



Title	Entrepreneurship Education Centres in universities: evidence and insights from Italian “Contamination Lab” cases
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Publication date	2020-08-13
Publication information	Secundo, Giustina, Gioconda Mele, Giuliano Sansone, and Emilio Paolucci. “Entrepreneurship Education Centres in Universities: Evidence and Insights from Italian ‘Contamination Lab’ Cases.” Emerald, August 13, 2020. https://doi.org/10.1108/IJEBR-12-2019-0687 .
Publisher	Emerald
Item record/more information	http://hdl.handle.net/10197/26835
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Publisher's version (DOI)	10.1108/IJEBR-12-2019-0687

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Entrepreneurship Education Centres in Universities: evidence and insights from Italian "Contamination Lab" cases

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Abstract

Purpose – Entrepreneurship Education (EE) is increasing throughout the world. In 2012, the Italian Ministry of Education, University and Research (MIUR) financed Contamination Labs (CLabs), which are laboratories that are aimed at developing entrepreneurial mindsets in all university students. This study analyses the entrepreneurial learning process mechanisms adopted in these CLabs.

Methodology – An ethnographic case study was performed in two Italian CLabs from October 2017 to December 2019.

Findings – Findings demonstrate that the CLabs in Italy are promising Entrepreneurship Education Centres which create programmes to develop an entrepreneurial mindset in students with different educational backgrounds and levels. Interdisciplinarity in the composition of the student teams, virtuous contamination of knowledge and experience between the students and the stakeholders from the entrepreneurial ecosystem are the key pillars to foster an entrepreneurial mindset in all the students.

Implications for practice – The findings provide indications that may be used to guide a university faculty in the design and management of Entrepreneurship Education Centres in collaboration with entrepreneurs, corporations, student clubs, incubators and representatives of the local entrepreneurial ecosystem. Moreover, the results point out a need to develop interdisciplinary entrepreneurial programmes.

Limitations – The limitations of this work regard the need to expand the analysis to all the other CLabs created in Italian universities.

Originality – The originality resides in the analysis of a novel type of Entrepreneurship Education Centre in Italian Universities, created as the result of an ad-hoc Italian policy.

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Keywords: Contamination Lab, Entrepreneurship Education, Entrepreneurial mindset, Entrepreneurial learning, Entrepreneurship Education Centre, Enterprise Culture.

Introduction

After the emergence of the Entrepreneurial Economy in 1980s (Thurik *et al.*, 2013), scholars from different fields started to conduct studies related to entrepreneurship. Moreover, the fast adoption of new technologies, accompanied by a rapid digitalisation of society, has had a profound impact on the types of jobs available for graduates and on the mindset needed for their future careers (Brynjolfsson and McAfee, 2014). This can be called an entrepreneurial mindset because it provides individuals with the willingness and ability to recognise and pursue opportunities for new value creation in any organisational setting (Fyen *et al.*, 2019; Romano *et al.*, 2014). The transformation of challenges and obstacles into novel entrepreneurial opportunities, and not (just) being a business owner or founder of a start-up, is seen as a multifaced phenomenon, called entrepreneurship (Fyen *et al.*, 2019). The European Commission pointed out the "sense of initiative and entrepreneurship" as one of the eight key competencies that all individuals need for personal fulfillment, social inclusion and employment in the economy (European Commission, 2006). This aspect is becoming more strategic as a result of the emergency caused by COVID-19, which is obviously a priority for the government.

In this scenario, universities play a key role in addressing these societal challenges through Entrepreneurship Education (EE), which is a way of developing an entrepreneurial mindset in talented young people through the adoption of entrepreneurial learning processes (OECD/EU, 2019). Several scholars have sustained that an entrepreneurial mindset can be developed (Kuratko, 2005; Sánchez, 2011, 2013), and this represents a pivotal aim of EE in the academic community (Cassia *et al.*, 2014; Katz, 2003). However, to develop the entrepreneurial mindset, students need to be a proactive recipient (Honig, 2004; Wright *et al.*, 2017).

Although EE has traditionally mainly been a priority for business schools, recently, in the wake of the rapid development of new technologies in the academic context (Rippa and Secundo, 2019), an expansion of EE to other disciplines and departments has been considered

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(ranging from humanities to engineering) as being crucial for developing mindsets (Boocock *et al.*, 2009).

This has led to an expansion, in the academic community, of several curricular and extra-curricular programmes, aimed at promoting more entrepreneurial mindsets in the field of knowledge-intensive entrepreneurship (Beckman *et al.*, 2012; Mian *et al.*, 2016; Ndou *et al.*, 2018; Secundo *et al.*, 2015).

Universities are ideally suited to providing "out of the box" solutions to complex societal problems and challenges. The combination of several disciplines allows them to provide advanced knowledge that leads to societal development, while stimulating their students about the context of interdisciplinary teamwork (Fyen *et al.*, 2019). A fully supported interdisciplinary cooperation requires the reformation of programmes combined with the establishment of the necessary accompanying organisational structures. Changing the complex university organisational structures, in the context of a rapidly changing society, is an important challenge for university policy makers and leaders. However, only a few studies have focused on EE involving students with an interdisciplinary background and different educational levels in the same classroom (Fyen *et al.*, 2019).

This is particularly true for Italy, where, in 2012, EE was enriched by the launching of Contamination Labs (CLabs), namely laboratories financed by the Ministry of Education, University and Research (MIUR) with the aim of developing entrepreneurial mindsets in all students with different educational backgrounds and level through the activation of university linkages with local entrepreneurial ecosystems. The OECD has recently considered CLabs as one of the best ways of supporting entrepreneurship and innovation in Italian universities (OECD/EU, 2019). Even though several scholars are currently engaged in the study of EE, and several initiatives are starting to be launched in universities, knowledge about how extra-curricular programmes for students from different backgrounds and with different educational levels are facilitated and managed is very limited. This is particularly true especially in Italy, where the phenomenon of ad hoc policies that support EE, at a university level, is still in its infancy. This means there is a need to understand the entrepreneurial learning mechanisms that take place between the stakeholders of the local entrepreneurial ecosystem and the university students. To understand it, this work analyses the Italian CLabs through the activation of extra-curricular programmes which have the aim of creating an entrepreneurial mindset among students from an interdisciplinary background and different educational levels.

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Accordingly, the paper attempts to provide an answer to the following Research Question (R.Q.): *how are the entrepreneurial learning processes within Italian CLabs organised to instil entrepreneurial mindsets in university students from an interdisciplinary educational background?*

By answering this R.Q., the final goal of the study is to contribute to the general debate on Entrepreneurship Education Centres through an ethnographic case study carried out in two Italian CLabs. These CLabs involved the development of extra-curricular entrepreneurship courses aimed at instilling an entrepreneurial mindset in university students with an interdisciplinary background and enrolled at different course levels (from bachelor to PhD) through the engagement of the university stakeholders from the local entrepreneurial ecosystem.

The findings provide evidence about the positive role of MIUR's policy, in terms of moving EE ahead in Italian Universities through the creation of ad hoc Entrepreneurship Education Centres, called CLabs. These Centres represent learning environments where university students with an interdisciplinary background and different educational levels can be involved in extra-curricular programmes to develop an entrepreneurial mindset by working with the local entrepreneurial ecosystem.

The remaining part of the paper is organised as follows: section two introduces the literature background, section 3 presents the research methodology, section 4 describes the findings, and section 5 discusses and compares the findings. Section 5 also concludes the paper by highlighting the theory and practice implications.

Literature Background

Developing an entrepreneurial mindset in university students: the role of Entrepreneurship Education

Nowadays, universities are increasing their efforts to foster the entrepreneurial mindset of their students (Bae *et al.*, 2014; O'Connor, 2013; Solomon, 2007). This interest derives from different factors. One of the main factors is the need for an entrepreneurial mindset that all individuals require for personal fulfillment, social inclusion, and employment in the economy (Bacigalupo *et al.*, 2016). Another factor is that an entrepreneurial mindset may be one of the success factors in this digital and globalising world (Balocco *et al.*, 2019; Brynjolfsson and McAfee, 2014). Moreover, entrepreneurial mindset influences key decisions such as financing projects (Schückes and Gutmann, 2020).

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According to several studies (e.g., Athayde, 2009; Costa *et al.*, 2018; Morris *et al.*, 2013; Peterman and Kennedy, 2003; Sánchez, 2013; Wilson *et al.*, 2007), one of the most promising activities to foster an entrepreneurial mindset is EE. EE defined as "any pedagogical [programmme] or process of education for entrepreneurial attitudes and skills" (Bae *et al.*, 2014 p. 219; Fayolle *et al.*, 2006, p. 702). Sánchez (2011) found that the students who had attended EE increased their entrepreneurial mindset, whereas the students in the control group – students who had not attended EE – did not. Similarly, Karimi *et al.* (2016) showed that EE has a significant effect on the entrepreneurial mindset of students, as measured by the number of and most innovative business ideas. Hahn *et al.* (2019) also found that entrepreneurship elective courses as well as compulsory entrepreneurship courses contribute towards the entrepreneurial mindset of students. Moreover, applying the Theory of Planned Behaviour, Maresch *et al.* (2016) found that EE has a positive effect on the entrepreneurial mindset of business students and on science and engineering students. Rauch and Hulsink (2015) discovered that students participating in EE show an increase in entrepreneurial attitudes and perceived behavioural control.

These results may also derive from the fact that universities represent a positive context in which students can develop an entrepreneurial mindset (Fyen *et al.*, 2019). In fact, according to the Knowledge Spillover Theory of Entrepreneurship (Acs *et al.*, 2013), universities are a knowledge-intensive context where it is possible to foster an entrepreneurial mindset and activities (Civera *et al.*, 2019). Universities contribute to the promotion of innovation, human capital training and knowledge generation (Audretsch *et al.*, 2016). Moreover, Fyen *et al.* (2019) pointed out that universities should nurture the benefits they obtain in a multidisciplinary context. In fact, universities have a strong Human Capital asset (knowledge, habits, and social and personality attributes) for entrepreneurship, since universities allow students, researchers, professors, mentors, tutors, entrepreneurs, and managers to work together. Therefore, universities represent a context in which entrepreneurship can be learned and developed to contribute to the local economic development (Philpott *et al.*, 2011).

These studies indicate that an entrepreneurial mindset can be developed through education in universities. However, since entrepreneurship requires practice (e.g., Fiore *et al.*, 2019; Peterman and Kennedy, 2003), the entrepreneurial learning processes within EE are important. Some studies (e.g., Honig, 2004; Wright *et al.*, 2017) suggested that an

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entrepreneurial mindset is difficult to foster through education, unless the students actively take part in the entrepreneurial learning process. In line with this, Neck and Greene (2011) explained that EE requires practice and experience. In fact, it is important to teach entrepreneurship through experiential teaching models (Honig, 2004; Rasmussen and Sørheim, 2006; Wright *et al.*, 2017) and to consider a wide range of university stakeholders (Siegel and Wright, 2015; Wright *et al.*, 2017). As a result of the evolving perspectives of the role of the university in developing EE, more stakeholders have become involved (Siegel and Wright, 2015). This interaction between university and its stakeholders is important (Wright *et al.*, 2017) since it allows students to network, test their ideas, receive feedback and work with different actors. In fact, Kassean *et al.* (2015) observed that students who participated in more practical entrepreneurship classes developed higher entrepreneurial intentions.

Since EE can foster the entrepreneurial mindset of students, universities all over the world are increasing the number of their entrepreneurship courses (Fretschner and Weber, 2013; Katz, 2003; Kuratko, 2005; Solomon, 2007; Varano *et al.*, 2018). An interesting entrepreneurship course that has recently been developed as part of the Erasmus+ projects is the LISTO project (Fiore *et al.*, 2019). The aim of the LISTO project is to develop EE online. This project may be very useful to address some of the challenges that have arisen or which could arise as a result of the COVID-19 pandemic.

Despite these insights, there is still a lack of literature on EE that investigates the heterogeneity of university students as a contingency that influences learning and obtains entrepreneurial mindset from EE (Fayolle, 2013; Nabi *et al.*, 2017). In fact, most of the studies on EE refer only to one field of study, such as business and management (e.g., DeTienne and Chandler, 2004) or sciences and technology (e.g., Souitaris *et al.*, 2007). Moreover, studies on this topic have usually concentrated on EE at one level of education (mostly either bachelor or master students). However, interdisciplinary is important for entrepreneurship (Colombo and Grilli, 2005), and it is therefore useful to teach entrepreneurship to students from different fields of study and with different educational levels (Fyen *et al.*, 2019). Fyen *et al.* (2019) have recently explained that universities need to develop EE in which students cooperate and resolve challenges with colleagues from different backgrounds (Pruett *et al.*, 2009). In addition, even though there are some studies about EE policies (e.g., Åstebro *et al.*, 2012; Hoppe, 2016; O'Connor, 2013), there is still a dearth of studies about Italian EE policies.

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The role of Entrepreneurship Education Centres in Italy

Among the key strategic actions that facilitate EE, including the growth in the number of entrepreneurship courses on campus, the establishment and growth of Entrepreneurship Centres, and student business plan competitions have become pillars (Sansone *et al.*, 2019; Siegel and Wright, 2015). Moreover, the number of Social Entrepreneurship Centres is growing (Leborgne-Bonassié, *et al.*, 2019).

These shifts reflect an adherence to the policy developments that recommend the creation of an entrepreneurial mindset in students at all levels of education, a mindset that is defined by five constituent elements: (1) the capacity to think creatively, strategically, analytically and reflectively, (2) confidence in one's abilities, (3) the ability to collaborate, (4) well-developed communication skills and (5) an understanding of the current business context (Pollard and Wilson, 2014). Students in science, humanities, physics, social sciences and engineering disciplines, to mention just a few, are expected to set up new ventures and to work in dynamic, innovative areas that will generate economic growth and boost employment (Luthje and Franke, 2003). Targeting all the university students with an entrepreneurial mindset is an emerging priority for universities and higher education systems in general, and it is increasingly requested of policy makers and practitioners (Bacigalupo *et al.*, 2016; OECD/EU, 2019).

The Italian MIUR has also reflected on the policies and tools that are necessary to support the changing role and purpose of universities regarding EE. In fact, in 2012, MIUR allocated funds to public universities for the creation of the so-called CLabs. CLabs are collaborative learning environments that have the aim of developing entrepreneurial mindsets in all university students by activating virtuous cross-fertilisation processes in which the creation, diffusion and valorisation of knowledge can be promoted and fertilised (Secundo *et al.*, 2020). The creation of CLabs as environments that are able to foster entrepreneurial mindsets and skills requires the involvement of a large community of stakeholders from the local entrepreneurial ecosystem (Bischoff *et al.*, 2018) and students with a multidisciplinary profile enrolled in different degree programmes. Several actors may become involved in the contamination process within CLabs, including students and the younger generation of faculty and post-doctoral fellows who are more comfortable working with industry, thereby improving the socioeconomic impact of academic and student entrepreneurship.

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With this aim, CLabs are called upon to play a key role in the Italian university system, because of their mission to create and diffuse entrepreneurial mindsets, behaviour and attitudes in students. These capacities will in turn allow students to be more creative, to explore new opportunity spaces in science and industry, and to set up new business configurations in order to transform ideas, opportunities and inventions into economic and social value (Elia *et al.*, 2011). The pursuit of entrepreneurial opportunities is also important when managers want to create novel strategies (Baumann *et al.*, 2019). CLabs are designed to activate entrepreneurial knowledge contamination processes in order to increase an entrepreneurial culture among university students and to develop a more extensive role in career planning than simply creating new ventures, through the development of the typical innovative learning strategies of EE.

The aim of this work has been to explain that Entrepreneurship Education Centres encourage universities to collaborate with the local entrepreneurial ecosystem to include the stakeholders' points of view and experiences in their entrepreneurship courses. In addition, by adopting innovative and experiential teaching models for entrepreneurship, Entrepreneurship Education Centres allow students to obtain practical and project-based experience in entrepreneurship that allows universities to foster an entrepreneurial mindset in all university students. Unlike entrepreneurship courses, Entrepreneurship Education Centres develop programmes that are open to students from different backgrounds (from medicine to computer sciences) and with different educational levels (from bachelor to PhD students) by involving professors from different departments and stakeholders from the local entrepreneurial ecosystem.

On the basis of these premises, Figure 1 illustrates the research framework of this paper.

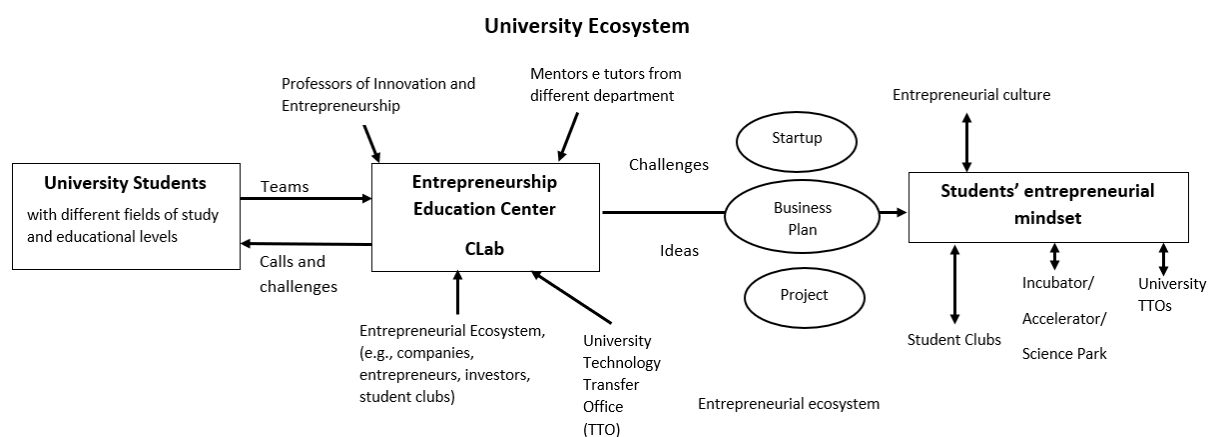


Figure 1. The Research Framework

The framework suggests how all students may contact and collaborate with an Entrepreneurship Education Centre. Students from different fields of study and education levels may contact an Entrepreneurship Education Centre in response to an entrepreneurship course call. This allows the Entrepreneurship Education Centre to create multidisciplinary teams. The academic committees and the stakeholders in the entrepreneurial ecosystem work together to improve the entrepreneurial mindsets of the participants. Professors from different departments and entrepreneurs or experts from the local entrepreneurial ecosystem act as mentors during the programme. Professors and experts from different domains, and not only from management or entrepreneurship, are involved. The participants develop their entrepreneurial mindsets through the entrepreneurial learning approach of the Entrepreneurship Education Centre and the participants' outputs. Moreover, because of their programmes, these Centres may indirectly influence the entrepreneurial culture in the university. Entrepreneurial culture defined as a state of mind where prior efforts made by pioneering professors and students foster other professors and students to consider entrepreneurship is a suitable activity also inside universities (Bramwell and Wolfe, 2008).

Research Methodology

According to the research framework, this paper attempts to provide an answer to the R.Q. An ethnographic case study methodology, based on ethnography and semi-structured in-depth interviews with key informants (Yin, 2013; Robinson and Shumar, 2014), has been developed. In general, a case study methodology is preferred when the research questions are "how" or "why" and when they require not only a simple observation of the social phenomena but also an interpretation by the researchers (Johnstone, 2016). This methodology is preferred also when the consequence that different possibilities are generated according to the different perspectives of the researchers (Glaser and Strauss, 1967) and results may be predicted by looking for a literal replication (Yin, 2013). Ethnographic case study research is defined as "the application of the ontological, epistemological and methodological features of ethnography to a theoretically selected set of business cases" (Visconti, 2010, p. 29). The ethnographic case study methodology is appropriate to analyse events that cannot be controlled and to support researchers in collecting qualitative data, and it is closely related to

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case study research, as described by Eisenhardt (1989), since it has been shown to be a powerful means of building theory.

Ethnography is a research technique that is not usually linear, but it is a cyclical approach that involves unstructured field research. This unstructured, flexible and open-ended method involves fields researchers' observations of people in a natural setting and participation in their day-to-day activities (Burgess, 1982; Robinson and Shumar, 2014). Ethnography allows researchers to know about their informants in more depth. This method can be used to develop a deep understanding of how people's intentions are created in a social context. The main features of ethnography are the extensive fieldwork, where the researcher is often immersed as an observer or as a participant observer, the adoption of cyclical patterns of investigation and a flexible approach to data gathering (Johnstone, 2016).

Thus, an ethnographic case study is a structured combination of a case study and ethnographic methods (Visconti, 2010). The flexibility and rigorous features of an ethnography case study approach make it an appropriate tool for the analysis of EE research (Robinson and Shumar, 2014). The nature of EE lends itself to ethnography as a study technique and to discuss how an entrepreneurial mindset is nurtured, supported and how it evolves into an EE programme. Moreover, it is a good research technique for EE, because it is able to point out insights that cannot be expressed by means of quantitative or statistical data but which require different narrative and art tools (Robinson and Shumar, 2014).

To understand the complex phenomenon of improving the entrepreneurial mindset of all university students and of making a novel comparison of Italian CLabs, this study has chosen two Italian CLabs from the field of Public Universities. The choice of a specific context, that is, Italy, was made to reduce the impact of other context variables (e.g. different legislations). In fact, Laskovaia *et al.* (2017) discovered that different culture contexts can have an impact on an entrepreneurial mindset.

The cases were selected on the basis of the following criteria: 1) they represent a convenient sample (Bell and Bryman, 2007) because they are two CLabs financed by MIUR within the Contamination project. 2) they represent a good context to analyse the role of the university and EE with regards to the involvement of the local entrepreneurial ecosystems, 3) the two cases pertain to two different regions: one in the south of Italy, in a less innovative region and with a low rate of technological entrepreneurship, and one in the North of Italy, in an innovative territory. Therefore, these two CLabs work in two different entrepreneurial ecosystems. 4) the CLabs both received the same amount of funding from MIUR. Finally, 5)

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the two CLabs have the possibility of developing entrepreneurship extra-curricular courses for different students.

Research context

In line with the objectives of EE fostered by EU, the MIUR published the first call for the creation of CLabs (Directorial Decree no. 315 of 29 November 2016). The aim of CLabs is to create opportunities for students through the development of an entrepreneurial mindset and skills which can be used to turn creative business ideas into innovative projects or new start-ups. A total of 22 CLabs were financed and launched in Italy in the competitive call launched by MIUR, which also defined the guidelines that the universities had to follow to create and launch a CLab.

Table 1: CLabs at a glance

CLab Programme	
Aim	Enhance an entrepreneurial mindset and skills to foster the creation of innovative projects
Mission	<ul style="list-style-type: none"> • Foster academic and student entrepreneurial competencies • Promote team-working and soft skills • Support the development of student's innovative business ideas
Governance	Head of CLab, CLab Project Manager, tutors and a committee composed of faculty members, managers and entrepreneurs.
Target students	Students from different backgrounds (technical and non-technical students) and with different levels of study (undergraduate, graduate, Ph.D. and recent graduates)
Community and entrepreneurial ecosystem	Students, academic staff, start-ups, innovative enterprises, venture capitalists, business angels, researchers, associations, spinoffs, student-clubs, corporations, entrepreneurs, incubators, accelerators, university technology transfer offices and research centres.
Evaluation	Qualitative and quantitative indicators to evaluate the achievement of goals, impacts, network created, learning outcomes and the number of start-ups created

The ethnographic case studies dealt with in this paper refer to the CLab at the University of Salento (CLab@Salento) in the South of Italy and the CLab at the Politecnico di Torino and the University of Turin (CLabTo) in the North of Italy. It is interesting to note that the Politecnico di Torino and the University of Turin are collaborating to develop multidisciplinary entrepreneurial extra-curricular programmes. These two CLabs represent successful examples of the 22 Italian CLabs.

CLab@Salento organises extra-curricular entrepreneurship programmes that last 6 months (5 hours per week) for a total of 150 hours. These programmes offer students from different backgrounds (Business, Humanities, Social sciences, Science, Engineering, Biology, Arts etc..) the possibility of developing entrepreneurial mindsets by developing a business plan for an innovative business idea. The mission of CLab@Salento is to sustain the development of entrepreneurial mindsets and awareness.

CLabTo offers several short extracurricular entrepreneurship programmes, which were drawn up by the two universities in Turin, to students from different fields of study and with different educational levels. The entrepreneurship courses at CLabTo usually last one month. The CLabTo programme offers students the opportunity to test their theoretical knowledge in a real case, in multidisciplinary teamwork, and therefore to learn from others. The entrepreneurship courses at CLabTo adopt a challenge-based approach, since the literature (e.g., Honig 2004; Kassean et al. 2015; Rasmussen and Sørheim 2006) suggests using practical-oriented teaching models in EE. The challenge-based nature of the CLabTo programme also makes it possible to involve other actors from the Turin entrepreneurial ecosystem, such as companies, student clubs, incubators and entrepreneurs who can launch a call for ideas.

Data collection and analysis

Data collection was performed, using an ethnographic technique, to cover a period of two years, that is, from October 2017 till December 2019. The involved researchers had been immersed in organisational life to collect data and information (Johnstone, 2016). The data collection phase was aimed at describing the common elements and the distinctive features of the CLabs in the universities considered in our study in more depth in terms of target students, methodologies and approaches, duration of the programmes, effort required, main context of application and the teachers involved in the learning process.

The official documents were analysed to obtain a first general understanding of the project and of the process of the students developing an entrepreneurial mindset. Two of the authors served as either a CLab Chief or a CLab Manager, and another two are involved in the mentoring and tutoring of the university students' activities. The data analysis was performed according to an inductive and iterative process (Strauss and Corbin, 1998).

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The informal interviews and the authors' participation in and observation of the CLab processes have instead led to the exploration of the real CLab processes and have highlighted routines and common behaviour in the programmes. Finally, the direct involvement of the authors in the organisation and management of both CLabs allowed more insights to be derived about the study (Table 2).

Table 2. Data collection and research topics

COMMON FEATURES	
RESEARCH TOPICS	DATA SOURCES
CLab web site and social web page	Archival records; Project Reports, institutional web page; Italian CLab network web pages and social accounts.
Promoter of the CLab	Interviews; archival data; data bases; official social network accounts; Italian CLabNetwork webpages and social accounts; Project Reports.
Duration of the programmes	Project reports, institutional web pages; Italian CLab networks.
CLab partners	Interviews; archival data; data bases; official social network accounts; Italian CLabNetwork webpages and social accounts; Project Reports.
CLab aims, areas, timelines, evaluation committee compositions, value for participants	Project Reports; archival data, data bases, official social network accounts.
Entrepreneurial Learning Phases, Entrepreneurial Learning approach, Composition of the student teams, Stakeholders' involvement, Outputs and Awards	Project reports realised for national funding, field observation through the direct involvement of researchers, interviews, social media and administrative office reports.

Interviews were conducted with four key informant figures: the head of the CLab project, the project manager, the tutors, and students in the CLab. Integration of the collected information made it possible to understand the learning processes that were adopted in the two CLabs, the elements of distinction and the impact on the students' skills. Coherently with a qualitative methodology, the in-depth interviews were conducted through a semi-structured scheme and were conducted during the project delivery phase and at the end of the programme. The interviews were aimed at determining whether an informant was able to confirm the insights and information that the researchers had discovered (Kumar *et al.*, 1993). The involvement of CLab staff (project head, project manager and tutors) has led to a clear and complete

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representation of the entrepreneurship course practices. At the end of the programmes, interviews with participants made it possible to understand the learning impact and to identify the dynamics and processes of the different entrepreneurial actors involved in the programme with their different perspectives. Table 3 illustrates the interview details.

Table 3: The CLab staff and students interviewed

Position covered	N° of Interviews
CLab - Heads	2
CLab - Project Managers	2
CLab@ - Tutors	2
CLab@Salento interviews	I edition - 32 II edition - 65 III edition - 50
CLabTo interviews	I st challenge - 31 II nd challenge - 13 III rd challenge - 12 IV th challenge - 12 V th challenge - 15

Research Findings

CLab@Salento and CLabTo at a glance.

Since 2017, CLab@Salento has launched three editions. A total of 122 students have so far taken part in the CLab@Salento programme, 39 in the first edition, 83 in the second one and 50 in the third one. The enrolled students were aged between 17 and 35 in the first edition, between 16 and 54 in the second one, and between 20 and 34 in the third edition, with average ages of 24, 27 and 26 years, respectively. The percentage of women slightly exceeded that of men in all three editions, 51% in the first, 53% in the second and 55% in the third edition.

CLabTo has launched five challenges. A total of 183 students have taken part in the CLabTo challenges so far. The enrolled students were aged between 20 and 35, with a peak at 25. About 61% of the CLabTo students were men and 39% women. However, in addition to these participants, another 266 students were involved in other collaboration activities with CLabTo. CLabTo will also offer an international Summer School on Entrepreneurship in collaboration with the University of Groningen (Groningen, the Netherlands), the Higher School of Economics – National Research University (Moscow, Russia), the Russian

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Presidential Academy of National Economy and Public Administration (RANEPA - Moscow, Russia) and the University of Economics (Prague, the Czech Republic) in the Summer of 2021. Moreover, CLabTo is collaborating with Entrepreneurship Education Ecosystems in the Engineering and Technology (E4T) Erasmus+ project (Varano *et al.*, 2018). Moreover, as a result of the current pandemic, CLabTo is developing a challenge, in collaboration with a large Italian corporation involved in health assistance, to improve digital access to the Italian national healthcare system.

A more in-depth analysis of the distinctive features in the two CLabs, the Entrepreneurial Learning approaches, the Entrepreneurial Learning phases, the Composition of the classes, the Stakeholders' involvement, and the Outputs/Awards, is presented in the next section.

The distinctive features of CLab@Salento and CLabTo

The two analysed cases have the same mission and vision regarding the development of entrepreneurial mindsets, innovation and sustaining academic entrepreneurship among students, but they organise their activities in different ways. This section describes the elements of distinction of each CLab and makes a cross-comparison of the items identified in Table 4.

Table 4: Distinctive features of CLab@Salento and CLabTo

Research items	CLab@Salento Lecce	CLabTo - Torino
Entrepreneurial Learning Phases	Students develop and present a business idea they want to develop during the two phases of the programme, which lasts 6 months.	Students develop a general business model of an innovative solution through interdisciplinary teamwork and interactions with professors, mentors and tutors from different departments, usually over a period of one month.
Entrepreneurial Learning approach	<ul style="list-style-type: none"> • Innovative learning methodologies to guide students from business idea creation to the planning and development of a business plan. • Seminars, simulation, project-based activities, entrepreneurs in residence and contamination workshops allow the students to describe and develop their ideas according to a bottom – up approach. 	<ul style="list-style-type: none"> • Innovative teaching models through a mix of design-thinking and EE to create a challenge-based entrepreneurship course that leads to cooperation with external actors in the local entrepreneurial ecosystem. • The students are guided in the development of the idea according to a top-down approach that starts from a challenge presented by the stakeholders (e.g., corporations or student clubs).

Composition of the student teams	Students, with the support of the CLab@Salento staff, constitute teams that guarantee interdisciplinarity.	A team of psychologists guides the creation of the student teams through team-building exercises in the first days of each challenge.
Stakeholders' involvement	Local entrepreneurial ecosystem actors support the development of an entrepreneurial mindset and encourage the creation of the business model and the business plan according to their expertise.	<ul style="list-style-type: none"> • The stakeholders present the innovation challenge to the students. Therefore, they present the problems they need to solve to the students during the challenge. • They also act as mentors during the challenge and they are included in the examination board to evaluate the final presentation of the teams and to conclude the challenge.
Outputs and Awards	The Business Plan documents and the final Business Presentation are judged and awarded by experts and by the CLab Staff.	The students pitch their business ideas in front of an examination board. The best ideas are supported by experts and the CLab Staff. Some ideas are then supported by Incubators/Accelerators

From Table 4, it is possible to highlight the distinctive features of the two CLabs. Despite the two CLabs have the same final output, such as the diffusion of entrepreneurial mindset among students with different background, the CLabs present different learning approaches.

CLab@Salento's programme starts with a business idea generated by students and CLab's mentors and faculties support them in the process of the business idea and entrepreneurial process development in a period of six months. CLab@Salento is more focalized in the process of opportunity development and championing that allow students to identify innovative business ideas and write a business plan analysing the value proposition, the market context, the competitors and the financial items. The final output is the elevator pitch of the business idea developed. The local entrepreneurial ecosystem supports CLab@Salento in the achievement of the final objective, sharing experiential knowledge with students, sustaining them in the development of their business idea.

CLabTo starts with challenges presented by actors from the local ecosystem. Students, generally in a one month, are engaged in the development of the most suitable innovative solution realising also a final prototype. CLabTo sustains the development of entrepreneurial experiential knowledge and it is more oriented in the opportunity development and resource acquisition. The final output is a pitch of the designed solution that could be furtherly developed in incubators or accelerators. The role of the actor that presents the open challenge to students is fundamental for CLabTo's activities since representing the real needs from which to start novel entrepreneurial ideas.

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The different learning approaches such as the support in the redaction of business plans, the organisation of open challenges with enterprise of the local entrepreneurial ecosystem, the collaboration and support of entrepreneurs, institutions and banks allow considering CLabs as good example of Entrepreneurship Education Centres universities which foster students' knowledge, skills and attitudes towards entrepreneurship.

The Entrepreneurial Learning Phases.

The *CLab@Salento Learning phases* are organised with the aim of helping students to create and develop their business ideas. The activities of *CLab@Salento* are organised in two phases, both of which last 3 months:

- Phase 1: *Inspiring & Engaging*, which is aimed at developing entrepreneurial awareness and generating new innovative business ideas in the Bio-economy, Smart Technologies and Cultural and Creative Industry fields;
- Phase 2: *Experimenting & Developing*, which is aimed at translating business ideas into innovative projects or start-ups through the redaction of a business plan.

The learning phases in *CLabTo* are organised as follows:

- Phase 1: *Knowledge & Understanding*, to introduce knowledge on entrepreneurship and innovation to generate ideas. During this phase, the students also learn to recognise and understand the challenge they need to solve during the course. This phase is more theoretical and usually lasts one week.
- Phase 2: *Teamworking & Idea generation*, which involves the students working in interdisciplinary teams and developing an idea to solve the challenge. Professors, mentors and tutors from different departments and local entrepreneurs act as mentors by giving feedback to the students. This phase is more practical and usually lasts three weeks.

The challenges at *CLabTo* usually last one month.

The Entrepreneurial Learning Approach

The *Entrepreneurial Learning approach at CLab@Salento*. The *CLab@Salento* learning approaches include the typical innovative methodologies of EE, which are based on the integration of seminars, case study discussions, contamination workshops, entrepreneurs in residence, project work, business plan competitions and business games. A Business Plan

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competition, which ends up with "The Best Business Plan" award, requires interaction between the participants and the local stakeholders, such as entrepreneurs, business professionals, researchers, enterprises, TTOs, incubators and investors (McKenzie and Sansone, 2019; Russell *et al.*, 2008). The redaction of a Business Plan, with a financial statement, allows students to acquire action-learning capabilities, starting from idea generation and moving on to the first prototypes of their innovative project. The programme also includes interesting entrepreneurial initiatives, such as Entrepreneurs in residence, during which innovative entrepreneurs share their knowledge with the students, and Students@abroad initiatives, through which the students participate in conferences, workshops and exhibitions abroad to increase knowledge contamination process.

The Entrepreneurial Learning approach at CLabTo. CLabTo applies innovative teaching models, through a mix of design-thinking and EE, to create a challenge-based entrepreneurship course that leads to cooperation with the Turin entrepreneurial ecosystem to favour the development of innovative ideas. All the challenges are aimed at encouraging the students to generate new innovative ideas, moving from the need of the stakeholders from the local entrepreneurial ecosystem (e.g., corporations, student clubs, etc) to the adoption of a practical oriented teaching model. At the beginning of the challenges, the students acquire knowledge on entrepreneurship and innovation through traditional lectures. The students then begin to work in multidisciplinary teams to generate an innovative idea to solve a challenge. This idea generation phase includes more-practical oriented activities, such case-studies, simulation and brainstorming with experts on the thematic of the challenge. In this part of the challenge, the professors, mentors and tutors from different departments and all the local stakeholders involved in the challenge act as mentors to the teams. Moreover, participants of CLabTo need to consider both the economic and environmental sustainability of an innovative idea. At the end of each challenge, the teams have to pitch their idea in front of an examination board composed of professors, mentors and tutors from different departments, entrepreneurs and managers.

The composition of the teams

The composition of the student teams in CLab@Salento starts in the first phase of the programme with a session held by psychologists to develop team building skills and empowerment in groups. The students then proceed with the creation of the teams, while

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being supported by the tutors, mentors and staff members. Each team is composed of 5-6 students from different backgrounds in order to guarantee an interdisciplinary composition, because research has demonstrated that heterogeneity in a team, especially in an entrepreneurship team, has a positive impact on performance, due to the diversity of skills and perspectives of the team (Jin *et al.*, 2017). The teams are composed of students who have experience in bio-technologies, engineering, humanities, legal studies, physics, management, nano-technologies, biology and cultural heritage.

The composition of the student teams in CLabTo is facilitated by team-building exercises, which are supervised by psychology researchers in the first days of each challenge. Based on the work of the psychology researchers, the students create the teams. Each team is composed of a total of 4-5 people from at least 2 different backgrounds to guarantee interdisciplinary.

The stakeholders' involvement

The stakeholders' involvement in CLab@Salento. The learning strategy of CLab@Salento includes the involvement of numerous local entrepreneurial ecosystem actors who support the entrepreneurial mindset development process and encourage the creation of entrepreneurship. The external stakeholders are professors and mentors from Italian and international universities, entrepreneurs, managers and employees, experts from incubators and accelerators, investors such as business angels and venture capitalists, and banks belonging to the local Apulia Region ecosystem (Secundo *et al.*, 2015). Their involvement is fundamental in all the phases of the programme as they provide assistance and share knowledge, starting from idea generation to elevator pitching, to support the launching of a business in the form of a start-up, spin-off or others.

The stakeholders' involvement in CLabTo. The stakeholders play a fundamental role in CLabTo since they generally present the challenge to all the students. They present the problems that need to be solved to the students during the challenge. These challenges allow students to work on real cases and to collaborate and, therefore, to network with the Turin entrepreneurial ecosystem. Moreover, these challenges sometimes involve open innovation strategies for corporations. The external stakeholders of the CLabTo are local entrepreneurs, managers and employees of corporations, incubators, accelerators, science parks, maker places, student clubs, investors (business angels and venture capitalists), banks and

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foundations. These actors are involved in the lectures and throughout the entire challenge, even though they do not present the challenge. In fact, they support the teamwork during the challenge. Finally, the stakeholders are also included in the examination board to evaluate the final presentation of the teams and to conclude the challenge.

The students' outputs and awards

The students' outputs and awards at CLab@Salento. The students are supported in the development of business ideas and innovative projects. At the end of the first phase, *Inspiring & Engaging*, a set of innovative business ideas, in the context of bio-economy, smart-technologies and industrial and creative industries, is selected for phase 2, that is, *Experimenting & Developing*, when the business plan and a demo or prototype of the innovative project are developed. The student teams are awarded with "The Best Business Plan", "The Most Innovative Project" and the "Best Research Project". The scientific committee evaluates the business plans on the basis of the following parameters: clarity and completeness of the contents, innovation of the project, validity of the business model, level of detailed study of each section of the business plan template, clarity and completeness of the contents and economic-financial solidity. Moreover, the "Best Research Project" is assigned on the basis of the following parameters: strong connotation of research and innovation of the project idea; development of the demo and/or prototype, commercial relevance and the final business presentation. A jury of experts evaluates the final business presentation and assigns "The Most Innovative Project" award on the basis of the following parameters: clarity of exposition of the business presentation; innovation of the idea and validity of the business model.

Entrepreneurship outputs and awards at CLabTo. At the end of the challenges at CLabTo, the interdisciplinary teams pitch their ideas in front of an examination board. Their ideas are evaluated according to specific criteria and are awarded in different ways according to the committee's decisions. The criteria also included the social/environmental sustainability of the idea. The best ideas are then supported by experts and CLabTo Staff in order to exploit the ideas in a real entrepreneurial project. As a result of the high involvement of the stakeholders in the challenges, the ideas are usually supported by such local actors as corporations or Incubators/Accelerators. In CLabTo, the students develop their innovative projects in collaboration with the stakeholder that launch the challenge, with the support of CLabTo,

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mainly in the domains of Smart mobility, Sustainable mobility, Food, AgriTech, FinTech, Innovative education and Circular economy.

Discussion

CLabs are the first examples of Entrepreneurship Education Centres in Italy and are increasing their efforts to support EE in close collaboration with the local entrepreneurial ecosystems. The study has provided insights, in terms of the design and management of extra-curricular entrepreneurship programmes pertaining to the entrepreneurial learning approaches, entrepreneurship contents, stakeholders' involvement and final value generated for the students. The findings make it possible to demonstrate that, among their strategic roles, universities with their CLabs are a fertile ground to develop entrepreneurial mindset skills in talented young students. Although the two analysed CLabs have the same mission, the findings demonstrate that different learning processes and mechanisms can be pursued to achieve the development of an entrepreneurial mindset in university students, also according to the university context in which they are located. Thus, it could be useful to discuss the critical factors of success of the analysed entrepreneurial learning initiatives developed within the Italian CLabs in more detail.

First, it is interesting to show that both CLabs decided to develop extra-curricular entrepreneurship programmes, since offering curricular courses that were open to all students would be complex, if not impossible, in Italian universities. In fact, identifying activities that can be conducted by all the departments and deciding on the number of credits for students from different departments, with different educational levels and different hours for teachers in different departments may be very complex. One of the interviewees said, "*Offering extra-curricular courses allowed us to have great flexibility, in terms of teaching to all students*". In addition, one of the CLab Heads said "*Many professors and researchers, but also Ph.D. students, from different departments are very interested in our entrepreneurship programmes and they are collaborating in them. In this way, we are offering an intradisciplinary entrepreneurial programme*". Professors and researchers from different departments and with expertise in different scientific fields are involved in guaranteeing an interdisciplinary composition of the faculty.

Second, a common aspect is that of the key role of the contamination process among the stakeholders to allow knowledge transfer in the local entrepreneurial ecosystem. The external stakeholders, such as entrepreneurs and managers, are invited, to both of the CLabs, to

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exchange knowledge about the innovation challenges of setting up an innovative project, and the presence of a multitude of entrepreneurs in a region helps build up a support structure of investors, advisors and mentors. This is in line with the tendency of several corporations that are increasingly interested in entrepreneurship as a part of their open innovation activities (Wright *et al.*, 2017; Wright *et al.*, 2019). Moreover, also Italian SMEs are fostering their open innovation activities by collaborating with universities (Santoro *et al.*, 2020). The majority of the interviewed students evaluated their participation in the CLab programmes as a good way of enhancing their competence and of acquiring the experiences needed to develop entrepreneurial and innovative ideas. As one student said: *"I participated in the CLab in order to acquire competences that would be useful to overcome the so-called "Death Valley", which prevents innovative ideas from moving from the laboratory phase to the market"*. In answer to the question "Would you recommend CLab to your colleagues and why?" all the interviewed students answered "Yes" and they recognised the contribution of the CLab programme to increasing their managerial and entrepreneurial competences and soft skills. One student said that he would suggest CLab to all the students that have a business plan *"because it offers a good context to develop a project with the support of the local entrepreneurial ecosystem"*. Moreover, another student said: *"I would recommend participation in a CLab course because it leads to an enhancement of the "specific" knowledge of the degree programme with a broader competence"*. Coherently with the recent literature, the advantages of having access to the creativity and sometimes brilliant ideas of university students allows companies to achieve innovation and corporate entrepreneurs (Lazarotti and Manzini, 2009; Secundo *et al.*, 2017). One interviewed student said: *"CLab represents a "fantastic" experience that allows a network of academic staff, venture capital, bank and enterprises to be created and also enhances prior knowledge and experience"*.

Third, it is also possible to observe that the two analysed CLabs allow students to develop entrepreneurial competences that may be expressed as: *opportunity development*, which is related to the ability to recognise and exploit opportunities; *championing*, which is the ability to develop a business vision and to involve others; and *resource acquisition*, which is related to the ability to organise resources for the exploration of opportunities. Furthermore, these competences are completed, during the courses, with business knowledge on business models, technology foresight, global technology scenarios, design thinking, intellectual property management, open innovation, digital technologies and financial plans to support students in

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their learning phases. It is also interesting to highlight the action of social/environmental sustainability in the CLabTo.

Fourth, the findings also confirm that EE requires new entrepreneurial education approaches, that is, action-based or project based, which are the key to acquiring an entrepreneurial mindset, thus confirming the most relevant literature in the field of EE (Bae *et al.*, 2014; Beyhan, and Findik, 2018; Fayolle and Gailly, 2015). While the students at CLabTo develop more ideas, based on the logic of corporate entrepreneurship, by adopting a top-down approach in terms of idea generation, the students at CLab@Salento are instead more motivated towards a bottom-up process of idea generation, in line with the principles of independent entrepreneurship. The learning approaches should not be treated in a mutual way, but rather in a complementary way, with the direct involvement of the local entrepreneurial ecosystem, which can help universities foster students' knowledge, skills and attitudes towards entrepreneurship.

Finally, both of the CLabs contribute to the development of entrepreneurial competences and diffuse the idea that the entrepreneurial culture and entrepreneurial mindsets are not only the characteristics of business students, but from other backgrounds. Interdisciplinary teams with complementary competences lead to a process of entrepreneurial knowledge creation and have a positive impact on the performance of these teams, because the students take part in concrete experiences. This was possible as a result of the Italian policy created ad-hoc for the creation of these CLabs. In fact, as suggested by the Head of CLabTo "*This policy allowed students from two different universities in Turin to work together in entrepreneurship courses. I do not know if it would be possible without this type of policy*".

Conclusions and Implications

The entrepreneurship programmes developed within Entrepreneurship Education Centres throughout the world represent a means of addressing new economic challenges, creating jobs and fighting social issues. In Italy, in 2012, MIUR developed a policy to finance the creation of CLabs, that is, Entrepreneurship Education Centres that are aimed at developing entrepreneurial awareness and mindsets in all university students. This study has investigated how the entrepreneurial learning processes activated in the CLabs have favoured the creation of an entrepreneurial mindset in university students. CLabs represent favourable environments for the creation of EE courses, through the virtuous contamination process, among students from different educational backgrounds and level, who work with faculty and

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managers from the local entrepreneurial ecosystems in a real context in which entrepreneurial approaches are developed. The entrepreneurship programmes developed within the CLabs are extra-curricular courses that engage students and faculty members from different departments.

The originality of the study resides in the characteristics of the EE programmes organised by the CLabs, which can be expressed in terms of: interdisciplinarity in the composition of the students' teams; an opportunity for students to learn in a different way from students in traditional university courses, that is, learning approaches that are based on the development of practical experience; the involvement of professors, mentors and tutors from different departments; the virtuous contamination process of knowledge and competences with the stakeholders from the local entrepreneurial ecosystems. Based on the interviews, we discovered that all the students improved their entrepreneurial mindsets. Moreover, the students from a science or engineering background developed more knowledge and competences in the business management field, while the students from an economic, business or humanity background developed knowledge about technology management.

Implications for Theory. The paper contributes to the extant literature on EE developed within Entrepreneurship Education Centres and provides recommendations and guidelines for the Italian Context. Through CLabs, Italian universities are starting to move ahead with EE, by adopting different learning strategies, including entrepreneurial learning approaches, business idea development with companies, open innovation workshops, hackathon and elevator pitching to develop entrepreneurial mindsets in students. In this way, EE represents a set of actions that can be adopted by educational institutions and encouraged by policy makers in response to the fact that entrepreneurship is considered an engine for economic prosperity and growth (Shah and Pahnke, 2014). CLabs represent a place where the contamination of the culture of entrepreneurship, innovate learning methodologies is diffused in coherence with the key role of universities. Therefore, the Italian policy has been useful for the development of these Entrepreneurship Education Centres to foster entrepreneurial mindsets in all their students. CLabs represent the ideal locus for the promotion of open innovation, which is supported by the creativity of young, motivated, talented students who, interacting with a plurality of local stakeholders, can become ambassadors for the development of their local entrepreneurial ecosystem (Cavallo *et al.*, 2019). However, the different typologies of EE all require the engagement of students in partnerships with entrepreneurs, networks and business activities with companies and other external stakeholders, such as TTOs, incubators,

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accelerators, institutions, student clubs or banks, in order to enrich the knowledge contamination process. Companies benefit from university teaching and research, universities benefit from knowledge contamination in the local ecosystem, while students establish networks and learn in an experiential way. Moreover, the findings highlight that interdisciplinary is important for EE. The overall value generated for the students is the opportunity to develop and incubate business ideas while working with other students enrolled in different programmes.

Implications for Practice. The findings provide practical recommendations about the design, organisation and management of ad hoc entrepreneurship programmes within universities. An Entrepreneurship Education Centre may be considered as a permanent learning environment in which the values of interdisciplinarity and contamination between students, professors, researchers from different departments and external stakeholders are the most relevant factors to support the development of an entrepreneurial mindset in university. In fact, the involvement of the local entrepreneurial ecosystem is fundamental to develop practical oriented entrepreneurship courses. Interesting, the two analysed case studies allowed two different EE approaches to the creation of an entrepreneurial mindset to be identified. In one case, a top-down approach is followed, where actors from the local entrepreneurial ecosystem present some challenge to the students. In the second case, a bottom-up approach allows students to propose innovative business ideas arising from their previous studies or experiences. In both CLabs, the engagement of the students in entrepreneurial learning processes within the local entrepreneurial ecosystem represents a common success factor. The different initiatives and methodologies that have been described can support other universities along the evolving path towards the inclusion of EE in their courses or university degrees. Moreover, the results allow the project managers and scientific coordinators of other CLabs in Italy to identify the most suitable strategies and contents when designing innovative entrepreneurship programmes to instil an entrepreneurial awareness in university students, regardless of their background. Moreover, these Centres may indirectly foster the university entrepreneurial culture. Academic policy and decision makers need to be convinced of the value of offering such courses before they can be included in mainstream programmes. The feasibility of these suggestions needs to be analysed and contextualised according to the cultural context of the universities, the scientific research areas developed inside their laboratories and the local entrepreneurial ecosystems where the universities are located.

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Finally, it is important to create similar policies of EE in order to foster entrepreneurship programmes open to all the students also from different universities.

Limitations of the study and future research. The limitations of this study include the impossibility of generalising the results, since this is typical of case study methodology, and the fact that the research suffers from its own bias due to the involvement of the authors in the CLab experiences. Other research is necessary to analyse other CLabs in Italy to establish the "common traits" of these Entrepreneurship Education Centres as expressions of the local entrepreneurial ecosystems involved in moving EE forward. Furthermore, there is still a need to investigate the impact of extra-curricular EE programmes on the students' entrepreneurial outcomes and their contribution to academic and student entrepreneurship. Future research will be aimed at understanding the relevance of the COVID-19 health emergency, considering the novel ideas developed by students and the digital transformation of EE due to the necessity of adopting distance learning technologies in all universities throughout the world. Finally, a relevant issue that still needs to be analysed is the role of the universities in sustainable entrepreneurial ecosystems and digital entrepreneurship.

Conflict of interest: The authors declare that they have no conflict of interest.

Funding: This research was funded by the Ministero dell'Istruzione, dell'Università e della Ricerca (MIUR) PNR 2015/2020—Directorial Decree no. 3158 of 29 November 2016, grant number Prot. CL16JWECRH

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