

Research Article

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Author for correspondence:

Einat Gil

 egil767@gmail.com

 Kibbutzim College of Education, Israel

Pre-service Teachers' Perceptions of Developing Entrepreneurial Thinking in an International Learning Environment During COVID-19

Einat Gil , Anat Even-Zahav , Justyna Siemionow 

Abstract

Background/purpose. The COVID-19 pandemic presented challenges and opportunities for students' learning worldwide and changed the environments in which students learn. An international learning environment was designed to "bridge the distance", address pre-service teachers' socio-emotional needs and develop their entrepreneurial thinking (ET), a learned process of practicing behaviors and acquiring competencies that equip individuals with entrepreneurial skills, which may serve to improve oneself and society in times of uncertainty. In a design-based study, we aimed (1) to identify pre-service teachers' perceptions of ET emerging within an international learning environment and (2) to characterize a learning environment that supports the development of their ET.

Materials/methods. Twenty-four pre-service teachers from two countries participated in six online sessions. The learning design included "looking inward" at the challenges students faced through an artistic task and an "outward-looking" entrepreneurship task that involved finding opportunities to address the challenges and proposing educational initiatives. Data was collected through questionnaires, semi-structured interviews, reflections, and students' outcomes tasks.

Findings. Pre-service teachers' perceptions of their ET development were expressed in three different contexts: in relation to time, future-oriented, in relation to life, individual, society, and the world, and in relation to cognitive competencies, breaking boundaries, and developing creativity. Furthermore, we identified four learning environment characteristics that played a role in the development of ET: learning by doing through collaboration, authentic challenge related to COVID-19, international aspect, and socio-emotional aspects.

Conclusion. This study highlights the importance of integrating entrepreneurial activities and socio-emotional support within innovative learning designs for pre-service teachers.



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1. Introduction

The COVID-19 pandemic confronted higher education with a range of challenges and opportunities, such as the need to find ways to address the quality and equity of distance learning instruction as well as the socio-emotional needs of those who partake in teaching and learning. It is important to understand both the challenges and opportunities involved to orchestrate future learning better, deal with crises, and improve aspects of teaching and learning in the higher education system. The living conditions that developed after the worldwide outbreak of COVID-19 required people to adapt to new ways of conducting their personal and professional lives (Adolph et al., 2021).

The lack of social relations and the high emotional load of days spent in isolation were key factors that challenged students' socio-emotional condition. Social-emotional learning helps students understand and manage their emotions, equipping them with the skills to lead successful lives and resolve unexpected problems (Elias, 2009). In this context, entrepreneurial thinking (ET) emerges as a valuable asset for students navigating uncertain times.

ET is a learned process of practicing behaviors and acquiring competencies, equipping individuals with ET-7 entrepreneurial competencies (Peschl et al., 2021), including personal attributes that serve as a force to improve oneself and society (Fleischmann, 2018). This important skill may enhance students' ability to develop their creativity and risk-taking capabilities, making it a highly sought-after competency in the 21st century (EU Skills Panorama, 2014). Thus, ET may equip students to address their challenges in a proactive way, particularly during times of crisis and rapid change.

Although multiple studies have delved into the teaching and learning of entrepreneurial skills among business students (e.g., Peschl et al., 2021), less attention has been given to how these skills can be taught and applied by pre-service teachers in higher education. Moreover, while there is growing interest in ET for educators, recent research indicates a specific need for targeted interventions within teacher education programs designed to effectively nurture pre-service teachers' entrepreneurial spirit and foster the social and personal attributes associated with teacher-entrepreneurship (Liu et al., 2024). This highlights a gap in understanding the nuances of pedagogical approaches that best foster these specific attributes in future teachers, particularly during their pre-service training. It may be crucial to place greater emphasis on developing the social and personal attributes of entrepreneurial thinking (ET) in addition to foundational instructional attributes.

The present research aims to fill this gap and describes the early steps of this process. This paper presents a study that aims to promote ET through the design of an engaging online, international learning environment during the COVID-19 pandemic. Our "Bridging the Distance" (BTD) program aimed to help pre-service teachers overcome distancing and isolation by promoting ET while addressing socio-emotional challenges.

In light of the social and emotional difficulties the COVID-19 pandemic caused students, in addition to the challenges of distance learning, we sought to use ET to encourage pre-service teachers into an active problem-solver way of thinking, helping them apply creativity and innovation to turn their ideas into reality. Our underlying idea in developing the international program was that ET might be an asset to pre-service teachers, particularly during a time of uncertainty that posed global challenges to education systems. ET skills support personal development, active citizenship, and entrepreneurial behavior (Engeström & Käyhkö, 2021). Therefore, equipping pre-service teachers with ET skills may enhance their teaching abilities, social values, and awareness of the importance of entrepreneurship education. Additionally, understanding their perceptions of ET can aid in designing appropriate entrepreneurship education programs in schools based on pre-service teachers' experiences. Thus, we aim to contribute to the theory and practice of teacher education coupled with entrepreneurship.

In the context of this study, our purposes were to identify pre-service teachers' perceptions of ET emerging within an international learning environment and to characterize a learning environment that supports the development of their ET. Thus, our research questions are:

RQ1. What are pre-service teachers' perceptions of Entrepreneurial Thinking emerging within an international learning environment amidst the COVID-19 pandemic?

RQ2. What are the characteristics of a learning environment that support the development of the pre-service teachers' Entrepreneurial Thinking?

The following sections present the theoretical background on ET, pre-service teachers' perceptions of it, and the socio-emotional aspects supporting ET. The methodology, informed by design-based research, was developed to answer the research questions. Our findings elaborate on pre-service teachers' perceptions of ET and the characteristics of learning environments. In the discussion, we contextualize our results within the broader research landscape, emphasizing the importance of designing innovative learning environments for pre-service teachers that include both social and academic interactions among international students, contributing to the development of their ET. The conclusion section provides the study's key outcomes and its implications.

2. Literature Review

2.1. Developing Entrepreneurial Thinking

Entrepreneurial thinking (ET) is defined as the process of practicing behaviors and acquiring competencies that equip individuals with entrepreneurial skills, a learned process that can be trained for (Peschl et al., 2021). Where entrepreneurship skills are typically more specific and task-oriented, competencies are broader and encompass a range of skills, knowledge, abilities and personal attributes necessary for successful entrepreneurship (Neck & Corbett, 2018; Morris et al., 2013).

Peschl et al. (2021) identify seven necessary competencies for developing ET (ET-7): (1) *Problem-solving*: the ability to create numerous new business ideas (in an entrepreneurial setting) and think of several solutions. (2) *Tolerance for ambiguity*: a tolerance for uncertainty helps people deal with unexpected situations, such as COVID-19 and climate change, while maintaining a positive attitude. (3) *Failing forward*: an individual's ability to learn, especially from negative experiences. This concept emphasizes learning by doing. (4) *Empathy*: a skill of interpersonal sensitivity and awareness of others' well-being. It is related to the ability to consider others' perspectives, intentions, and feelings. (5) *Creativity with limited resources*: The ability to be creative with limited resources is critical to developing purposeful ideas that can be implemented. Creative imagination involves generating new ideas by making connections with existing knowledge. (6) *Responding to feedback*: The ability to respond to critical feedback is assisted by listening to others and deciding how best to proceed with the idea. (7) *Teamwork approach*: teamwork ability is reflected in the ability to work in collaboration with others and the skill of recruiting others to join you, which is a leadership skill that helps entrepreneurs inspire followers to accept their ideas.

Moreover, Peschl et al. (2021) describe how a specific signature pedagogy can develop business students' entrepreneurial skill (ET-7) over a prolonged period. They suggest a flipped classroom approach, learning through failure and access to open educational resources, and emphasize creativity as one of the main qualities of ET, contributing not only to the realization and development of entrepreneurs' initiatives but also to the formation of the initial idea (Grădinaru et al., 2018).

A more holistic and social perspective of ET is presented in Fleischmann's studies and theoretical papers (e.g., Fleischmann, 2018). He looks at how entrepreneurship contributes to self and society, not only to the economy. He states that ET can be characterized by 10 attributes: "(1) Hopeful thinking; (2) Melioristic thinking, it wants to make something better; (3) Holistic thinking, in the sense

of connective thinking; (4) Action-oriented and team-oriented, it has a multiplier effect; (5) Enables leadership, by embracing possibility; (6) Emancipatory thinking, a force against alienation; (7) Social and ethical thinking; (8) Heuristic and dialectical thinking, it rejects the hubris of certainties; (9) Utopian thinking; (10) Is about connective problem-solving" (ET-10; Fleischmann, 2018, p. 39, shortened).

These two approaches to ET complement one another. While the first describes a competency supported by signature pedagogy, which can be taught and acquired (Peschl et al., 2021), the second is a thematic value-inclined one, characterising ET as a force to improve oneself and society (Fleischmann, 2018). It may be beneficial to combine the two approaches when looking at education as an applied value-driven discipline.

2.2. Entrepreneurship Education

Entrepreneurship is considered an important skill in the working life of the younger generations. Therefore, educational systems focus on developing it and providing tools to facilitate it (Engeström & Käyhkö, 2021). According to EU documents, "Entrepreneurship education is about learners developing the skills and mind-set to be able to turn creative ideas into entrepreneurial action" (European Commission, EACEA & Eurydice, 2016, p. 12). It is a competence that supports personal development, active citizenship, and employability, and it is therefore relevant to all areas of learning and all forms of training (formal and informal), contributing to entrepreneurial behavior whether with or without a commercial purpose (Engeström & Käyhkö, 2021).

Concerning the integration of entrepreneurship education into curricula, it can be either a mandatory subject, an elective subject, or an element integrated into other subjects, all of which are represented in national educational systems in Europe. When applying or implementing entrepreneurship, students might be encouraged to think in economic terms like profit and loss. However, the EU recommends that schools prioritize the conceptual learning of entrepreneurship. They emphasize the notion that an in-depth study of the topic is an important precursor to its practical application (Greeno & Engeström, 2014; Engeström & Käyhkö, 2021).

Sirelkhatim and Gangi (2015) claim that the entrepreneurship education curriculum should consist of three major levels: (1) teaching "about" entrepreneurship, which means learning its concepts; (2) teaching "for" entrepreneurship, which includes students developing their ideas; (3) teaching "through" entrepreneurship, which imparts entrepreneurial skills through the practice of actual activities/initiatives. In line with this third curriculum level, Mueller and Anderson (2014) argue that when teaching entrepreneurship, it is important to promote the applied component. They suggest that entrepreneurship is a difficult subject to teach and should be learned using constructivist approaches. An active learning process leads students to "construct" useful entrepreneurial knowledge. Entrepreneurial learning processes with a constructivist approach include exploratory and experiential learning, where the learner is the central actor and responsible for their learning processes (Löbler, 2006). Interactivity or sharing between learners is important for a productive learning experience (Anderson, 2011). Mueller and Anderson (2014) explain that despite differences between learners, such as their cultural background or prior experience in entrepreneurship, they exhibit similar patterns and dynamics in the learning process that are essential for understanding entrepreneurship. Three personal qualities that emerged as vital to the learning process were: (1) a sense of learning responsibility, indicating a willingness to contribute and influence learning processes rather than passively learning knowledge; (2) an ability to connect to personal needs and those of others, facilitated through learning interactions that engage students with their immediate social environment; (3) an independent way of thinking fostered by practical experiences, leading to belief in their ability to succeed and confidence in their learning ability (Mueller & Anderson, 2014). Building on the understanding of entrepreneurship education, recent research also highlights the

concept of "teacherpreneur competency", which encompasses a blend of pedagogical, social, personality, and professional attributes essential for educators who aim to innovate and lead within the educational landscape (Liu et al., 2024). This perspective underscores the multifaceted nature of the skills and mind-sets, akin to entrepreneurial thinking, that modern teacher education programs should aim to cultivate.

2.3. Students' Perceptions of Entrepreneurship Education

Studies indicate positive effects of entrepreneurial learning on students' perceptions relating to the following three concepts (Anwar et al., 2022; Huang et al., 2023; Rakicevic et al., 2023):

1. *Entrepreneurial self-efficacy* relates to the belief in one's ability to mobilise and apply the resources and skills necessary to succeed in running an initiative (Anwar et al., 2022). University students perceive entrepreneurial education as a process that helps them identify opportunities, thereby increasing their entrepreneurial self-efficacy. It also relates to how they perceive their ability to generate ideas and develop an initiative (e.g., Huang et al., 2023).

2. *Entrepreneurial intentions* relate to students' intentions to engage in entrepreneurship in the future (Anwar et al., 2022; Huang et al., 2023). Students perceive entrepreneurial learning as positively influencing their intentions to engage in entrepreneurship in the future. They expressed a willingness to dedicate time and energy to entrepreneurial activities and seek out engagement opportunities.

3. *Social awareness* relates to acquiring an understanding of social issues, which influences students to take action and become involved in social initiatives (Rakicevic et al., 2023). Students' perceptions of social entrepreneurship demonstrate how participation in an entrepreneurship program increases their views on the importance of involvement in social enterprises and influences their entrepreneurial intentions in the social field.

Thus, given the positive influence of entrepreneurship education on students, some of the perception studies hint at a link between entrepreneurship and socio-emotional aspects.

2.4. Socio-Emotional Aspects Supporting ET

The spread of the COVID-19 pandemic, which led to lockdowns and social isolation, had a dramatic psychological impact on students, affecting their socio-emotional state (Gloster et al., 2020). It impacted their capacity to recognize and manage emotions, solve problems effectively, and establish positive relationships with others (Elias, 2003). Impairment in the acquisition of these skills had a negative impact on students' learning processes (Gandía-Carbonell et al., 2022). To enhance social-emotional learning (SEL) in online learning, the participation of the "whole person" must be achieved through dialogic exchanges that include cognitive, emotional, and interpersonal social relations (Delahunty et al., 2014). Hence, a well-designed online learning environment may have a positive impact on students' SEL.

Emotional competencies play a significant role in shaping entrepreneurial intentions among university students, influencing their attitudes towards entrepreneurship and perceived self-efficacy (Fernández-Pérez et al., 2019). Although these competencies are not at the center of this study, previous research has emphasized the importance and potential impact of emotional considerations in entrepreneurship (Rodrigues et al., 2019). Despite the focus on equipping entrepreneurs with the necessary skills, emotional challenges are often overlooked, necessitating the development of tools to teach emotional skills and resilience in the entrepreneurial journey (Bigos & Michalik, 2020). Therefore, integrating emotional competencies into entrepreneurship education is crucial for fostering a positive attitude towards entrepreneurship, enhancing students' perceived capabilities to

become successful entrepreneurs, and creating a safe and productive learning process (Rose et al., 2019).

3. Methodology

3.1. Study Paradigm and Context

To address the research questions, we used design-based research (Barab & Squire, 2004), aiming to develop and implement new learning and teaching designs and gain insights about learning that contribute to theoretical and practical knowledge in the field. Five characteristics of design-based research are present in this study: it offers an intervention program aimed at contributing to theory; it provides a reflective perspective on the learning and design process; it includes more than one iteration (though this paper reports only on the first one), and it operates in an academic course, the natural field setting (Cobb et al., 2003).

Informed by the theoretical knowledge related to promoting entrepreneurship (ET-7, Peschl et al., 2021; ET-10, Fleischmann, 2018), constructivist approaches, and the unique COVID-19 setting, a learning environment was collaboratively designed. It spanned across six synchronous sessions with pre-service teachers from two academic institutions in Israel and Poland. The Israeli students enrolled in the Pedagogical Entrepreneurship course as part of the Regev Excellence program¹ for pre-service teachers at the Kibbutzim College of Education (n=11). They were in the second year of their program, specializing in different disciplines (e.g., teaching Literature, English, Math, Science) for elementary or high school. The course was an elective class for them. The Polish students studied Pedagogy at the University of Gdansk (n=13). They were studying to become either teachers or social workers and were in different stages of their degree (mostly B.A. students, with one M.A. student). The class was an extracurricular program for them. Most of the students (from both countries) were new to entrepreneurship. We refer to the students as pre-service teachers because more than 70% were on the academic track to becoming teachers.

The program design was led by the Center for Innovation & Learning Design at the Kibbutzim College in collaboration with the course instructors (from both countries) and academic and professional contributors who were part of creating the collaboration in the first iteration of the course. The designer and instructional team included experts from various disciplines: psychology, innovative pedagogies, the arts, and educational entrepreneurship. The learning goals aimed to achieve: (1) theoretical conceptualization – to learn about and become familiar with the concepts of pedagogical entrepreneurship; (2) participation in an international project to develop entrepreneurial-pedagogical thinking, collaborating with students in institutions in Israel and Poland; (3) development and design of a pedagogical project and its implementation as a part of the international group project. In the international part of the program, each group created an initiative and pitched it. With it, in continuation of the course, only the Israeli students had to write a full proposal that included all phases and the implementation method of the project.

The learning design considerations guiding us included learning through doing and active learning in mixed groups – to promote social interaction and the formation of creative ideas; the creation of a safe, inclusive, and supportive environment, focusing on the socio-emotional aspects.

The program included two main teaching units. The first invited students to “look inward” at the challenges of studying during the pandemic by collaboratively designing a T-shirt using a composition of images and text (Figure 1). This task gave us and the students an insight into their authentic, real-life socio-emotional challenges, which in part were translated in the second task to greater challenges

¹ The Excellence teacher program is a national program in which selected education candidates participate in a shorter, 3-year teacher program that includes extra courses and receive a scholarship from the Ministry of Education.

and solutions. It also aimed at creating bridges of communication for students coming from different cultures and who are isolated in their own country at times. The second asked students to "look outwards" at the challenges and opportunities of this time and create a proposal for a social, business, and/or pedagogical project, which would be presented to "potential investors." Students received benchmark lessons on entrepreneurship and how to create a persuasive pitch. These activities were held online in mixed international groups under the guidance of instructors from both institutions. We consider these authentic tasks (Herrington et al., 2004; Warren et al., 2014) as they address an authentic challenge that is open-ended and requires collaboration and reflection.

In the first iteration, the international team met after each session to discuss insights from the design enactment and update the plan accordingly. In addition to a detailed lesson plan that accompanied each session, the two instructors of the course (one from each country) and learning design expert from the innovation center held a reflection conversation after each session and discussed the difficulties that arose, such as level of grasping the course material, issues with students' communication during the assignment activity or understanding the assignment's instructions. Based on these reflections, changes were made for the next session at the content level and task design, within the learning environment, and in communication strategies.

The program underwent four iterations (from 2021 to 2024), enabling us to update the course design. In response to design considerations, students' responses, and the college's request, we added an applied component in entrepreneurship enactment (Mueller & Anderson, 2014) for the Israeli students from the third iteration onward—additionally, the focal topic transitioned from COVID-19-related challenges to those arising in schools. The current paper presents findings from the first iteration, which were particularly interesting due to the COVID-19 context and the acute needs of the students.

3.2. Research Instruments and Procedures

We used four research tools (Table 1): (1) two student questionnaires (N=24, with n=15 respondents); (2) six semi-structured interviews (3PL, 3IL); (3) student written reflections; (4) students' task outcomes. The development, validation, and reliability considerations for these instruments are detailed below. Additionally, we utilized the team's design notes to contribute to the characterization of the learning environment.

1. The first questionnaire was a program feedback questionnaire focusing on the instructional team, relationships between participants, and cultural aspects. It contained eight closed-ended and one open-ended question. The instructional team reviewed its content validity for clarity, relevance to program objectives, and comprehensiveness. The second questionnaire focused on the challenges and opportunities students experienced in distance learning during the pandemic, the socio-emotional aspects related to living and studying during COVID-19, pedagogic entrepreneurship and international aspects. It included 18 open and closed questions. This questionnaire underwent content validation by three researchers with expertise in pedagogical entrepreneurship, distance learning, and socio-emotional learning to ensure item clarity, relevance, and alignment with research aims (Fraenkel et al., 2012). Due to the diverse exploratory nature of the items covering multiple distinct themes, and the mix of open and closed questions, aggregated reliability scores were not calculated for the entire instrument. Both questionnaires were completed during the last class or soon after (response rate: 63%).

2. Semi-structured online interviews were conducted by one of the authors in the student's native language (30-50 minutes each). An interview protocol was developed based on the research questions, outlining key topics and guiding questions. The interviews focused on the students' experiences participating in the project, their understanding of "pedagogical entrepreneurship," and if/how they planned to implement their initiatives, whether the activities

during the meetings supported their understanding, and recommendations to improve the project in future iterations. The protocol was pilot-tested with the first interviewee and slightly refined to ensure question clarity and effective prompting. We chose students who were communicative and engaged in the program, who attended the 5-6 meetings, and who arrived at an interesting outcome for the group work (intensity sampling method; Patton, 2014). This sampling method was selected to provide rich examples of the phenomenon of interest but not highly unusual cases. The interviewees represented the approximate gender distribution of the cohort (one male and two females from each country) and from different groups in the project. Since the richest data was provided in the interviews, it was selected as the leading analysis tool of this research.

3. Students' written reflections were collected at the end of the course from most Israeli students (part of the course assignment) and some of the Polish students (voluntary assignment). Students were provided with general prompts to reflect on their learning, challenges, and key takeaways from the project.

4. Student outcomes comprised T-shirt designs, entrepreneurship initiative notes, and presentations. These authentic assessments provided direct evidence of student engagement and learning.

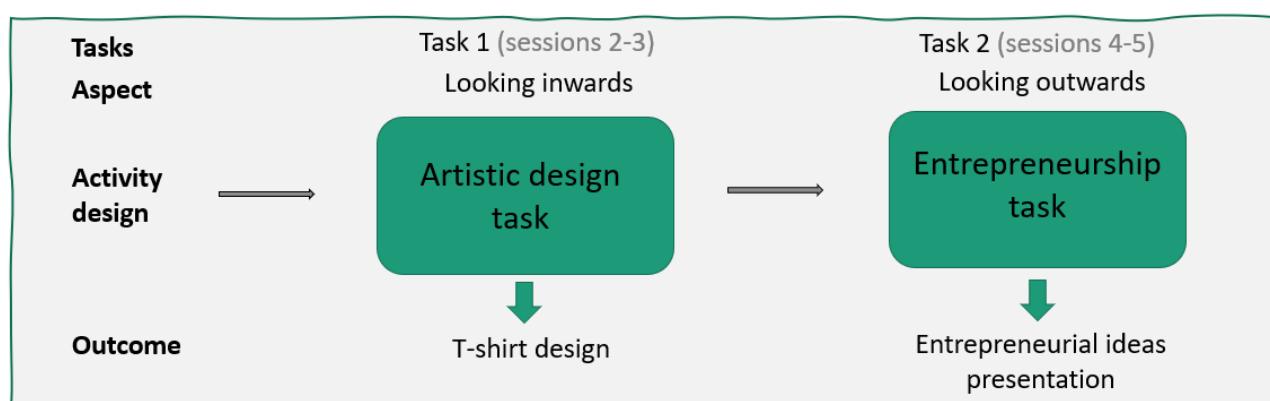


Figure 1. Activity Design Aspects of the “Bridging the Distance” Project

Table 1. Research Tools (and abbreviations)

Type	Number	Abbreviation
6 interviews	3PL(Polish), 3IL(Israeli)	Int.1,2,3,4,5,6
Program feedback questionnaire	15	Q1
Research questionnaire	15	Q2
Students’ artistic outcome	6 T-shirt designs	TD
Initiative outcome	6 IO	IO 1,2,3,4,5,6
Reflections	15	RF

3.3. Data Analysis

Qualitative Data Analysis: Systematic thematic analysis (e.g., Creswell, 2013) was conducted on the interviews by two researchers after their translation into English. We used Codebook Thematic Analysis (Braun & Clark, 2022), where initial categories emerged from the data with reference to the pre-defined topics reflected in the interview questions. Later, the categories were reiterated and categorized into sub-codes and themes with topic summaries to encompass the notions of perceptions of ET, socio-emotional aspects, and international aspects. The codebook that emerged from the dialogue between the two researchers about the coding thus reflects a combination of inductive and deductive analysis processes. It guided the analysis of the other data sources, including the reflections, student outcomes, and open questions on questionnaires, which provided both supportive evidence and triangulation of our interpretations of the findings.

Quantitative Data Analysis: Descriptive statistics were employed to analyze the closed-ended questions from both questionnaires (Q1 and Q2). This included calculating frequencies and percentages for categorical responses, for items measured on rating scales, means (M) and standard deviations (SD) were computed. The analysis was performed using statistical software to ensure transparency and facilitate replicability of the quantitative findings.

The study was approved by the Ethics Committee of each institution. The participants were informed of the details of the study and could choose whether or not to join the study with no impact on their final course grade. There were restrictions in place on the course instructor that enabled them to review the questionnaire data and conduct interviews only after grading. Thus, students' feedback reaffirmed our intention that the course should be a source of encouragement in a stressful time (due to COVID-19) and not pose an additional stress factor for the students.

4. Findings

Our findings convey the importance that pre-service teachers attribute to the development of their ET while engaging in entrepreneurial activity. Furthermore, the data suggest that the designed learning environment supported the development of their ET, as they perceived it. We first present findings on pre-service teachers' perceptions of ET developed within the designed learning environment during the COVID-19 pandemic (RQ1). This is followed by looking at the characteristics of a learning environment in an academic course that supports the development of ET (RQ2).

4.1. Pre-Service Teachers' Perceptions of Entrepreneurial Thinking

We identified students' perceptions relating to the development of their ET while engaging in entrepreneurship activities (RQ1). According to their stated perceptions, ET relates to future thinking, to the contribution to the individual and society, and to breaking boundaries and developing creativity. The perceptions are thus categorized into three different contexts: (a) in relation to time: future-oriented; (b) in relation to life: individual, society, and the world; (c) in relation to cognitive competencies: breaking boundaries and developing creativity (Figure 2). Pre-service teachers were new to entrepreneurship theory and practice, so their perceptions relate to early entrepreneurial thinking. Their initial exposure to a course involving ET raised challenges and opportunities. The pre-service teachers acknowledged that certain ET skills, such as creativity, translating an entrepreneurial idea into a practical venture, and visioning and forecasting for the future, were not yet available to them. On the other hand, they saw ET as an opportunity for self-improvement and a contribution to society.

The following sections describe these perceptions with supporting evidence that emerged from the analysis of the various research tools.

4.1.1. In Relation to Time: Future-Oriented

Research participants expressed the idea that entrepreneurship requires thinking about the future, explaining that the targeted initiative or solution does not exist yet, or at least not in the same way or for the same audience. As one of the students described it:

"This course exposed me to creative ways of [future] thinking [...], for example, how to take an idea and develop it in a way that will be coherent and interesting to develop for the future in different and varied ways." (Q2)

But, for many, future-oriented thinking is not easy, as another student asserted:

"The task of designing T-shirts [Task 1] was great for me; in general, I believe that I am quite good at devising things here and now. I find planning and thinking about the future [e.g., Task 2, the entrepreneurship task] more difficult." (Int. 4)

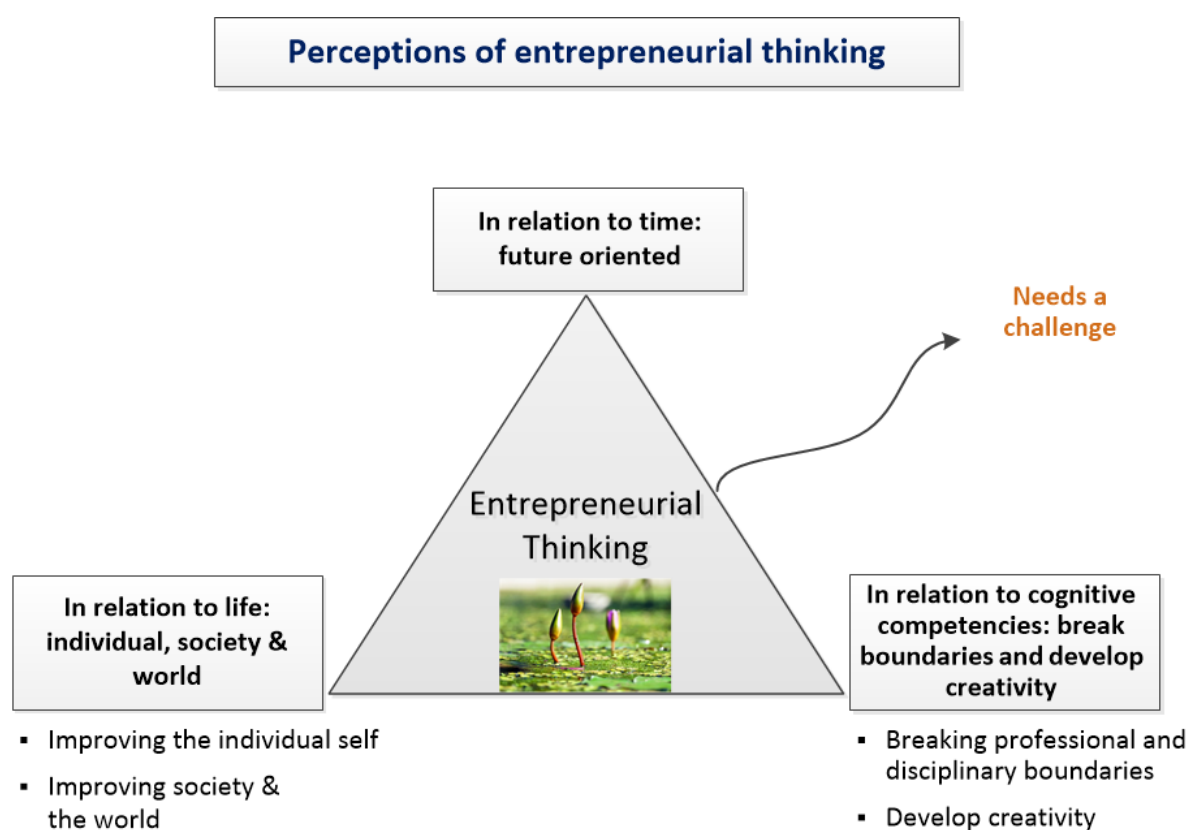


Figure 2. Perceptions of Entrepreneurial Thinking

Looking at the students' initiative outcomes (IO), we see that all the initiatives refer to the future – things that did not exist yet. For example, one of the initiatives, "Unibook" (IO2), looked at the challenges of borrowing books from libraries during the COVID-19 pandemic. The students suggested a solution that did not yet exist (at least, to their knowledge).

4.1.2. In Relation to Life: Individual, Society & The World

This perception of ET relates to life cycles and the way entrepreneurship contributes to improving one's individual life, society and the world through collaborative activities.

Improving the individual self – The ability to create change and the resulting sense of agency can be turned inward. In other words, engaging in entrepreneurship can be perceived as improving one's own life or empowering oneself. The two following quotes demonstrate this perception:

"I also learned that a lot depends on me; I manage my own life and I look for situations advantageous to me – I am learning through such experiences." (Int.3)

"I love people, this project makes me feel braver... no matter where we live, we still can learn from each other and become better and better." (Q2)

Another student phrased this idea in a more general way:

"It showed me that knowledge about pedagogy, education, psychology – that is, what we are studying – can be used to improve life, to improve the quality of life." (Int.4)

Looking at an example of a student initiative, @note_alone19 (IO5), the challenge focused on people struggling with mental health issues during the COVID-19 pandemic. The resulting initiative is an Instagram page where struggling teens can send their thoughts and feelings to be posted anonymously. This initiative creates change for oneself and others in the areas of social interaction and mental health issues.

Improving society & the world – Students expressed the possibility of engaging in entrepreneurship to improve issues or tackle challenges in the world, such as in the following examples about environmental issues:

"And the work together, whether it's the shirts, the pitch of the idea of the initiative, there was something in it, which I think encourages students who would not work like that... would not think in this direction. If I have an idea just to create something that will make people preserve the environment. [...] In our case, it was COVID-19. But if I take the subject of the environment [...] You can take these initiatives and make them global and international." (Int.6)

"I love that through entrepreneurship projects and collaborative ideas, brainstorming and making suggestions, we as humans can evolve and bring about change in the world; and with representatives from other places, we manage to conduct these meetings so it's just 'planting more seeds of thought' – that for me is insanely interesting. That means I can use my stuff collaboratively." (Int.1)

Engaging in entrepreneurship can foster global improvement and create change in the world. Improving society was observed, for instance, in the initiative to build an app to help people struggling financially during the pandemic by building a community of people who had lost their job or business as a result of the pandemic and were searching for a new direction (IO1).

4.1.3. In Relation to Cognitive Competencies: Breaking Boundaries and Developing Creativity

In this context, students' perceptions expressed the development of their cognitive competencies while engaging in entrepreneurial activity: breaking professional and disciplinary boundaries and developing creativity.

Breaking professional and disciplinary boundaries – Students expressed that the knowledge and skills they acquired during their studies could be adapted or transferred to new applications, areas or disciplines. As one student explained:

"It made me realize that after getting a degree in pedagogy, you do not have to be a school teacher or a tutor; you can use this knowledge in another way. The knowledge can be translated into actual actions and innovations. After the project, I came to the conclusion that I had selected a good course of study which would open a lot of opportunities." (Int.4)

This student continues to emphasize the bridge between the academic environment and industry. She describes how participating in this course prepared her for the changing labor market.

"[...] related to pedagogical entrepreneurship, and it really made me think that after graduation, I can do a number of things, that professionally this is a really good foundation; the experience gathered during the project was really great. In my opinion, our university offers too few of such classes; there could be many more of them because they prepare us to enter the labor market." (Int.4)

Developing creativity – Students felt that the course activities helped them acquire creativity, and some reflected on their gaps in this area. One student described the difficulty of translating an initial idea into an innovation, reflecting on her pragmatic and rational approach to the challenge:

"Entrepreneurship does not really appeal to me; I believe that my group did not complete this task well – other groups did it better. It seems to me that we understood the task but were not able to translate it into an innovation like other groups did. We approached it in a very rational and pragmatic manner." (Int.3)

On the other hand, quite a few voices emphasized the development of creativity during entrepreneurship activities, as few students expressed:

"I really liked this exercise where we had to create a program with pedagogical entrepreneurship, and the groups had brilliant ideas; for example, this app for lending books or this Instagram account for sharing emotions. It shows how people are unique and creative. It helps me think in other ways and develop my skills." (Q2)

"This course exposed me to creative ways of thinking that required me to think outside the box – first to conduct myself within a group. For example, how to take an idea and develop it in a way that will be coherent and interesting, and to develop it for the future in different and varied ways..." (RF)

"When teaching classes or talking to people, I would also like to be a creative person; especially after the project, I feel even more strongly that I can operate in this way. So, I intend to work creatively in the future because this is a good path for me... The most important thing for me was a different outlook on my professional future after graduation; [...] So I intend to work creatively in the future because this is a good path for me." (Int.5)

Students clearly referred to the creative aspect of ET that was promoted in the activities and valued how it might change their outlook towards new possibilities in the future, beyond their current studies. Based on the various perceptions, we can see a vivid change in mind-set towards entrepreneurship and what it might offer to these international pre-service teachers during times of prolonged stress.

4.2. Characteristics of The Learning Environment

Looking at the design of the learning environment, we can identify the characteristics supporting the development of ET (RQ2). Four characteristics were identified: (a) learning by doing through collaboration, (b) an authentic challenge related to COVID-19, (c) international features, and (d) socio-emotional aspects. The following sections elaborate on these characteristics with supporting evidence that emerged from the study data.

4.2.1. Learning by Doing Through Collaboration

One of the objectives of our design was to create a task set that students would do together. Rather than individually learning about- or listening to lectures, as often done in academic courses,

they would create together in groups. This design was inspired by learning approaches such as project-based learning (Krajcik & Blumenfeld, 2006), though our tasks aimed for a shorter study time. It included an open-ended task where students had to collaborate to find a solution or create a learning artefact. In the BTB project, Tasks 1 and 2 both directed the students to create a group outcome through collaboration between Polish and Israeli students, be it a collage of photos for a T-shirt design or an entrepreneurial idea. As one student said of Task 2:

"I definitely liked the artistic task more, that is to say, the T-shirt design. We were able to express our emotions and say what COVID-19 meant to us; this was great for me. I believe that it was a very suitable task, because it made me think about the pandemic, about what I have lost, so primarily the aspect of interpersonal relations, or rather the lack of them." (Int.3)

4.2.2. An Authentic Challenge Related to the COVID-19 Pandemic

The literature about learning environments teaches us that an authentic challenge motivates learners to address or find a solution to a challenge (Herrington et al., 2004). Building upon situated cognition theory, context plays a significant role in the way understanding evolves and learners process information (Brown et al., 1989). The knowledge and skills aimed for are best learned when situated within an authentic task (Warren et al., 2014). In our course, the authentic challenges related to living and studying during the COVID-19 pandemic. They were open-ended, ill-defined, and could be integrated across different subjects/disciplines. These challenges promoted diverse solutions and outcomes. Thus, they met most of the criteria for authentic tasks (Herrington et al., 2014). However, due to time limitations, students had a shorter time to complete the task.

In Task 1, the students related to this challenge indirectly by providing a photo that captured their COVID-19 experience and creating a collage with a brief description. The T-shirt designs expressed some personal challenges, such as the need for optimism in the face of social distancing and pandemic-related fears (examples in Figures 3 and 4).



Figure 3. Group 6 T-Shirt Design



Figure 4. Group 2 T-Shirt Design

In Task 2, the students formulated ideas for initiatives in response to the challenges of studying and living during the pandemic. The students' initiatives can be grouped under topic headings relating to (1) socio-emotional-vocational aspects, (2) mental health issues, and (3) distance learning, all of which the students experienced during the pandemic. Two examples of student initiatives, one of which was mentioned earlier in response to RQ1, can be found in Figures 5 and 6. It seems that the authentic challenges of both the setting and the task design contributed to the success of the program and its impact on the students.

4.2.3. The International Aspect

The international aspect was an important feature in the program design and a key aspect of the setting. We aimed to encourage ample interaction between Polish and Israeli students. Every team consisted of three-four students, usually two students from each country.

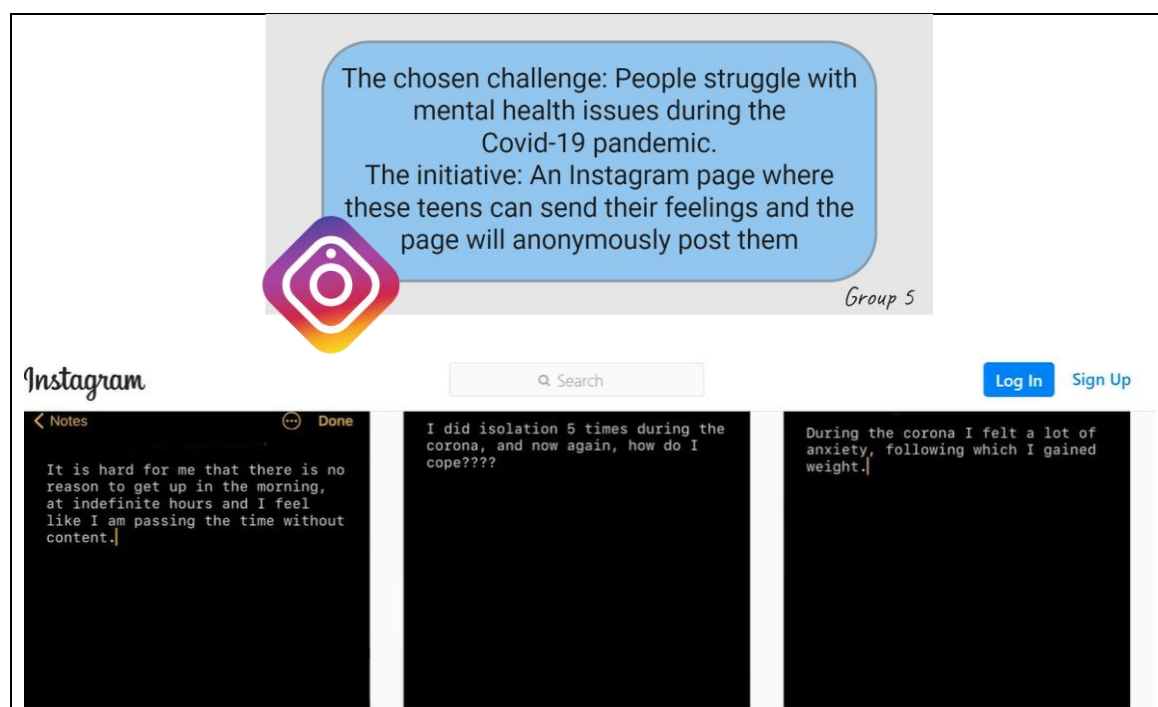
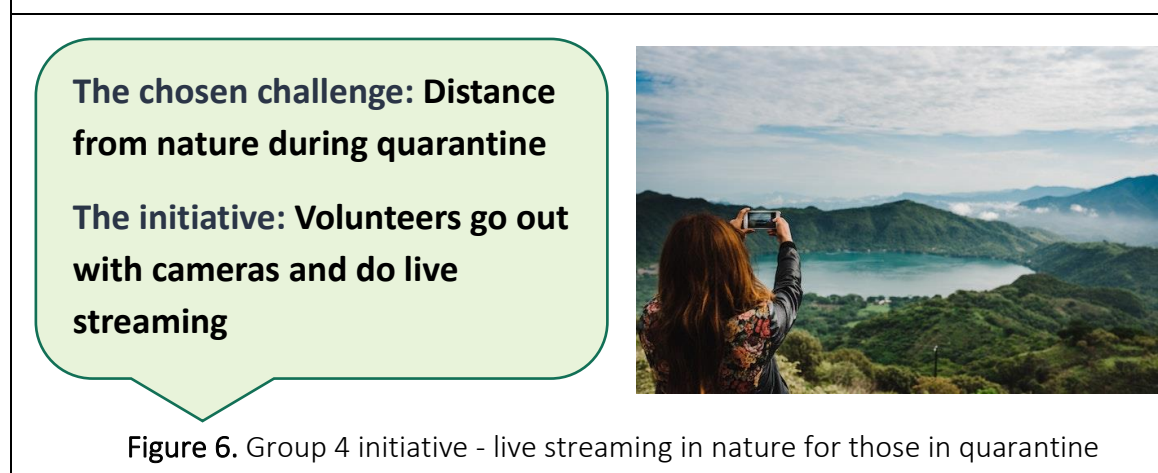


Figure 5. Group 5 initiative – Instagram for mental health assistance



Two questions on the feedback questionnaire addressed the international aspect. In answer to question 4 (Q1), "I felt like a partner in an international project between Poland and Israel and experimented with various digital tools," most students responded with 5 "strongly agree" or 4 "agree" (M=4.0). Their responses to question 6 (Q1): "I learned and got to know a new diverse cultural world and share new experiences" also indicated high agreement (M=4.0). Thus, the international design feature seems to have contributed to the success of the program in general and to students' expression in the English language, as quite a few students reflected in the various research tools:

"The undisputed advantage of this project was the meeting with other people, especially from another culture, another country, and the fact that I could freely speak in English. I felt at ease during these talks and during the performance of tasks. The possibilities of getting to know other people and discussing things with them were the strongest advantages of the project." (Int.5)

It also contributed to promoting ET, as well as providing a greater global context for the initiatives, as one student elaborated:

"And the work together, whether it's the shirts, the pitch of the idea of the initiative, there was something in it, which I think encourages students who would not think in this direction, [...]. If I have an idea just to create something that will make people preserve the environment, if I do it on a national level and in Hebrew, and with my close friends, it is one thing. But once I get people to work with who are neither from my area nor live in the environment I live in, maybe they have a different point of view on the same issue[...] So, these different points of view connect and create something together, and because it suits both us and the other side, it can also suit a third party and a fourth party and a fifth party. You can take these initiatives and make them really global, really international." (Int.6).

4.2.4. Socio-Emotional Aspects

In designing the course, it was important for us to attend to the socio-emotional aspects of learning in various ways, including in the instruction, in the artistic expression of emotions, and in the fostering of social interaction.

Quite a few students related to the socio-emotional aspect of the project, as mentioned in previous student quotes. Other students related to the sessions as a whole and to the instructor-student interaction:

"I experienced the emotional aspect most; I felt satisfied after every class, I felt that I was doing something, that I was active, so to speak. I looked forward to these Wednesdays, they were important to me. [...]. As far as the social aspect is concerned – it was great to talk to other students from Israel, even though in our group, two girls were quite shy and not really willing to talk, especially at the beginning. I liked the fact that there was a lot of ease between the lecturers and students on the Israeli side." (Int. 5)

In summary, we can see that these four main design features contributed to the impact of the learning environment and played a supporting role in promoting ET.

5. Discussion

This study examined an international learning environment aimed to promote ET among pre-service teachers during the COVID-19 pandemic. Pre-service teachers' perceptions identified in the study, align with previous studies presenting positive effects of entrepreneurship courses on graduates in terms of increase in entrepreneurial intention, social awareness and self-efficacy. The increase in entrepreneurial intention (Anwar et al., 2022; Huang et al., 2023) is reflected in students' perceptions of entrepreneurship as encouraging future-oriented thinking, an activity they find relevant to their future careers. The social awareness aspect (Rakicevic et al., 2023) is seen as contributing to life, prompting the development of pedagogical initiatives for society and the world (e.g., a project to overcome distance from nature for people in isolation). The increase in self-efficacy (Anwar et al., 2022; Fernández-Pérez et al., 2019) manifested in students' cognitive skill development, such as the creativity required to develop their initiative and the ability to translate ideas into reality.

Students' perceptions align well with several of Fleischmann's intercultural and holistic theses of ET that go beyond the business world to benefit oneself and society. Our findings suggest that ET can serve as a source of hope and agency during times of crisis, which is consistent with Fleischmann's first thesis that "ET is hopeful thinking," enabling individuals to reimagine themselves and their potential beyond their current circumstances (Fleischmann, 2018). Furthermore, the participants'

views of ET as benefiting both the individual and society resonate with Fleischmann's second thesis, "ET is melioristic thinking, it wants to make something better." This also ties into his sixth and seventh theses, which posit that ET is emancipatory, social and ethical, focusing not just on individual gain but on the betterment of communities and society as a whole. The students' perceptions of ET as breaking boundaries and fostering creativity also connect to Fleischmann's ideas that ET is holistic and connective, rejecting limitations and embracing possibilities beyond the status quo – a perspective that seems especially valuable for educators navigating the challenges and opportunities of the pandemic and other crises.

Our study extends Fleischmann's work by grounding these abstract ideas in the lived experiences and perceptions of pre-service teachers engaged in entrepreneurship education. The international learning environment created, with its emphasis on collaboration, authentic problem-solving, and socio-emotional support, provides a concrete example of how ET can be cultivated in educational settings. This aligns with Fleischmann's tenth thesis, "ET is about connective problem-solving"; however, our study offers valuable insights into how this can be achieved in practice, particularly in the context of teacher education during a global crisis. Moreover, our focus on the socio-emotional dimensions of ET and the importance of supportive learning environments in fostering its development is a novel contribution that expands upon Fleischmann's framework. By highlighting the role of emotional well-being and social connection in nurturing ET, particularly during times of stress and uncertainty, the findings suggest new avenues for research and practice at the intersection of entrepreneurship education and teacher training.

Beyond these theoretical alignments, our study offers empirical insights into addressing the identified gap in the literature: the limited attention to how ET skills can be effectively taught and applied by pre-service teachers. The BTED program, as an intervention, demonstrated specific learning environment characteristics that participants perceived as supportive of their ET development. This is particularly relevant given recent findings by Liu et al. (2024), who emphasized the need for "targeted interventions within teacher education programs to nurture their entrepreneurial spirit and foster the social and personal attributes associated with teacherpreneurship". Our findings on the effectiveness of 'learning by doing through collaboration' and supportive 'socio-emotional aspects' resonate strongly with Liu et al. (2024) report that pre-service teachers scored lowest in 'Social Competency.' This suggests that our intervention's focus on these dimensions directly addresses an area crucial for developing well-rounded teacherpreneurial capabilities, thus critically contributing to understanding *how* ET can be cultivated in this cohort. Furthermore, the participants' perception of ET development involving 'breaking boundaries and developing creativity' aligns with Liu et al.'s (2024) observation of 'Personality Competency' (including creativity) as a relative strength, indicating our program may effectively channel and enhance such existing potentials through structured engagement.

In our changing world, developing entrepreneurship in academic settings is important, even more so in the post-COVID-19 period. Our findings reinforce the OECD's statement, "Entrepreneurship education is about learners developing the skills and mind-set to be able to turn creative ideas into entrepreneurial action" (European Commission, EACEA & Eurydice, 2016, p. 12). They suggest that pre-service teachers are just one of many populations for whom these skills and this type of thinking are important to their future professional life and self-development.

Advancing education involves the design of innovative learning environments that may include international aspects. Entrepreneurship education should also be included, as it contributes to students' ability to apply creativity and break boundaries and promotes student agency. The COVID-19 pandemic has been a common challenge for Polish, Israeli, and other students to overcome. Therefore, higher education curriculum designers might adopt our suggestions to integrate entrepreneurial activities and socio-emotional considerations within innovative learning designs in

line with the “teaching for” practices of entrepreneurship education (e.g., Sirelkhatim & Gangi, 2015). Indeed, our study’s demonstration of ET development through a multi-component learning environment supports a holistic view of teacher preparation. This view is echoed by Liu et al. (2024), whose findings on the independent nature of various teacherpreneurial competencies call for integrated educational strategies. The BTD program, therefore, illustrates a response to this need for comprehensive and multifaceted ET cultivation.

The study has also provided insight into pre-service teachers' perspectives on coping with the COVID-19 pandemic and its impact on their lives. Through various research tools, including the analysis of student outcomes such as the creation of T-shirts and entrepreneurial initiatives, we examined the socio-emotional strains and challenges facing students worldwide. From an initial mind-set of "not looking back in fear", students went on to consider "how to identify and initiate ideas" to help others in need. This highlights an important aspect of the learning process: integrating social interactions in an accepting, creative and proactive way that contributes to the development of students' ET and teacher education, aiming to benefit oneself and society.

While this study focused on pre-service teachers during the COVID-19 pandemic, our findings may have broader applicability to curriculum design in higher education. The development of entrepreneurial thinking (ET) through collaborative, international learning environments could benefit students across various disciplines, especially in fields where innovation and adaptability are valued. The four characteristics we identified as supporting ET development - learning by doing through collaboration, addressing authentic challenges, incorporating international perspectives, and attending to socio-emotional aspects - could inform the design of courses beyond education and beyond crisis contexts. These characteristics align well with employing Fleischmann's (2018) theses on ET, particularly his emphasis on holistic, connective thinking and the social and ethical dimensions of entrepreneurship. Our findings suggest that Fleischmann's framework can be effectively applied and expanded upon in diverse educational settings.

However, the specific manifestation of these elements may vary depending on the field of study and current events. For instance, while our authentic challenge related to COVID-19, other disciplines might focus on field-specific issues or broader societal challenges. Additionally, the heightened emotional impact and global nature of the pandemic may have intensified the effects of our international and socio-emotional design elements. Future research could explore how these principles translate into different academic contexts and time periods, and how they might further develop or challenge Fleischmann's ET theses. Curriculum designers in higher education may find value in implementing various components of this learning environment with students new to ET across disciplines, while adapting the specific content and challenges to their field.

6. Conclusion

Our findings present pre-service teachers' perceptions of ET as it emerged within an international learning environment amidst the COVID-19 pandemic (RQ1). Research participants emphasized the value of engaging in entrepreneurial activities. Their perceptions of ET development were expressed across three dimensions (Figure 2):

- a. In relation to time – future-oriented, entrepreneurship was seen as requiring forward-thinking and a search for solutions that do not yet exist.
- b. In relation to life—individual, society, and world: Students described entrepreneurship as a tool for improving their own lives, contributing to society, and fostering positive global change.
- c. In relation to cognitive competencies – breaking boundaries and developing creativity: students valued and highlighted the development of cognitive skills through entrepreneurial activity, which enabled them to think creatively and transcend disciplinary boundaries.

Additionally, we identified the characteristics of the learning environment that support the development of the pre-service teachers' ET (RQ2). Participants attested to the advantages of the international learning environment in supporting the development of their ET. Based on our analysis, we identified four key attributes of the environment that contribute to this development:

a. Learning by doing through collaboration: students highlighted the value of working collaboratively to find solutions or create learning artifacts. This hands-on, cooperative approach was seen as a meaningful component of the experience.

b. an authentic challenge related to the COVID-19 pandemic: an authentic task (Herrington et al., 2004; Warren et al., 2014) addressing real-world problems, are open-ended, and require collaboration and reflection. In this case, the challenges stemmed from students lived experiences during the pandemic and encouraged diverse, creative solutions.

c. international aspects: the global aspect of the program was perceived as a motivating factor. It encouraged students to collaborate across cultures, engage with peers as equal partners, and work jointly to address educational challenges.

d. socio-emotional aspects: the use of artistic expression in the first task helped students convey emotions and connect on a personal level. This creative approach fostered social interaction and helped participants feel more comfortable and engaged in the learning process.

These outcomes highlight the potential of intentionally designed international learning environments to foster crucial entrepreneurial thinking skills in pre-service teachers, particularly during challenging times. The identified supportive characteristics of such environments offer practical insights for teacher education programs seeking to cultivate innovation, adaptability, and a proactive mind-set in future educators.

Interpreting this study's findings requires consideration of several limitations inherent in its specific design. The research centered on a single iteration of a short program with undergraduate pre-service teachers conducted during the COVID-19 pandemic. Participants were also primarily non-native English speakers in an English-medium course. These distinct programmatic, contextual, and participant characteristics, while providing a unique lens, may collectively influence the transferability of the findings to different populations (such as graduate students or in-service teachers), more extended interventions, or educational settings operating under more typical circumstances. Despite these limitations, the study offers valuable insights into the potential of entrepreneurship education to foster ET among pre-service teachers, particularly in international and collaborative learning environments during times of crisis. The findings provide a foundation for further research and program development at the intersection of entrepreneurship and teacher education.

7. Suggestions

This study's findings suggest several practical recommendations for fostering Entrepreneurial Thinking (ET) in pre-service teachers:

- Integrate authentic, collaborative "learning by doing" tasks that address relevant real-world challenges, as students found these motivating and impactful.
- Capitalize on international collaboration by designing activities in mixed-culture groups to broaden perspectives and encourage global thinking in developing ET.
- Embed socio-emotional support within the learning design, using activities that allow for emotional expression and fostering a supportive instructor-student dynamic to encourage engagement and ET development.

- Explicitly demonstrate how ET skills (e.g., creativity, problem-solving) apply to diverse career pathways, thereby expanding pre-service teachers' professional outlooks.
- Encourage future-oriented and melioristic thinking, guiding students to develop initiatives aimed at positive societal and individual change, which aligns with their perception of ET's value.

Implementing these strategies can help teacher education programs more effectively cultivate ET and teacherpreneurial competencies.

Declarations

Author Contributions. All three authors contributed to all aspects of the course design, instruction, and research. The research part includes literature review, conceptualization, data collection and analysis, and manuscript preparation. All authors have read and approved the final version of the manuscript.

Conflicts of Interest. The authors declare that they have no conflict of interest.

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Ethical Approval. This study was conducted in accordance with the ethical standards of each participating Institution. Ethical approval was obtained from the Ethics Research Committee of the Kibbutzim College of Education. All participants provided informed consent, and measures were taken to ensure their privacy, anonymity, and the confidentiality of the data collected.

Data Availability Statement. The data that support the findings of this study are not publicly available due to privacy concerns and restrictions imposed by the institutional Ethics Committee. Interested researchers may contact the corresponding author to inquire about access, which may be granted on a case-by-case basis and subject to appropriate approvals.

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References

- Adolph, C., Amano, K., Bang-Jensen, B., Fullman, N., & Wilkerson, J. (2021). Pandemic politics: Timing state-level social distancing responses to COVID-19. *Journal of Health Politics, Policy and Law*, 46(2), 211-233. <https://doi.org/10.1215/03616878-8802162>
- Anderson, A. R. (2011). The university's role in developing Chinese entrepreneurship. *Journal of Chinese Entrepreneurship*, 3(3), 175-184. <https://doi.org/10.1108/17561391111166957>
- Anwar, I., Thoudam, P., & Saleem, I. (2022). Role of entrepreneurial education in shaping entrepreneurial intention among university students: Testing the hypotheses using mediation and moderation approach. *Journal of Education for Business*, 97(1), 8-20. <https://doi.org/10.1080/08832323.2021.1883502>
- Barab, S., & Squire, K. (2004). Design-based research: Putting a stake in the ground. *The Journal of the Learning Sciences*, 13(1), 1-14. https://doi.org/10.1207/s15327809jls1301_1
- Bigos, K., & Michalik, A. (2020). Do emotional competencies influence students' entrepreneurial intentions? *Sustainability*, 12(23), Article 10025. <https://doi.org/10.3390/su122310025>
- Braun, V., & Clarke, V. (2022). Conceptual and design thinking for thematic analysis. *Qualitative Psychology*, 9(1), 3-26. <https://doi.org/10.1037/qup0000196>
- Brown, J. S., Collins, A., & Duguid, P. (1989). Situated cognition and the culture of learning. *Educational Researcher*, 18(1), 32-42. <https://doi.org/10.3102/0013189X018001032>

- Cobb, P., Confrey, J., DiSessa, A., Lehrer, R., & Schauble, L. (2003). Design experiments in educational research. *Educational Researcher*, 32(1), 9-13. <https://doi.org/10.3102/0013189X032001009>
- Creswell, J. W. (2013). *Qualitative inquiry and research design* (3rd ed.). Sage Publications.
- Delahunty, J., Verenikina, I., & Jones, P. (2014). Socio-emotional connections: Identity, belonging and learning in online interactions. A literature review. *Technology, Pedagogy and Education*, 23(2), 243-265. <https://doi.org/10.1080/1475939X.2013.813405>
- Elias, M. J. (2003). *Academic and social-emotional learning* (Vol. 11). International Academy of Education.
- Elias, M. J. (2009). Social-emotional and character development and academics as a dual focus of educational policy. *Educational Policy*, 23(6), 831-846. <https://doi.org/10.1177/0895904808330167>
- Engeström, R., & Käyhkö, L. (2021). A critical search for the learning object across school and out-of-school contexts: A case of entrepreneurship education. *Journal of the Learning Sciences*, 30(3), 401-432. <https://doi.org/10.1080/10508406.2021.1908296>
- EU Skills Panorama. (2014). *Entrepreneurial skills analytical highlight*. ICF and Cedefop for the European Commission. https://www.cedefop.europa.eu/files/EUSP_AH_Entrepreneurial_0.pdf
- European Commission/EACEA/Eurydice. (2016). *Entrepreneurship education at school in Europe: Eurydice Report*. Publications Office of the European Union. <https://doi.org/10.2797/301610>
- Fernández-Pérez, V., Montes-Merino, A., Rodríguez-Ariza, L., & Galicia, P. E. A. (2019). Emotional competencies and cognitive antecedents in shaping student's entrepreneurial intention: The moderating role of entrepreneurship education. *International Entrepreneurship and Management Journal*, 15, 281-305. <https://doi.org/10.1007/s11365-017-0438-7>
- Fleischmann, F. (2018). What is entrepreneurial thinking: Ten theses and provocations. In G. Faltn (ed.), *Handbuch Entrepreneurship* (pp. 39-53). Springer Fachmedien Wiesbaden. https://doi.org/10.1007/978-3-658-04994-2_2
- Fraenkel, J. R., Wallen, N. E., & Hyun, H. H. (2012). *How to design and evaluate research in education*. McGraw-Hill Education.
- Gandía-Carbonell, N., Losilla, J. M., & Viguer, P. (2022). Strategies to assess and promote the socio-emotional competencies of university students in the socio-educational and health fields: A scoping review protocol. *International Journal of Educational Research*, 112, Article 101922. <https://doi.org/10.1016/j.ijer.2021.101922>
- Gloster, A. T., Lamnisos, D., Lubenko, J., Presti, G., Squatrito, V., Constantinou, M., ... Karekla, M. (2020). Impact of COVID-19 pandemic on mental health: An international study. *PLOS ONE*, 15(12), Article e0244809. <https://doi.org/10.1371/journal.pone.0244809>
- Grădinaru, C., Toma, S. G. I., & Marinescu, P. I. (2018). Entrepreneurial thinking in the educational system. In *Value sharing for sustainable and inclusive development* (pp. 29-48). IGI Global. <https://doi.org/10.4018/978-1-5225-3147-0.ch002>
- Greeno, J. G., & Engeström, Y. (2014). Learning in activity. In R. K. Sawyer (Ed.), *The Cambridge handbook of learning sciences* (2nd ed., pp. 128-148). Cambridge University Press. <https://doi.org/10.1017/cbo9781139519526.009>

- Herrington, J., Reeves, T. C., & Oliver, R. (2014). Authentic learning environments. In *Handbook of research on educational communications and technology*, (pp. 401-412). https://doi.org/10.1007/978-1-4614-3185-5_32
- Herrington, J., Reeves, T., Oliver, R., & Woo, Y. (2004). Designing authentic activities in web-based courses. *Journal of Computing in Higher Education*, 16, 3-29. <https://doi.org/10.1007/BF02960280>
- Huang, L., Bai, X., Huang, L., Huang, Y., & Han, G. (2023). How does college students' entrepreneurial learning influence entrepreneurial intention: Evidence from China. *Sustainability*, 15(12), Article 9301. <https://doi.org/10.3390/su15129301>
- Krajcik, J.S., & Blumenfeld, P. (2006). Project-based learning. In R. K. Sawyer (Ed.), *The Cambridge handbook of the learning sciences* (pp. 317-334). Cambridge University Press. <https://doi.org/10.1017/CBO9780511816833.020>
- Löbner, H. (2006). Learning entrepreneurship from a constructivist perspective. *Technology Analysis & Strategic Management*, 18(1), 19-38. <https://doi.org/10.1080/09537320500520460>
- Liu, D., Chaemchoy, S., & Siribanpitak, P. (2024). Unlocking teacherpreneur potential in higher education: Validating a competency measurement scale. *Education Sciences*, 14(9), Article 1005. <https://doi.org/10.3390/educsci14091005>
- Morris, M. H., Webb, J. W., Fu, J., & Singhal, S. (2013). A competency-based perspective on entrepreneurship education: Conceptual and empirical insights. *Journal of Small Business Management*, 51(3), 352-369. <https://doi.org/10.1111/jsbm.12023>
- Mueller, S., & Anderson, A. R. (2014). Understanding the entrepreneurial learning process and its impact on students' personal development: A European perspective. *The International Journal of Management Education*, 12(3), 500-511. <https://doi.org/10.1016/j.ijme.2014.05.003>
- Neck, H. M., & Corbett, A. C. (2018). The scholarship of teaching and learning entrepreneurship. *Entrepreneurship Education and Pedagogy*, 1(1), 8-41. <https://doi.org/10.1177/2515127417737286>
- Patton, M. Q. (2014). *Qualitative research & evaluation methods: Integrating theory and practice*. Sage Publications.
- Peschl, H., Deng, C., & Larson, N. (2021). Entrepreneurial thinking: A signature pedagogy for an uncertain 21st century. *The International Journal of Management Education*, 19(1), Article 100427. <https://doi.org/10.1016/j.ijme.2020.100427>
- Rodrigues, A. P., Jorge, F. E., Pires, C. A., & António, P. (2019). The contribution of emotional intelligence and spirituality in understanding creativity and entrepreneurial intention of higher education students. *Education + Training*, 61(7/8), 870-894. <https://doi.org/10.1108/ET-01-2018-0026>
- Rakicevic, Z., Njegic, K., Cogoljevic, M., & Rakicevic, J. (2023). Mediated effect of entrepreneurial education on students' intention to engage in social entrepreneurial projects. *Sustainability*, 15(5), Article 4606. <https://doi.org/10.3390/su15054606>
- Rose, A. L., Leisyte, L., Haertel, T., & Terkowsky, C. (2019). Emotions and the liminal space in entrepreneurship education. *European Journal of Engineering Education*, 44(4), 602-615. <https://doi.org/10.1080/03043797.2018.1553937>

- Sirelkhatim, F., & Gangi, Y. (2015). Entrepreneurship education: A systematic literature review of curricula contents and teaching methods. *Cogent Business & Management*, 2(1), Article 1052034. <https://doi.org/10.1080/23311975.2015.1052034>
- Warren, S. J., Lee, J., & Najmi, A. (2014). The impact of technology and theory on instructional design since 2000. In *Handbook of research on educational communications and technology* (pp. 89-99). Springer. https://doi.org/10.1007/978-1-4614-3185-5_8

About the Contributor(s)

Einat Gil, Ph.D., is a Chief Researcher at The Institute for Applied Research of AI in Education at the Ministry of Education, Israel. Formerly, a lecturer and an Innovation Director at the Kibbutzim College of Education and Levinsky College of Education. Her research focuses on innovative learning environments, hybrid learning spaces, entrepreneurship education, and artificial intelligence in education (AIED). She is the co-editor of a Springer volume *Hybrid Learning Spaces* and has led national research initiatives on the integration of educational innovation and AI-supported teaching and learning.

Email: egil767@gmail.com

ORCID: <https://orcid.org/0000-0002-8453-7950>

Anat Even-Zahav, Ph.D., is a faculty member at AL-Qasemi Academic College, Israel and at Kibbutzim College of Education, Technology, and the Arts, Israel. Anat has earned her Ph.D. in Science Education from the Faculty of Education in Science and Technology at the Technion (2016). Her thesis was presented in the SpringerBrief: Risk Management of Education Systems - The Case of STEM Education in Israel. Currently, Anat develops courses that integrate innovative teaching environments and pedagogies, such as internationalism, interdisciplinary studies, and entrepreneurial thinking. Her research focuses on risk management in educational systems and entrepreneurship education.

Email: anatez@gmail.com

ORCID: <https://orcid.org/0000-0001-5389-0316>

Justyna Siemionow, Ph.D., is an assistant professor in the Social Sciences Department at the University of Gdansk in Poland and a Fellow at Turku University of Applied Sciences in Finland, the Director of the Institute of Pedagogy. Her research interests lie in the broad areas of residential child care, families, education, and the process of supporting pedagogical staff.

Email: justyna.siemionow@ug.edu.pl

ORCID: <https://orcid.org/0000-0003-3831-3515>

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