Preface

Metacognition is an important component of successful learning strategies in Higher Education. Since the early days of research into metacognition and metacognitive instruction, it was observed that meta-cognition impacts successful learning strategies. However, the first models were developed for preschool and elementary school children. As was observed by Flavell (1979, p. 906) metacognition plays an important role in oral communication of communication, oral persuasion, oral comprehension, reading comprehension, writing, language acquisition, attention, memory, problem solving, social cognition, and various types of self-control and self-instruction. But, the model of cognitive monitoring describes a wide variety of cognitive enterprises proving the interconnections between metacognitive knowledge, metacognitive experience, goals (or tasks) and actions (or strategies). Indeed, with Favell's metacognition it was added a New dimension in applied learning theory and design of successful learning strategies.

The actual conceptual framework of successful learning strategies in Higher Education "grows" Flavell's ideas of knowledge or believes about thinking in order to build a more sustainable education where metacognition and successful learning strategies are integrated into teacher(s) and student(s)' mind and behaviors. "Metacognition is a self-reflective consciousness" activity (Metcalfe & Schwartz, 2016). This meta-competency is crucial in performance development for the rapid adaptivity in a high turbulent and global world. In order to develop a model of successful learning strategies is important to take into consideration the state-of-the art in the philosophy of global learning, as well as in quantum and development psychology, competence pedagogy, pedagogical cybernetics, neurosciences and knowledge management.

Metacognition and its use towards evolving successful learning strategies in Higher Education is of high interest in theoretical research and as discussion topic in university pedagogy (Harvey, Coulson, & McMaugh, 2016; Herrmann, Bager-Elsborg, & McCune, 2016; de Bruijn-Smolders, Timmers, Gawke, Schoonman, & Born, 2016; Liu, 2016; and others). One of the ways of thinking about knowledge and knowing is *epistemic (meta)cognition,* which is concerning of understanding how people think about knowledge, truth, and justification. As was noted by Barzilai and Zohar (2016, pp. 410-411), the most important term in the field of epistemic (meta)cognition is metacognition. However, metacognition is, first of all, a meta-level cognition and between cognition and metacognition are many intertwined processes. Secondly, metacognition includes specific knowledge, skills, and experience. Third, the metacognition develops gradually, but not equal for all learners. Not less important is that metacognitive instruction has a high impact on academic performance.

Since metacognition is an extensive term of competence encompassing knowledge, skills, and attitude, the scientific understanding the impact of the term on successful learning strategies in Higher Education have extended beyond its original definition and now encompass many new concepts and

functions that relate on metamemory, metaknowledge, metalanguage and so on. This has led to a wide away of assessment tools and scales developed in an attempt to measure metacognition or, at least, one of its complex structure. Such tools allow observing some correlations between cognition and attention disorder, as well as in the capacity to translate the information provided on screens into useful notes. In turn, impact of the metacognition on successful learning strategies in Higher Education depends on how sustainable the provided information for learning was, what educational technologies were used for delivering the information and how students are motivated to learn. The integrity of "metacognition and successful learning strategies" are considered of high significance. On the one hand, metacognition is a requirement for successful learning strategies however on the other hand successful learning strategies are only an additional variable that may influence outcomes of higher education, because these strategies represent the memory, thinking, intelligence, behavior, energy, emotions, etc. and vary during the learning processes.

Although there is some overlap between and among the proposed studies in the area of metacognition, the metacognitive deficit may cause students to find old stratagems as a "gambling" for assessment instead of the successful learning strategies. Few studies focused on stratagem rather than on strategy. It was observed that deficit of stratagem may be associated with the specific features of global labor market that requires lifelong learning competence instead of the university diploma. Among important aspects of current strategies and models for Higher Education, labor market and its correlations there is a weak demand for university graduates that have knowledge, but not software skills. To address these issues many universities are being currently updated their strategies. However, commercialisation of university studies in many cases lost the image of the Higher Education and increased differences between meanings of metacognition and importance of successful learning strategies.

Various universities have different requirements for quality of study. Thus, many universities accept the superficial information processing strategies, based on memorization of provided knowledge, practical activities and/or Internet searching. Students are considered as the information processing agents (e.g. cognitive system) that are able to gather information, integrate rules, solve tasks in a more or less creative way and generalize ideas using concept mapping techniques. Deeper processing strategies are based on designing the successful personality and/or organisation, elaboration and monitoring of data (e.g. learning analytics).

Design thinking is a problem-solving mindset of knowledge, ability and attitude to exploit issues, controversies and problems for real solutions. In the case of higher education this means balancing system, environment, tools & resources with students' desirability, technological feasibility and economic viability, as was noted by Tim Brown (2009) in his famous book *Change by Design*: *How Design Thinking Transforms Organizations and Inspires Innovation*. Design of learning strategies is user centric, collaborative and experimental. It is required to think outside of the traditional cognitive taxonomy, because design thinking framework integrates approach of immerse (understand, map), invent (define, ideate), and implement (prototype, user test) in a holistic approach "Animated, digital, and interactive technology has opened a door that allows instructors to connect, motivate, communicate, collaborate, and build educational communities that immerse students in their learning. Storytelling, visual and verbal interactive communication, and engagement sets students on a path to embrace their education no matter what course or field they are enrolled" (Kline, 2016, p. 2133).

Feedback in Higher Education is vital not only when questions are focused on students' interest, motivation and specialisation. "Immerse" indicates to self-assessment with immediate feedback and lifelong learning for rapid adaptation in diversity of learning environments and challenges. "Invent" stands for identifying the right problems based on evidence data observed, and generating sustainable solutions. "Implement" stands for developing working solutions to get feedback to evaluate them before implementation into curricula. In all these tactics, it is important to keep the student in the centre of the learning process and apply empathy and learning analytics to get the right insights. Learning to a greater degree is possible when the right interconnections between emotion, intelligence, empathy, energy, communication and dialogue are valued. Possible correlations between these components indicate the need of a new model of academic learning when students are not only co-designers of their own learning, but rather become a partner of the teacher for lifelong learning.

In the ever-evolving contexts and challenges for learning, university educators are focused on re-thinking education and modernisation. What are the most successful learning strategies in higher education? What factors contribute to learning outcomes? What is the role of the metacognition in higher education? When and how the metacognitive knowledge, skills and language should be developed? What is the metacognitive accuracy? What are the similarities and differences between metacognitive accuracy, confidence and academic performance? How to develop symbolistic language strategies? What are the specifics of metacognition and successful learning strategies in STEAM/STEM education? What is the impact of social media for learning strategies? These questions are aimed at exploring new ways and strategies for successful learning and are considered in this edited book.

The global world is under the hood of the globalization's and local's turbulence. Shoebridge (2016) notes that the future classroom is not about the environment or about the furniture or the technology either, but it is about how the students learn. In our point of view learning to learn is also a very important problem for Higher Education, but more important is to understand what students want to learn, what skills are required and how to develop these skills, how to increase the ability of critical thinking and how to solve global problems collaboratively.

Many of those concerns are being addressed in this edited volume. There are mainly three reasons why this book will have impact on applied learning theory and design in modern education. These can be identified as follows:

1. Chapters assembled from international academic works entice reader to consider the importance of metacognition and its effect in developing successful learning strategies in Higher Education. This will provide a discussion about theory and practice by exploring new conceptual frameworks of metacognition in light of the global challenges (e.g. openness of the educational system, flexibility, networking, immerse, invert and implement etc.) impacting educational systems, learning environments, learning spaces and settings.

2. Researchers and university professors contributing to this volume present recent findings that may help to conceptualize academic learning by a) identifying important correlations among cognition, metacognition, critical thinking, metacognitive experiences, emotional intelligence and others, and c) exploring innovative techniques such as concept mapping (mind map), critical thinking, brainstorming, questioning and meta-teaching.

3. The book is warranted because 4th technical revolution provides global challenges that allow redefining metacognition from "thinking about thinking" (Flavell, 1979) to "neuroscience of metacognition" (Metcalfe & Schwartz, 2016).

The contributors of this volume consider important issues such as cognition and metacognition, learning at the crossroads of the theory and practice, intellectual skills development as a bridge between cognition and metacognition, development of metacognitive strategies, metalanguage of working organisations, development of metaskills, metacognitive growth in innovative classrooms, metacognitive experience in the impact of metacognition on teaching literature, development of emotional intelligence, and, others. Thus, analysing the state of the art in the frontier area of modern university pedagogy evidences that metacognition is a new kind of thinking for successful development in an academic environment. And, this is an important ingredient in shaping successful learning strategies in Higher Education.

Metacognition is a complex construct of physics-psychics-spiritual body and, as shown by various experiments, activates human brain, coordinates behavioral actions and leads to success in Higher Education and beyond in some specific conditions. But, how to extend the results of these experiments to Higher Education strategies? One of the way is Metasystems Learning Design approach. This means that the correlation between metacognition and successful learning strategies in Higher Education may be treated as a personalized meta-system of knowledge, skills and attitudes generative construct that may be easy integrated in team working for sustainable decision-making that is vital for "a workplace competences" (Winthrop, Williams, & McGivney, 2016). In turn, education technology is not a panacea for solving the global education challenges.

Global Education and Educational Technology is for a digital age that are more dynamic, relevant and applied. Global connectivity through academic dissemination of knowledge is a new way for learning about academic learning. However, to be successful in academic learning it is important to self-cultivate the breath of skills. In this way, students will master subject-matter content and breadth of skills simultaneously. The new profile of the specialist with university diploma describes, first of all, a happy, healthy and productive member of a global-local society and, secondly, a personality with highly developed (meta)cognitive skills and experience.

THE ORGANISATION OF THE BOOK

This edited book titled *Metacognition and Successful Learning Strategies in Higher Education* offers a holistic approach to understand the Metasystems Learning Design Theory as an ecosystem of academic learning for success instead of simply providing information, both superficial and deeper. There are many conceptual frameworks based on metacognition available to train students. Metacognition can have a major impact on culture of learning, as well as on outcomes of learning in an academic environment. Should metacognition be integrated in the strategy of university-teacher(s)-student(s), it can help students step out of the box and learn from failures early on in return saving time, money, and effort. The aim of metacognitive approach to feedback is to help clarifying what successful learning strategies are (tactics, aims, objectives, criteria, standards, etc.) by providing opportunities to close the gap between current level of competence and desired performance, and allowing students to reflect on their learning. Academic environment allows students to develop memory, thinking and some innovative ideas, but less to make future work a network of ideas. Pursuing metasystems design processes helps everyone to understand own potential for successful learning.

This book is divided into three sections. In Section 1, "Ubiquitous Learning Environment for 21st Century Generative Competence", four introductory chapters begin the discussion of how postmodernism, globalisation and 4th industrial revolution have impacted learning theory and design. The synthesis

of recent research in metacognition and successful learning strategies in Chapter 1 explores the impact of global challenges on conceptual framework for metacognition and successful learning strategies. It used metasystems learning design approach to examine the evolution of understanding metacognition and conditions for successful learning strategies.

In Chapter 2, Maizam Alias and Nor Lisa Sulaiman explore important concepts and strategies for development of metacognition in Higher Education. Hence, it was noted that metacognition is a process that regulate thoughts, enabling an individual to break rigidities in their thinking that lead to mindful and productive thoughts which is important to self-regulation. It was observed that the most important thing is to develop a deeper self-awareness for life-long learning and success. The key for development of metacognition is effective communication. All successful strategies involve communication, but, also, in favor of innovative techniques such as concept mapping, brainstorming and questioning. These techniques are integrated parts of meta-teaching.

In Chapter 3, Ioan Neacsu also examines the academic universe, but from the perspectives of external challenges and needs for new models and patterns of learning. The author observes that learning to learn has three dimensions: cognitive, metacognitive and affective-motivational. Factors that impact the quality of the academic learning are classified into a) processual factors, b) intrinsic motivation, c) learning strategies, methods, techniques and environments, d) difficulty of academic learning, e) time management, and, f) quality of academic results. One of the most important correlation between cognition and metacognition is devoted to the efficiency of the academic learning styles. New data were provided by the Big Five Test related on personality characteristics. It was highlighted that academic success is a result of the synergy between cognitive and metacognitive values. Self-adjustment of academic learning allow reducing differences among the student's expectations, the level of self-perceived reality and the quality of the feedback provided by the evaluating teachers. Section 1 concludes with a co-authored chapter by three Russian researchers in metacognition, that examines the correlation between metacognition and metacognitive skills. However, the chapter emphasizes intellectual development rather than metacognitive development. Thus, the issue of "How to learn?" is handled from the perspective of identification of new ways to get knowledge as the causal relation between facts and the learning processes and/or as the activity between the child and the teacher. It presents some contradictions between efficient metacognitive strategies for students and those applied by students; metacognition and stressful situations as well as the place of metacognition in the framework of intellectual skills.

Although there is some overlap among the concepts studied in this edited volume, Section 2, "Improving Metacognitive Skills and Strategies in Higher Education", includes four chapters that seek to focus the discussion on specific metacognitive strategies triggered the issue of developing the most effective learning strategies. Chapter 6 "Metacognitive Strategies in Higher Education: Development of Spiritual Intelligence Strategies within Training of the Academic Staff", offers a comprehensive understanding of issues related to development of spiritual intelligence skills. It is shown that spiritual intelligence is correlated with metacognition in terms of capacities for critical existential thinking, personal meaning production, transcendental awareness, and conscious state expansion. Hence, the complex "structure" of the spiritual intelligence opens up new ways of understanding the reality of Who I am, as well as the meaning of life, existence of things, the purpose of the human life and the history of humankind. The research methodology used allows evidence of four components: critical existential thinking, personal meaning production, transcendental awareness, and, conscious state expansion. These components were integrated into a model and a program for developing spiritual intelligence skills of academic staff. Chapter 7, "Metacognition of Organization Members as the Basis of Learning Strategy in Higher School", co-

authored by Irina Sergeyevna Yakimanskaya, Anna Mikhaylovna Molokostova and Milyausha Yakubovna Ibragimova, provides a new definition of metacognition as a component of planning. It provides two hypotheses that were tested as a model of research. The model, tested in some small business company, allows identifying some important aspects of metacognition in non-formal learning. The next chapter, Chapter 8 authored by Adela Moraru, relies on the importance of understanding the structure of two components of metacognition, both declarative and procedural, as a fundamental condition for academic success. It investigates the interdisciplinary approach to develop a self-regulated model of metacognition as a base for metacognitive skills. The final chapter in this section, Chapter 9 by Pei-Ling Yang, "Facebook Discussion to Enhance English Learners' Metacognitive Strategies", proves that language learning strategies have a positive and significant influence on learners' academic accomplishment. It emphasizes the importance of Social Media, especially Facebook discussions to promote research, interaction and engagement in Higher Education. This empirical study evidences that the most reported strategies are metacognitive strategies.

Section 3, "The Importance of Metacognition for Teaching Art, Mathematics and Literature", includes four chapters. The first chapter in this section, Chapter 10, by Marina Morari, relies on theoretical study of reflexivity, as a non-algorithmic method for Science, Technology, Engineering, Art and Mathematic (STEAM Education). Chapter explores the challenges of globalisation on art and artistic education, the role of scientific and artistic knowledge, knowledge development as an inner experience, importance of art for spiritual intelligence, as well as the philosophical and psychological dimensions of metacognition (as think about thinking). It is proposed as a model for understanding the impact of metacognition in art education.

The next chapter, Chapter 11 by Samuel Olugbenga King, "Investigating the Correlation Between Clicker Usage and Learning Gains in University Mathematics: The Influence of Metacognitive Growth", aims to understand how interactive polling-based assessment may be conceptualized through the application of the Conversational Framework to close the feedback gap between the desired performance and actual student learning outcomes in university mathematics, The chapter investigates the use of clickers for assessment of university mathematics. The clickers are presented as a generic class of interactive polling technologies that are used as teaching tools, and enable real time feedback during instructional episodes. It finds that the instructional activity consists of seven steps, all of which includes interactive feedback. Hence, during learning process, students are also routinely given opportunities to discuss problems and possible solutions with one another (peer discussion) before submitting their final answers. The instructor may then decide to elaborate on any relevant issues based on student voting. It was observed that it is important to have adaptations both within and across what instructors know (ideas) and do (practice), and what students know (ideas) and do (practice) – metacognitive growth in order to fully maximize learning gains.

The third chapter in this section, Chapter 12, is titled "Using Metacognitive Strategies in the Stem Field". The authors, Gina Mariano, Fred J. Figliano and Autumn Dozier, work on ideas that teachers teach students what to think, but not how to think. The latter skill is more important because only the metacognitive strategies allow students to become good learners. The chapter brings together multiple perspectives on metacognition and the importance of engaging students in metacognitive activities and strategies to improve learning outcomes. Several facets of metacognition (critical thinking, motivation, problem solving, academic performance) and some important correlations (metacognition and math infused subjects; metacognition and mathematics; metacognition and math anxiety) are identified. In

conclusion it was remarked that students sometimes encounter difficulty when they use metacognitive techniques for the first time. In addition, having students' complete metacognitive activities in class is not sufficient for their learning. This last chapter in this section, Chapter 13 by Martina Petrikova, refers to understanding the impact of metacognition in teaching of literature. This chapter investigates various teaching strategies those impact on learning literature.

There are many evidences of links between metacognition and successful learning strategies in Higher Education. An example of this is demands of global education for new generative structure of competence. Metacognition and successful learning strategies are two of the most important components for sustainable education. They are inherently linked to one another in that strategies and tactics are used, for example, in self-directed learning or self-assessment. Metacognition, on the other hand, is required for thinking about own thinking in order to identify through mental synthesis the most successful learning strategies that are important not only for success in academic learning, but also, in life. The principles underlying the vital functionality between metacognition and successful learning strategies will be future developed.

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