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The Reflective Entrepreneur: Tools that Increase Metacognition during Venture Creation Programs

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Abstract

Metacognition, thinking about thinking, is an important concept in entrepreneurship education due to its role in facilitating learning and reflection. However, little is known about how practitioners should implement metacognitive practices in entrepreneurship education. The purpose of this essay is to increase understanding of: a) the impact that entrepreneurship educators have on the development of students' metacognitive abilities and b) how metacognition can be deliberately practiced. We propose this in the context of venture creation programs (VCPs). By integrating educational psychology literature with entrepreneurship education, we discuss how teachers can facilitate metacognitive practices, and we propose a metacognitive development model for entrepreneurship students. We demonstrate theoretically how this model can contribute to entrepreneurial learning through the development of metacognitive abilities, and we identify specific tools that entrepreneurship educators can implement. In this process, we offer new insights, demonstrating why these tools matter and how these practices should be implemented.

Keywords: metacognition, venture creation programs, entrepreneurship education, entrepreneurial learning, adaptive cognition

1.0 Introduction

Entrepreneurial activity, such as identifying and exploiting opportunities, is highly contextual and inseparably linked with cognitive abilities (Shepherd et al., 2014). The dynamism and uncertainty that are associated with the complexity of the entrepreneurial context require entrepreneurs to continuously rethink their actions (Naumann, 2017). It is essential to understand these cognitive processes because they predict cognitive adaptability and

performance in a context of changing and novel business environments (Haynie et al., 2010). Importantly, a number of studies point to the potential for metacognition to be an educable process (Nietfeld & Schraw, 2002; Rosi et al., 2019).

Metacognition (Flavell, 1979), or thinking about thinking, is a higher-order cognitive process that systematizes what individuals know and recognize about themselves, their tasks, and their environments (Flavell, 1976, 1987). It has been defined as “an ability to reflect upon, understand, and control cognitive processes relating to a concrete goal or objective” (Mitchell et al., 2011, p. 685). Specifically, and differing from cognition, it helps individuals to understand *how* a task is performed (Schraw, 2001). In the entrepreneurial context,¹ metacognition regulates the process of developing and selecting cognitive strategies to stimulate an entrepreneurial mindset, which involves having the ability, under conditions of uncertainty, to sense, act, and mobilize resources effectively (Haynie et al., 2010). Similarly, in entrepreneurship education, which refers to any pedagogical program or educational process that teaches entrepreneurship, entrepreneurial attitudes, or skills (Fayolle, 2006; Nabi et al., 2017), the cognitive development of an entrepreneurial mindset² in students plays a significant role in encouraging entrepreneurial activities (Wardana et al., 2020).

Entrepreneurship training activities, such as programs or courses, vary greatly across countries and educational institutions (Vesper & Gartner, 1997). Some entrepreneurship courses mainly teach entrepreneurship theory, whereby students learn *what* entrepreneurship is. Other entrepreneurship programs facilitate the creation of student start-ups, whereby students mostly learn *how* to be entrepreneurs (Aadland & Aaboen, 2020). The latter, involving the development of new ventures during higher education, are known as venture creation programs (VCPs), and they serve as the context for this chapter (Ollila & Williams-Middleton, 2011). VCPs are action-orientated and depend on reflective thinking and awareness of one’s actions, with the result that experience can be turned into entrepreneurial learning (Lundemark et al., 2019; Pittaway & Cope, 2007a). Since such programs teach students how to become entrepreneurs through the creation of their own start-ups, this chapter emphasizes the importance of teachers using metacognitive tools and practices to facilitate awareness and reflection. This is important since the experiential learning-based process

¹ The context of our study is based on evidence from studies in the Western World.

² In this chapter, when we refer to the entrepreneurial mindset, we are specifically focusing on its cognitive aspects, which relate to how entrepreneurs use mental models in order to think (Kuratko et al., 2020).

employed in VCPs requires students to engage in reflective practices if they are to convert their actions into entrepreneurial learning (Pittaway & Cope, 2007b).

Entrepreneurship education contributes to the development of higher metacognitive abilities among students, and this can consequently lead to an increasing interest in entrepreneurship intention (Ling et al., 2013; Venesaar et al., 2011). Although prior research has identified the importance of metacognition in developing students' entrepreneurial competencies (Ling et al., 2013; Ustav & Venesaar, 2018), approaches that support an understanding of how metacognitive abilities develop in student settings remain unexplored (Vos & de Graaff, 2004). While studies such as those of Ling et al. (2013) and Ustav and Venesaar (2018) have deepened our understanding of why metacognition is important and how metacognitive processes interact with affective and motivational components, little evidence is available on *how* teachers can stimulate students' metacognitive abilities in the classroom environment. This is surprising, as metacognitive research in education emphasizes both the impact of the environment (Salonen et al., 2005; Schraw, 1998) and the importance of teachers facilitating reflective tools and practices to support the development of students' metacognitive abilities (Schraw, 1998; Tanner, 2012). Nevertheless, little is known about hands-on, user-friendly guides to enable teachers to implement metacognitive training within entrepreneurship education (Urban, 2012). We identify this gap as problematic for entrepreneurship education, while also recognizing that metacognitive abilities can be developed through entrepreneurship courses (Ustav, 2017). In this chapter, we respond to the need to explore how metacognition can be "deliberately practised in an entrepreneurial context because of the appealing notion that such metacognitive thinking undertaken in an entrepreneurial context will lead to the creation of entrepreneurial expertise by facilitating the self-reflection, understanding, and control of one's own entrepreneurial cognitions" (Mitchell et al., 2007, p. 14).

The purpose of this chapter is thus to increase our understanding of the impact that teachers can have on students' metacognitive development. To that end, we propose concrete tools and practices for use by educators who facilitate entrepreneurship courses, and we debate the suitability of these instruments in the experiential learning environment of VCPs in the European context. We draw on educational psychology literature (Salonen et al., 2005; Schraw, 1998; Tanner, 2012) to answer the question: *How can teachers facilitate metacognition in entrepreneurship education?* and we propose a model in which the teacher facilitates the classroom environment in such a way that it stimulates the students'

metacognitive development. In doing so, the chapter enriches our understanding of the role of educators in facilitating an environment that supports entrepreneurial activity.

We aim to make several contributions through our work. This chapter contributes to the entrepreneurship education literature on reflective practices in VCPs; such literature already shows that metacognition contributes to a reflective process in which students become self-regulated learners (Hägg, 2021). Specifically, we complement work done on reflective thinking in an educational context (e.g., Deacon & Harris, 2011; Neck & Greene, 2011) by nuancing how this can be facilitated by metacognitive practices. In addition, this chapter enriches theory by addressing the lack of research into how metacognition can be practiced in the entrepreneurial context. We open the black box of the (previously and almost exclusively) conceptual nature of metacognition in entrepreneurship. Specifically, from a theoretical perspective, our model enriches entrepreneurship education through its integration of educational psychology literature, and it thereby provides insights into the development of specific metacognitive abilities and why they matter. Furthermore, from a practical point of view, we offer an original approach by identifying the tools that can be used by practitioners, and by explaining how each of these tools may be used, and how they can unfold in VCPs.

2.0 Theoretical framework

2.1 Metacognition

Metacognition,³ a conscious reflection on one's own thinking (Jost et al., 1998), is a higher-order cognitive process that operates as the ability to reflect, understand, and control one's cognitive processes (Flavell, 1976). Since metacognition regulates cognitive strategies, it is known to predict personal success and achievement (Baumeister et al., 2007). Thus, metacognition represents awareness of one's own cognition and how to regulate it (Brown, 1987; Schraw & Dennison, 1994). This awareness of cognition is known as *metacognitive knowledge*, and it refers to what individuals know about their own cognition. This is important, since it consists of knowledge about one's cognitive strategies and how and when to use them (Schraw, 1998). Imagine a student who is working on an entrepreneurial task, such as identifying a suitable market for a technological service: since metacognitive

³ Metacognition is multifaceted (Efklides, 2008) and is sometimes only vaguely distinguished and conceptualized (Mitchell et al., 2011). For the sake of consistency, we are referring to metacognitive abilities when we talk about metacognition. We rely on the frameworks of Schraw (1998) and Efklides (2008) to justify this approach.

knowledge helps individuals to become aware of their knowledge, this student, who is new to the entrepreneurial process, may think that “the process of understanding the market selection is complex” and she may then take advantage of this understanding by considering how “If I scan the current market first, it might help me to understand which other similar markets are out there.”

In addition to developing individuals’ knowledge and regulating their cognition, metacognition regulates how cognitive processes are affected by experiences and feelings. These processes, known as *metacognitive experiences*, are important for learning outcomes (Haynie & Shepherd, 2009; Salonen et al., 2005). Metacognitive experiences refer to a person’s experiences during a cognitive task, be it beliefs, feelings, or judgments (Flavell, 1979). Such aspects occur spontaneously and are the result of a non-conscious inferential process (Efklides, 2001). Specifically, metacognitive experiences support individuals’ judgement of tasks, such as when people experience certain feelings around difficulties or in relation to their confidence (Efklides, 2001). For instance, a student who is working on a customer portfolio task might experience difficulty in specifying what should be included. The recognition of the difficulty is a metacognitive experience that could prompt the student to stop for a moment to assess how confident she is about the work she has done so far. As a result, the student who recognizes feelings of difficulty will think about a suitable strategy, such as reaching out for help, before continuing with the task. Additionally, this process emphasizes the role of collaboration and communication, since it involves the sharing of perspectives. That is, when solving problems in groups, students may influence each other’s metacognition through sharing their thoughts and ideas around how to solve the problems (Chiu & Kuo, 2009).

2.2 *Entrepreneurial metacognition and its role in entrepreneurship education*

Entrepreneurs benefit from the use of metacognition because it plays a key role in the development of an entrepreneurial mindset (Haynie et al., 2010). Namely, to manage dynamic and uncertain task environments, metacognitive processing enables entrepreneurs to generate, select, and engage with multiple frameworks and consequently, to interpret, plan, and implement an assortment of personal, social, and environmental goals (Haynie et al., 2012). In contrast, individuals who are restricted in their metacognition are less likely to adopt alternative strategies and less likely to show cognitive flexibility within a changing environment (Earley & Ang, 2003).

In entrepreneurship education, metacognition has gained attention due to its role in facilitating learning (Kyrö et al., 2011). One study found that, in contrast to active entrepreneurs, who have self-awareness about *what* they know and *how* they know their metacognitive abilities, students—due to their lack of experience—mostly have self-awareness only about *what* they know (Ustav, 2018). Indeed, metacognition is a valuable tool for explaining how students can become aware of their own learning processes in order to adapt and regulate them so as to achieve their goals. To facilitate an optimal learning environment, teachers can actively encourage students to take significant control over their own learning process. This contributes to the students' interest in and intention toward entrepreneurship (Ustav & Venesaar, 2018).

2.3 Metacognition in the context of European Venture Creation Programs

The context of this chapter is European venture creation programs, and specifically, the programs that exist in higher educational institutions. Examples of such programs are found at the Chalmers School of Entrepreneurship, Lund University's master's program in Entrepreneurship and Innovation, and the Norwegian University of Science and Technology (NTNU) School of Entrepreneurship (Alsos et al., 2022). What these programs have in common is that they all embrace experiential learning as the main approach to entrepreneurial learning, emphasizing that students learn how to be entrepreneurs through creating their own startups (Aadland & Aaboen, 2020). Thus, the students' venture creation is developed through the educational platform, and their learning is facilitated through education and incubation (Ollila & Williams-Middleton, 2011). During this process, students interact with each other, with academics, investors, and practitioners, and jointly, this can lead to the development of student startups (Lackéus & Williams-Middleton, 2015; Ollila & Williams-Middleton, 2011). An important nuance in these programs is learning from mistakes and practicing reflection-in-action (Lackéus & Williams-Middleton, 2015). Specifically, experiential learning is considered an essential part of entrepreneurial learning: when students reflect on their actions, entrepreneurial learning occurs (Pittaway & Cope, 2007a). Thus, reflections that stimulate metacognitive abilities are an important part of the learning process in the VCP context. Particularly for individuals who are new to the entrepreneurial process, metacognitive processes are valuable because the tasks these individuals are confronted with are new to them. As a result, it is crucial to engage the students in their own cognitive processes as they become aware of what they do and do not know, and learn to seek help when required. In addition, entrepreneurial activities, such as those experienced in a VCP, may generate an

optimistic mood, which in some cases, may promote the tendency to act immediately, when reflection would have been more helpful (Baron, 2014). Given the importance of the teacher's role in stimulating metacognition, we now discuss how metacognition can best be facilitated by teachers and consequently developed in the students.

3.0 Development of metacognitive abilities

Building on the educational psychology literature on students' metacognition, we developed a model that shows the joint influence of both teachers and classroom environment on the students' metacognitive development. Figure 1 illustrates this process: On the left side, we emphasize the equally important roles of the teacher and the classroom environment. As we will elaborate, the teachers can use metacognitive modelling and tools to explain metacognition, while peer collaboration and improvements in competence through reflection will stimulate metacognition in the classroom environment. These factors can jointly lead to improved metacognitive development, as illustrated on the right side of the model. More precisely, the equally important roles of the teacher and the classroom environment can result in the development of: (1) metacognitive knowledge (i.e., knowledge of cognition); (2) metacognitive experience (i.e., awareness of experience and feelings); and (3) metacognitive regulation (i.e., regulation and control of cognitive strategies).

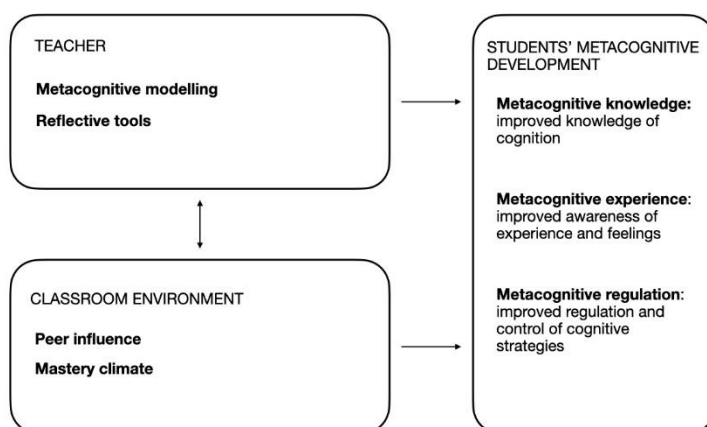


Figure 1. A metacognitive development model for entrepreneurship students

3.1 Teacher

In order to stimulate metacognitive abilities among their students, teachers must motivate successful adaptation and developmental change by influencing this process within the learning setting (Reynolds & Miller, 2003; Salonen et al., 2005). The students' metacognitive development can be facilitated through the teachers' modelling their own metacognitive processes (Schraw, 1998). *Metacognitive modelling* consists of demonstrating what metacognition is by using examples, such as the teachers' own thinking processes, during problem-solving activities. In particular, students need to understand the difference between cognition (i.e., how to perform a task) and metacognition (i.e., how they think about or monitor the task), which is achieved with the help of examples. When teachers explain what metacognition is, it helps the students to understand the difference between cognition and metacognition, while the use of examples is beneficial in showing how metacognition can be applied. Rather than highlighting the kind of cognitive strategies the teacher uses to solve a task (e.g., causation or effectuation), knowledge must be modelled regarding when to use cognitive strategies and how to coordinate them. This shows the students that there are several cognitive strategies from which to choose (Carrell et al., 1989). In doing so, the teacher contributes to the students' metacognitive knowledge and regulation. For instance, Haynie et al. (2010) describe how the entrepreneurial task of preparing a marketing strategy for a meeting with an investor may start with the evaluation of several alternative marketing strategies: "The process responsible for ultimately selecting a response (i.e. a guerrilla marketing campaign) is cognitive—the process responsible for ultimately selecting how the entrepreneur will frame the entrepreneurial task (i.e. effectuation) is metacognitive" (p. 220).

In addition to metacognitive modelling, teachers can facilitate metacognitive development through the use of *reflective tools* (Schraw, 1998; Tanner, 2012). The reflective tools used in metacognitive development aim to guide the students to reflect on how, when, and why to use a particular cognitive strategy, as well as the planning, monitoring, and evaluation of the strategy (Tanner, 2012). In the VCP context, cognitive strategies can include classic learning strategies, such as to "slow down" (i.e., to stop, read, and think about information), and also entrepreneurial strategies, such as causation or effectuation (Haynie et al., 2010; Schraw, 1998). Stimulating students to reflect on the use of different cognitive strategies contributes to their development of metacognitive knowledge. Moreover, when teachers facilitate reflective practices around students' planning, monitoring, and evaluation processes, they can additionally stimulate their metacognitive regulation, since such reflective practices will

encourage the students to become aware of their own thinking processes (Schraw, 1998). For example, when students are instructed to stop and reflect during a problem-solving task on whether they need to change their strategy, they learn to become adaptable to a changing situation, which is an essential skill for an entrepreneur (Haynie et al., 2012).

3.2 Classroom environment

The classroom environment shapes the participants' learning processes. While the learners do naturally contribute to the classroom environment, it is the teacher who decides how the learning processes should unfold, for instance, through the choice of topic and the organization of activities. Metacognitive abilities can be deliberately developed during this process through a strong emphasis on collaboration. Specifically, when peers collaborate, they automatically share their thoughts and perspectives while solving a problem. As a result, the metacognitive processes at the group level influence the metacognitive processes at the individual level (Chiu & Kuo, 2009). *Peer influence* is a significant contributing factor in students' metacognitive development because it helps them to gain knowledge about their own cognitive strategies and when to use them. For example, if a group member is asked to justify an opinion, other members may disagree. The process of understanding disagreement is crucial to becoming aware of one's own knowledge. It also helps students to understand how cognitive processes are affected by feelings, as judgments are highly influenced by emotional factors (Efklides, 2008), and this may be revealed during the process of thought sharing. While teachers cannot control the communication that takes place between students, they can facilitate the group reflections and discussions (Salonen et al., 2005; Schraw, 1998). For example, teachers may facilitate discussions during the VCP in which experiences and feelings are openly shared, and this will increase the development of metacognitive experiences (Ustav, 2017).

One way to establish a classroom culture of reflection and knowledge sharing is to create a so-called *mastery climate* (Schraw, 1998). A mastery climate is a class environment that fosters a mastery orientation among its students rather than a performance orientation (Dweck & Leggett, 1988). While students with a performance orientation seek to *prove* their competence, students with a mastery orientation attempt to *improve* their competence (Ames & Archer, 1988). A mastery climate can foster a mastery orientation among students by rewarding effort and persistence and by focusing on learning processes rather than outcomes.

An effective way to facilitate a conversation between teacher and students is through a culture of reflection and knowledge sharing. For instance, Tanner (2012) stresses the importance of discussing *confusion* with students by asking, “What has been challenging or unclear so far?” Rather than aiming for “right” answers, teachers allow students to become aware of and share what they do not understand, thereby creating an environment where asking questions is acceptable. These reflective processes can lead to improvements in metacognitive knowledge and metacognitive experience.

4.0 Metacognition in action: Tools and practices for Venture Creation Programs

In the following sequence, we translate our model into practice by introducing four tools and practices that entrepreneurship educators can use to foster students’ metacognitive development in the context of VCPs. Specifically, we emphasize the role of (1) thinking journals, (2) strategy and regulatory checklists, (3) team reflections, and (4) process assessments and rewards. An overview of these different tools and practices can be found in Table 1.

Table 1: *Tools and practices to promote students’ metacognitive development*

Tools and practices for teachers in VCP	Students' metacognitive development
Thinking journals	Metacognitive knowledge and experience
Strategy and regulatory checklists	Metacognitive knowledge, experience, and regulation
Team reflections	Metacognitive knowledge, experience, and regulation
Process assessments and rewards	Metacognitive knowledge and experience

4.1 Thinking journals

Self-written reports and diaries can be powerful tools to stimulate an active learning process and to monitor thinking processes (Kaffka et al., 2021). A thinking journal aids students in exploring and connecting ideas and persisting in their learning by reflecting on, encouraging,

and questioning their thinking. Although diverse types of thinking journals have been distinguished in the literature (Bolger et al., 2003; Wheeler & Reis, 1991), we suggest the use of so-called interval-contingent protocols on a weekly basis, since these require students to think about their metacognitive abilities in a structured way over time. We argue that weekly intervals reduce the retrospection bias that can occur with longer intervals. Moreover, a diary is particularly appropriate for entrepreneurial action and thinking (Kaffka et al., 2021).

Indeed, Hägg (2021) emphasizes the importance of VCPs facilitating reflection diaries so that students will convert the action-oriented activities of the VCP into entrepreneurial knowledge and experience. Specifically, the following reflective questions can support students in moving toward a higher-order cognitive level:

- *What have I done, and whom have I met?*
- *Why did I do what I did?*
- *Write your observations and reflections relating to points 1 and 2.*
- *Reflect on (entrepreneurial) theory and connect it with point 3.*
- *What are my goals for next week?*

Overall, the reflective journal seeks to create a continuous flow in the learning process, thus helping students to become self-regulated learners. This may have important consequences for the development of entrepreneurial competencies in the students, such as improvements in customer orientation to a viable market and in a business model design (Kaffka et al., 2021; Mitchelmore & Rowley, 2010). In addition to the journal, an important part of this reflective process includes the delivery of two reports (one mid-term report and one final report) that build on the reflective diary and create continuity in learning and self-awareness over the year. We encourage scholars to facilitate a thinking journal with a format similar to that suggested by Hägg (2021), whereby students are expected to journal consistently and to use their journals as a basis for assessment at the end of each semester. However, as thinking journals might be perceived as a vulnerable, private matter, students must decide for themselves how comfortable they are with sharing their thoughts. Teachers play a vital role here, as personal feedback might encourage students to share their own thoughts, feelings, and experiences, thereby enabling further development.

4. 2 Strategy and regulatory checklists

A strategy evaluation matrix may help students to develop awareness of their cognition, to define their cognitive strategies, and to reflect on how, when, and why to use them (Schraw,

1998). However, predefined cognitive strategies may be less advantageous in an entrepreneurial context. Take causation and effectuation as examples (Sarasvathy, 2001): while causation is consistent with planned strategy approaches, effectuation is consistent with non-predictive strategies (Chandler et al., 2011). Depending on the objective and the means available, either an effectuation or a causation process could be the preferred option for the entrepreneur (Santos et al., 2019; Sarasvathy, 2008). As a result, we suggest that reflexivity around one's cognitive strategies, as illustrated in Table 2, is the most appropriate approach for an entrepreneurship education context. Table 2 represents a complete reflection checklist, integrating knowledge, experience, and regulation, and suitable for use during problem-solving tasks.

This is distinctive from a thinking journal in the sense that it addresses specific metacognitive strategies that can be used before, during, and after an individual or team task. A checklist can make students aware of their cognitive strategies and how different elements, such as emotions, may affect their strategy choices. This process of increased awareness has important implications for analytic and strategic competencies, such as expanding a search for information to apply in alternative contexts, monitoring progress toward an objective, and feeling an urge to get involved in strategic questioning (King, 1991; Man et al., 2008). Our checklist can be facilitated by a teacher when students are involved in teamwork activities, such as the feasibility studies used to assess different business ideas. For example, teachers may bring out the checklist and go through its reflective questions with students at the start (i.e., planning), during (i.e., monitoring), and after (i.e., evaluating) the feasibility study, thereby prompting the students to activate their own metacognitive abilities. Teachers may also provide examples of how to answer the questions in the checklist, thereby guiding the students through a process of awareness as they observe different cognitive strategies.

Table 2: *Reflective questions to promote students' metacognitive development**

Strategy and Regulatory Checklist

Planning	Monitoring	Evaluation
<ul style="list-style-type: none"> • What is my goal? • What kind of information and strategies do I need? • How can I use these strategies? • When should I use these strategies? • Why should I use these strategies? • What do I feel about the difficulty of the task/problem? • How confident do I feel about solving this task/problem? • How familiar is this task/problem? 	<ul style="list-style-type: none"> • Am I reaching my goals? • Have I received any new information that I should consider? • Have any feelings around solving this task/problem changed? • Do I need to make any changes in my strategies? 	<ul style="list-style-type: none"> • Have I reached my goal? • What worked well and what worked less well? • What did not work? • Would I do things differently next time? • What do I feel about the outcome?

*inspired by Schraw (1998) and Tanner (2012)

4.3 Team reflections

Team-based experiential learning is an important aspect of VCPs because it reflects how entrepreneurs develop their start-ups (Harms, 2015). Many new ventures are founded by a group of people and have, due to the diversity in thinking (inter alia), achieved better results than individual entrepreneurs (Birley & Stockley, 2000; Chowdhury, 2005; De Mol et al., 2015). Consequently, a number of the learning methods used in entrepreneurship education are group-based and focus on team learning in reflecting on actual new venture teams (Pittaway & Cope, 2007b; Wu et al., 2009). In a VCP, activities should be facilitated around teamwork, and students should be encouraged to work with different peers before forming their ultimate start-up teams. This is because metacognition is often cultivated through social interaction (Efklides, 2008). For instance, discussions with others will help overcome “the fragility of our introspection and [so we] learn to experience ourselves better” (Frith, 2012, p. 2217), and these practices stimulate metacognitive experiences. Additionally, reflective exercises relating to action are important in the experiencing of outcomes that shape social interactions (Moretto et al., 2011).

Reflections also help teams to encourage processual insights into relational and personal competencies, such as group performance, proactive behaviour, and awareness of the consequences of actions (Edmondson, 2002; Man et al., 2008; Wiedow & Konradt, 2011).

These interactions may help students to think collectively about different solutions through their new understanding of things they had not known previously. For example, when students experience doubt or feel confused, metacognitive processes are activated because they are then required to rethink how they will move forward. Teachers and practitioners may, alternatively, ask each group about the things that have been confusing for them so far. In general, teachers will ask each group to come forward and explain their thinking. Here, it is crucial that the rest of the class interacts by questioning the reasoning of the team. Alternative explanations that are given then lead to new reflective practices as a result of the group's metacognitive processes. Each time new solutions appear, based on these team reflections, the teacher can point out that these solutions are the result of metacognitive thinking.

4.4 Process assessments and rewards

One of the main challenges in teaching metacognition is the gap students experience between the knowledge and strategies they possess and their ability to employ those strategies. This discrepancy may be caused either because tasks that are challenging may be perceived as demotivating, or because the students do not link their progress to the use of metacognitive strategies (Schraw, 1998). Teachers have a crucial role to play, as they can facilitate an environment that will stimulate the students to increase their metacognitive knowledge and regulation, while they can also help the students to consider and choose between a broad range of strategies (Schraw & Moshman, 1995). Specifically, mastery-orientated students, as opposed to performance-orientated students, experience less anxiety, greater persistence, and have a greater sense of self-efficacy (Graham & Weiner, 1996; Schunk, 1989). This has particularly important implications for the development of entrepreneurial competencies that are linked to individual beliefs about accomplishing a goal (Bandura, 1977) and the willingness to commit resources (Sánchez, 2013) to the entrepreneurial intention (Liñán et al., 2011). Students can be prompted to become mastery-orientated by emphasizing the importance of improving, rather than proving, their competence. Specifically, a mastery orientation implies the importance of explaining entrepreneurship as a trial-and-error process that happens over time, while simultaneously, providing the students with consistent encouragement to learn by experience and from practice.

The stimulation of a mastery environment includes the recognition that students must have autonomy over their own learning processes and personal goals. The teacher's role is to follow up with the students and to recognize process and effort rather than performance outcomes. Teamwork with different peers, as well as a variety of activities in the classroom

that challenge the students in different ways, can also encourage this process. With regards to time, the teacher's emphasis should be on maximizing the time allowed for practice and learning (Ames, 1992).

When students work together in an interactive climate during VCPs, entrepreneurial learning can be generated (Haneberg & Aadland, 2020). From this perspective, VCPs can be seen as communities of practice, where interactions among students, in particular, shape the learning context (Haneberg & Aadland, 2020). During this process, it is important that students come to see mistakes as the essence of learning and that they learn to verbalize what is happening. By seeing their mistakes as learning, students activate metacognitive processes and become curious about how their feelings influence their metacognitive experience. Furthermore, recognizing mistakes allows the individual to see the positive function of errors and to reframe problems as opportunities to learn (Funken et al., 2020). An environment in which the teacher interprets failures and mistakes positively allows the students to mitigate their fear of failure and encourages the activation of their metacognitive processes. To facilitate such an environment, teachers need to be cautious in relation to focusing on reward and performance. For example, rewarding the winners of a VCP with extrinsic benefits, such as grades, might be counterproductive when learning from failure is being facilitated at the same time (Buch et al., 2017). Ways to manage this include allowing the students to manage their self-evaluations of their semester goals and evaluating assessments with passes or fails rather than specific grades.

5.0 Concluding thoughts and future research directions

In this chapter, we sought to answer *how* metacognition can be taught in entrepreneurship education. Throughout the chapter, we contextualized the role of VCPs and metacognition in entrepreneurship education. Metacognition plays a significant role in VCPs, as it helps individuals to think about the entrepreneurial tasks in relation to their own experience (Haynie et al., 2010). Specifically, we demonstrated that the development of metacognitive abilities can be enhanced when knowledge, experience, and regulation are collectively promoted within VCPs. Although metacognition has been demonstrated as a concept that can be taught (e.g., Nietfeld & Schraw, 2002) and as a tool that benefits entrepreneurs and their teams (Bastian & Zucchella, 2022), approaches that help to understand how metacognitive abilities develop in student settings and what practitioners can do remain unexplored (Urban, 2012; Ustav, 2017; Vos & de Graaff, 2004). We have addressed this research gap by demonstrating

a variety of practical tools that stimulate metacognitive processes and by theoretically explaining how these approaches operate.

This chapter aimed to contribute to entrepreneurship education literature by uncovering the lack of theory on how metacognition can be deliberately practiced in VCPs. Specifically, we proposed a model and argued theoretically why this model matters in terms of improving students' metacognitive abilities. Until now, little has been known about how metacognition can practically support entrepreneurship education (Urban, 2012; Ustav, 2017; Vos & de Graaff, 2004). Additionally, we enrich theory by integrating metacognition with work done on reflective thinking in the educational context (Hägg, 2021). From a practical point of view, this chapter contributes by offering a set of tools for entrepreneurship practitioners to use to promote metacognition, thereby making an important contribution to an area that has had a significant lack of evidence (Mitchell et al., 2007). In particular, we concentrated on what teachers can do to promote students' metacognitive abilities.

5.1 Future research to test metacognition in entrepreneurship education

Research on metacognition is still in its infancy, and many promising future research directions in entrepreneurship education need further exploration. While this chapter does not aim to provide a systematic overview of metacognitive practices, we see this contribution as a first step toward an effective application for entrepreneurship educators wishing to develop metacognitive practices in VCPs. We envisage interesting research emerging from related experimental studies. Entrepreneurial learning may offer much potential for the experimental testing of metacognition. Future research would benefit from evidence-based approaches in which the effectiveness of our tools would be hypothesized. For example, the outcomes of a metacognitive education program could be compared with the outcomes of another type of program. In such a setting, one group could be prompted to use reflexive journals to test whether this has a positive effect in encouraging students to become self-regulated learners. The two groups would then be compared on the outcomes of a self-regulated learning model (Cheng, 2011), in which they would assess their intended learning outcome and compare this with their actual learning outcome after the intervention (Harms, 2015). The effects of implementing metacognition could also be tested within an education program to assess the quality of different business ideas. For example, half the participants in a group could be asked, individually, to go through our recommended checklists before, during, and after evaluating different business ideas. The evaluation outcomes of the two groups would then be compared through the assessment of an expert panel. This could be extended to a group

setting, in which the effect of our recommended group reflections would be tested against learning outcomes.

Finally, as the arguments in this chapter are based on entrepreneurial settings in Europe, ideas generated in different countries, regions, cities, and villages may require different approaches to facilitation (Jones & Matlay, 2011). For example, Robinson and colleagues (2016, p. 674) argue that, in some parts of the world, students are “acculturized throughout their studies to the idea that they are going to work either in the private or public sector once they graduate and are not at all focused on alternative career routes,” because they must fulfil their basic needs. Therefore, future research is needed to explore further the importance of context to our findings. For example, a VCP applying the practices we propose could be conducted outside of Europe to understand, based on these contextual differences, where and how practitioners may need to adapt their approaches. We see significant potential for future studies on the tools described in this chapter. Qualitative, processual studies provide the possibility of capturing how metacognition in entrepreneurship education evolves over time. Future research may also investigate whether metacognition has drawbacks. For example, under some conditions, too much thinking about thinking may result in doubt and delay. Lastly, we note that metacognition is in considerable lack of reviews. We see this as an important future contribution, due to the “multi-faceted” character of metacognition (Efklides, 2008, p. 278). Entrepreneurship researchers may take advantage of this by conducting a systematic literature review of metacognition and demonstrating more clearly what metacognition is and what it is not.

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