial mindset means for children develop vital skills, such as problem-solving, innovation, team-building (Heinonen, 2007), altruism (Gilder, 1981), perseverance, social orientation, and self-efficacy (Farrington et al., 2012), and recognition of opportunities (Fisher et al., 2008). With such an entrepreneurial mindset, children can operate under uncertain conditions (Gibb, 2002); affecting positively future labor market (Moberg, 2014a), and creating new enterprises (Hassi, 2016; Obschonka et al., 2011). Additionally, an early entrepreneurial mindset empowers individuals and organizations to create value and promote future entrepreneurial ecosystems (Volkmann et al., 2019) by developing active citizenship, social inclusion, and collective socioeconomic enhancement (Falcone et al., 2015). Finally, encompassing the children's life entirely (Bourgeois and Balcon, 2016), an early entrepreneurial mindset spread values and create the conditions for positive socioeconomic development (Floris and Dettori, 2020; Floris and Pillitu, 2019).

Consistent with the literature, this paper, questions how an early entrepreneurial mindset can be stimulated and proposes the collaboration between University and Primary School as a suitable way to overcome difficulties and ensure the development of an entrepreneurial mindset in children.

2.2. The powerful collaboration between University and Primary School

As underlined in the previous section, Primary School teachers often denote a sort of resistance in acting to develop an entrepreneurial mindset in pupils. This can be due to the resource constraint, the lack of specific expertise and knowledge, and the low interest in acquiring adequate knowledge and competence (Floris and Dettori, 2020; Floris and Pillitu, 2019; Johannisson, 2010; Komulainen et al., 2011).

To overcome these difficulties, the European Union (Commission, 2013), and several scholars (Elmore, 1996; Floris and Pillitu, 2019; Gibb, 2008; Lackéus, 2014), have underlined that imparting entrepreneurial competencies in children can be ensured with beneficial collaborations with relevant stakeholders, such as University and, thus, academic researchers of management and entrepreneurship. A collaborative approach has recently found a full application in education (Eldridge et al., 2018; Floris and Dettori, 2020; Floris and Pillitu, 2019; Palmér et al., 2018), and stakeholder involvement has allowed to address the crisis of children dropping out of school and to foster students' motivation and competencies (Mulvey, 2016).

In this perspective, University is becoming a socially and economically relevant institution under the lens of the "Third Mission", especially concerning the contribution to building an entrepreneurial architecture (Vorley and Nelles, 2008). The combination of teaching, research, and third-stream activities reinforces relationships with other institutions and creates reciprocal development (Vorley and Nelles, 2008). More recently, University is evolving toward its "Fourth Mission" (Cooper, 2009, 2017), characterized by the renewed role of scholars, focused on the "transformation of socio-economic-cultural inequalities" (Cooper, 2015, p. 240). This epochal change involves academics in a quadruple helix of university-industry-government-civil society (Cooper, 2017), to solve social challenges (Campbell and Carayannis, 2016; Carayannis et al., 2018). This is particularly relevant concerning entrepreneurial education (Rebernik, 2009) because societies need the spread of entrepreneurial mindsets (Audretsch et al., 2007a, 2007b) and architecture that, following Vorley and Nelles (2009, p. 288), consists of "the

institutional, communicative, coordinating and cultural elements of an organization oriented towards innovation”, and comprises several elements, among which entrepreneurial culture (Burns, 2012). Regarding this, University, in line with its third and fourth mission, can help Primary Schools impart entrepreneurial competencies and help pupils construct their entrepreneurial mindset.

Notwithstanding, some scholars sustain that the entrepreneurial mindset cannot be taught because it depends on genetic factors (Nicolaou and Shane, 2009), while others argue that it can be imparted (Kuratko, 2005), through experiential and collaborative approaches (Pittaway and Cope, 2007) and it has to be learned from generation to generation using entrepreneurship education for kids and youth (Lindner, 2020). Following this perspective, Lackéus (2014) and Lackéus et al. (2013) underline that the entrepreneurial mindset can be built by imparting entrepreneurial competencies through an interactive process that encompasses two entities: the learner and who teaches skills orchestrating personal and collective competencies. In such a context, Primary School teachers and Academic researchers of management and entrepreneurship are invited to invest their effort, by collaborating to ensure children have the possibility to construct their entrepreneurial competencies. These involve several dimensions (Oosterbeek et al., 2010): achievement; autonomy; power; social orientation; self-efficacy; perseverance; risk-taking propensity; creativity; flexibility. Achievement refers to the ability to define and pursue goals. Autonomy is essential to make independent decisions and facing difficulties. Power means influencing the behavior of people. Social orientation reflects the need for matching defined goals with social needs and social activities. Self-efficacy refers to the awareness of personal abilities and is fundamental in pursuing desired goals. Perseverance means endurance and durability, with high resistance to stress and tiredness. Risk-taking propensity is the ability to act with uncertainty, accepting the possibility of losing the invested resources. Creativity is the aptitude to see and create something new and turn concerns and difficulties into opportunities. Finally, flexibility reflects the ability to adapt and change behavior by reacting to environmental change.

The mentioned competencies are mainly “non-cognitive” (Johannisson, 2010; Surlemont, 2007) and require learners to actively participate in activities where they have to assume responsibility for the entire process, by exercising direct influence and making decisions (Moberg, 2014b). As Cunha and Heckman (2007) note, non-cognitive skills cannot be ascribed merely to individual abilities, but rather their development depends on the educational context. Fostering these skills requires that teachers be facilitators and mentors to encourage children to leave their comfort zones to pursue their goals and ambitions (Surlemont, 2007). Therefore, teachers have to promote creativity, proactivity, and a sense of initiative-taking (Pepin, 2012), and learning environments need to be funny, authentic, collaborative, lead to self-awareness, and be open to diverse forms of talent (Collins, 1996).

3. Methodology

In order to answer the following research question: “*Can the collaboration between University and Primary School spread an early entrepreneurial mindset to effectively face current social challenges*”, this research adopts a single case study (Eisenhardt and Graebner, 2007; Yin, 1994) of a pioneering extracurricular project, and evaluates the efficacy of the proposed activities.

The project was launched in an Italian region that shows several concerns in terms of unemployment, lack of entrepreneurial competencies, isolation and rapid societal structure change, low-quality infrastructures, and youth depopulation. Due to this situation, the call to action for developing an early entrepreneurial mindset is urgent, thus, the children’s involvement can represent

the key to changing past-anchored culture, by shifting from old development trajectories, based on the traditional search for an employee job or the need for public intervention in the activities to self-employment and, therefore, to the development of entrepreneurial initiatives on the one hand, and to the improvement of the organizational contexts on the other (Olutuase et al., 2023).

The delivered project involved 175 children aged from 6 to 10 years and was carried out with an active collaboration between one University, represented by three researchers of Management and Entrepreneurship, and three Primary Schools, represented by ten teachers.

The research path was divided into two main phases: the first was related to the project delivery, and the second focused on evaluating the project's efficacy.

During the first phase, which started in September 2018 and finished in June 2019, the three scholars were involved in 60 hours of direct activities (seminars, laboratories, experiential initiatives), with the pupils and their classroom's curricular teachers. The used pedagogical approach can synthesize the main characteristics of the project, which was *learning through creating value for others* (Lackéus, Lundqvist, and Middleton, 2016). This approach can bridge the 'educational rift by combining standardized subject matter with individual students' needs and abilities' (Lackéus et al., 2016, p. 793). New means such as fables, usually used in studies on management and entrepreneurship for spreading entrepreneurial competencies (Das, 2014; Drucker, 1963; Smith and Neergaard, 2015), were introduced in the project. The relevance of the approach is generally recognized as a tool to revitalize entrepreneurship education (Beyes et al., 2016; Floris and Dettori, 2020; Floris and Pillitu, 2019; Hjorth, 2017; Johannisson, 2018), because fables help to 'communicate multidimensional concepts concisely' and allow 'rich lessons' (Short and Ketchen Jr, 2005, pp. 816–817), through which a learner can contextualize new information in a familiar context. Moreover, movies, music, laboratories, workgroups, and other means were used to enhance specific competencies.

The second phase of the research focused on the evaluation of the project's efficacy, and the data collection was based on a longitudinal study methodology (Langley, 1999; Leonard-Barton, 1990), characterized by the use of multiple sources of data. The primary source was a questionnaire addressed to teachers and a parent for each child. The questionnaire contained subtle differences consistently to the interviewees – teacher or parent, to clarify the project's effects on schooling and daily living. The questionnaire consisted of two main sections. The first was related to the informants' perception of the project's efficacy. The second, using a 1–5 Likert scale (Allen and Seaman, 2007) measured the level of increase, in the children involved in the project, of the following entrepreneurial skills (Johannisson, 2010; Oosterbeek et al., 2010): self-esteem and self-efficacy, social orientation, perseverance, autonomy, proactivity, and creativity.

The questionnaire was pilot tested before the leading survey on 15 parents. Following several modifications to the layout, order, and wording of some items, the questionnaire's internal reliability was 0.78, which was calculated via Cronbach's alpha. The final version of the questionnaire was approved by three academic experts in the field of management, following a content validity method (Churchill Jr, 1979). Then, the questionnaire was sent online from September to December 2019, and the data was collected in January 2020. The sample of respondents was defined following a non-probability procedure and a convenience sampling method, because of their accessibility and proximity to the researchers (Black, 1999) and the size can be considered sufficient for obtaining consistent statistical results (Bentler and Chou, 1987; Hair et al., 1998). Especially, respondents (teachers and parents) were selected based on the classrooms where the project was concluded and according to their availability. This allows for avoiding the nonresponse bias (Armstrong and Overton, 1977). Ethical

aspects were taken into consideration and respected throughout the study's implementation. Moreover, the goal of the research was clearly expressed and presented to the respondents in the questionnaire introduction; anonymity was guaranteed, and the respondent's consent to gather data and to use it for scientific and academic purposes was asked by means of a document.

All teachers involved in the delivered project (for a total of 10 teachers) and one parent for each learner (for a total of 175 parents) were invited to participate voluntarily in the study, for a sum of 185 involved individuals. The totality of teachers agreed while parents agreed for the 32% of the total. Thus, the online questionnaire was sent to and filled from 59 respondents: 10 teachers and 49 parents. The number of participants was considered adequate to guarantee the representativeness and significance of the sample (Bentler and Chou, 1987).

Secondary sources were direct observations of pupils within the classrooms during the project and informal semi-structured interviews with teachers and parents. These qualitative data allowed for triangulating information obtained by the analysis of questionnaires and comparing quantitative results with teachers' and parents' perceptions and thoughts and children's behaviors and expectations.

4. Results

The quantitative analysis was carried out by descriptive statistical analysis, and in a second step, by applying the Efficacy Index (EI) to the data collected.

Concerning the descriptive statistical analysis, findings showed that the project produced positive effects. Expressly, differently from what we expected, even if teachers taught different subjects and were different in terms of classroom and learner approach, they all agreed about the efficacy of the project. In detail, the totality of the teachers stated that the project has generated positive effects on curricular activities. About the overall evaluation of the project in terms of effects realized in pupils' daily lives, for 99% of the respondents, the project was useful and has stimulated children's curiosity (40%), interest (30%), reflection (29%), fun and boredom (1%). For the others, the project has produced no effects. No one of the respondents has replied that the project has raised difficulties, resistance, and discouragement.

The originality of this study comes from the second step of the analysis, which consists of evaluating the project's efficacy. In this regard, the efficacy has been assessed, by conceiving and then calculating a specific index for each item included in the questionnaire, the EI, measured applying the following formula:

$$EI = \{[\sum(X_i F_i)]/n\} - \mu \quad (1)$$

In the formula, X_i represents the mode of the variable (1; 2; 3; 4; 5), F_i the absolute frequency, that is the number of responses for each individual, n the sample size and μ is equal to 3, that is the central value of the scale. The EI can assume values between -2 and 2 . On one side, if the index registers negative values, it highlights the ineffectiveness of the project for the item analyzed; on the other side, if the index assumes positive values, it highlights the effectiveness of the project for the item analyzed. The latter can be weak, if the values are in the range $0 \leq I_e \leq 1$, or strong, if the values are in the range $1 < EI < 2$. If $I_e = 2$, there is full efficacy of the project.

Table 1 and Table 2 summarize the results of the second part of the questionnaire, where the respondents have answered according to a Likert scale from 1 to 5 (1 = not entirely agree; 5 = completely agree) to evaluate the efficacy of the project. In detail, table 1 presents the EI for each

element of every item, while table 2 indicates the overall EI (OEI) for each item. The OEI represents the mean of the different EI, and it was calculated by applying the following formula:

$$OEI = \sum EI/n \quad (2)$$

Table 1. EI for each element.

Items	EI for each element							
	(1)	EI	(2)	EI	(3)	EI	(4)	EI
Self-esteem/ Self-efficacy	Confidence	1.07	Acceptance	1.10	Self-awareness	0.74	Strengths and weaknesses	0.98
Social orientation	Relate	1.17	Co-operate	1.35	Listen	1.20	Self-control	0.81
Perseverance	Determination	1.19	Commitment	1.27	Capacity	1.08	Encouragement	1.05
Autonomy	Identify problems	0.80	Select information	1.00	Propose and select solutions	1.10	Identifying solutions	1.51
Proactivity	Plan	0.78	Time use	0.86	Manage change	0.86	Manage events	0.85
Creativity	Generate new ideas	1.22	Thinking outside the box	1.03	Make connections	0.98	Propose innovative solution	1.61

Source: Author's elaboration.

As shown in Table 1, concerning the elements identified for each item, the EI is always positive; therefore, there is consistency with the analyzed elements and the project's effectiveness.

Table 1 shreds of evidence that the highest value of EI is obtained for “propose innovative solutions” (EI=1.61), which signifies a substantial enhancement of identifying and proposing innovative answers to real and current problems and difficulties that children have to face. This element nurtures the item “creativity”. This result corroborates the direct observations. Stimulated by problem—solving activities, children have improved their abilities to conceive solutions based on “lateral thinking.” These initiatives have generated positive outcomes also in curricular activities, as the following quotes underline:

“Children have started to apply the lateral thinking principle in our lessons, by developing exciting paths and solutions above all in mathematics and sciences.” (Teacher)

“(...) now the motto is thinking differently; thus, my learners are leaving traditional solutions to solve a problem.” (Teacher)

Regarding daily lives, a parent said:

“My daughter has started to identify innovative ways to solve her little problems. (...) the most relevant result is, in my opinion, how she has renewed her method to study and do her homework. I'm delighted.” (Parent)

Particularly relevant also the element “cooperate” (EI=1.35), included in the “social orientation” item. The triangulation of data sources has been particularly helpful to investigate why this element has obtained the highest value. From the semi-structured interviews, it emerged that children understood the importance of cooperating within classrooms and families. The following quotes can help in interpreting the concept:

“Surprisingly, at the end of the project, children have begun to collaborate within the classroom, losing their individuality in favor of collective activities and results.” (Teacher)

“When the project finished, my son was sad, but I noted a lot of behavioral changes. One in particular: he started to collaborate with me. For example, he started tidying up his room and helping me with the housework. I hope it’s an effect that lasts over time (laughter).” (Parent)

On the opposite side, the lowest rate of EI has been registered for the element “self-awareness” (0.74), included in the item “self-esteem and self-efficacy”. This indicates that informants have argued that children have shown a weak enhancement of the level of self-awareness of their abilities. This evidence has emerged from direct observations, above all, concerning children that initially did not trust in their abilities and, at the end of the project, showed an adequate level of confidence. Moreover, the following exciting quotes can further underline this enhancement:

“Sometimes, children get discouraged and believe that they are not able to overcome the difficulties they face daily at school. The activities proposed during the project undoubtedly shook the children and led them to have greater confidence in their abilities.” (Teacher)

“My daughter has always doubted her abilities. Following the project, I see her more confident and aware of being able to carry out activities that she previously thought impossible to do.” (Parent)

From the EI of each item, it was possible to measure the OEI, in order to frame how self-esteem and self-efficacy, social orientation, perseverance, autonomy, proactivity, and creativity increased because of the project. Table 2 shows the results obtained.

Table 2. Overall efficacy index (OEI).

Items	OEI
Self-esteem/Self-efficacy	0.97
Social orientation	1.23
Perseverance	1.15
Autonomy	1.10
Proactivity	0.84
Creativity	1.21

Source: Author’s elaboration.

Surprisingly, “social orientation” represents the item that has registered the highest value of *OEI* (1.23), underlining that the project has slowly spread in children’s specific abilities. More in detail, children have actively improved their ability to relate to others, increase their skills to co-operate and work in a team, and enhance their propensity to listen. This improvement in social competencies has also emerged from direct observations. Initially, the children experienced many difficulties in working together, while, at the end of the project, they have shown their pleasure to relate with others, by collaborating and reciprocally listening. Therefore, inspiring quotes have also emerged from semi-structured interviews with parents and teachers:

“We have always found difficulties in engaging children to work in groups because individualism tended to prevail. Now, they have learned that the strength is in the group and, in particular, in everyone’s abilities.” (Teacher)

“My son has finally learned to collaborate and play with his brother. Furthermore, I realize that it has also improved his interpersonal relationships with other children. It tends to value differences and not highlight defects. I am delighted.” (Parent)

Concerning “creativity” (OEI 1.21), the pupils enhanced their innate creativity, improving the ability to create something new by recycling and in a situation of limited resources. In detail, the proposed activities consisted of inviting them to utilize a few resources to conceive and realize a new product for solving an emerging need. Direct observation showed a growing acquisition of creativity, especially in younger children. This would seem to highlight that creativity tends to decrease over time, and thus, it must be a skill to be nurtured and nurtured consciously.

Here are some meaningful extracts:

“Before the project, the children needed structured games, well-defined activities. Now they can organize their breaks independently and create new games without our intervention.” (Teacher)

“Now I can no longer throw anything away because my daughter gives new life to everything. She has learned to create new games using what she used to throw away.” (Parent)

About “perseverance” (OEI 1.15), children initially showed discouragement and resistance in carrying out complex and new tasks to pursue challenging goals. Slowly, they began to take up new challenges, commit themselves more, and, above all, not get discouraged in the face of the first difficulties. During the observations, it clearly emerged how the initial sense of discouragement and surrender in front of failures was replaced by a growing ability to resist stress and accept new challenges, learning new strategies to achieve the goals set, and demonstrating a growing commitment.

The following, are some interesting sentences:

“Faced with a particularly difficult math problem, the children would put up a wall and, instead of trying and accepting that they were wrong, they avoided getting involved. Today they ask me for increasingly complex tasks because they love to test themselves and commit themselves to achieve the goal.” (Teacher)

“I think the best effect of this project was what my son told me while I was complaining about an activity I had to do for my job that required a particular commitment. “The limits are only in our minds. Don’t say I can’t do it”. (...) I understood that my son has learned not to give up in the face of the first difficulties (...) it was a great life lesson for me.” (Parent)

Regarding “autonomy” (OEI 1.10), the children have shown a growing ability to operate autonomously, progressively reducing the request for support from teachers. If initially, the questions to the teachers were numerous both for requests for clarifications with respect to the objectives to be achieved and for suggestions on how to operate, the direct observations have highlighted a constant reduction in requests for support, with, on the contrary, a growing ability to operate by relying on their knowledge and skills.

Some significant phrases are as follows:

“(...) for example, for a text comprehension job, I have always received a very high amount of questions. Thanks to the project, the children have learned to depend less on me and to try to work independently.” (Teacher)

“Fortunately, my son has also learned to define his spaces and times on his own, without necessarily wanting me by his side. He is finally able to complete a task without asking for my help (...) this is a great satisfaction.” (Parent)

With reference to “self-esteem/self-efficacy” (OEI 0.97), the children improved their awareness of their abilities and their self-esteem, managing to achieve small unexpected successes, thanks to their personal commitment.

Some excerpts from the interviews with teachers and parents are particularly relevant:

“(...) their insecurity led them to convince themselves that they did not have the right skills for certain tasks. So even making them work in a team was not easy. Now, however, they have been encouraged to find their strengths and exploit them They feel much more motivated and effective!” (Teacher)

“My daughter always thought she wasn’t adequate and she didn’t have many friends. Today, however, she feels stronger and able to compare herself with others and, finally, she is starting to make friends with her classmates.” (Parent)

From the analysis has emerged that “Proactivity” represents the item with the lowest EI, notwithstanding the positive value underlined that children had increased their ability to plan and manage time, changes, and events. This result supports direct observations, in particular concerning the planning ability and the time use. Children have demonstrated an increasing ability to plan and to manage time effectively, but the registered results are not in line with the initial expectations. However, OEI is positive, and teachers and parents have elucidated their appreciation for this item.

A teacher has argued that:

“You probably would have expected a higher result, but I am delighted because I can tell you that they have improved in time management. There is still work to continue, but children have internalized that time is a strategic resource.” (Teacher)

According to, a parent underlined:

“Thanks to the project, my daughter spends less time chatting and finally uses it to do what she must. She finally realized that in doing so, she has much time to play and have fun, and, above all, she does not always hear me repeating to her to commit herself to make good use of time and to organize her work efficiently.” (Parent)

5. Discussion

This study aimed to answer the following research question: *“Can the collaboration between University and Primary School spread an early entrepreneurial mindset to effectively face current social challenges?”*

By analyzing in-depth a successful project that produced positive effects on children by developing an entrepreneurial mindset useful in schooling and in daily lives, findings allowed answering the research question. In fact, according to them, the collaboration between University and Primary School represents a successful means to spread an entrepreneurial mindset in children and concurs, in this way, to propose new and effective responses to present and future challenges that society has to face.

Specifically, the collaboration between University and Primary school took the form of providing an extra-curricular project aimed at implementing and developing entrepreneurial skills, to build a fundamental entrepreneurial mindset in all areas of individuals’ lives. Thanks to this collaboration, management, and entrepreneurship scholars have made themselves available to primary schools to fill the gaps relating to the skills of curricular teachers and the difficulties due to the lack of resources to be allocated both to teacher training and to the acquisition of external professionalism. Thanks to the third and fourth missions of the University it was possible to promote this initiative. What has emerged is that the project has produced numerous positive effects, profitably impacting soft skills, specifically entrepreneurial ones. In detail, what has emerged is that children have increased their social orientation, essential for the creation of a more inclusive society, as indicated by the 2030 Agenda. Furthermore, another competence that has been strengthened is that relating to creativity, although in the latter case,

a slight resistance was registered by children aged between 10–11, compared to the younger ones, to highlight that creativity is a skill that tends to decrease during a person's life as resistances take over due to the acquisition of certain mental patterns and behaviors induced by external influences. The improvement relating to perseverance was particularly significant, an almost absent skill initially which, however, was built up through the various laboratory activities proposed. Perseverance is a fundamental driver that allows individuals not to give up at the first difficulties, but on the contrary, to invest more effort and energy to achieve their goals. Furthermore, perseverance also allows you to set yourself more challenging goals and, therefore, to overcome your limits. Related to this aspect, there is also the improvement of autonomy and self-esteem, as well as self-efficacy, fundamental skills for achieving one's goals. In summary, the effects that the project has produced are particularly positive and, for this reason, the present study has several scholarly and practical implications.

Concerning theoretical implications, this research contributes to the literature in at least three ways.

First, this study has contributed to the call for empirical studies about the quadruple helix model (Höglund and Linton, 2018), focusing on those that concern entrepreneurial education (Rebernik, 2009). The analyzed project represents an experiential learning activity that calls into action University to generate positive outcomes in societies. That contributes to changing the past culture into a new one, based on the construction of an effective entrepreneurial mindset since childhood.

Second, this study contributes to the literature on early entrepreneurship education, focusing on this stream of research that is in its initial stage and deserves more attention (Gibb, 2008; Handscombe et al., 2008) from scholars because of its relevance (Moberg, 2014a; Rosendahl Huber et al., 2014). More in detail, this study proposes to fill the gap underlined by previous studies (Falk-Lundqvist *et al.*, 2011; Jones, 2019; San Tan and Ng, 2006) by proposing the collaboration between University and Primary School as a successful way to overcome the underestimation by teachers, due of their lack of specific skills, knowledge, and attitudes. Moreover, this study has obtained results that contrast with other studies that sustain that the entrepreneurial mindset cannot be taught because it depends on genetic factors (Nicolaou and Shane, 2009). Here, findings have shown that specific activities sustain children in constructing their entrepreneurial mindset and, thus, spread the positive outcomes stemming from the proposed activities into school and daily lives.

Third, the proposed EI and OEI can be useful tools to evaluate the efficacy of the projects. Correctly, this study has shown that the most relevant enhancement has been registered from “social orientation” skills. This means that children, thanks to the proposed activities included in the project, have improved their abilities in appreciating diversity, working in a team, relating and collaborating with others, active listening and managing their self-control, avoiding potentially violent actions dictated by bad anger management that is often experienced in social contexts and, therefore, also within schools.

As far as the practical implications are concerned, this study has shown how the main problems of building an entrepreneurial mindset in children can be overcome with extracurricular projects involving adequate and prepared stakeholders. Accurately, the collaboration between University and Primary school can represent a valid tool to transfer the knowledge and skills of scholars of management and entrepreneurship in contexts other than university classrooms, thus fulfilling the third mission that sees universities as protagonists of social and economic change. In this sense, this study, by introducing and discussing the results of a project co-produced by the University and Primary school, highlights the importance of promoting strong and long-lasting collaborations between the aforementioned institutions (and others), to promote the dissemination of projects of this nature and

with similar purposes. This last aspect could represent a valid step to create entrepreneurial ecosystems based on the creation and development of entrepreneurial mindsets from childhood. In this way, the effects of the proposed project activities would also have a positive echo within families and communities, generating more open and inclusive societies and, at the same time, contributing to the reduction of poverty and the implementation of strategies based on sustainability.

Finally, yet importantly, the main contribution is dictated by the demonstration of the efficacy of a pioneering project, especially in terms of the construction of social skills. These competencies, above all currently, seem to be fundamental to responding to the challenges of today's changing society and formulating adequate answers to these same challenges. Stimulating children to create a proper social skills system and a broader entrepreneurial mindset contribute to the creation of a better society. For this reason, the most relevant expectation is that other similar projects will be proposed to spread the positive effects in other areas, particularly those that suffer socioeconomic concerns, to build a substantial opportunity for socioeconomic development.

6. Conclusions

This study analyzed in depth the effects of an extracurricular entrepreneurial project involving University and Primary school. Teachers and parents spotlighted that pupils have improved their entrepreneurial competencies, by developing an early entrepreneurial mindset, both in school and in daily lives. The project was delivered as a result of the effective collaboration between the University and Primary schools that ensured the overcoming of difficulties stemming from the resource constraint and the lack of teachers' entrepreneurial competencies. However, the present study is not without limitations. The most relevant is linked to the moment in which the measurements of the effectiveness were performed. The questionnaire and semi-structured interviews were conducted shortly after the closure of the project. Therefore, the effects could be different in a medium-long-term vision. However, this does not affect the validity of the study and, on the contrary, suggests the study's replication at different times to monitor the project's effectiveness. Another limitation refers to the fact that this study is based on one single project, and to generalize findings. The expectation is the replication of the project in other settings and, in a different period, to construct and spread an entrepreneurial mindset in children, and adolescents, to have adults more able to solve social challenges. Furthermore, further studies could include other elements to be evaluated and devise a tool capable of also assessing the efficiency in terms of "ecosystem," going to verify the impact even in the social fabric of the community in which the project was provided.

Conflict of interest

All authors declare no conflicts of interest in this paper.

References

Acosta Castellanos PM, Queiruga-Dios A (2022) From environmental education to education for sustainable development in higher education: a systematic review. *Int J Sust Higher Ed* 23: 622–644. <https://doi.org/10.1108/IJSHE-04-2021-0167>

- Adey P (2005) Issues arising from the long-term evaluation of cognitive acceleration programs. *Res Sci Educ* 35: 3–22. <https://doi.org/10.1007/s11165-004-3430-5>
- Adey P (2006) Thinking in Science-Thinking in General, In: *Asia-Pacific Forum on Science Learning and Teaching* 7: 1–6.
- Allen IE, Seaman CA (2007) Likert scales and data analyses. *Qual Prog* 40: 64–65.
- Alvesson M, Sandberg J (2011) Generating research questions through problematization. *Acad Manage Rev* 36: 247–271. <https://doi.org/10.5465/amr.2009.0188>
- Amirkhanyan AA, Holt SB, Mccrea AM, et al. (2019) Managing Racial Diversity: Matching Internal Strategies with Environmental Needs. *Public Admin Rev* 79: 69–81. <https://doi.org/10.1111/puar.12977>
- Armstrong JS, Overton TS (1977) Estimating nonresponse bias in mail surveys. *J Mark Res* 14: 396–402. <https://doi.org/10.2307/3150783>
- Audretsch DB, Grilo I, Thurik AR (2007a) Explaining entrepreneurship and the role of policy: a framework. *The handbook of research on entrepreneurship policy*, 1–17.
- Audretsch DB, Grilo I, Thurik AR (2007b) *Handbook of research on entrepreneurship policy*, Edward Elgar Publishing.
- Avenier MJ (2000) *Ingénierie des pratiques collectives: la cordée et le quatuor*, Editions L’Harmattan.
- Bacigalupo M, Kampylis P, Punie Y, et al. (2016) *EntreComp: The entrepreneurship competence framework*, Publication Office of the European Union, Luxembourg.
- Bell R, Liu P (2019) Educator Challenges in the Development and Delivery of Constructivist Active and Experiential Entrepreneurship Classrooms in Chinese Vocational Higher Education. *J Small Bus Enterp Dev* 26: 209–227. <https://doi.org/10.1108/JSBED-01-2018-0025>
- Bentler PM, Chou CP (1987) Practical issues in structural modeling. *Sociol Methods Res* 16: 78–117. <https://doi.org/10.1177/0049124187016001>
- Berkovich I, Eyal O (2019) Transformational Leadership, Transactional Leadership, and Moral Reasoning. *Leadersh Policy Sch* 20: 131–148. <https://doi.org/10.1080/15700763.2019.1585551>
- Beyes T, Parker M, Steyaert C (2016) Introduction: why does management education need reinventing? In: Steyaert, C., Beyes, T., Parker, M., *The Routledge Companion to Reinventing Management Education*, Routledge, 17–36. <https://doi.org/10.4324/9781315852430>
- Black TR (1999) *Doing quantitative research in the social sciences: An integrated approach to research design, measurement, and statistics*, Sage.
- Boffo S, Cocorullo A (2019) University Fourth Mission, Spin-Offs and Academic Entrepreneurship: Connecting Public Policies with New Missions and Management Issues of Universities. *High Educ Forum* 16: 125–142.
- Bourgeois A (2011) Entrepreneurship Education at School in Europe: National Strategies, Curricula and Learning Outcomes.
- Bourgeois A, Balcon MP (2016) Entrepreneurship Education at School in Europe.
- Bruner JS (1966) *Toward a theory of instruction*, Harvard University Press.
- Burns P (2012) Corporate entrepreneurship: innovation and strategy in large organizations.
- Cai Y, Lattu A (2022) Triple helix or quadruple helix: which model of innovation to choose for empirical studies? *Minerva* 60: 257–280. <https://doi.org/10.1007/s11024-021-09453-6>
- Campbell DF, Carayannis EG (2016) The academic firm: a new design and redesign proposition for entrepreneurship in innovation-driven knowledge economy. *J Innov Entrep* 5: 12. <https://doi.org/10.1186/s13731-016-0040-1>

- Canrinus ET, Klette K, Hammerness K (2019) Diversity in coherence: Strengths and opportunities of three programs. *J Teach Educ* 70: 192–205. <https://doi.org/10.1177/0022487117737305>
- Carayannis EG, Grigoroudis E, Campbell DF, et al. (2018) The ecosystem as helix: an exploratory theory-building study of regional co-opetitive entrepreneurial ecosystems as Quadruple/Quintuple Helix Innovation Models. *R D Manage* 48: 148–162. <https://doi.org/10.1111/radm.12300>
- Cascavilla I, Hahn D, Minola T (2022) How You Teach Matters! An Exploratory Study on the Relationship between Teaching Models and Learning Outcomes in Entrepreneurship Education. *Adm Sci* 12: 12. <https://doi.org/10.3390/admsci12010012>
- Chilenga N, Dhliwayo S, Chebo AK (2022) The entrepreneurial mindset and self-employment intention of high school learners: The moderating role of family business ownership. *Front Educ* 7: 1–13. <https://doi.org/10.3389/educ.2022.946389>
- Churchill Jr GA (1979) A paradigm for developing better measures of marketing constructs. *J Mark Res* 16: 64–73. <https://doi.org/10.2307/3150876>
- Collins A (1996) Design issues for learning environments, In: Vosniadou, S., De Corte, E., Glaser, R., et al., *International perspectives on the design of technology-supported learning environments*, Lawrence Erlbaum Associates, Inc, 347–361.
- Commission E (2006) The Oslo agenda for entrepreneurship education in Europe, In: *Entrepreneurship education in Europe: Fostering entrepreneurial mindsets through education and learning conference*.
- Commission E (2013) Thematic Report PLA on Stakeholder Engagement in Entrepreneurship Education, Retrieved from Copenhagen.
- Cooper D (2009) University-Civil Society (U-CS) research relationships: The importance of a ‘fourth helix’ alongside the ‘triple helix’ of University-Industry-Government (UIG) relations. *S Afr Review Sociol* 40: 153–180. <https://doi.org/10.1080/21528586.2009.10425106>
- Cooper D (2015) Social Justice and South African University Student Enrolment Data by ‘Race’, 1998–2012: From ‘Skewed Revolution’ to ‘Stalled Revolution’. *High Educ Quart* 69: 237–262. <https://doi.org/10.1111/hequ.12074>
- Cooper D (2017) Concepts of “applied and public sociology”: Arguments for a bigger theoretical picture around the idea of a “university third mission. *J Appl Soc Sci* 11: 141–158. <https://doi.org/10.1177/1936724417722580>
- Cuesta-Claros A, Malekpour S, Raven R, et al. (2022) Understanding the roles of universities for sustainable development transformations: A framing analysis of university models. *Sustain Dev* 30: 525–538. <https://doi.org/10.1002/sd.2247>
- Cunha F, Heckman JJ (2007) The evolution of inequality, heterogeneity and uncertainty in labor earnings in the US economy. *National Bureau of Economic Research*. <https://doi.org/10.3386/w13526>
- Das SC (2014) Learning management from Aesop’s Fables and panchatantra or Jatak tales. *Bus Manag Rev* 5: 434.
- Daspit JJ, Fox CJ, Findley SK (2023) Entrepreneurial mindset: An integrated definition, a review of current insights, and directions for future research. *J Small Bus Manag* 61: 12–44. <https://doi.org/10.1080/00472778.2021.1907583>
- Drucker PF (1963) Twelve fables of research management. *Harvard Business Review*.
- Dubey P (2022) Entrepreneurial characteristics, attitude and self-employment intention: A study of public and private technical institutes’ undergraduates. *J Small Bus Manag* 24: 21–30.

- Eisenhardt KM, Graebner ME (2007) Theory building from cases: Opportunities and challenges. *Acad Manage J* 50: 25–32. <https://doi.org/10.5465/amj.2007.24160888>
- Eldridge K, Larry L, Baird J, et al. (2018) A collaborative governance approach to improving tertiary education in Papua New Guinea. *Asia Pac J Educ* 38: 78–90. <https://doi.org/10.1080/02188791.2018.1423949>
- Elmore R (1996) Getting to scale with good educational practice. *Harvard Educ Rev* 66: 1–27. <https://doi.org/10.17763/haer.66.1.g73266758j348t33>
- Falcone D, Silvestri A, Cerbaso C, et al. (2015) Proposal of a Methodology For Non-Formal Competences Certification. *Online J New Horiz Educ* 122.
- Falk-Lundqvist Å, Hallberg PG, Leffler E, et al. (2011) Entrepreneurial pedagogy in schools: driving forces for pupils' learning, Liber, Stockholm.
- Farrington CA, Roderick M, Allensworth E, et al. (2012) Teaching Adolescents to Become Learners: The Role of Non-cognitive Factors in Shaping School Performance—A Critical Literature Review.
- Filion LJ (1994) Ten steps to entrepreneurial teaching. *J Small Bus Entrep* 11: 68–78.
- Fisher SL, Graham ME, Compeau M (2008) Starting from scratch: Understanding the learning outcomes of undergraduate entrepreneurship education, In: Harrison, R., Leitch, C.M., *Entrepreneurial Learning*, 335–362, Routledge. <https://doi.org/10.4324/9780203931929>
- Floris M, Dettori A (2020) Fostering Early Entrepreneurial Competencies: An Action Research Approach, In: *Sociological Perspectives on Educating Children in Contemporary Society*, IGI Global, 259–281. <https://doi.org/10.4018/978-1-7998-1847-2.ch011>
- Floris M, Floris S (2021) Soft skills and entrepreneurial competencies to promote equity in schools. In: *Bending the arc towards justice: equity-focused practices for educational leaders*, Information Age Publishing, 257–282.
- Floris M, Pillitu D (2019) Improving entrepreneurship education in primary schools: a pioneer project. *Int J Educ Manag* 33: 1148–1169. <https://doi.org/10.1108/IJEM-09-2018-0283>
- Gasse Y (1985) A strategy for the promotion and identification of potential entrepreneurs at the secondary school level. *Front Entrep*, 538–559.
- Gibb A (2002) In Pursuit of a New 'Enterprise' and 'Entrepreneurship' Paradigm for Learning: Creative Destruction, New Values, New Ways of Doing Things and New Combinations of Knowledge. *Int J Manag Rev* 4: 213–231. <https://doi.org/10.1111/1468-2370.00086>
- Gibb A (2008) Entrepreneurship and enterprise education in schools and colleges: Insights from UK practice. *Int J Entrep Educ* 6: 48.
- Gilder G (1981) Moral sources of capitalism. *Society* 18: 24–27. <https://doi.org/10.1007/BF03180594>
- Hair JF, Anderson RE, Tatham RL, et al. (1998) *Multivariate data analysis* 5: 87–135.
- Handscombe RD, Rodriguez-Falcon E, Patterson EA (2008) Embedding Enterprise in Science and Engineering Departments. *Educ Train* 50: 615–625. <https://doi.org/10.1108/00400910810909063>
- Hartikainen H, Ventä-Olkkonen L, Kinnula M, et al. (2023) We were proud of our idea: How teens and teachers gained value in an entrepreneurship and making project. *Int J Child-Comput Interact* 35: 100552. <https://doi.org/10.1016/j.ijcci.2022.100552>
- Hassi A (2016) Effectiveness of early entrepreneurship education at the primary school level: Evidence from a field research in Morocco. *Citizenship Soc Econ Educ* 15: 83–103. <https://doi.org/10.1177/2047173416650448>
- Heinonen J (2007) An entrepreneurial-directed approach to teaching corporate entrepreneurship at university level. *Educ Train* 49: 310–324. <https://doi.org/10.1108/00400910710754453>

- Hjorth D (2017) Critique nouvelle—an essay on affirmative-performative entrepreneurship research. *Revue de l'Entrepreneuriat* 16: 47–54. <https://doi.org/10.3917/entre.161.0047>
- Höglund L, Linton G (2018) Smart specialization in regional innovation systems: a quadruple helix perspective. *R D Manag* 48: 60–72. <https://doi.org/10.1111/radm.12306>
- Ireland RD, Hitt MA, Sirmon DG (2003) A model of strategic entrepreneurship: The construct and its dimensions. *J Manage* 29: 963–989. [https://doi.org/10.1016/S0149-2063\(03\)00086-2](https://doi.org/10.1016/S0149-2063(03)00086-2)
- Johannisson B (2010) The agony of the Swedish school when confronted by entrepreneurship. In: *Creativity and Innovation: Preconditions for Entrepreneurial Education*, 91–105.
- Johannisson B (2018) Limits to and prospects of entrepreneurship education in the academic context, In: Fayolle, A., *A Research Agenda for Entrepreneurship Education*, Edward Elgar Publishing, 139–163. <https://doi.org/10.4337/9781786432919.00014>
- Jones C (2019) A signature pedagogy for entrepreneurship education. *J Small Bus Enterp Dev* 26: 243–254. <https://doi.org/10.1108/JSBED-03-2018-0080>
- Kanselaar G (2002) Constructivism and socio-constructivism. *Constructivism and socio-constructivism*, 1–7.
- Kautonen T, Van Gelderen M, Fink M (2015) Robustness of the theory of Planned Behavior in Predicting Entrepreneurial Intentions and Actions. *Entrep Theory Pract* 39: 655–674. <https://doi.org/10.1111/etap.12056>
- Kibler E, Kautonen T, Fink M (2014) Regional social legitimacy of entrepreneurship: Implications for entrepreneurial intention and start-up behaviour. *Reg Stud* 48: 995–1015. <https://doi.org/10.1080/00343404.2013.851373>
- Komulainen K, Naskali P, Korhonen M, et al. (2011) Internal Entrepreneurship—a Trojan horse of the neoliberal governance of education? Finnish pre-and in-service teachers' implementation of and resistance towards entrepreneurship education. *J Crit Educ Policy Stud* 9: 341–374.
- Kuratko DF (2005) The emergence of entrepreneurship education: Development, trends, and challenges. *Entrep Theory Pract* 29: 577–597. <https://doi.org/10.1111/j.1540-6520.2005.00099.x>
- Lackéus M (2014) An emotion based approach to assessing entrepreneurial education. *Int J Manag Educ* 12: 374–396. <https://doi.org/10.1016/j.ijme.2014.06.005>
- Lackéus M (2015) Entrepreneurship in education: What, why, when, how. Available from: https://www.oecd.org/cfe/leed/BGP_Entrepreneurship-in-Education.pdf.
- Lackéus M, Lundqvist M, Middleton KW (2016) Bridging the traditional-progressive education rift through entrepreneurship. *Int J Entrep Behav Res* 22: 777–803. <https://doi.org/10.1108/IJEBR-03-2016-0072>
- Lackéus M, Lundqvist M, Williams Middleton K (2013) How can entrepreneurship bridge between traditional and progressive education? Available from: <file:///C:/Users/zhuan/Downloads/Howcanentrepreneurshipbridgebetweentraditionalandprogressiveeducation-FINAL.pdf>.
- Langley A (1999) Strategies for theorizing from process data. *Acad Manage Rev* 24: 691–710. <https://doi.org/10.5465/amr.1999.2553248>
- Lanivich SE, Bennett A, Kessler SR, et al. (2021) RICH with well-being: An entrepreneurial mindset for thriving in early-stage entrepreneurship. *J Bus Res* 124: 571–580. <https://doi.org/10.1016/j.jbusres.2020.10.036>
- Leonard-Barton D (1990) A dual methodology for case studies: Synergistic use of a longitudinal single site with replicated multiple sites. *Organ Sci* 1: 248–266. <https://doi.org/10.1287/orsc.1.3.248>

- Lindner J (2020) Entrepreneurship Education by Youth Start—Entrepreneurial Challenge-Based Learning. In: Auer, M., Tsiatsos, T., *The Challenges of the Digital Transformation in Education. ICL 2018. Advances in Intelligent Systems and Computing*, Springer, Cham, 916: 866–875. https://doi.org/10.1007/978-3-030-11932-4_80
- Löw M (2020) Social and Spatial Uncertainty and Inequality: The Refiguration of Spaces as Today's Challenge for Cities. In: Smagacz-Poziemska, M., Gómez, M., Pereira, P., et al., *Inequality and Uncertainty*, Singapore: Palgrave Macmillan, 23–41. https://doi.org/10.1007/978-981-32-9162-1_2
- McCann JE, SELSKY J (1984) Hyperturbulence and the emergence of type 5 environments. *Acad Manage Rev* 9: 460–470. <https://doi.org/10.5465/amr.1984.4279678>
- McGrath RG, MACMILLAN IC (2000) *The entrepreneurial mindset: Strategies for continuously creating opportunity in an age of uncertainty*, Harvard Business Press.
- McGuinness C (1999) From thinking skills to thinking classrooms: A review and evaluation of approaches for developing pupils' thinking. Department for Education and Employment, London. <https://doi.org/10.13140/RG.2.1.4000.1129>
- Moberg K (2014a) *Assessing the impact of entrepreneurship education: From ABC to PhD*, Frederiksberg: Copenhagen Business School (CBS).
- Moberg K (2014b) Two approaches to entrepreneurship education: The different effects of education for and through entrepreneurship at the lower secondary level. *Int J Manag Educ* 12: 512–528. <https://doi.org/10.1016/j.ijme.2014.05.002>
- Morawska-Jancelewicz J (2022) The role of universities in social innovation within quadruple/quintuple helix model: Practical implications from polish experience. *J Knowl Econ* 13: 2230–2271. <https://doi.org/10.1007/s13132-021-00804-y>
- Motta VF, Galina SVR (2023) Experiential learning in entrepreneurship education: A systematic literature review. *Teach Teach Educ* 121: 103919. <https://doi.org/10.1016/j.tate.2022.103919>
- Mucci N (2019) Social Work and Social Welfare from a multidisciplinary perspective—A challenge for researchers. *Soc Work Soc Welf* 1: 1–3. <https://doi.org/10.25082/SWSW.2018.01.002>
- Mulvey J (2016) Educating communities, In: Mulvey, J., Cooper, B.(Eds.), *Understanding the power and politics of public education: Implementing policies to achieve equal opportunity for all*, Rowman & Littlefield Publishers, 81–91.
- Mwasalwiba ES (2010) Entrepreneurship education: a review of its objectives, teaching methods, and impact indicators. *Educ Train* 52: 20–47. <https://doi.org/10.1108/00400911011017663>
- Ngwoke AN, Aneke AO, Oraelosi CC (2020) Developing entrepreneurial mindset in the Nigerian child through quality early childhood education. *Int J Stud Educ* 16: 162–174.
- Nicolaou N, Shane S (2009) Can genetic factors influence the likelihood of engaging in entrepreneurial activity? *J Bus Ventur* 24: 1–22. <https://doi.org/10.1016/j.jbusvent.2007.11.003>
- Obschonka M, Silbereisen RK, Schmitt-Rodermund E, et al. (2011) Nascent entrepreneurship and the developing individual: Early entrepreneurial competence in adolescence and venture creation success during the career. *J Vocat Behav* 79: 121–133. <https://doi.org/10.1016/j.jvb.2010.12.005>
- Olutuase SO, Brijlal P, Yan B (2023) Model for stimulating entrepreneurial skills through entrepreneurship education in an African context. *J Small Bus Entrep* 35: 263–283. <https://doi.org/10.1080/08276331.2020.1786645>
- Oosterbeek H, Van Praag M, Ijsselstein A (2010) The impact of entrepreneurship education on entrepreneurship skills and motivation. *Eur Econ Rev* 54: 442–454. <https://doi.org/10.1016/j.euroecorev.2009.08.002>

- Patrício LD, Ferreira JJ (2023) Unlocking the connection between education, entrepreneurial mindset, and social values in entrepreneurial activity development. *Rev Manag Sci*, 1–23. <https://doi.org/10.1007/s11846-023-00629-w>
- Palmér H, Johansson M, Karlsson L (2018) Teaching for entrepreneurial and mathematical competencies: teachers stepping out of their comfort zone, In: Palmér, H., Skott, J., *Students' and Teachers' Values, Attitudes, Feelings and Beliefs in Mathematics Classrooms*, Springer, Cham, 13–23. https://doi.org/10.1007/978-3-319-70244-5_2
- Palumbo R, Manna R (2019) Making Educational Organizations Able to Change: A Literature Review. *Int J Educ Manag* 33: 734–752. <https://doi.org/10.1108/IJEM-02-2018-0051>
- Pepin M (2012) Enterprise education: a Deweyan perspective. *Educ Train* 54: 801–812. <https://doi.org/10.1108/00400911211274891>
- Piaget J (1936) *Origin of intelligence in the child*, Penguin books, New York.
- Piaget J (1975) *L'équilibration des structures cognitives: problème central du développement*, Presses universitaires de France.
- Piaget J (1976) Piaget's theory, In: Inhelder, B., Chipman, H.H., Zwingmann, C. (eds) *Piaget and His School. Springer Study Edition*, Berlin Heidelberg: Springer, 11–23. https://doi.org/10.1007/978-3-642-46323-5_2
- Pittaway L, Cope J (2007) Simulating entrepreneurial learning: Integrating experiential and collaborative approaches to learning. *Manage Learn* 38: 211–233. <https://doi.org/10.1177/1350507607075776>
- Rae D (2010) Universities and enterprise education: responding to the challenges of the new era. *J Small Bus Enterp Dev* 17: 591–606. <https://doi.org/10.1108/14626001011088741>
- Rauch A, Hulsink W (2015) Putting entrepreneurship Education where the intention to Act lies: An investigation into the impact of entrepreneurship education on entrepreneurial behavior. *Acad Manag Learn Educ* 14: 187–204. <https://doi.org/10.5465/amle.2012.0293>
- Rebernik M (2009) Quadruple helix of entrepreneurship and management education. *Revista de Management Comparat Internațional* 10: 910–921.
- Rodriguez S, Lieber H (2020) Relationship between entrepreneurship education, entrepreneurial mindset, and career readiness in secondary students. *J Experient Educ* 43: 277–298. <https://doi.org/10.1177/1053825920919462>
- Rosendahl Huber L, Sloof R, Van Praag M (2014) The effect of early entrepreneurship education: Evidence from a randomized field experiment. *Eur Econ Rev* 72: 76–97. <https://doi.org/10.1016/j.eurocorev.2014.09.002>
- Rustiana Y, Mohd OB, Binti MN (2022) The distribution role of entrepreneurship mindset and task technology fit: an extended model of theory of planned behavior. *J Distrib Sci* 20: 85–96. <http://dx.doi.org/10.15722/jds.20.05.202205.85>
- Sahlberg P, Oldroyd D (2010) Pedagogy for economic competitiveness and sustainable development. *Eur J Educ* 45: 280–299. <https://doi.org/10.1111/j.1465-3435.2010.01429.x>
- Sampene AK, Li C, Khan A, et al. (2022) Yes! I want to be an entrepreneur: a study on university students' entrepreneurship intentions through the theory of planned behavior. *Curr Psychol* 1: 1–19. <https://doi.org/10.1007/s12144-022-03161-4>
- San Tan S, Ng CF (2006) A problem-based learning approach to entrepreneurship education. *Educ Train* 48: 416–428. <https://doi.org/10.1108/00400910610692606>

- Sánchez JC (2013) The Impact of an Entrepreneurship Education Program on Entrepreneurial Competencies and Intention. *J Small Bus Manag* 51: 447–465.
- Sarasvathy SD, Venkataraman S (2011) Entrepreneurship as method: Open questions for an entrepreneurial future. *Entrep Theory Pract* 35: 113–135. <https://doi.org/10.1111/j.1540-6520.2010.00425.x>
- Shayer M, Adhami M (2007) Fostering cognitive development through the context of mathematics: Results of the CAME project. *Educ Stud Math* 64: 265–291. <https://doi.org/10.1007/s10649-006-9037-1>
- Short JC, Ketchen Jr DJ (2005) Teaching timeless truths through classic literature: Aesop’s Fables and strategic management. *J Manag Educ* 29: 816–832. <https://doi.org/10.1177/1052562904271450>
- Smith R, Neergaard H (2015) Telling business stories as fellowship-tales. *Int J Gend and Entrep* 7: 232–252. <https://doi.org/10.1108/IJGE-08-2014-0026>
- Somprach K, Popoonsak P, Sombatteera S (2014) Soft skills development to enhance teachers’ competencies in primary schools. *Procedia-Soc behav Sci* 112: 842–846. <https://doi.org/10.1016/j.sbspro.2014.01.1240>
- Surlemont B (2007) Promoting enterprising: a strategic move to get schools’ cooperation in the promotion of entrepreneurship, In: Fayolle, A (ed.), *Handbook of Research in Entrepreneurship Education*, Edward Elgar Publishing, 2: 255–265.
- Volkman C, Fichter K, Klostner M, et al. (2021) Sustainable entrepreneurial ecosystems: An emerging field of research. *Small Bus Econ* 56: 1047–1055. <https://doi.org/10.1007/s11187-019-00253-7>
- Von Glasersfeld E (2001) Radical constructivism and teaching. *Prospects* 31: 161–173. <https://doi.org/10.1007/BF03220058>
- Vorley T, Nelles J (2008) (Re) conceptualising the academy. *High Educ Manag Policy* 20: 1–17. <https://doi.org/10.1787/17269822>
- Vorley T, Nelles J (2009) Building entrepreneurial architectures: A conceptual interpretation of the third mission. *Policy Futures Educ* 7: 284–296. <https://doi.org/10.2304/pfie.2009.7.3.284>
- Vygotsky L (1962) *Thought and language*, MIT Press. <https://doi.org/10.1037/11193-000>
- Vygotsky L (1978a) Interaction between learning and development. *Readings on the development of children* 23: 34–41.
- Vygotsky L (1978b) Internalization of higher psychological functions. *Mind in society: The development of higher psychological processes* 37: 52–57.
- Woods P, Jeffrey B, Troman G, et al. (2019) *Restructuring schools, reconstructing teachers: Responding to change in the primary school*, Routledge.
- Yan J, Huang T, Xiao Y (2022) Assessing the impact of entrepreneurial education activity on entrepreneurial intention and behavior: role of behavioral entrepreneurial mindset. *Environ Sci Pollut Res* 30: 26292–26307. <https://doi.org/10.1007/s11356-022-23878-w>
- Yin RK (1994) *Case study research* (3 ed.), Sage, Thousand Oaks, CA.
- Zupan B, Cankar F, Setnikar Cankar S (2018) The development of an entrepreneurial mindset in primary education. *Eur J Educ* 53: 427–439. <https://doi.org/10.1111/ejed.12293>



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