Since January 2020 Elsevier has created a COVID-19 resource centre with free information in English and Mandarin on the novel coronavirus COVID-19. The COVID-19 resource centre is hosted on Elsevier Connect, the company's public news and information website.

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Threat or opportunity? A case study of digital-enabled redesign of entrepreneurship education in the COVID-19 emergency

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ABSTRACT

The COVID-19 crisis has forced universities worldwide to seek urgent solutions to reconfigure traditional education programs for distance learning. The transformation process faces a number of complexities deriving from both institutional and contextual factors. It may generate threats and as well as opportunities to enhance the education system and prepare for potential future emergencies. In this article, we adopted a combined research approach to describe the experience of the Contamination Lab of the University of Salento (CLab@Salento), an entrepreneurship education program focused on innovative and technology-based entrepreneurship for university students. Moving from the analysis of the main challenges the pandemic generated for the institution, students and faculty, we illustrate the process of redesigning the entrepreneurial learning program by leveraging digital technologies. We show a new approach to entrepreneurial storytelling, pitching and business planning and development through digital technologies. We also report the outcomes of a student survey to highlight the strengths of the redesigned program and some weaknesses, especially associated with digital technologies' limitations in education, which represent areas for future improvement. The study contributes at theory level with a new discussion on digital-supported entrepreneurship education. At practitioner level, it offers insights on redesigning traditional university programs to effectively address emergencies.

1. Introduction

In the early 2020s, the global health crisis caused by a novel form of coronavirus, named COVID-19 (COrona VIrus Disease 2019), has generated a disruptive impact on most economic and social activities, including schools and universities, people's going-out behavior (Kurita and Managi, 2020; Katafuchi et al., 2020). The emergency has forced countries around the world to adopt a variety of policies including social distancing, home quarantine, school closures, and case isolation in order to diminish infections and deaths (Yoo and Managi, 2020). At the same time, studies and researches were performed in various field to analyze and calculate the global risk of the COVID-19 outbreak, the risk of importation and exportation of the virus (Nakamura and Managi, 2020) and the estimation of the socioeconomic costs of COVID lockdowns (Mandel and Veetil, 2020; Martinet al.2020; Gharehgozli et al., 2020).

Universities had to undertake urgent solutions to reconfigure traditional programs using digital technologies. Restrictions on mass gatherings and social distancing requirements have limited class teaching, resulting in a massive quick shift to online teaching (Ratten, 2020). The crisis is thus an important occasion to reflect on, design and implement new education processes that leverage the potential offered by digital technologies (Krishnamurthy, 2020). More broadly, the challenging scenario represents an opportunity to enhance the education system and prepare it for potential future emergencies

The COVID-19 outbreak poses a significant challenge to management education, especially for experiential courses (Brammer and Clark, 2020; Kryukov and Gorin, 2017; Marshall & Wolanskyj-Spinner, 2020) such as Entrepreneurship Education (EE) (Ratten and Jones, 2020; Secundo et al., 2020). The development of entrepreneurship competencies is crucial for higher education institutions (Finkle et al., 2006; Finkle et al., 2013; Lombardi et al, 2019; Nelles and Vorley, 2011), and the digital revolution has opened fascinating opportunities for innovating EE (Cohen et al., 2017; Margaryan et al., 2011; Cassia et al., 2014; Maas and Jones, 2017). The adoption of digital technologies is strategic for creating entrepreneurially equipped students (Secundo et al, 2020a), also in consequence of European countries' need to accomplish the

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Digital Education Action Plan (European Commission, 2018).

Whereas digital technologies are crucial for education (Gupta and Bharadway, 2013; Al-Atabi, M. and Deboer, 2014; Holzmann et al., 2018), few studies analyzed digital technologies in entrepreneurship education (Rippa and Secundo, 2019). The particular situation generated by the health emergency represents a further reason to investigate how digital technologies can be adopted to design and deliver drive effective entrepreneurship education processes.

We undertake a combined research process to describe the experience in Italy at the University of Salento *Contamination Lab* (CLab@Salento), an entrepreneurship education program focused on innovative and technology-based entrepreneurship for University students. The study's main research curiosity is twofold: 1) *how can digital technologies be used to reconfigure the design and delivery of learning processes within entrepreneurship education to face the COVID-19 outbreak?* 2) *is the redesign a threat or opportunity to enhance the education system and prepare it for future likely (although undesired) emergencies?*

Accordingly, we adopted a combined research approach to describe the experience at the University of Salento *Contamination Lab* (CLab@Salento), an entrepreneurship education program focused on innovative and technology-based entrepreneurship. Moving from the analysis of the main challenges the pandemic generated for the institution, students and faculty, we illustrate the process of redesigning the entrepreneurial learning program by leveraging digital technologies. We show a new approach to entrepreneurial storytelling, pitching, and business planning and development through digital technologies. The study contributes at theory level with a new discussion on digital-supported entrepreneurship education. At practitioner level, it offers insights on redesigning traditional university programs to effectively address the arising emergency.

The remainder of the paper is organized as follows. Section 2 introduces the literature background on entrepreneurship education and the use of digital technologies to support learning. Section 3 presents the research methodology. Section 4 describes the findings achieved and Section 5 outlines a discussion. Section 6 concludes the paper by highlighting the study's theoretical and practical implications.

2. Literature background

2.1. Entrepreneurship education: Where are we in Italy?

Entrepreneurship education centers within the Italian Universities received increasing attention in 2012 when the Italian Ministry of University and Research (MUR) financed the creation of *Contamination Labs* (CLabs). These are hybrid (virtual and physical) laboratories where university students with different background can be involved in entrepreneurial learning activities. These promote their entrepreneurial awareness and innovative ability and aid the incubation of their business ideas. Within the CLabs, students are involved in typical EE activities such as idea generation, creative thinking, business games, elevator pitch, business plan competitions and idea challenges proposed by companies. The CLabs' strategic role has been recognized by the Italian *National Agency for the Evaluation of Universities and Research institutes* (ANVUR), which considers the presence of a CLab within a university a further indicator to evaluate the universities' third mission performance (ANVUR, 2016).

The European Commission has highlighted the importance of developing an entrepreneurial mindset in young people in several reports, starting from the "Oslo Agenda for Entrepreneurship Education" (European Commission, 2006), "Building Entrepreneurial Mindset" (European Commission, 2012), and in the "Entrepreneurship 2020 Action Plan" (European Commission, 2013).

Entrepreneurial mindset means the members of society, students at all levels of education, young entrepreneurs and start-up business people's competence to be creative and confident in whatever they undertake (European Commission, 2008), to cope with business uncertainty, ambiguity and complexity (Gibb, 2005). EE is a growing research field, with most articles written after 2010. The literature is full of descriptions of programs (e.g. Phan, 2014; Harmeling and Sarasvathy, 2013; Pardede and Lyons, 2012; Stone et al., 2005). Whereas most studies have been conducted in business schools, an increasing stream of research focuses on non-business students. Among these, the strategic importance of training engineering and scientists on entrepreneurship has been explicitly discussed by several scholars (Lynch et al., 2019; da Silva et al., 2015; Ndou et al., 2018; Elia et al., 2011; Lamine et al., 2018; Maresch et al., 2016).

The EE literature focus on courses that prepare students for creating ventures rather than students conducting real venture creation processes directly. Actually, a limited amount of literature focuses on venture creation programs (e.g. Lackéus and Williams Middleton, 2015; Rasmussen and Sørheim, 2006) and extra-curricular activities (Claudia, 2014; Haneberg and Aadland, 2019) to provide students with a direct support to create a real venture. The programmes and courses are described as being 'about,' 'for,' 'through,' 'in' or 'embedded' entrepreneurship to specify the learning approach and objectives (Pittaway and Cope, 2007; Harms, 2015; Robinson et al., 2016).

The creation of an entrepreneurship culture is also among Italian Universities' strategic priorities. The OECD Leaders Survey 2019 (Jerrim and Sims, 2019) positions the creation of an entrepreneurial mindset in students at the third place of Italian Universities' strategic objectives (with 39% of preferences). Twelve institutions out of 18 HEI responding to the Leader Survey declared having a dedicated staff to teach Entrepreneurship (OECD/European Union, 2019). In the Italian context, the Italian Ministry of Universities and Research (MIUR) provided a stimulus for EE development. In 2012, it started a program to finance university projects aimed to develop a "Contamination Lab" (CLab). CLabs are innovative Entrepreneurship Education Centres aiming to satisfy three complementary educational needs (Secundo et al., 2020b). First, *education on entrepreneurship*, through specialized seminars and digital entrepreneurship modules aimed to support the development of digital and entrepreneurship skills and focus on the identification and pursuit of digital opportunities (OECD, 2019). Second, *education for entrepreneurship,* providing students with the tools to start a business and implement the approach suggested by Pittaway and Cope (2007); this consists of turning an idea into a business proposition through the development of business models and business plans, indispensable aspects of EE and training (Albornoz-Pardo, 2013). The transformation of a business idea into a successful start-up requires gathering interdisciplinary information to develop the scenarios that may affect a business. It also needs accurate analysis and insights to chart the venture's course (Honig and Karlsson (2004). Third, *education through entrepreneurship* concerns the use of new venture creation to help students acquire a range of knowledge and skills on business and entrepreneurship (Kirby, 2004; Man et al., 2015). The CLabs support students by providing meetings with corporations, investors, angel groups and venture capital funds that affect the growth and scale up of digital new ventures (Cavallo et al., 2019). Twenty-three Italian CLabs were created in 2017–2020 through national government funding. Moreover, five other CLabs have been created thanks to internal funding in other universities. The three EE scenarios require students' engagement in partnerships with entrepreneurs, companies and other stakeholders to enrich the knowledge contamination process through economic and technological diversities (Geissinger et al., 2019). The learning approaches vary from classroom lectures, in which students are passive, to action-based. In these, students are self-driving and programs may help the student to become an entrepreneur (Aadland and Aaboen, 2018). In this exchange of flows, companies and universities build mutual benefits, and students establish networks and learn experientially (Guerrero and Urbano, 2012).

2.2. Digital technologies for entrepreneurship education

Online or distance learning in higher education has grown

exponentially in the past decade (Yuan and Kim, 2014), and the education system has been significantly impacted by the development of information technology and the introduction of web-based learning tools to deliver effective, just-in time and personalized learning (Assaf et al., 2009; Elia et al., 2009). In the last decade, a pervasive use of digital technologies has been promoted also in the entrepreneurship education domain, where MOOC providers, incubators and accelerators offer specific contents to individuals and teams that undertake the entrepreneurial process (Vorbach et al., 2018; Cirulli et al., 2016). Digitalization of entrepreneurship education is supported by the use of different virtual educational platforms, reuse of digital contents, and integration of new complementary technologies, with the resulting widespread use of online courses, simulators, interactive whiteboards, projectors, 3D printers, etc. (Vinogradova et al., 2019).

This represents only one dimension of digital technologies' more pervasive impact on education, by introducing significant changes at both individual and organizational level, as well as at cultural and professional level (Facer, 2011). The digital technologies phenomenon also characterizes EE by enhancing the partnerships between business and universities to expand practice and utilize experiences (Frolova et al., 2019), with a threefold objective (Vinogradova et al., 2019): provide opportunities for entrepreneurs to participate in the development of curricula; combine companies' and universities' resources for implementation of research and entrepreneurial projects, and finally to provide the opportunity for universities to attract business to their own advisory or governing bodies.

The use of digital technologies can be crucial to build effective, cost-efficient and flexible solutions aimed to develop entrepreneurial mindset and competencies, facilitate continuous learning for employees, and sensitize Higher Education Institutions (HEI) to face global technological, economic and social challenges (Kenney and Zysman, 2015; OECD, 2019; Rippa and Secundo, 2019). Digital technologies are supporting the traditional EE models (Swaramarinda, 2018) since they are contributing to enhancing the communications among the ecosystem actors involved in the entrepreneurial development processes (Rippa and Secundo, 2019).

The entrepreneurial ecosystem includes a large and diversified number of stakeholders providing a valuable contribution to the entrepreneurial development process (Elia et al., 2020; Elia et al., 2011; Ndou et al., 2018; Secundo et al., 2019a; Secundo et al., 2019b). Digital technologies can support the interaction of students with stakeholders during seminars, mentoring activities, project development sessions, demonstrations, and debates, with the final aim to make the education experience more effective and attractive.

The adoption of digital technologies in EE can drive relevant changes in the students' experiences in terms of online collaboration, online engagement, and teamwork satisfaction (Wolverton, 2018; Ku et al. 2013; Miles and Mangold, 2002; Greenlee and Karanxha, 2010). Moreover, digital technologies increase engagement and allow managing and implementing effectively synchronous discussion in online education (Klotz and Wright, 2017; Wolverton, 2018). The success of online collaborative learning depends on team dynamics, team acquaintance and instructor support (Ku et al., 2013). Team dynamics is related to the degree of participation in the communication process, collaboration, trust and cohesion (Greenlee and Karanxha, 2010). Team acquaintance refers to a team's familiarity with members' learning styles, personal beliefs, and professional backgrounds. Instructor support includes guiding students to achieve learning objectives and encourage peer interaction. Liu et al. (2008), Miles and Mangold (2002), discovered that the level of trust among members contribute to people engagement and satisfaction. Ku et al. (2013), Lancellotti and Boyd (2008) found that open and frequent communication increase team effectiveness. In online collaborative learning contexts, the role of instructor changes and evolves towards a co-learner, supporter, facilitator and designer of action-learning processes (Ku et al., 2013). Such new instructor provides guidance on learning goals, on the configuration of the learning environment, and the provision of rules and support (Zhu et al., 2016; Faustmann et al., 2019). Despite all the positive impact of distance learning on students experience, it is not worth noting that also critical issues emerge such as students' frustration with the adoption of digital technologies, isolations and anxiety; Garrison (2009) suggests that 'transformation of remote teaching and learning can happen by fundamentally rethinking higher education's collaborative nature (p. 98).'

Coherently with the learning processes and above-mentioned challenges, the fast growth can be observed of MOOC platforms like Coursera, eDX, Udemy, and Udacity (Cirulli et al., 2016) and Federica web learning, the platform of University of Naples Federico II (Italy). MOOC aggregators (e.g. Class Central or MOOC List) allow to do a meta-search on multiple MOOC platforms (Liyanagunawardena et al., 2019), and receive a list of free courses to compare (Dhekne and Bansal, 2018). Course providers include MOOC platforms, universities (e.g. Harvard University, Stanford University, MIT, HEC Paris, Delft University of Technology, University of Naples Federico II etc.) and business accelerators (e.g. Y Combinator, Techstars, etc.). Digital technologies can offer more advanced support to EE through the possibility to access to an online community in which to develop and tune potential business ideas (Elia et al., 2020) and to realize innovative entrepreneurial learning experiences supported by the emerging digital technologies within the Entrepreneurship Education Centers (Secundo, Meoli & Rippa, 2020b). The Global Entrepreneurship Network's *Startup Compete* is a global networking community and competition platform that allows aspiring entrepreneurs, mentors and advisors to connect and develop potential business ideas. The platform offers an articulated system of digital services and interactive tools that enable actions and interactions throughout the entire entrepreneurial process. *IBridgeNetwork* is a digital community that provides support to idea discovery, people's connection and collaboration, developing early-stage technological projects, broadcasting technology needs, discovering matching technologies and partners, and connecting to clients and investors. To support prototyping and application development, many universities and Fab Labs provide students with the access to cloud computing infrastructure and 3D printing services and facilities in order to develop both software and hardware prototypes (e.g. Google Cloud for Startups, online software simulators, or FabLearn Labs network). Angel.co provides online support to form the entrepreneurial team and find potential investors, whereas F6s.com offers online services to connect directly with accelerators, funds and investors, and search talents to complete the team. The *Italian Contamination Lab Network* is a network of the Italian Entrepreneurship Education Centers named Contamination Labs (CLabs). They aim to develop and disseminate an entrepreneurial mindset and enterprise culture among university students through extra-curricular courses and experiences also supported by digital technologies (Secundo, Meoli & Rippa, 2020b).

All these cases show how digital technologies can support EE along complementary dimensions; e.g., learning methodology (e.g. project and problem based learning, storytelling), learning context (e.g. collaborative communities, cooperative learning), learning tools (e.g. simulations, augmented reality, gamification), and learning support systems (e.g. mobile, MOOC platforms, learning object repository) (Vorbach et al., 2019). This introduces changes and innovation in the content delivery, content aggregation, people collaboration, interactive discussion, information sharing, idea development and validation, access to resources, project development, simulation, and prototyping also with reference to the academic entrepreneurship process (Secundo, Rippa & Meoli, 2020c).

3. Research method

We adopted a case study methodology (Yin, 2009) based on ethnography, semi-structured in-depth interviews with key informants (Yin, 2009; Robinson and Shumar, 2014) and a survey. A case study is preferred when the research questions are "how" or "why" and require a

simple observation of the social phenomena and an interpretation by the researchers (Ryan et al., 2009). Consequently, different possibilities are generated according to the researchers' different perspectives (Glaser and Strauss, 1967) and results may be predicted by looking for a literal replication (Yin, 2009). 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). This methodology is useful for the events that cannot be controlled and to support researchers in collecting qualitative data for building theory (Eisenhardt, 1989).

3.1. Research context

The study was conducted at the University of Salento *Contamination Labs* (CLab), one of the Italian Contamination Labs created since 2012, developed as an entrepreneurship education center financed by the Italian Ministry of University and Research (MUR). The CLabs are hybrid (virtual and physical) laboratories where students with different background can be involved in entrepreneurial learning activities to promote their entrepreneurial awareness and innovative ability, and work on the incubation of their business ideas. Within the CLabs, students are involved in typical EE activities such as idea generation, creative thinking, business games, elevator pitch, business plan competitions and idea challenges proposed by companies. The CLabs' strategic role has been also recognized by the Italian *National Agency for the Evaluation of Universities and Research institutes* (ANVUR), which considers the presence of a CLab within a university a further indicator to evaluate the Universities' third mission performance (ANVUR, 2016).

At University of Salento, the CLab@Salento was financed in 2017 by the Italian Ministry MIUR and University of Salento launched a generalist University in South of Italy, with 8 departments. The CLab@Salento aims at developing entrepreneurship courses to instill an entrepreneurial mindset in university students through the engagement of local stakeholders, such as managers, entrepreneurs, and institutions (e.g. Confindustria local association of Apulia Young entrepreneurs and banks) in three main research areas: Smart technologies, Creative industries and Bio Technologies. At CLab@Salento during each academic year, an edition of the EE program is organized; the program lasts 6 months (5 hours per week) for a total of 150 hours. Since 2017, CLab@Salento has launched three editions involving a total of 172 students, 39 in the first edition and 83 in the second one, and 50 students in the third edition that has completely re-designed its EE course through the adoption of Digital technologies starting from March 2020 due to the lockdown.

The CLab@Salento has been selected as a case for our study for three main reasons. First, the program is specifically focused on entrepreneurship education and the development of entrepreneurial competencies and mindset in university students. Second, the lockdown of the Italian Universities as of March 11, 2020 forced the program's scientific director and project manager to rapidly reconfigure the activities by leveraging digital technologies and distance learning platforms such as Moodle platform and Microsoft Teams have been prepared and customized to support the new configuration of learning and education activities. Third, the authors' role as faculty members, project manager and project tutor has supported a participant observation and more effective data collection and analysis. The next section described the process and methods used to gather and elaborate data.

A number of challenging aspects for the university (institution), faculty members and students characterized the study context. For the university, the main issues were related to properly applying the emergency regulations defined by the national and the regional government, and the recommendations received from local health authorities, into a renewed institutional framework to preserve the educational process's quality and effectiveness. Concerning the faculty, the most relevant challenges consisted of the need to immediately reconfigure all the curriculum design and the delivery of their course contents. This has been more important, especially for the experiential learning based course, such as the typical entrepreneurship education course, requiring the creation of team dynamics and group activities. Concerning students, the Covid-19 emergence imposed attending lectures online, becoming comfortable with the use of distance learning technologies, and the need to work on teams, using the different technologies to create the sharing and collaborative environment they had in universities.

3.2. Data collection, analysis and validity

A combination of methods, ranging from direct participant observation, semi-structured conversations and archival research, was adopted to gather data. Ethnographic methods such as participant observation and conversations are a common element of recent studies on organizations (Czarniawska , 2012). Multiple data collection methods were used to exploit the synergistic effects of combining them via triangulation (Bell and Bryman, 2007) to reduce the bias of a single observation in comparison of multiple data (Tarrow, 1995).

- *Direct observation.* Direct observation included the analysis of the team members' interactions within the classroom activities and the participants' strict interactions with all the stakeholders involved. The CLab tutors and Project manager interacted directly with the participants during all the classroom and online activities and observed the stakeholders' reactions to the activities organized. The authors' participation in the CLab program supported the exploration of the processes happening in the distance learning technologies.
- *Interviews and conversations:* The research was enriched by a dozen semi-structured conversations and interviews with various key informants (Kumar et al., 1993), including CLab ecosystem representatives and program participants. The direct involvement and observation of the CLab project manager and CLab tutors allowed the continuous informal interview with all the participants. Interviews were based on semi-structured schemas using a flexible approach that allowed gathering the informants' perspectives on specific issues, or as a way of checking whether the informant could confirm insights and information the researchers already held (Myers, 2008). Informal interviews aimed to capture the participants' level of involvement and satisfaction in the entrepreneurial learning processes. They involved all 42 students (of a total of 50 students of the third edition) successfully completing the program (see Table 1).
- *Archival Research:* Data collected included official documents, websites, social network accounts, interviews and surveys. The official

Table 1
Student population and characteristics.

Gender	
Male	15
Female	24
Age	
20–22	10
23–25	12
26–28	11
29 or higher	6
Education Background	
Math and physics	1
Economics Sciences	4
Humanistic Studies	3
Engineering for Innovation	9
History, Society and Human Studies	6
PhD Program	5
Cultural Heritage	3
Languages	1
Post-doctoral researcher in Chemistry	1
Environmental Sciences	1
Biology	2
Biological And Environmental Sciences And Technologies	3
Total	39

documents were analyzed to obtain a first general understanding of the project and of the process of incubation of the student's business idea. The data collection process covered a period from October 2019 to June 2020. Two of the authors served as CLab Project Manager and CLab learning facilitator, and the others as CLab mentors on specific topics of business management and technology entrepreneurship.

- Finally, a *o line survey* was been managed through Google Form and made accessible by a link sent with an official mail to capture anonymously the students' satisfaction about the digital learning modalities during the outbreak. Using a Likert scale from 1 to 5 (where 1 means not all agree and 5 strongly agree), respondents have thus evaluated their learning experience. The number of questionnaires filled in was 39 of the total of 50 students with a return rate of 79% (see Table 1).

After collecting the data, the processes of data reduction, data display, conclusion drawing and verification (Miles and Huberman, 1994) have been carried out. As argued by Gilmore and Coviello (1999), in case study based investigations, this approach guarantees the highest degree of reliability The analysis of data followed an inductive and iterative process (Strauss and Corbin, 1998). The involvement of CLab staff (professors, mentors and tutors) has led to a clear and complete representation of the universities' practices.

Data were subsequently organized into tables to ease comparisons, and the importance of some concepts representing the key elements of the analysis were highlighted. The data was interpreted by seeking out how the curriculum design and delivery of the Elevator pitch and Business Plan development changed through the adoption of distance learning. An online survey was developed and filled in by the students enrolled in the third edition of the CLab@Salento, in the aim to grasp their reactions and insights about the effectiveness of the new distance learning mode as well as the main problems and challenges encountered.

Finally, as described by Eisenhardt (1989), a further series of iterations between data, both secondary and primary, and the literature was conducted to better ground the theoretical foundations of our investigation into the current scholarly work.

Table 2 synthetizes the data collection and analysis.

Validity of the qualitative case study is assured using the four types of methods proposed by Yin (2009), i.e. construct validity, internal validity, external validity and reliability. Construct validity can be executed by utilizing a wide variety of evidence sources to establish reliable chains of evidence. In our case, we used a combination of data collection methods, from ethnographic observation, up to different types of archival documents, such as websites, articles and printed report and materials (see Table 2). Using these different sources, it was possible to cross-check the findings and, therefore, to create trustworthiness. Internal validity is assured by identifying causal relationships and patterns in the case research. This is executed by relating empirical data to existing research, as expressed in the discussion and conclusion section. External validity is proved by the generalization of results. As the research only contains one case, the generalization of the findings could be considered limited. Awareness of these limitations improves the external validity. Finally, reliability has been addressed by documenting all the research data into archival records eventually accessible by other researchers.

4. Findings

We illustrate in the next sections the process of redesigning the entrepreneurial learning program by leveraging digital technologies. In particular, we show a new approach to entrepreneurial storytelling, pitching and business planning and development through digital technologies. We provide details on how the environmental conditions impacted the revision of the contents as well as the delivery mode, and we report the outcomes of a student survey to highlight the strengths of the redesigned program in terms of engagement and satisfaction, and a number of criticisms to be properly managed.

4.1. Redesign of the entrepreneurship education curriculum using digital technologies

The CLab@Salento program aims to guide students in the creation and development of their business ideas along two phases (Secundo et al., 2020a). The first phase, *Inspiring & Engaging*, was aimed to develop entrepreneurial awareness and business ideas in areas such as bio-economy, smart technologies and cultural and creative services. This phase was realized in class from December 2019 until March 2020. The phase 2, *Experimenting & Developing*, was addressed to translate ideas into innovation projects. This phase, realized in the period March 2020-June 2020, was completely re-designed to face the Covid-19 epidemic.

Transferring all learning processes of phase 2 to distance learning has required an extensive effort of the academic and management staff to redesign the learning process according to the new requirements and constraints. Courses designed for the physical classroom had to be reorganized to satisfy the functionalities of the distance learning

Table 2
Data collection and analysis.

Data collection process	Timing	People involved	Data analyzed	Findings
Direct observation	October 2019- June 2020	CLab project manager CLab tutors CLab faculty members	Design of the learning processes • Team learning dynamics • Students' performance and satisfaction • Stakeholders engagement within the program	• Organization of the EE program • Novel Curriculum design through distance learning • Curriculum delivery through Distance Learning • CLab processes in the distance learning technologies. (See Section 4.1, 4.2, 4.3)
Interviews and conversations	April – June 2020	42 students (on 50)	Notes about the interview with students Recording some interviews	Impressions and comments of students about distance learning (Section 5)
Archival Research	November 2019 – April 2020	–	Detailed design of the learning processes CLab Project report Web site, social page CLab Brochure Course contents and calendar CLab email sent to participants by the scientific committee and tutors	• Digital learning activities at CLab@Salento (See Section 4.1; 4.2)
Anonymous on-line survey	April 2020	39 respondents (on 50)	Survey replies taken from the on line database	• Students perceptions about distance learning modalities and technologies (Section 5) • Distance learning impact on individual learning (Section 5)

technologies. The EE literature has extensively argued that effective distance learning requires online collaboration and engagement, open and frequent communication to increase team effectiveness, trust and cohesion (Greenlee and Karanxha, 2010). Following previous literature, the redesign of the distance learning curriculum in the CLab@Salento was based on the following criteria or goals:

a) providing information to students regarding the available technologies for knowledge exchange and communication, and supporting them to becoming familiar with digital tools and their functionalities;
b) providing students' team members with support and guidelines regarding the way to structure the action learning and collaborative process, how to manage conflict and build trust;
c) stimulating exploration and critical thinking by providing students with digital material like videos, papers, reports, websites, and help them to organize and structure group discussion;
d) promoting the use of synchronous and asynchronous communication strategies to support discussion, collaboration, and knowledge exchange;
e) promoting frequent communication among team members and the instructor to encourage knowledge exchange and promote cohesive decision making;
f) shifting the instructor's role to a supporter that guides teams in designing learning goals, facilitates learning, coaches and mentors teams to become proactive collaborators, think critically, be creative, and integrate multiple perspectives to optimize insights;
g) setting specific and measurable goals and expectations, and periodically evaluating the process's effectiveness as well as taking corrective actions when necessary.

Table 3 provides a synopsis of how the curriculum design and development was redesigned with reference to CLab@Salento Phase 2. The table shows the program's different learning methods and outcomes, along with a short description of the same, and illustrates how the activities were undertaken into the new digital configuration.

The CLab@Salento digital curriculum was mostly based on the use of Google Meet® platform, an interactive system for organizing virtual meetings using audio/video connections. To join the meeting, participants used either their personal pc or mobile devices, and in case of unavailability of Internet connection, joined the meeting by a phone call. Besides, Google Meet, also Skype® was used for individual meetings and personal mentoring sessions to track work progress and clarify doubts. Microsoft Teams® was used as well to gather project presentations, record the pitches, fill in the evaluation modules, and invite external stakeholders willing to join the event.

4.2. Entrepreneurial storytelling through digital learning: The virtual elevator pitch

A milestone of the EE process is the preparation and delivery of an "elevator pitch." This is a purposeful, concise and business-oriented verbal message about a technology venture idea or project. During their learning experience at the CLab@Salento, student teams are indeed involved in a business idea competition and the pitch is aimed to: 1) develop business presentation and public communication skills; and 2) obtain an early validation of their business project and feedback to improve and drive future actions. The virtual learning process and a focused structure of contents were thus designed to train students, and materials were prepared and distributed both via e-mail and through the distance learning system. The module outline includes key background knowledge on management of organizations (1), technology entrepreneurship and venture creation (2), fundamentals of public communication and business presentation (3) and elevator pitch basics (4).

The learning process design has been realized to support interaction and intentional knowledge sharing among team members, mentors, and

Table 3
Digital learning activities for Entrepreneurship education at CLab@Salento.

LEARNING PROCESS	DESCRIPTION	DIGITAL ENABLED ACTIVITIES
Seminars	Seminars on specific topic related to entrepreneurship: • Innovation • Digital Transformation • Circular Economy • Innovative Entrepreneurship • Business models Community's interaction in the classroom.	Digital Seminars through google Meet in synchronous modalities: • Digital Transformation trends • Understanding IT and societal mega trends • Big Data or The Internet of Things (IoT) • Circular economy paradigm • Innovative Entrepreneurship. Community's interaction in virtual classroom with chat, video and microphone functionalities.
Case studies	• Real-life case studies. • Students works in teams • Discussion in classroom.	• Real-life case studies through Google Meet. • Skype and Google Meet sessions for team work discussion
Contamination workshop	• Speakers share experiential knowledge about entrepreneurship and innovation in classroom. • Brainstorming and Q&A section in classroom.	• Workshop delivered through Google Meet. • Synchronous brainstorming and Q&A section in virtual classroom.
Elevator Pitch	• Student teams presents in three minutes the Elevator Pitch of their business idea. • Mentors give feedback and suggestions for future business development after presentation.	• Elevator pitch in three minutes has been video-recorded and delivered in google drive • After the display of the pitch, mentors gave evaluations and suggestions through an online Q&A session.
Business plan simulation	• Student teams write a Business Plan with financial statements. • Mentor and tutor support students in classroom.	• Seminar on Business Plan development with Google MEET. • Student teams work in Virtual classroom on Google Classroom for writing their Business plan.
Students@ abroad	Students participates to conferences, exhibitions, workshops in other universities or institutions	Activities canceled due to the COVID-19 mobility restriction.
Business model canvas	• Business model canvas seminars • Practical sessions and simulations in classroom.	• Business Model Canvas developed by students' teams working on line through skype and google meet • Business Model Canvas Review with mentors through Google MEET • Virtual Classroom for discussion and performing the final version of Business Model Canvas on Google Classroom. • Final upload in Google Drive knowledge base.
Open innovation challenge	Open innovation challenges with local entrepreneurs for the identification of novel solutions (products, platform or process).	• Students' teams work on Open Innovation Challenge supported by different tools: Skype, Slack platform, Google Meet. • Update meeting usually two times per month
Prototype development	Development of the first prototype in the university research laboratories.	• Development of the first prototypes thorough remote access to R&D laboratory of university.

members of the program's scientific and industrial committee. The learning module included four main phases, as represented in Fig. 1.

First, content design was based on the assumption that only specific and highly focused pieces of information should be provided to students. Resources need to be easily accessed and used on-line (file size and software tool requirements are thus important elements to evaluate) and should provide a practitioner a rather purely academic view of technology venturing. Second, training sessions were delivered using a practitioner orientation and style, and reducing the total duration of seminars. Overall duration and extended coaching was ensured to students, also off-line (e.g. through e-mails). Third, students were asked to work (and collaborate in a virtual setting) in teams of 3 to 5 members with the aim to prepare an elevator pitch of their business idea (different stages of the venturing process were allowed). The simulated audience would include potential funders, partners, investors, and other forms of stakeholders potentially interested to collaborate in the venture. The elevator pitch was delivered and video-recorded by students at home, and then uploaded in a purposefully created Google Drive® folder. Max pitch time was 3 minutes and materials (e.g. pamphlets, posters, prototypes) could have been showed in the video. For each team, only one member held the pitch and the others handled the questions and answers session during the evaluation and feedback session. Fourth, the evaluation of the video-pitch was mostly qualitative, based on a scorecard distributed to students at the beginning of the module, and suggestions were provided for improving the presentation quality and the venture project's overall quality.

Whereas the overall learning module process was redesigned to best fit into a "digital" environment, the learning pitch delivery and evaluation phases were particularly impacted from the shift from a traditional to an innovative digital-enabled configuration. For the delivery, students had to record a video-presentation and pretend to be physically in front of a specialized audience. The questions and answers session was realized on-line and evaluation was provided by the evaluators (program coordinators, professors/researchers and industry professionals) by annotating qualitative aspects related to both the quality of the pitch and students' ability to manage questions. After the evaluation, students were provided with detailed insights, suggestions and recommendations for improvement and follow-up. Table 4 reports the video-pitch evaluation areas, along with the weight of each aspect on the final evaluation.

The pitch preparation/delivery and evaluation processes highlighted a number of differences compared with a traditional face-to-face module. In particular, differences may be described as challenging issues or "complexities" to consider and address properly. First, a number of *technical issues* can be experienced, such as bandwidth issues or limitations, quality or ineffective use of audio/video devices and software, latency time in speaker's voice, and screen/framing issues. Second, *contextual issues* exist, as the speaker should pretend to be in a specific entrepreneurial/investment situation and the whole team has limited potentialities of replicating to a physical audience of stakeholders. Third, *interaction limitations* or complexities derive from the absence of a physical approach. If "digital proximity" replaces physical proximity, crucial aspects such as audience observation and eye contact dynamics are of course hindered. Finally, *emotional barriers* may derive from the use of web-based communication tool that creates a filter between the speaker and the listeners.

Table 4
Elevator pitch evaluation areas.

Area of evaluation and weight	Description
Background knowledge (10%)	Basic knowledge about business management, technology entrepreneurship, and business presentation
Style and approach (20%)	Overall verbal and non-verbal characteristics of the presenter and the presentation
Material and content (40%)	Contextual and venture information provided to the audience
Reasoning flow (30%)	Consistency of assumptions and statements in a logical problem-solution-market-process-profit line of thinking

4.3. Business plan design and development through digital technologies

The design and realization of business model and business planning is one of the essential entrepreneurial activities realized by students in Phase 2 of the CLab@Salento. A business plan is a comprehensive written report of the business's goals, which includes discussion of the business concept, operational plan, marketing plan, financial issues, organizational structure, and legal requirements (Zuckerman, 2004). The required skills and competences for developing business plans are theoretical and practical and in addition, team members' rationality and creativity are indispensable. Therefore, designing a distance learning process for business planning is a pertinent challenge afforded by the CLab@Salento, and faced with both synchronous and asynchronous technologies for student's communication and collaboration. Fig. 2 shows the business planning process and approach, which shares some of the aspects already described for the elevator pitch module.

Synchronous communication consisted of online lectures and weekly meetings with the teams to stimulate communication, knowledge sharing and collaboration, while asynchronous communication was used by the teacher for exchanging the knowledge that was useful for leading teams toward more critical assessment, reflective and thoughtful learning. The business planning module outline consisted of training and providing students with hands-on, information, resources, approaches and methodologies for business modeling and planning.

During the action learning phase, the team members were asked to continue working, to further develop their idea and to define their business plans. The teams were involved in activities related to performing market and competitive analysis to establish the positioning, market size and distinctive elements of the new venture, simulating forming new ventures, practicing entrepreneurship tools for market research, business model validation, customer discovery, and fundraising. These aspects were first included within the Business Model Canvas that in Phase 2 is at the basis of Business Plan development and has been designed through online teamwork (Fig. 3).

Moving from the Business Model Canvas, the teams will work to collect, structure, and analyze all information, resources and knowledge necessary for structuring and writing a real business plan and presenting it live, with digital technologies. The final version of the business plan requires several interactions of students with faculty mentors through

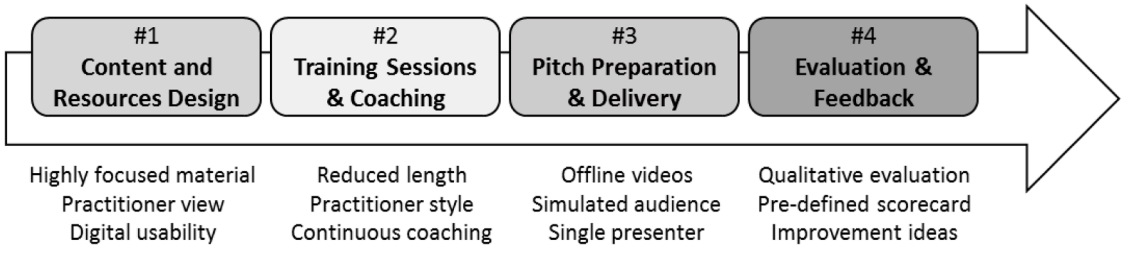

Fig. 1. Elevator pitch: design for distance learning.

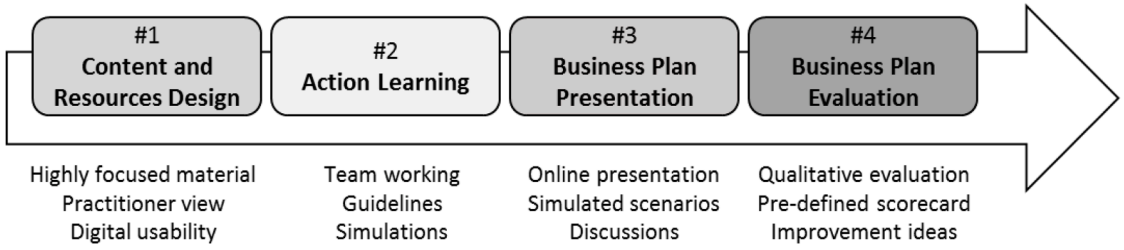

Fig. 2. Business planning process and approach.

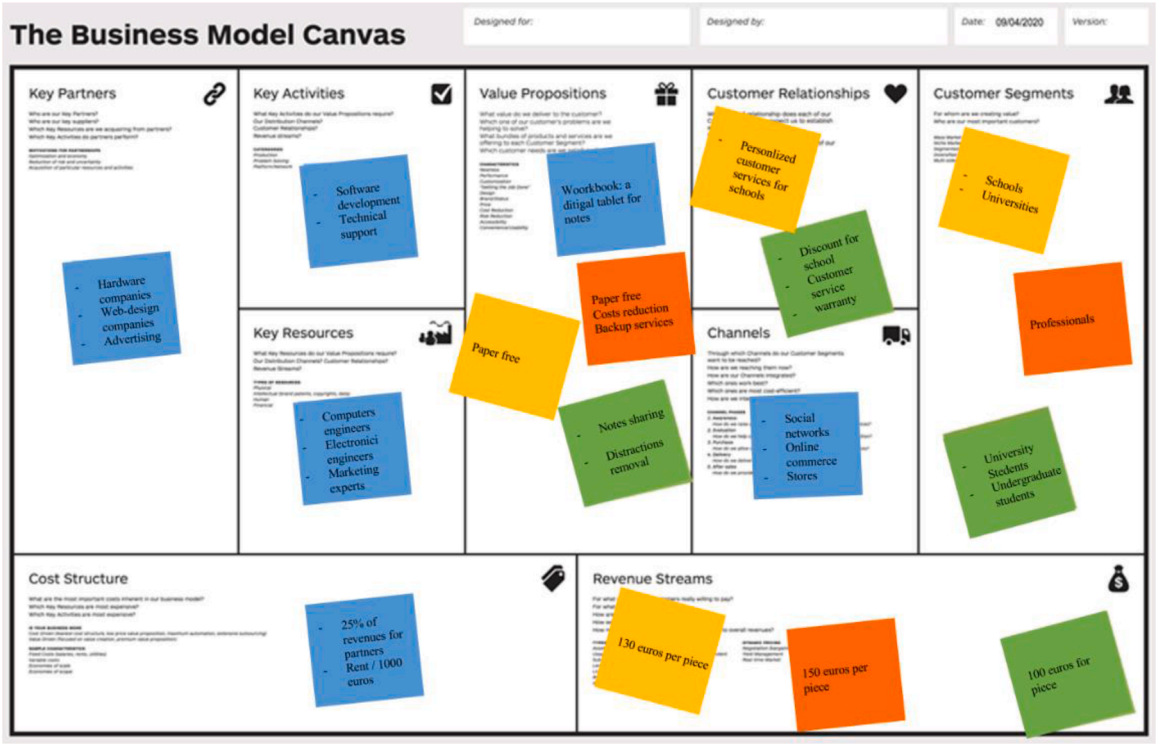

Fig. 3. Business Model Canvas developed using on-line software.

the available synchronous and asynchronous technologies that guide teams in drafting a final document that would be useful to start new ventures. This activity allows teams to acquire action-learning capabilities, starting from idea generation and moving on to the first prototypes or demos of the innovative project, in collaboration with the main entrepreneurial ecosystem stakeholders.

The business plan was evaluated by the scientific committee members, composed of CLab@Salento professors and experts, and a qualitative evaluation was defined for each team. At the end of the program, the business plan was presented through the online platform Google Meet to an audience of peers, professors and experts by also simulating the presence of financial institutions, angel investors and venture capitalists. Final Evaluation was based on business plan document quality, presentation quality and question-handling sessions (Table 5).

During the final CLab@Salento program workshop (not yet undertaken at the writing of this paper), a competition is to be held to nominate "The Best Business Plan" to be awarded by local stakeholders, such as entrepreneurs, business professionals, researchers, enterprises, incubators and investors.

Table 5
Business Plan development evaluation areas.

Area of evaluation and weight	Description
Basic background knowledge (30%)	Background knowledge on marketing plan, competitors analysis, financial plan and operational plan.
Style and approach of oral presentation (20%)	Verbal and communication quality of the power point presentation
Material and content (40%)	Business plan report; Business plan PowerPoint; Final video presentation.
Question handling (10%)	Capacity of students to face the questions posed by the scientific committee.

5. Students' evaluation and insights for improving the EE program

In this section, we report the outcomes of a survey conducted with the students to analyze their satisfaction and perceptions about distance learning modalities. The findings suggest a number of strengths of the redesigned program as well as some weaknesses, especially associated with the limitations of digital technologies in education, which represent areas for future improvement. Before the Covid-19 emergence, only

28% of the population had already engaged with digital education, and most students (41%) declared having used only asynchronous modules, such as webinars or other seminars without interactions with the class or teacher. This aspect represents useful elements to take into consideration when analysing the final results.

Students were asked to evaluate their satisfaction about organization of classroom activities in distance learning in comparison to the traditional (face-to-face) modalities experienced in the CLab@Salento during the program's first phase. Although the ongoing COVID-19 crisis at the time of writing this article impeded us from collecting longitudinal data, findings demonstrate a balancing between positive and negative judgments. Specifically, a positive impact of distance learning was recognized in terms of the "sentiment" about the sense of belonging to the CLab learning community (Question A1), as also confirmed by the interviews, reported here by some students:

> "The distance learning mode is much better because I can comfortably follow the seminar at home, with greater concentration. In addition, this method has stimulated a greater interaction with the staff and the mentor, also through the virtual classroom chats" (Student 1).

> "Distance learning allows some students to overcome the difficulty of moving away from home. It would be an optimal strategy in the future too, but to be added to classroom lessons" (Student 5).

Some problems are related to the increased complexity that participation in distance learning seminars creates (question A.8) in terms of greater confusion, probably due to students' limited bandwidth, which required major concentration (question A.7). At the same time, according to 21 students, the virtual mode allowed taking all the lessons thanks to removal of the barrier of physical distances (question A.2) (see Fig. 4). Another interesting aspect analysed concerns the impact of distance learning on individual learning; the virtual mode does not represent a limit clarifications during lectures or within the virtual classroom (question A. 8).

Among the negative aspects highlighted by students is their perception about specific EE learning activities (e.g. Elevator Pitch and Business plan development): limited effectiveness is observed since 56% of respondents evaluated negatively, while 44% evaluated the novel mode positively.

> As a student confirmed, "*In group work, everyone needs to speak, and in a group that works on a digital platform, with connection problems, with*

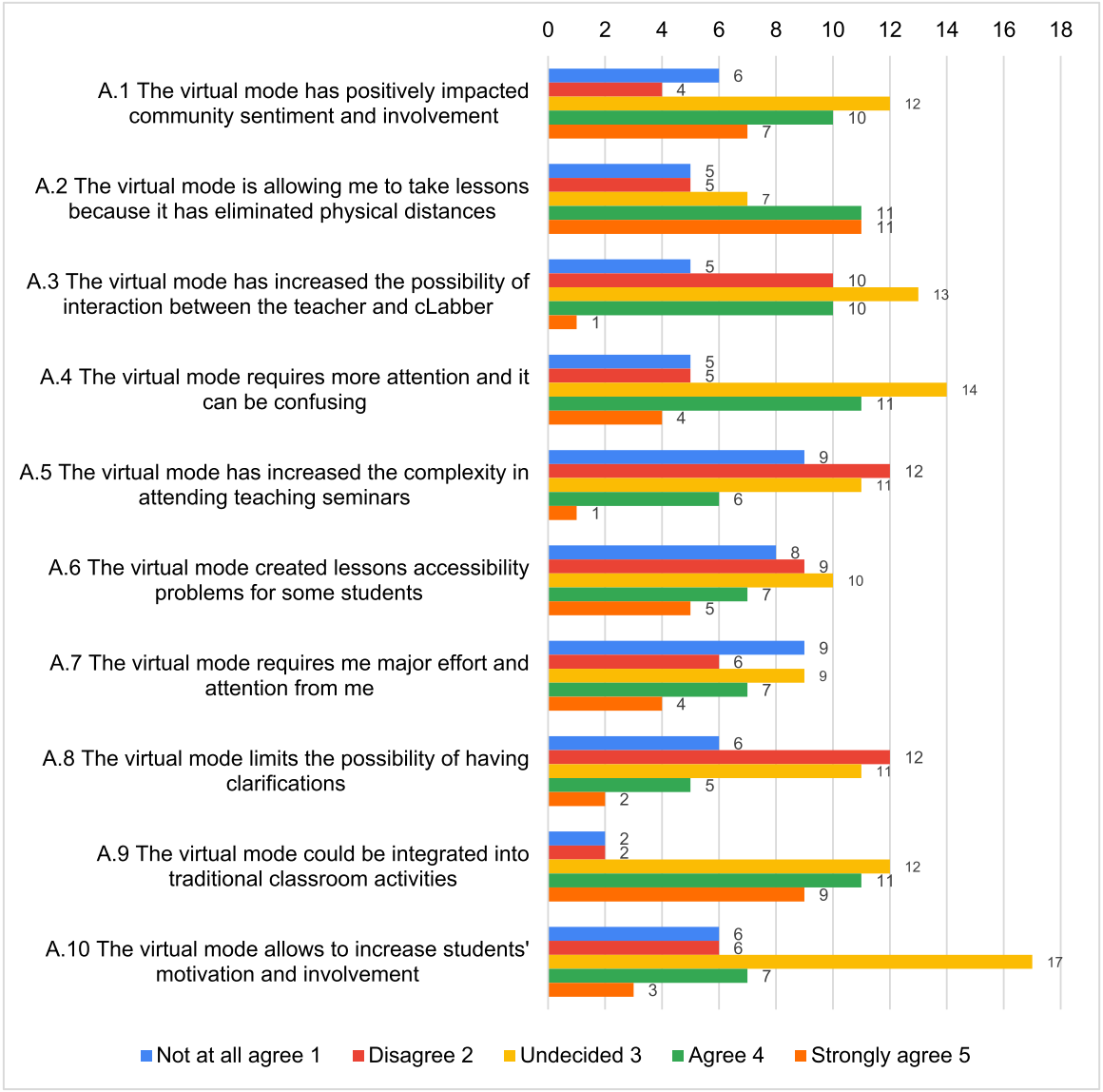

Fig. 4. Students' satisfaction with distance learning mode.

people who know each other little and with totally different skills, it is not easy at all." (Student 25).

"…It is a good solution if you consider the current situation, but I believe that distance learning can never replace the classroom teaching method" (Student 17).

This phenomenon could be due to two reasons: 1) the elevator pitch was the first module shifted into virtual mode and thus the respondents were not totally prepared to face such new modalities and, 2) this module requires high engagement, collaboration and communication among team members and audience. However, respondents that have been satisfied with the distance learning for the elevator pitch reported a large consensus on the virtual mode's benefits for the elimination of anxiety during the presentation, thanks to the opportunity to display the pitch's storyboard.

The mix of synchronous and asynchronous strategies to deliver the elevator pitch session caused some elements of criticism related to the absence of real time feedback during the recorded Video pitch. At the same time for other students, this was the strong point, since shyer students who prepared the video pitch performed better during the presentation. The criticism highlighted by some students with reference to the elevator pitch could be related to two main aspects: the majority of the students' limited previous knowledge on the topics of Business Management and in other cases the low level of familiarity with the adoption of distance learning technologies as confirmed by the survey. In all the teams, the elevator pitch session allowed the enhancement of the business idea. This is coherent with findings from other work indicating that knowledge sharing, fast research of content and collective knowledge are relevant dimensions for digital learning (Faustmann et al, 2019; Matschke et al., 2014). However, some students highlighted more stress in attending on line seminars due to connection problems and the limited possibility of interactions among peers. This aligns with findings from the Wolverton study (2018) that argues that in virtual presentations students can experience anxiety, and the instructor needs to support them to overcome these problems.

.".The face-to-face mode would have allowed direct feedback with immediate comments, but trying it in the virtual mode has been positive since we had time to arrive prepared and to record the video without anxiety" (S31).

During this time "*faculty should remember to be empathetic to themselves as they are adjusting to a change and extend empathy to students as they are in a transition process together"* said the Clab@Salento project manager.

As regard the other learning sessions delivered on line (seminars and contamination workshop), the students' reactions confirmed that the learning process was effective mainly due to the team members' high engagement in the activity and the students' high commitment to experiment, create and design innovative business ideas and projects. This is in line with non-business students and especially engineering and science students being identified as the most promising candidates for entrepreneurship education (Holzmann et al., 2018) and our class is composed of students with different educational backgrounds.

These findings are in line with previous work that argues that team dynamics, the degree of participation, collaboration, trust and cohesion are relevant aspects to consider for successful distance learning design (Greenlee and Karanxha, 2010; Liu et al. 2008; Miles and Mangold 2002; Ku et al., 2013). In these learning activities, the role of instructor needs to shift to a co-learner, supporter and facilitator in online collaborative learning (Faustmann et al., 2019, Zhu et al, 2016; Ku et al., 2013).

Other elements of reflection raised by students concern the fact that distance may limit the possibility of working in teams and reduces the benefits of personal interaction. Besides, online learning could reduce the effectiveness of learning for students without specific prior knowledge on topics of entrepreneurship education that require alternative and innovative modalities based on experiential learning approaches. Furthermore, another aspect that could justify the negative perceptions was that the survey took place just one month after the beginning of the pandemic emergency, which forced everyone to embark on new teaching and learning modalities. Findings coming from the students' interview and on line survey definitely highlighted the novel challenges that entrepreneurship education should face when designed and delivered through distance learning and some recommendations that could improve the design of online courses, as discussed in the next section.

6. Discussion, implications and conclusions

6.1. Discussions

This paper analyzed the case of the "Contamination Lab" at University of Salento (CLab@Salento) to show how digital technologies were used to deliver a digital-enabled entrepreneurial education process to face the COVID-19 emergency.

Findings show that the re-design of typical EE learning processes, such as the elevator pitch, business idea presentation, business model canvas and business plan development were to some extent supported by the adoption of digital technologies. The nature of the class involved in the program, composed of learners having different experiences and educational backgrounds (a distinctive and valuable dimension of the CLab@Salento) can generate at the same time opportunities and criticisms for virtual "configuration." Findings allowed to derive useful insights about recommendations useful for the design and delivery of EE programs through distance learning and its long term sustainability.

First, the elements of complexity identified at technical, contextual, interaction and emotional level at the basis of the elevator pitch session can represent design elements to address within the online system, with the goal to increase the overall effectiveness and student satisfaction.

Second, a blended learning approach is recommended through all the EE program, at two levels. First, integration of digital tools and devices (e.g. digital whiteboard) to build a smooth and stimulating student experience. Integrating physical and virtual sessions would combine comfort and logistic optimization with involvement and interaction advantages. These aspects could allow a more effective way to design and deliver the entrepreneurship education program in the future. Courses and experience related to education 'about' entrepreneurship could benefit from distance learning technologies that allow eliminating physical barriers to classroom attendance. The face-to-face interactions are recommended to build the sense of community among students within the contamination process of knowledge, competence and experiences.

Third, the frequent online involvement of mentors from the local ecosystem within the EE program, needs to be developed to overcome the absence of students' physical interactions with mentors. The mentors' continuous advice and support through online communications allow creating stronger motivation within the team members, high familiarity among them, confidence building, and knowledge of each other's behaviors, attitudes and expertise, which encouraged the information and experience exchange. This finally resulted in increasing team effectiveness, enhancing problem solving skills as well as facilitating the decision-making process and cohesiveness.

6.2. Theory and practice implications

The revolution towards university students' digital lifestyle during the Covid-19 outbreak needs to be explored (Ratten and Jones, 2020) and become a key challenge, especially for Entrepreneurship education based on experiential learning activities. A digital transformation of the university context and establishment of the digital culture (Guy, 2019) are significant, with both theoretical and practical implications.

The paper contributes to entrepreneurship education theory in times of COVID-19, providing a contribution to the call of Rattan and Jones

(2020) about the need to deepen the way entrepreneurship educators have adjusted to the new environmental conditions, focusing more on how technological innovation has been utilized both by educators and students.

Our study showed how distance learning modalities impacted the creation of entrepreneurial mindset and offered new opportunities to cope with the outbreak. In particular, the typical experiential learning platform of EE (Ahmed, 2020), the elevator pitch and business plan sessions, have been totally reconfigured to online mode to allow students the effective use of digital technologies and tools. Our findings prove that distance learning allows delivering entrepreneurship education 'about' entrepreneurship, since the organization of online seminars about the topic of Business and entrepreneurship could benefit from the use of digital technologies.

Distance learning could provoke some criticism in the organization of experiential learning activities typical of education 'for' entrepreneurship, such as elevator pitch and business plan. These suffer from the need for face-to-face interactions in the typical team building and knowledge sharing process experiencing the students' entrepreneurial mindset. Finally, all the processes characterizing the education 'Through' entrepreneurship; e.g., students' involvement in enterprise laboratories and participation in experiences abroad to build their social relationships, are impeded by the lack of physical interactions and socialization. To conclude, a blended approach is recommended to support the distance learning strategies of entrepreneurship education and to benefit from the most relevant advantages of the experiences.

More than even before, the distance learning modalities require that entrepreneurship educators utilize their experience and skills to motivate students' commitment to entrepreneurial learning with particular emphasis on doing elevator pitches and writing feasible and viable business plans (Ibidunni et al., 2017). The form of interactivity with the continuous support and communication with students through online technologies also allowed students who feel isolated during the epidemic crisis period to receive a stronger sense of students' engagement with the local ecosystem.

In implications for practices, the CLab@Salento represented a favorable environment for experimenting with the use of digital tools for the creation of an entrepreneurial mindset, and an appropriate setting to benefit from more flexible and appropriate teaching and learning practices. Findings from questionnaires and interviews evidenced that developing an entrepreneurship education curriculum through distance learning technologies is a critical process. It requires a complete reorganization of the learning approaches, especially concerning the learning sessions that require more action learning and experimentation, team collaboration and continuous interaction between the teacher and the students. These aspects should influence the choice of the entrepreneurship contents to be delivered and the level of depth of the same contents, especially when the classroom is composed of students with different educational backgrounds. Specifically, we found that this aspect could represent an opportunity and a threat at the same time; the opportunity comes from the collaboration among students' teams working on business ideas when they take the role of the entrepreneurial team members in a natural way. The threats comes from the need to provide different contents to students according to the previous knowledge they have due to the different educational backgrounds. The personalization in the learning process definitely calls for continuous interactions and engagement between facilitators and students. Therefore, an important practical implication for implementing distance learning in entrepreneurship education is to consider all factors and conditions, enabling and inhibiting ones, to design a successful learning process. Another key learning benefit of entrepreneurship education is the exposure students have to real entrepreneurs, involving mentors who inspire students to be entrepreneurs. Within an entrepreneurship course, there are normally some tasks involving how to develop creativity that can lead to a business venture. The experience of CLab@Salento allowed confirming this opportunity, involving in on line seminars also people from other geographical contexts, overcoming the physical barriers. To conclude, it is crucial to consider technology solutions and students' and lecturers' prior experiences, needs, backgrounds and behaviors to design new learning approaches that fit their situations and increase their level of engagement, performance and satisfaction.

6.3. Concluding remarks and limitations

The digital transformation of entrepreneurship education can provide significant opportunities for lecturers and students to enrich their learning experiences by designing more engaging, interactive, student-centered instructional practices that boost students' motivation and learning outcomes (Sigala, 2014). The COVID-19 emergency has forced universities worldwide to re-organize their teaching and research activities using virtual and on-line learning. This challenging situation has represented an important occasion to reflect on, design and implement new entrepreneurship education processes, leveraging the potential offered by digital technologies and experimenting with students' level of engagement and satisfaction. We described the experience in Italy at the CLab@Salento, the Entrepreneurship Education center at University of Salento. There, the Entrepreneurship learning program was completely redesigned to ensure continued effectiveness of the experience in the face of the pandemic. The distance learning modalities in this specific type of education allowed students to develop the critical skills of entrepreneurship, e.g., motivation, goal attainment, determination and management of risks, although a balanced approach between face-to-face and distance learning is strongly recommended.

Our study is not without limitations. First, there is the impossibility to generalize the results, which is typical of case study. Future research is necessary to analyze and compare the results with other CLabs in Italy and with similar centers outside Italy, to identify the "common traits" of the distance learning approaches assumed to develop the entrepreneurship competence adopting the digital technologies. Furthermore, other research is required to provide a set of guidelines and recommendations for successfully adopting distance learning in Entrepreneurship Education Centers within the Italian Universities. Finally, the authors are aware that the research methodology has its own bias due to the authors' involvement within the CLabs experiences as Project Manager, facilitators and faculty member of the program.

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Declaration of Competing Interest

The authors declare that they have no conflict of interest.

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