

How Entrepreneurship Education Can be Developed Knowing the Power of Metacognition

Sirje Ustav

Department of Business Administration, Tallinn University of Technology

Akadeemia tee 3, 12618 Tallinn, Estonia

Phone: +3726203964, e-mail: sirje.ustav@ttu.ee

Abstract

Metacognition as a concept has been thoroughly studied and its effect on learning is well demonstrated. Moreover, scholars find that it represents the entrepreneurial approach to thinking and has the propensity to affect selecting an entrepreneurial career. Hence, entrepreneurship education, still the subject of discussions about its aims methods and outcomes, has not taken any visible advantage of this powerful concept, and no specific advice for educators has been delivered. To rectify this deficiency, the aim of the current research is to propose how entrepreneurship education can be developed to increase metacognitive abilities in students. Individual differences in student metacognition are therefore studied, and the strongest and weakest aspects are identified using quantitative and qualitative research methods. Based on the theoretical framework of the conceptualisation of metacognitive abilities as well as empirical evidence, the article contributes to a better understanding of the connections between metacognition and educational settings. The article provides a practical holistic proposal for how metacognitive abilities can be developed systematically through entrepreneurship courses.

85

JEL classification codes: I23, L26

Keywords: entrepreneurship education, metacognition, intervention, learning activities, teaching methods

1. Introduction

The impact of entrepreneurship programs is still under dispute (Fayolle & Gailly, 2013), and according to Frechner and Weber (2013), research into entrepreneurship should provide more than just mean values, giving more practical recommendations for educators (Frechner & Weber, 2013). They discuss whether we are comparing apples with oranges, and recommend distinguishing programs in higher education according to awareness and start-up concepts. Start-up programs try to imitate entrepreneurial tasks, and in many cases aim to increase entrepreneurial intention (Liñán & Chen, 2009; Pittaway & Cope, 2007; Souitaris et al., 2007). Those that aim at building awareness, we see as creating an awareness of the entrepreneurship phenomenon in terms of beliefs and attitudes to promote enterprising behaviour and the ability to cope with a variety of tasks in changing environments.

Looking closer the second, studies show that increased awareness about one's thinking patterns relates to greater success in entrepreneurship (Ku & Ho, 2010), and better results in critical thinking, which is facilitated by metacognition (Magno, 2010; Willingham, 2007; Flavell, 1979). Metacognition is addressed in several studies (e.g. Mitchell et al., 2005; Haynie et al., 2010) aiming to explain the relationship between the conscious guidance of one's reasoning patterns, the propensity to embark on entrepreneurial careers and cultivating the necessary mind set. Moreover, Mitchell et al. (2005) claim that metacognitive thinking can be deliberately practiced in the entrepreneurial context, leading to the creation of entrepreneurial expertise. Universities serve to a large extent as a source for developing future entrepreneurs, a general consensus highlighted by Dickson et al. (2008), indicating a significant and positive relationship between education and entrepreneurial performance. Students, knowing their own strengths and weaknesses, can adjust their thinking so as to be more diverse, and from this, it is claimed that a metacognitive knowledge of strategies as well as self-knowledge is linked to student performance in the classroom (Pintrich, 2002). Therefore, the special strength of universities lies in their ability to develop higher-level skills and nurture analytic abilities in students (Anderson, 2011). This, however, creates the challenge for entrepreneurship teachers and trainers to find innovative learning methods that coincide with the requirements and expectations of the aims of entrepreneurship education to develop entrepreneurial competencies, enterprising behaviour and metacognition. Moreover, disregard for existing research findings confirming that students who have received metacognitive instructions will obtain entrepreneurial skills faster than those who have not (Mitchell et al., 2005), the question then arises of how such expertise is developed. Researchers (Urban, 2012; Vos & de Graaff, 2004) have pointed out that the relationship between active learning approaches and the development of metacognitive abilities in students is in need of further elaboration. Indeed, descriptions of instructions for teaching metacognition or explanations of methodology are not clear in the literature, so that the question of which techniques have caused improvements in metacognitive awareness or how were improved learning results technically achieved remains unanswered.

So what is the best configuration of available resources for improving the awareness of metacognitive abilities in students so that entrepreneurship is fostered and people who are more aware and more responsible for their own thinking, learning and behaviour, could perform better not only in studies or in entrepreneurship but also in life in general. Drawing from this, the current problem for research is that despite having proven that the power of metacognition contributes to learning (Baker, 2008), the implications and practical recommendations for entrepreneurship education are missing (Urban, 2012).

The aim of this research is to identify how entrepreneurship education can be developed to increase student metacognitive abilities. This will be pursued through analysing the needs of students for the development of their metacognitive abilities and providing concrete directions for educators and trainers in the field of entrepreneurship that they can work with when implementing metacognitive interventions. In order to achieve this, the following research questions are formulated:

- 1) How is metacognition identified among students?
- 2) How can we develop entrepreneurship education that aims to increase metacognitive abilities in students?

Therefore, this paper focuses on the missing link between the rather excessive conceptual discussion, progress in assessment, and practical use of metacognition in the learning process. Understanding how to embed the development of metacognition within entrepreneurship courses provides input for further research to expand this know-how to cover other metacompetencies.

The current research begins by presenting the theoretical framework behind the conceptualisation of metacognition while emphasizing entrepreneurial metacognition, learning strategies and activities enhancing the development of metacognitive abilities in students in universities as a basis for empirical research. The data and methodology are then presented. Finally, the results of the study are discussed, giving recommendations for the development of courses on entrepreneurship education. The paper concludes with a discussion of the limitations of the research and proposals for future research.

2. Theoretical framework

2.1. Research on metacognition

In order to build up curricula enabling the development of metacognitive awareness and skills in students, clear and consistent conceptualisations of metacognition will be useful (Schraw, 1998; Veenman et al., 2006). The following will discuss the various angles on and conceptualisations of metacognition.

Research on metacognition can be dated back to 1979 when Flavell described it as higher order cognitive ability, the recognition of one's own thoughts and abilities, tasks, situations and environments. In learning situations, it expresses the ability to reflect, understand and control one's own study processes (Schraw & Dennison, 1994) as in the entrepreneurship context it is proposed to be a basis for entrepreneurial decision-making (Mitchell et al., 2005). Metacognitive awareness is associated with information active in one's working memory and with social interaction, and the need to communicate our thoughts to others or to understand and judge the thinking of others (Efklides, 2008; Fernandez-Duque et al., 2000). It is connected with planning and consciously executing appropriate actions to achieve a particular goal (Sheorey & Mokhtari, 2001). Somewhat different conceptualisations (Table 1) exist with simultaneous interest in the phenomenon of metacognition in a variety of areas and specialist fields. The origins of these definitions stem from developmental psychology (Flavell, 1979), educational psychology (Schraw & Dennison, 1994), and education (Hacker, 1998), and have later been considered for study by entrepreneurship scholars (Mitchell et al., 2005; Haynie, 2005). Efklides (2008) again represents cognitive psychology, and in later works, her interest

can be observed to turn towards affective and motivational relationships to metacognition as part of self-regulative behaviour (Efklides, 2011).

Having carefully studied all avenues of research on metacognition, this work will be based on Haynie’s (2005) empirical study in the context of entrepreneurship. His development relies on earlier conceptualisations by Flavell, and a measurement instrument modified for use in the entrepreneurship field based on Schraw and Dennison (1994). An instrument to be used in entrepreneurship was also developed by Haynie (2005), and further modified in the context of entrepreneurship education by Ling et al. (2013; 2015). The latter instrument is used in this empirical research. Furthermore, Baker (2008) asserts that the best measures for assessing metacognition are considered self-reflections – firstly, verbal, interviews, learning diaries and so on, and secondly, survey instruments that include multiple response options to a series of items. After exploring the range of survey instruments available, it is evident that most questionnaires are domain specific (Baker, 2008).

Table 1. Constructs of metacognition in research

Flavell (1979)	Metacognition	Model of cognitive monitoring Metacognitive knowledge Metacognitive experiences Goals or tasks Actions or strategies
Schraw and Dennison (1994)	Metacognitive awareness	Knowledge of cognition Declarative knowledge Procedural knowledge Conditional knowledge Regulation of cognition Planning Information management strategies Comprehension monitoring Debugging strategies Evaluation
Hacker (1998)	Metacognition	Metacognitive awareness Metacognitive experience Metacognitive skill
Mitchell et al. (2005)	Metacognitive awareness	Understanding of metacognitive strategies Metacognition about self and others Normative metacognition Long-term metacognitive beliefs
Haynie (2005)	Metacognitive awareness	Model of cognitive adaptability Goal orientation Metacognitive knowledge Metacognitive experience Metacognitive choice Monitoring
Efklides (2008)	Metacognition	Metacognitive experiences Metacognitive knowledge Metacognitive skills Orientation strategies Planning strategies Strategies for regulating cognitive processing Strategies for checking (monitoring) the implementation of planned action Strategy for evaluation of the outcome of task processing Strategy for recapitulation and self-regulation

Source: Compiled by the author based on literature

In the entrepreneurship framework, metacognition is seen as part of a larger and more inclusive construct of executive functioning, an important component of the cognitive system, specifically associated with processes of mental control (Haynie, 2005) affording adaptable cognitive functioning in complex and dynamic environments. Therefore, the five dimensions from Haynie that enable such functioning will be discussed in association with conceptualisations from other authors.

According to Flavell (1979), goals or tasks refer to the objectives of a cognitive enterprise where the person sets the proper goal(s) for task processing. This involves strategies such as asking oneself questions on the requirements of the task, on comprehension, and on possible caveats, contradictions, or missing information that may hinder understanding the task (Efklides, 2009). Efklides also suggests that planning strategies may involve the establishment of sub-goals and their sequencing, the sequencing of procedures, time schedules, check points for monitoring the progress of work done, and going back and forth while reading the instructions. It involves drawing diagrams, using symbols, producing tables, underlying the main ideas, and figuring out possible interrelations. As Pintrich (2002) notes, goal setting can occur at any point during performance.

Moving on from goal setting, the second dimension, metacognitive knowledge, consists primarily of knowledge or beliefs about what factors or variables act and interact in what ways to affect the course and outcome of cognitive enterprises (Flavell, 1979). It refers to one's conscious and cognitive understanding of people, tasks and strategy. Metacognitive knowledge reflects perceptions about oneself (knowledge of self), and about others in terms of competencies, weaknesses, how people think, comprehend and use memory. There are various degrees and kinds of task comprehension options like attending, remembering, communicating, problem solving as well as strategic components like evaluating where to pay particular attention, and looking up the main points and trying to repeat them to yourself in your own words (Flavell, 1979). Flavell also points out that how well you understand something now, may not be an accurate predictor of how well you will understand it later. Nevertheless, it has been shown that students that know about the different kinds of strategies for learning, thinking, and problem-solving, will be more likely to use them.

Metacognitive experience is an important metacognitive resource that can provide input that activates metacognitive skills, controlling action and behaviour. It consists of individual experiences based on cognitive activity and serves as a conduit through which previous memories, intuitions, and emotions may be employed as resources given the process of making sense of a given task (Flavell, 1987; Efklides, 2009; Haynie et al., 2010). Flavell's (1979) guess at that time was that metacognitive experiences are especially likely to occur in situations that stimulate a lot of careful, highly conscious thinking: in a job or school task that expressly demands that kind of thinking, in novel roles or situations, where every major step taken requires planning beforehand and evaluation afterwards. However, Haynie et al. (2010) hold it is important to note that knowledge and experiences can only be characterized as metacognitive in cases when the individual has an awareness of how that knowledge or experience relates to formulating a strategy to process the task at hand. Then this awareness should also be expanded to the emotions, feelings and attitudes, which along with motivations are part of affective learning, distinctively stated by Efklides (2008) as a crucial part of metacognitive experience in helping to estimate effort and time expenditure, and the correctness of the solution. Tasks far above or below a person's competence level cause negative feelings inhibiting the use of metacognitive knowledge and self-regulation.

Metacognitive choice is a component added by Haynie (2005), defining the selection of what is perceived to be the most appropriate cognitive response (based on motivation and the environment), from a set of available cognitive responses (Haynie et al., 2010). Flavell (1987: 23) noted:

“...while a cognitive strategy is simply one to get the individual to some cognitive goal or sub-goal...the purpose (of a metacognitive strategy) is no longer to reach the goal, but rather to feel confident that the goal has been accomplished.”

He explains that skimming a set of directions to get a rough idea of how hard they are going to be to follow or remember is a metacognitive strategy. Another is to paraphrase aloud what someone has just told you to see if she will agree that that is, in fact, just what she meant. A third is to add a column of figures a second time to ensure that your total is accurate. Generating alternative ways to create cognitive strategies and choosing among them is a choice of metacognitive nature (Haynie, 2005).

Finally, monitoring, considered to be characteristic to metacognition, and especially needed in entrepreneurial activities (Mitchell et al., 2005), is a continuous process representing seeking and using feedback to re-evaluate and adapt motives, metacognitive resources, and the formulation of metacognitive strategies appropriate for managing a changing environment (Haynie et al., 2010). Mitchell et al. (2005) and Haynie et al. (2010) all suggest that metacognitive monitoring allows the entrepreneur to reflect on how, why, and when to use certain strategies (as opposed to others), given a changing environment, but also his or her own motivations. For example, one aspect of metacognitive monitoring is the recognition of task demands, such as the complexity of a perceived business opportunity. This involves monitoring compliance to the planned sequence of processing and the time schedule that was set, detection of errors and/or delays in execution, detection of discrepancies between actions and the plan, checking the appropriate application of strategies or the use of instruments, tools, and so on (Efklides, 2008). They also involve the identification of new needs that arise from the implementation of the plans, particularly if there is need for more input and revision of the planning (Kuhn, 2000). Part of the monitoring is also an evaluation of the outcome of task processing. Evaluation strategies involve an appraisal of the outcome of the cognitive processing vis-à-vis previously established criteria or standards that pertain to their quality (Veenman & Elshout, 1999). They may also involve strategies for the evaluation of the quality of planning, regulation, and implementation of strategies that were used to monitor task processing.

The multidimensionality of metacognition as a phenomenon, argued here earlier, makes the research complex and interdisciplinary (Flavell, 1979). The Journal of Metacognition and Learning involves myriad studies where researchers find it more comfortable to focus on narrow aspects of metacognition like using the metacognitive strategies of children in reading or learning maths, languages etc. However, a general consensus has been established in the core understanding about the difference between cognition and metacognition (Schraw, 1998). Although these terms overlap, cognition refers to performance while metacognition refers to understanding how the task was performed, the key or central difference lies in awareness (Fernandez-Duque et al., 2000). This serves as a key element that is subject to training when considering an intervention.

Our focus will now turn to factors supporting the enhancement of metacognitive abilities. A challenge lies in integrating the metacognitive component of training with entrepreneurial skill development taking into account the diversity within teaching strategies, learning styles and curricular design that universities have introduced.

2.2. Exploring methods for metacognitive intervention

Evidence from the early 2000s that metacognitive intervention is effective is so strong that disciplinary organisations and national panels recommend that metacognition should be included in teacher preparation and classroom curricula (Baker, 2008). The concept has found broad support and its inclusion in Bloom's taxonomy has now been widely accepted by scholars in the field (Krathwohl, 2002). The importance of metacognition is equally beneficial to students with lower and higher intellectual abilities, as it has been found that weaker students benefit even more (Rahman, 2010). But not all students can develop the awareness or monitor their own learning without external help.

The challenge for entrepreneurship teachers and trainers is to find innovative learning methods that coincide with the requirements of potential entrepreneurs (Henry et al., 2005). Although Mitchell et al. (2005) argue that findings confirm that students who have received instructions on metacognition will obtain entrepreneurial skills faster than those who have not, they do not reveal the content of the intervention or educational tools used. Therefore the need for such tools and more practical advice remains.

When looking for a systematic approach to enhance metacognitive awareness or methodology, in earlier research by Schraw and Moshman (1995), it was advised that metacognitive theorizing can be facilitated by self-talk and peer interactions that focus on the process rather than the product of learning (Table 2). The strategy evaluation matrix (SEM) proposed by Schraw (1998), offers suitable strategy samples of how, when and why to use certain strategies like skim, slow down, activating prior knowledge, mental integration and diagrams. He presents four instructional strategies, including promoting general awareness, improving self-knowledge, regulatory skills, as well as promoting learning environments that are conducive to the construction and use of metacognition.

Table 2. Compiling instructional recommendations for metacognitive intervention

Authors	Aim	Activity
Schraw and Moshman 1995	on procedural knowledge	self-talk and peer interactions
Schraw 1998	strategy evaluation (SEM)	skim, slow down, diagrams
White and Frederiksen 2005	creating and reflecting understanding	collaborative inquiry and discussion
Veenman 2006	maintained application of instruction	over-disciplinary curricular orchestration
Downing et al. 2008	metacognitive choice	problem-based learning (PBL)
Sandi-Urena et al. 2011	ability to solve problems	collaborative intervention reflection
Wheadon and Duval-Couetil 2014	reflecting on knowledge, experience and activity	business plan

Source: Compiled by the author based on literature

Veenman et al. (2006) suggested three fundamental principles of successful metacognitive instruction to be practiced in educational programs: embedding metacognitive instruction into the content matter to ensure connectivity; informing learners about the usefulness of metacognitive activities to make them exert the initial extra effort, and prolonged training to guarantee the smooth and maintained application of metacognitive activity. The latter also suggests these principles are successful only in the case of good cross-disciplinary curricula orchestration within the university and high awareness of metacognition among lecturers as a norm. However, this is still considered a strategic proposition, not a concrete methodology.

After a study lasting fifteen months and three semesters, Downing et al. (2008) demonstrated dramatic improvements in metacognition in a PBL (problem-based learning) group in different curricular environments. Analysis of student learning experience, measured at the end of the programme, revealed that the PBL group reported significantly higher scores in their overall course satisfaction and generic skills development. Vos and de Graaff (2004), on the other hand, argue that PBL together with POL (project organised learning), both models relying on didactic principles such as discovery learning, learning-by-doing, experiential learning and student-centred learning. The most important difference between PBL and POL seems to be the style of problem treatment as, for example, in a PBL setting students analyse an ill-defined problem in order to define their own learning goals (Vos & de Graaff, 2004). They admit that solving the problem is still a means, not the goal. Like learning-by-doing, PBL approaches, and others of this kind, have not always focused on the development of metacognition and not considered improvement in all the components suggested by research.

Sandi-Urena et al. (2011) confirm earlier aspects, where they reported that collaborative intervention, involving metacognitive reflection, helps to increase student ability to solve problems. They also suggest that more meaningful and purposeful social interaction facilitates metacognitive development and awareness. Indeed, encouraging social interactions between students and sharing experience is a beneficial tactical approach, especially in more individualist parts of the world.

Besides, Wheadon and Duval-Couetil (2014), in their study with engineering students, demonstrate how the business planning process can be purposefully set as a fully collaborative experiential, metacognitive exercise. Business plan development includes the critical evaluation of factual knowledge, planning and monitoring processes, awareness of declarative and procedural knowledge needs, and own knowledge, and reflecting on findings, and discussing different strategic options as examples of how to use this common tool for creating an awareness of entrepreneurial tasks and business creation with built-in metacognitive exercises.

Finally, the undeniable role of reflection in entrepreneurship education has to be stressed. By employing reflective thinking skills to evaluate the results of one's own learning efforts, the awareness of effective learning strategies can be increased and ways of using these strategies in other learning situations can be understood (Ertmer & Newbe, 1996) and reflective practitioners developed (Jack & Anderson, 1999). So we can even say that reflection makes metacognition possible.

Based on Schraw (1998), there are common ways to increase metacognition in classroom settings, such as promoting a general awareness of the importance of metacognition, improving knowledge of cognition, improving the regulation of cognition and fostering environments that promote metacognitive awareness. His preference is an interactive instructional approach that blends direct instruction, teacher and expert student modelling, reflection on the part of the students, and group activities that allow the students to share their knowledge about

cognition – everything we find in use a decade later. Hence, the list is far from complete and conscious creative experimenting with existing classical methods (e.g. case studies, feasibility analysis, interviews) may be designed to promote metacognition.

To that end, there has to be an awareness of the individual differences between students in terms of metacognition. Further, the study proceeds with the current strengths and especially weaknesses of students, and careful reading of their reflections. Synthesizing the recommendations above makes it possible to draft recommendations for the development of entrepreneurship education programs as enhancing student metacognitive awareness as a valuable addition.

3. Research methodology

The empirical study for this paper was carried out among undergraduate and graduate students in different disciplines at Tallinn University of Technology in 2012 (Table 3). We collected our data from non-economics students before they had taken any of the entrepreneurship courses. We asked students to rate their metacognitive abilities using MMA (measure of metacognitive abilities), a survey instrument based on Schraw and Dennison (1976), and developed by Haynie (2005) for use in the entrepreneurship context. This instrument has been slightly adjusted for Estonian students by Ling et al. (2013). In this survey, the instrument was piloted a second time among our students using 7-step Likert scales and including 29 individual statements. The sample consisted of 190 respondents where nearly two-thirds (65%) were male and most of them (86%) studying technical and natural sciences.

Table 3. Sample of the empirical study

	Count	Share in the sample (%)
1	2	3
Male	124	65.3
Female	66	34.7
Undergraduate	81	42.6
Graduate	109	57.4
Logistics	26	13.7
Natural sciences	61	32.1
Technical sciences	103	54.2

Source: Compiled by the author

Respondents gave answers to statements by rating them on a scale of 1 to 7 where 1 was equal to “Not very much like me” and 7 “Very much like me”. For the purpose of establishing whether the respondents with different levels of metacognitive abilities also evolve different levels of entrepreneurial intentions, we additionally studied career aspirations as a prognosis immediately after graduation and after a five-year period. Linear statistical analyses have been utilised at this stage in the analysis.

The main focus was on investigating differences between students based on metacognitive abilities. In order to accomplish the classification of students into different groups, a K-means clustering methodology is used. Clustering is used to group the objects in a way that one cluster

consists of objects as similar as possible, making it possible to distinguish them from objects in other clusters. The similarity function chosen for this research was Euclidean distance, which was compatible with the Likert scale. As a result, all respondents were grouped with most similar students. This new information was then added as a new attribute to every person in database, allowing to perform a follow-up analysis of every such an object or cluster. Clustering makes it possible to identify groups of students possessing distinct levels of metacognition, and establishes a base for further comparisons.

The further quantitative study focused on the aspects of metacognitive abilities scored highest and lowest by more than ten per cent of the students in order to explore how students differed in specific components of metacognition.

Finally, a qualitative survey was carried out in order to analyse and explain the findings of the quantitative results. The choice was to conduct in-depth interviews with a randomly selected group of students in order to retrieve explicit information related to those statements that scored lowest in the measure of metacognitive abilities (MMA). In addition, this step aimed to analyse student reflections in respect to any improvement in the entrepreneurship training. The interviews were conducted with four students participating in the student enterprise practice, who had exhibited stronger intentions to found a company and greater interest in developing their knowledge of entrepreneurship. The content analysis was used in order to better understand student opinions about the constructs of metacognition to provide recommendations for learning strategies in university entrepreneurship courses with a focus on improving student metacognitive awareness.

4. Discussion of results

4.1. Assessing students' metacognitive abilities

The first section of the analysis explores the differences between students based on metacognition. After identifying groups of students differing from each other based on metacognitive abilities, these were clustered into three groups using a K-means methodology (Table 4). Looking at the characteristics of these groups, it is evident that average scores in the first cluster (1) are significantly higher in all five components of the metacognitive abilities compared to the others. The same pattern, albeit with a lower means, can be seen in clusters two and three with a declining tendency. Based on the clear pattern, we can draw the conclusion that students with stronger scores for metacognition are generally stronger in all components, and vice versa, students with lower scores are equally lower in all aspects of metacognition.

When looking for differences between males and females, in cluster 1 it is apparent that among the males only the metacognitive experiences component is stronger than among females (5.5 and 5.2 respectively), while in cluster 3 with the lowest scores, females perform significantly lower in most components of metacognition. This might be due to the rather small number of students in the cluster. Although goal setting skills are the strongest among both females and males (5.8 and 5.6 respectively), the difference between them is not significant. However, we see at this point the biggest discrepancy between the first (1) and last (3) clusters. Based on these results, which suggest that gender does not have an effect on the level of metacognitive awareness, this study does not concur with the literature in this field (Memnun & Akkaya, 2009; Rahman, Jumani et al., 2010).

Table 4. Classification of students based on the metacognitive abilities of students using the K-means clustering method

	Cluster1 (N=104)	Cluster2 (N=62)	Cluster3 (N=22)
	Mean (male /female)		
Metacognitive abilities			
Goal Orientation	5.7 (5.6/5.8)	4.8 (4.7/4.8)	3.6 (3.6/3.7)
MC knowledge	5.3 (5.2/5.5)*	4.5 (4.5/4.6)	4.2 (4.5/3.2)*
MC experience	5.4 (5.5/5.2)*	4.7 (4.8/4.6)	4.2 (4.3/3.6)*
MC choice	5.5 (5.5/5.5)	4.4 (4.3/4.5)	4.1 (4.3/3.4)*
Monitoring	5.5 (5.5/5.6)	4.8 (4.8/4.7)	4.2 (4.3/4.0)

Note: *depicts statistically significant differences between males and females, $\alpha=0.05$

Source: Descriptive statistics of survey database; author's compilation

Nevertheless, it is significant that more than half (55%) of the students belong to the group of metacognitively high-scoring students (1). This suggests that the largest portion of students regardless of gender, are able to control and monitor their metacognitive functioning. In parallel, there is only a limited amount (12%) of students reporting less developed abilities (i.e. cluster 3). Still, when evaluating the magnitude of inter-cluster differences, then based on the standard deviation the students in cluster 2 seem to be on average more similar to the high-achieving students. Moreover, the differences between males and females in cluster 2 do not reach statistical significance in any metacognitive component allowing us to assume the average values are equal.

The following discussion attempts to go deeper into the details of the components of metacognition, to identify more specifically the deficiencies in different students' metacognitive abilities in terms of individual components. For example, aspects of goal orientation in this study are represented as having the highest and also the lowest level. This is an interesting aspect to investigate within the interviews in the last phase of the study. These results serve as a source of information and a basis for suggestions on the need for different training approaches for students according to their characteristics and how the entrepreneurship training needs to be improved, so that the students would be metacognitively more skilled; that is, manage uncertainty better and be more successful in their professional careers.

To start with an insight into the strongest aspects (Table 5) of metacognition is presented. Students declare goal setting (M1, mean 5.6) to be 80% of the case on average with 79% understanding the relationship between goals and accomplishments (M2 mean 5.5). Similarly, in relation to items of metacognitive knowledge (M6), where students are quite positive (81%, mean 5.7) that when solving problems they weigh between several options and are sure that having sufficient knowledge leads to the best performance (M10). The strongest statements of metacognitive experience reflect that 76% (mean 5.3) of students think about what they actually need to accomplish before starting (M17) and to the same extent use different strategies (M18). On average 79% (mean 5.5) of students, on not finding clear information, go back and add clarifications (M31), thereby demonstrating an awareness of using monitoring in their own learning process.

Table 5. Strongest aspects of the metacognitive abilities in students

	Mean
Goal orientation	
M1. I often define goals for myself	5.6
M2. I understand how the accomplishment of a task relates to my goals	5.5
Metacognitive knowledge	
M6. I think of several ways to solve a problem and choose the best one	5.7
M10. I perform best when I already have a knowledge of the task	5.6
Metacognitive experience	
M17. I think about what I really need to accomplish before I begin a task	5.3
M18. I use different strategies depending on the situation	5.3
Monitoring	
M31. I stop and go back over information that is not clear	5.5

Note: Means of Likert-7 Scale. Shown aspects rated highest by the largest amount of students
Source: compiled by the author based on survey results

However, we have set the focus of the current study on the development of entrepreneurship education using the means of metacognition, and are therefore even more interested in exploring the weaknesses to pay more attention to the design of interventions.

Here the focus will now turn to analysing individual statements by 77.4% of the respondents that scored the lowest (Table 6). Based on this, there is room for the development of metacognitive abilities in all aspects in terms of some components, except metacognitive experience as the deficiencies regarding this component were reported by a relatively smaller group of students compared to others.

Table 6. Weakest aspects of metacognitive ability in students (mean and % of respondents)

	Mean	Male	Under -grad	Gradu -ate	Nat. Sc	Tech. Sc
1	2	3	4	5	6	7
Goal orientation						
M4. I ask myself how well I have accomplished my goals once I have finished	4,9	13.7		10.5		10.5
M19. I organise my time to best accomplish my goals	4,9	13.2		12.1		
MC knowledge						
M7. I challenge my own assumptions about a task before I begin	4,5	16.3	14.7	11.1		12.6
M13. I ask myself questions about the task before I begin	4,8	12.2		10.1		
M14. I try to translate new information into my own words	4,9	13.2		11.1		10.0
MC choice						
M27. I ask myself if I have considered all the options after I solve a problem	4,8	10.0		10.5		
M29. I ask myself if I have learned as much as I could have after I finish the task	4,6	14.7		14.7	10.0	10.5
Monitoring						
M33. I find myself analysing the usefulness of a given strategy while engaged in a given task	4,6	12.1		10.5		

Source: Compiled by the author based on survey results

When comparing the goal orientation statements that scored the lowest to those that scored the highest, we can see a meaningful difference between achievement orientation on the one hand, and hence, at the same time not questioning one's own standards or use of time. This can be explained by the standards set by lecturers/teachers and the same with fixed homework timetables. Students may not feel they have control over the development of their own actual potential, performance standards, and use of time as far as they do what is expected from the course plan. In entrepreneurship, individual management and control of one's own performance and time resources is of high importance and should be foreseen as part of entrepreneurship education.

Looking at the data, we can see that an aspect in relation to the ability to question one's own assumptions (M7) is equally problematic both for undergraduate and graduate students. When comparing again the lowest rated statements to the highest, we can see a substantive difference. On the positive side, students are aware of the connection between knowledge and performance and that there are several options worth considering, but they lack the ability to question their own sources of knowledge and have a low level of conscious control over their own performance.

Metacognitive choice being low indicates the use of their own available resources in a more automatic manner. Creating an awareness of choice leads to more open searches for new information and options.

When monitoring the strongest aspects, we see that understanding information can be monitored more easily as a retrospective self-assessment, but monitoring their own learning or development, is on the contrary, positioned at the other end of the scale or is not a habit.

In conclusion, from the perspective of statistics, we can propose that the greater the probability of having less developed metacognitive ability is related to male graduate students studying technical sciences. A comparison of the statements with the strongest and weakest scores highlighted an interesting pattern that although students have a clear achievement orientation, and set general goals, when looking for ways to achieve them, on other hand, they lack the ability to analyse, question and challenge their own learning and achievement.

4.2. Understanding metacognition

In order to investigate in more depth, and to explain the results of the quantitative survey, in-depth interviews were conducted with students randomly selected from the survey sample. The students interviewed were developing a business idea with good entrepreneurial potential and were interested in becoming an entrepreneur. Therefore, it was a rather remarkable finding that these students possessed the same weaknesses that the quantitative study pointed out. Students admitted having general goals in mind and aiming to achieve them, although it turns out that this is not an entirely conscious or controlled process.

From the interviews (Table 7) we find students defining own goals (M1) generally connected to career planning (R1, R2). Two students, however, also display sub-goals coming from life events that were important for them, like sports (R4) and a baby (R3). For that reason, we realise that setting sub-goals does not come from awareness, or from an inner will, but from necessity or external circumstances. This supports the survey results, and adds the idea that if not learned earlier, sometimes life events support or motivate better planning.

Table 7. Student opinions selected from interviews supplementing the strongest survey statements

Survey statements	Interview statements
Goal orientation	
M1. I often define goals for myself	I would like to work for Texas Instruments (R1)
	... in three years I should have my own company established (R4)
	... set how many points I should make in this summer in sports (R4)
	I have short and long-term goals - a child is really life changing (R3)
M2. I understand how the accomplishment of a task relates to my goals	... plan to do my MBA and then start my own business - so far it is working (R2)
	... finish courses I decided to pass tasks at the first test (R3)
Metacognitive knowledge	
M6. I think of several ways to solve a problem and choose the best one	I have seen how some things are done ... (R1)
M10. I perform best when I already have knowledge of the task	I have found you can get everything from school (R3)
	... maths skills were very useful I could not manage without (R4)
Metacognitive experience	
M17. I think about what I really need to accomplish before I begin a task	... was at career advisor, completed tests - so I picked the subject (R1)
	... to get a scholarship, grades need to be kept in mind (R1)
M18. I use different strategies depending on the situation	... all written tasks in university are based on earlier experiences (R2)
Monitoring	
M31. I stop and go back over information that is not clear	... now I check when I have a goal, but not earlier ... just got things done (R3)

Source: Compiled by the author based on survey results and interviews

The second aspect of goal setting (M2) which was rated well, supports the earlier discussion about the general ability of students to evaluate their progress towards their goal. But as comments indicate it is just aiming at passing tasks at first attempt, to be done with it. These evaluations are not ambitious or aim at conscious self-development. The same applies to metacognitive knowledge (M6 and M10), where students appreciate earlier studies, and can easily refer to strategies already learned and knowledge at hand.

The strongest statements of metacognitive experience (M17 and M18) somewhat refer to the students' need for efficiency – using their skills and competencies in the best possible way. In respect to monitoring (M31) we can see that in having a goal, which we noted as scoring well (M1), the students also possess, the ability to keep monitoring the route to achieving the goal. In summary, it can be said that most students in university have their own goals and accomplishment strategies, but we have to note in entrepreneurship courses that not all students have the necessary abilities, as we also noted student explanations that do not reflect much conscious self-development.

Drawing from this, we continue by comparing the lowest scoring statements (Table 8), and explanations from the students. According to the statements on goal orientation, we stated earlier that students have a clear awareness of their goals. However, in the same component of metacognition, we face less developed aspects (M4 and M19) – the evaluation of their own accomplishment and their use of time in order to achieve the best results.

Table 8. Student opinions selected from interviews supplementing the weakest survey statements

Survey statements	Interview statements
Goal orientation	
M4. I ask myself how well I have accomplished my goals once I have finished	In the BA you just did what you had to do (R1)
	Once I was seriously not satisfied with my exam I thought of redoing it, but then, I did not (R2)
M19. I organise my time to best accomplish my goals	There are delays, but eventually, I do what I have planned (R3)
	A theoretical subject ... I read it through within 3 days before the exam (R1)
Metacognitive knowledge	
M7. I challenge my own assumptions about a task before I begin	I have been closed in mind, having a lot of fears of failing ...
	... I consider this my main weakness (R2)
M13. I ask myself questions about the task before I begin	It is easier in sports ... we calculate how fast I run then we know how far I can jump (R4)
Metacognitive choice	
M27. I ask myself if I have considered all the options after I solve a problem	It works very well what I learned to use in basic school (R4)
M29. I ask myself if I have learned as much as I could have after I finish the task	There are many obligatory courses I would not choose, just try to pass (R2)
Monitoring	
M33. I find myself analysing the usefulness of a given strategy while engaged in a given task	Under task load, there are times when I think if I suit here at all (R3)

Source: Compiled by the author based on survey results and interviews

Students admit doing what they were told to do and no more, and using weak time planning. This relates to subsequent weak aspects of metacognitive knowledge (M7, M13), where students do not challenge their own assumptions or available knowledge but count on the knowledge they already have. Students hence understand the weakness they have.

This study considers metacognitive choice the weakest component as no single statement appeared among those with stronger scores. Looking at the statements for metacognitive choice (M27, M29) and the explanations from the respondent (R4), we see that there is a choice to pass the course, to achieve the goal, but not consciously following personal development and potential. This aspect shows a lack of creativity and curiosity, competence in problem-solving, and must be carefully considered in the design of entrepreneurship courses.

In addition, the statement on monitoring (M33) turns out to be weaker with the high-achieving respondents, as in addition to test results we recognize the students' worries about accomplishing tasks without attempting to consciously control if the methods used are the

most appropriate. So the student is questioning their own self-worth instead of analysing their choices. Being more aware of the concept of metacognition prevents situations of this kind.

Based on the results of analysis it is possible to argue that students with higher metacognitive abilities have more knowledge on how to adapt their existing knowledge to the demands of any given task. Nevertheless, they underestimate the usefulness of making sure they understand their tasks clearly and choosing between different strategies to achieve the best results. The ability to question their own assumptions and subsequently be able to flexibly switch between different strategies was equally problematic both for undergraduate and graduate students. On the other hand, and on the positive side, goal setting skills in general, were strong as was metacognitive experience in all respects.

In addition, the interviews highlighted two more important aspects of the theoretical conceptualisations indicating motivation – to get a scholarship, grades need to be kept in mind (R1) and the sense of task value there are many obligatory courses I would not choose, just try to pass (R2). These are statements on the edge of metacognition, perhaps overlapping the motivational-volitional aspect. Based on metacognition, a student might reflect on his or her own considerations about why certain courses are not of interest. Could it be that he or she just lacks information about low-interest courses. Respondents admitted unanimously that if the subject or task is not valuable or interesting enough, the commitment is low and they spend the minimum time required. On the other hand, the students interviewed are more critical of subjects and tasks they pick themselves. A good example is the opinion of respondent R4, the sportsman, who strongly engaged strategies, training schedules, goal setting and achievements in sports. Respondent R3, becoming a mother and wanting to spend more time with her baby, admitted a dramatic change in her behaviour – she started to set very concrete and tight schedules to achieve more. Obviously, some personal motivators, especially external, may assist the development of metacognitive skills. However, the scholars referred to in this paper agree that metacognition can be and should be developed in and through entrepreneurship education.

4.3. Implications for entrepreneurship education

Based on the collected fragments of recommended interventions from different authors (Ch. 2.2.), supported by the empirical study here certain patterns are revealed from the weakest and strongest aspects of metacognition (Ch. 4.1.). In addition, student reflections and examples (Ch.4.2.) also, help facilitate the formation of implications for entrepreneurship education. The discussion here will now draft suggestions for the development of entrepreneurship courses (Table 7) to increase metacognitive awareness. We discuss the weakest components of metacognition based on theoretical assumptions.

First, the development of goal setting is discussed. The statements that scored low in the survey indicate that the evaluation of the achievement of goals, which according to Flavell (1979), should be a continuous process of metacognition, is not sufficiently taken into account. There is a need for assistance in establishing sub-goals and checkpoints, and most importantly in the planning phase to set the end-values and qualities the goal has to meet, as well as sub-goals as suggested by Efklides (2009). During a course, it could be a strategy for homework that is developed during the course in smaller parts controlling the previously agreed objectives. In addition, poor time management and low interest in the task or results act as obstacles to setting goals. Efklides (2009) explains that goal setting involves planning, which includes the

sequencing of procedures, establishing a time schedule and again, also check points. Dividing the course into smaller tasks with checkpoints is an option for rehearsing time management while discussing the expectations and possible outcomes of the course or project as a way to increase the student's interest in the subject.

Secondly, metacognitive knowledge is about knowing what factors or variables act and interact or affect the course or task, as expressed by Flavell (1979). But epistemological beliefs, as Efklides (2009) argues, are crucial for the critical appraisal of one another's thinking and reasoning. Letting the students express their beliefs and assumptions about a task so that the teacher could provide specific knowledge to challenge them, is a useful strategy. Looking for factors and variables influencing certain tasks would be a practical approach, a practice of procedural knowledge (Schraw 1998). Asking questions about the task before beginning, according to Flavell (1979), refers to knowledge about the self and others in terms of competencies and weaknesses. Pintrich (2002) argues that letting students know their own strengths and weaknesses means they can adjust their thinking. Flavell (1979) suggested it would be good to rehearse each time with certain questions: How capable am I for that? What knowledge do I have and what is available? What are the weakest points? One could improve one's ability and environment for learning beforehand to become more self-efficient (Schraw 1998). To question epistemological beliefs, Efklides (2009) suggests reflection as making one more aware of deciding on reliability and validity. She also suggests that a task or subject may have no value and no interest for the person, and there is therefore a lack of motivation for strategic involvement, which found confirmation in the qualitative survey.

Flavell (1979) stresses the comprehension of a task or study material through study. There are various degrees and kinds of comprehension options like discussion, case studies (Schraw 1998), problem-solving (Vos & de Graaff, 2004) as well as looking up the main points and trying to repeat them to yourself in your own words (Flavell 1979). As Vos and de Graaff (2004) suggest, teachers can creatively change between different strategies as each becomes habitual for the students making sure the comprehension of the task or study material.

According to Haynie et al. (2010), metacognitive choice appears to be expressed in the selection of what is perceived to be the most appropriate cognitive response. The low scoring statements in the survey were explained by the students interviewed as behaviour they mutually called "just getting things done". This might also refer to insufficient knowledge of the availability of strategic options (Flavell 1979, Schraw 1998). However, entrepreneurship education provides many opportunities (Haynie et al. 2010) to practice with real-life entrepreneurial cases. The latter were also seen as beneficial by the respondents as making it possible to be involved more closely in entrepreneurship.

Table 9. A sample entrepreneurship course design for increasing metacognitive abilities in students

Component of metacognition	Methodology	Details for practical activities (exercises) in the course
Goal orientation	Controlling Planning (Personal or group study plan) PBL	Set goals, sub-goals, establish checkpoints, needed values and qualities for each – check and discuss them. In larger groups use self-evaluation or student peer-evaluation. Include timeline. Involve students in planning the course, keep flexibility.
Metacognitive Knowledge	Normative study Analysis Discussions Learning Diary Psychology tests Group work	Ask students (essay) about their beliefs and assumptions about the subject. Challenge these with extra knowledge. Look for factors and variables influencing each task, for available and needed information. Use learning diary for reflection. Discuss what capabilities (test) are needed to achieve the goal, what are current weaknesses and strengths, what knowledge has to be acquired. Enhance procedural knowledge with group tasks
Metacognitive choice	POL Process-oriented instruction Social interaction Creativity exercises	Make sure of comprehension serving different options achieving this like giving information translated into own words (learning diary) or discussing/solving the cases. Group business models. Give knowledge of different strategies and creatively exchange between them with each task as it becomes habitual to ask which strategy is best to use each time and what are the options.
Monitoring	Feedback Analysis Learning Diary	Ask for motives, available (metacognitive) resources, task demands, new needs, time spending, required qualities etc. You may want to use a checklist or learning diary.
Metacognitive experience	Discussion Case studies Metacognitive reflection Learning Diary	Do not forget to ask how students feel about the tasks or problems to be solved, if they are too difficult, too demanding, or too easy. Take into account and make adjustment to optimize. Support discussions where experience and feelings can be shared. Use learning diary to reflect feelings about topics.

Source: Compiled by the author based on survey results and interviews

This is closely related to monitoring, representing the process of seeking and using feedback to re-evaluate and adapt motives, metacognitive resources, recognition of task demands, and the identification of new needs as put by Haynie et al. (2010). They suggest reflecting on how, why and when to use certain strategies, as Efklides (2008) recommends analysing the demands of the task and identifying new needs in the monitoring process.

Further, a common statement that emerged from the interviews was that students look more carefully at what they gain from course or task when they select it themselves, and subjects of low value and interest are not followed in the same manner. Efklides (2009) emphasizes the role of metacognitive experience that activates metacognitive skills, monitoring actions and behaviour, and stressing the importance of feelings. Therefore, the affective nature of metacognitive experience, creativity and sensitivity to the environment or atmosphere, has to be considered as part of learning.

One example is completing self-evaluation tests so as to increase the value of the tasks for the student and letting them choose between different tasks or subjects for homework tasks or group discussions. As Vos and de Graaff (2004) suggest, involve and make the student active.

In general, the greater use of illustration and visualisation, as well as discussion in the

classroom has been suggested in order to focus attention on the students' interest in a subject or task. This can be done by visualising the value or outcome for the student. The second recommendation is to use creativity exercises. To that end, it is beneficial to think about creating an appropriate environment, where open discussion and sharing experiences are possible or creativity could be fostered.

The research confirms that in order to develop metacognitive abilities in students, a single tool or method is not sufficient. As the lowest aspects of meta-competencies are connected to understanding one's own thinking patterns and weighing between different choices, we find reflection to be a very important method to enhance these aspects of metacognition. And though there are critical stands on the use of business plans, with proper design it enables several metacognitive exercises like setting goals and sub-goals, time planning, knowledge evaluation and synthesizing different areas of knowledge, strategic decision-making and reasoning, and monitoring the entire process. Course design should include a variety of carefully designed individual and collective activities for comprehensive development.

5. Conclusion

Starting from the problem described in the introduction (Urban, 2012), this paper set out to fill the gap and present how metacognition is manifested in the framework of entrepreneurship education and how the different components of metacognition are developed in students. In the theoretical background, it was acknowledged that metacognition is an independent phenomenon, with most attention from educational psychology. But little research has been made to analyse the development of metacognitive abilities in students in the entrepreneurship field.

This paper initially aims to generate an understanding of the individual differences between students in terms of metacognitive abilities using a survey instrument modified for use in the entrepreneurship context (Haynie, 2005; Ling et al., 2013). The results present significant variation in the components of metacognitive knowledge and metacognitive experience among different students as well as between male and female students. Since earlier claims made by Memnum and Akkaya (2009) contradict these findings, there is still a need to investigate this aspect further in order to find a consensus.

Since Flavell (1979), we have quite a clear understanding that students can be differentiated on the basis of metacognitive abilities; this study adds that students who have higher scores in one component of metacognition, also have greater means in other components and vice versa. In the framework of entrepreneurship education, it can be concluded that students have different needs for development. Moreover, to understand educational needs, specific aspects, generally scored highest and lowest were compared and analysed. Such a comparison has not been conducted before, to the author's knowledge. This analysis therefore, revealed rather interesting results, contributing to our understanding of connections between metacognition and educational settings. The strongest statements indicated that students generally set goals for themselves but then do not orient themselves towards the best outcome or use of time. Students understand the connection between knowledge and performance but again do not think about what they currently know and what else should be known. Metacognitive abilities are expressed in terms of achievement orientation, being aware of comprehension levels set by teachers and following fixed homework timetables, using in most cases a getting things done strategy, as one student in an interview explained. Looking at the weakest statements, it

becomes clear that students underestimate the usefulness of making sure they understand their tasks clearly or choosing between different strategies to achieve the best results. The ability to question their own assumptions and subsequently to be able to flexibly switch between different strategies is equally problematic both for undergraduate and graduate students. This reflects how metacognition hardly develops in the framework of traditional, teacher-centred environments. Students do not challenge their own potential or serve their future needs, but rather obey the demands of the course. Therefore, an interesting pattern emerges that is important to consider when planning an intervention.

Consequently, the emphasis should especially be placed on student awareness and the management of their own potential. Hence, this paper provides a practical holistic proposal for how metacognitive abilities can be developed systematically through entrepreneurship courses. A systematic course design addresses each of the sub-constructs of metacognition choosing tools, and examples available in this paper, and giving attention to the most underdeveloped metacognitive abilities. The multidimensionality of metacognition indicates that a single tool or method is not sufficient. Among other methods, reflection is crucially important to enhance aspects of metacognition and is strongly recommended in entrepreneurship education to encourage metacognitive awareness. Moreover, this study supports the use of the methodology of business planning since it enables several metacognitive exercises like goal and timeframe setting, reflecting upon and synthesizing knowledge, strategic decision-making, and monitoring. To summarize, course design should include a carefully designed variety of tasks for individual and collaborative activities, embedded within the content matter to ensure connectivity.

Limitations in the current research include the fact that this was a study carried out in one university, so the weakest and strongest aspects of metacognition may differ in other environments and contexts. We also limited this study by not going any deeper to show the connection between metacognition and motivation, as well as emotional aspects. Therefore, this further research avenue would reveal the interplay between metacognition, emotional (affective) variables and motivational-volitional (conative) aspects also brought to the meta-level. There is a need for future research in compiling a similar set of intervention methods, involving the management of emotional and motivational aspects with metacognition. A lack of practical studies exists in entrepreneurship education showing the design and assessment processes when metacognitive strategies are used. Since the phenomenon of metacognition is rather complex for teaching, and the educational aims of entrepreneurship courses vary, further instructional studies similar to the current one might be of value to practitioners in course development. This paper tried to connect the widespread research on metacognition with its practical output.

References

- Anderson, A. R. 2011. The university's role in developing Chinese entrepreneurship. *Journal of Chinese Entrepreneurship*, Vol. 3, No. 3, pp. 175–184.
- Baker, L. 2008. Metacognitive development in reading: Contributors and consequences. In K. Mokhtari & R. Sheorey (Eds.). *Reading strategies of first and second language learners: See how they read*, pp. 25–42. Norwood, MA: Christopher Gordon.
- Dickson, P. H., Solomon, G. T. and Weaver, K. M. 2008. Entrepreneurial selection and success: does education matter? *Journal of Small Business and Enterprise Development*, Vol. 15, No. 2, pp. 239–258.
- Downing, K., Kwong, T., Chan, S.-W., Lam, T.-F. and Downing, W.-K. 2008. Problem-based learning and the development of metacognition. *Higher Education*, Vol. 57, No. 5, pp. 609–621.
- Downing, K., Ning, F. and Shin, K. 2011. Impact of problem-based learning on student experience and metacognitive development. *Multicultural Education & Technology Journal*, Vol. 5, No. 1, pp. 55–69.
- Dweck, C. S. and Leggett, E. L. 1988. A social-cognitive approach to motivation and personality. *Psychological Review*, Vol. 95, No. 2, pp. 256–273.
- Efklides, A. 2008. Metacognition. *European Psychologist*, Vol. 13, No. 4, pp. 277–287.
- Efklides, A. 2009. The role of metacognitive experiences in the learning process. *Psicothema*, Vol. 21, No. 1, pp. 76–82.
- Efklides, A. 2011. Interactions of Metacognition with Motivation and Affect in Self-Regulated Learning: The MASRL Model. *Educational Psychologist*, Vol. 46, No. 1, pp. 6–25.
- Ertmer, P. A. and Newby, T. J. 1996. The expert learner: Strategic, self-regulated, and reflective. *Instructional Science*, Vol. 24, No 1, pp. 1–24.
- Fayolle, A. and Gailly, B. 2013. The Impact of Entrepreneurship Education on Entrepreneurial Attitudes and Intention: Hysteresis and Persistence. *Journal of Small Business Management*, Vol. 53, No. 1, pp. 75–93.
- Fayolle, A., Gailly, B. and Lassas-Clerc, N. 2006. Assessing the impact of entrepreneurship education programmes: a new methodology. *Journal of European Industrial Training*, Vol. 30, No. 9, pp. 701–720.
- Fernandez-Duque, D., Baird, J. A. and Posner, J. A. 2000. Awareness and metacognition. *Consciousness and Cognition*, Vol. 9, No. 2, pp. 324–326.
- Flavell, J. H. 1979. Metacognition and Cognitive Monitoring a New Area of Cognitive — Developmental Inquiry. *American psychologist*, Vol. 34, No. 10, pp. 906–911.
- Fretschner, M. and Weber, S. 2013. Measuring and understanding the effects of entrepreneurial awareness education. *Journal of Small Business Management*, Vol. 51, No. 3, pp. 410–428.
- Hacker, D. J. 1998. Definitions and empirical foundations. In D.J. Hacker, J.Dunlosky & A.C. Grasser (Eds.). *Metacognition in educational theory and practice*, pp. 1–24. Mahwah, NJ: Lawrence Erlbaum Associates.
- Haynie, J. M. 2005. Exploring the entrepreneurial mindset: feedback and adaptive decision-making. Babson College Entrepreneurship Research Conference (BCERC) 2007 Paper; *Frontiers of Entrepreneurship Research 2007*.
- Haynie, J. M., Shepherd, D., Mosakowski, E. and Earley, P. C. 2010. A situated metacognitive model of the entrepreneurial mindset. *Journal of Business Venturing*, Vol. 25, No. 2, pp. 217–229.

- Henry, C., Hill, F. and Leitch, C. 2005. Entrepreneurship education and training: Can entrepreneurship be taught? Part I. *Education + Training*, Vol. 47, No. 2, pp. 98–111.
- Jack, S. L. and Anderson, A. R. 1999. Entrepreneurship education within the enterprise culture. *International Journal of Entrepreneurial Behaviour & Research*, Vol. 5, No. 3, pp. 110–125.
- Krathwohl, D. R. 2010. A Revision of Bloom's Taxonomy: An Overview. *Theory Into Practice*, Vol. 41, No. 4, pp. 212–218.
- Ku, K. Y. L. and Ho, I. T. 2010. Metacognitive strategies that enhance critical thinking. *Metacognition and Learning*, Vol. 5, No. 3, pp. 251–267.
- Kuhn, D. 2000. Metacognitive development. *Current Directions in Psychological Science*, Vol. 9, No. 5, pp. 178–181.
- Kuratko, D. F. 2005. The emergence of entrepreneurship education: development, trends and challenges. *Entrepreneurship Theory and Practice*, Vol. 29, No. 5, pp. 577–597.
- Kyrö, P. and Niemi, M. 2008. Advancing Business Planning: From Planning to Entrepreneurial Learning. In P. C. van der Sijde et al. (Eds.). *Teaching Entrepreneurship*, pp. 35–52. Berlin, Heidelberg: Physica-Verlag.
- Liñán, F. and Chen, Y. 2009. Development of Cross-Cultural Application of a Specific Instrument to Measure Entrepreneurial Intentions. *Entrepreneurship Theory and Practice*, Vol. 33, No. 3, pp. 593–617.
- Ling, H., Kyrö, P. and Venesaar, U. 2013. Entrepreneurship education and metacognitive awareness: development of a tool to measure metacognitive awareness. In A. Fayolle, P. Kyrö, T. Mets and U. Venesaar (Eds.). *Conceptual Richness and Methodological Diversity in Entrepreneurship Research*, pp. 95–116. London: Edward Elgar.
- Magno, C. 2010. The role of metacognitive skills in developing critical thinking. *Metacognition and Learning*, Vol. 5, No. 2, pp. 137–156.
- Martinez, M. E. 2006. What is metacognition? *Phi Delta Kappan*, Vol. 87, No. 9, pp. 696–699.
- McWhaw, K. and Abrami, P. C. 2001. Student Goal Orientation and Interest: Effects on Students' Use of Self-Regulated Learning Strategies. *Contemporary educational psychology*, Vol. 26, No. 3, pp. 311–329.
- Memnun, D. S. and Akkaya, R. 2009. The levels of metacognitive awareness of primary teacher trainees. *Procedia - Social and Behavioral Sciences*, Vol. 1, No. 1, pp. 1919–1923.
- Mitchell, J. R., Smith, J. B., Gustafsson, V., Davidsson, P. and Mitchell, R. K. 2005. Thinking about thinking about thinking: Exploring how Entrepreneurial Metacognition Affects Entrepreneurial Expertise. In Wellesley, MA: Babson Research Conference.
- Mokhtari, K. and Reichard, C. A. 2002. Assessing students' metacognitive awareness of reading strategies. *Journal of Educational Psychology*, Vol. 94, No. 2, pp. 249–259.
- Pintrich, P. R. 2002. The Role of Metacognitive Knowledge in Learning, Teaching, and Assessing. *Theory Into Practice*, Vol. 41, No. 4, pp. 219–225.
- Pittaway, L. and Cope, J. 2007. Entrepreneurship education: a systematic review of the evidence. *International Small Business Journal*, Vol. 25, No. 5, pp. 479–510.
- Rahman, F., Jumani, N. B., Satti, M. G. and Malik, M. I. 2010. Do metacognitively aware teachers make any difference in students' metacognition? *International Journal of Academic Research*, Vol. 2, No. 6, pp. 219–224.
- Sánchez-Alonso, S. and Vovides, Y. 2007. Integration of metacognitive skills in the design of learning objects. *Computers in Human Behavior*, Vol. 23, No. 6, pp. 2585–2595.
- Sandi-Urena, S., Cooper, M. M. and Stevens, R. H. 2011. Enhancement of Metacognition

- Use and Awareness by Means of a Collaborative *Intervention*. *International Journal of Science Education*, Vol. 33, No. 3, pp. 323–340.
- Schraw, G. 1998. Promoting general metacognitive awareness. *Instructional Science*, Vol. 26, No. 1–2, pp. 113–125.
- Schraw, G. and Moshman, D. 1995. Metacognitive theories. *Educational Psychology Review*, Vol. 7, No. 4, pp. 351–371.
- Schraw, G. and Dennison, R., 1994. Assessing metacognitive awareness. *Contemporary Educational Psychology*, Vol. 19, No. 4, pp. 460–475
- Sheorey, R. and Mokhtari, K. 2001. Differences in the metacognitive awareness of reading strategies among native and non-native readers. *System*, Vol. 29, No. 4, pp. 431–449.
- Souitaris, V., Zerbiniati, S. and Al-Laham, A. 2007. Do entrepreneurship programmes raise entrepreneurial intention of science and engineering students? The effect of learning, inspiration and resources. *Journal of Business Venturing*, Vol. 22, No. 4, pp. 566–591.
- Urban, B. 2012. Applying Metacognitive perspective to entrepreneurship: empirical evidence on the influence of metacognitive dimensions on entrepreneurial intentions. *Journal of Enterprising Culture*, Vol. 20, No. 2, pp. 203–225.
- Veenman, M. and Elshout, J. J. 1999. Changes in the relations between cognitive and metacognitive skills during the acquisition of expertise. *European Journal of Psychology of Education*, Vol. 14, No. 4, pp. 14–509.
- Veenman, M. V. J., Hout-Wolters, B. H. A. M. and Afflerbach, P. 2006. Metacognition and learning: conceptual and methodological considerations. *Metacognition and Learning*, Vol. 1, No. 1, pp. 3–14.
- Vermetten, Y. J., Lodewijks, H. G. and Vermunt, J. D. 2001. The Role of Personality Traits and Goal Orientations in Strategy Use. *Contemporary educational psychology*, Vol. 26, No. 2, pp. 149–170.
- Vos, H. and de Graaff, E. 2004. Developing metacognition: a basis for active learning. *European Journal of Engineering Education*, Vol. 29, No. 4, pp. 543–548.
- Weber, S., Oser, F. K., Achtenhagen, F., Fretchner, M. and Trost, S. 2014. *Becoming an entrepreneur*. Sense Publishers, Rotterdam.
- Wheadon, J. D. and Duval-Couetil, N. 2014. Business Plan Development Activities as a Pedagogical Tool in Entrepreneurship Education. *Journal of Engineering Entrepreneurship*, Vol. 5, No. 1, pp. 31–48.
- White, B. and Frederiksen, J. 2005. A Theoretical Framework and Approach for Fostering Metacognitive Development. *Educational Psychologist*, Vol. 40, No. 4, pp. 211–223.
- Willingham, D. T. 2007. Critical thinking: Why is it so hard to teach? *Arts Education Policy Review*, Vol. 109, No. 4, pp. 21–32.
- Zimmerman, B. J. 1995. Self-regulation involves more than metacognition: A social cognitive perspective. *Educational Psychologist*, Vol. 30, No. 4, pp. 217–221.