

Promoting Teachers' and Students' Metacognitive Skills: Developing an Intervention Program

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Pro-Me-ToM (Promoting Metacognitive and Theory-of-Mind Skills) is an Erasmus+ collaborative project funded by IDEP (Foundation of European Programs for Lifelong Learning) and has been conducted by researchers from five countries (i.e., Cyprus, Greece, Hungary, Portugal, and Romania), aiming to both investigating and to promoting teachers' and students' metacognitive skills. Within this project a well-designed educational intervention has been developed, translated and applied in five countries. Specifically, this research project aimed to enhance such skills as metacognitive skills, epistemic beliefs and theory-of-mind skills of both teachers and students. These critical skills are examples of students' higher-order thinking, and are expected not only to help students to "learn how to learn" throughout their lives, but also to enable them to interpret human behavior in order to coexist functionally with others. This paper describes a specific educational intervention program implemented through "Action Research". The training program consisted of 12 (2-hrs) sessions, it has been implemented in the five participating countries, and all participating teachers and their students were administered a pre- and post-test (still being analyzed). This paper focuses and presents the pillars of the training program as well as examples of the intervention program content and tools.

Keywords: metacognition, theory-of-mind, epistemic beliefs, teachers' training program, intervention

Introduction

The great interest in metacognition stems from the widespread belief that students ought to be lifelong learners, equipped with the skills necessary both to solve problems in school and to extrapolate these skills into life through understanding their own thinking, learning, and strategic approaches to problem solving (Papaleontiou-Louca, 2014, p.7).

Therefore, ...one of the main goals of education is to make the students gain the thinking skills and strategies which they will use throughout their lives, rather than storing information. A good education should be able to show the students how to learn, how to remember, how to motivate themselves and how to control their own learning, so that they can teach themselves how to learn (Aydin 2011, p. 274).

Teachers' training programs usually aim in enhancing teachers' competency in various dimensions, such as induction, content, pedagogy, organization and assessment. Research findings reveal that training programs implementing and

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promoting metacognitive strategies lead teachers in a continuous improvement in all dimensions of teaching competency, by internalizing metacognitive skills and implementing them through self-regulation. Especially, planning, monitoring and evaluating are three basic strategies in metacognitive interventions that help teachers to become more confident by enhancing their teaching competencies in practice. There is an urgent need to increase the efforts towards implementing more Metacognitive interventions, and therefore enhancing teaching competency and help students to learn how to learn (Fathima et al., 2014).

Other studies (e.g., Artzt & Armour-Thomas, 1998; 1999) suggest that the metacognition of teachers and their ability to reflect on their instructional practice and underlying cognitions in a comprehensive manner, play a well-defined role in classroom practice and in students' ability to learn how to learn, so perhaps where we should focus on first, is on teachers' metacognitive training.

Similarly, Rahman et al. (2010) found that student of more metacognitively aware teachers performed better on metacognitive tests. Metacognitively aware teachers could be, for example those who tended to think more about what they were doing in classroom. This is consistent with other research findings that suggest that thinking about thinking and about learning is promoting a deeper and more permanent learning, therefore, such training programs are more than recommended both for teachers and students.

Theoretical Framework

Metacognition has attracted plenty of scholarly attention basically because it is essential for students as well as adults to learn how to learn. Although the term 'metacognition' has become fashionable referring to a hot research area, the definition of the term is a complex task.

The concept of "metacognition" was initially proposed by Flavell (1976, p. 232) who described it as "knowledge and cognitive about cognitive phenomenon", and "individual's knowledge about his/her own cognitive process, and employing this knowledge to inspect cognitive processes". Based on Flavell (1979), metacognition is the individual's awareness of how a person learns and what s/he does, to gain proper knowledge and succeed in one's own cognitive aims; the ability to adopt cognitive skills necessary for passing a test, knowledge of which strategies are best for a specific task/goal, and the assessment of one's own cognitive processes before, during and after a task. Finally, metacognition is a cognitive activity or knowledge that has to do with cognitive functions (Flavell, 1993).

Traditionally, metacognition is described as thinking about thinking or the monitoring and regulation of thinking. Initially, Flavell (2000) referred to metacognition as "knowledge that takes as its object, or that regulates, any aspect of any cognitive endeavor" (p. 16). Since then, the term 'metacognition' has included the awareness and control of one's own mental activities, planning, monitoring, and evaluation (Aydin, 2011).

Moreover, the definition of metacognition has been broadened in that it now includes not only “thoughts about thoughts” and cognitive states (as it was initially described) but also affective states, motives, intentions, and all those states related to cognitive phenomena, as well as the ability to consciously and deliberately monitor and regulate them (Papaleontiou-Louca, 2008).

Human beings (Shea et al. 2014) and empirical evidence has indicated that human metacognition is dependent on the activity of the prefrontal cortex (Fleming et al., 2010; Morales et al., 2018; Shekhar & Rahnev, 2018; Zheng et al., 2021) and can guide learning (Guggenmos et al., 2016). A recent paper demonstrated that humans have the capacity to perform repeated hierarchical evaluations of their judgments up to at least fourth-order judgments (Recht et al., 2022). This finding was recently replicated by a different group of researchers (Sherman and Seth, 2023).

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Moreover, metacognition is considered an evolutionary advantage for humans (Shea et al., 2014), which depends on prefrontal cortex activity (Fleming et al., 2010; Morales et al., 2018; Shekhar and Rahnev, 2018; Zheng et al., 2021), and which is empirically shown to guide learning (Guggenmos et al., 2016). A recent paper demonstrated that humans have the ability to repeatedly make hierarchical evaluations of judgments up to at least the fourth order (Recht et al., 2022). This finding was recently replicated by another group of researchers (Sherman and Seth, 2023).

Although metacognition may have rather vague boundaries, key distinctions can be made that help clarify the literature:

First, there is the well-known distinction between metacognitive knowledge (knowing about what you know) and metacognitive skills (knowing how to regulate what you know). Else, we can distinguish between knowledge and skills - between “knowing that” and “knowing how,” the old distinction between theory and practice, and between competence and performance (Papaleontiou-Louca, 2014). Knowledge about cognition refers to the information that thinkers have about their own cognitive processes. Regulation of cognition refers to the activities used to regulate and oversee learning. These processes include planning activities (predicting outcomes, scheduling strategies and various forms of vicarious trial and error, etc.) prior to undertaking a problem; monitoring activities (monitoring, testing, revising, and re-scheduling one’s strategies for learning) during learning; and checking outcomes (evaluating the outcome of any strategic actions against criteria of efficiency and effectiveness) at the end (Brown et al., in Flavell and Markman, 1983).

‘Metacognition’ has been also distinguished in *knowledge about cognition* and *regulation about cognition* (Brown, 1987): Knowledge about cognition can be information that human thinkers have about their own cognitive processes, while ‘regulation’ refers to activities used to regulate learning and its affected aspects (e.g., anxiety, fear, interest, self-esteem, self-efficacy).

Similarly, Kluwe (1982, p. 202) distinguishes metacognition in (a) the thinking subject has some knowledge about his own thinking and that of other persons; (b) the thinking subject may monitor and regulate the course of his own thinking, i.e., may act as the causal agent of his own thinking.

Examples of monitoring includes questions such as “How much effort do I have to put into learning this material?”; “Did I sufficiently learn this material to remember the details later on?”; and “How sure am I that this answer is correct?” (Roebers, 2017, p. 23).

The efficacy of such educational interventions for both teachers and students are of the utmost importance, therefore it is imperative that such programs prove durable and generative as they pertain to student outcomes (Nation et al., 2003). This is also true for teachers’ training programs, which are often relegated. As such, any teachers’ training programs seem to maximize the classroom’s investment.

As research findings show, the ability to effectively manage one’s learning seems to lead to success in and beyond school and accuracy in self-evaluation (which is a metacognitive skill) was found to be related to school performance in adolescence (Demetriou & Kazi, 2001, p. 525).

Brown et al. (1983) continue to emphasize the important implications of metacognitive development in education by stating that “Regarding the implications for education, confounded treatments that work are extremely interesting in themselves. Clarification of the specific factors responsible for positive effects may allow refinements of the package, but an intervention that works (for any of a number of reasons) is a desirable outcome in its own right”.

The Aim of this Paper

This paper aims to shed light on significant aspects of teachers' education, which are often overlooked. These include training and teaching to train metacognitive and theory-of-mind skills and epistemic values.

The novelty is that the developed educational program lies on three well-presented pillars and involves both teachers and students.

The paper's contribution is not only to theory but to practical implementation as well, with a detailed description of the training method "action research".

The Project: Aims and Design

Based on successful evidence-based practices reported in the literature, we designed a detailed educational training program aiming at supporting teachers' metacognitive development and enable them to promote their students' metacognitive skills, through specific teaching practices (Papaleontiou - Louca, 2023).

The intervention described in this paper is part of an Erasmus+ funded project, titled “Promoting the Development of Teachers' and Students'

Metacognitive and Theory-of-Mind Skills” currently being implemented in parallel in five participating countries. These teachers’ training programs are being conducted virtually to encourage the participation of teachers in remote areas who have limited opportunities to participate in professional development programs.

Prior to the training, teachers and students have been administered pre-tests (specifically designed for this project), and after the training, all participants completed a similar post-test. Both pre- and post-tests, as well as the content of the training program, and the materials used, have all been translated into the languages of the five participating countries.

Each teacher training intervention program consisted of 12 (120-minute) online sessions was designed for primary and secondary-level- teachers in the five participating countries: Cyprus, Greece, Hungary, Portugal, and Romania.

While the results are still being analyzed, the main focus of this paper is to present the content and philosophy of the intervention and to suggest similar promising interventions in other countries and educational systems.

The basic goal of this research project is to promote teachers' and students' awareness and development of metacognitive skills, both at primary and secondary educational levels (Papaleontiou-Louca, 2023).

More specifically, the Pro-Me-ToM project aimed to provide a well-designed and tested educational program for the development of teachers' self-awareness, self-monitoring, and self-evaluation, as well as to promote students' metacognitive skills, epistemological beliefs, and theory of mind (ToM) skills, which can be considered as crucial skills for a meaningful participation in the information society (Papaleontiou-Louca, 2008).

Specific activities and materials had been included in the training program, such as discussions on effective practices based on cutting-edge research in the field, case-studies that promote metacognitive awareness in various domains, etc. (Papaleontiou-Louca, 2023).

Before and after each (country's) training program, pre- and post-tests had been delivered among participants, so as for metacognitive awareness and skills to be assessed and finally the effectiveness of the intervention program to be defined.

Rationale and Description of the Intervention

To better understand the logic of this intervention program, participant teachers were first informed about previous educational interventions on ‘metacognition’. While many interventions aimed at developing metacognitive knowledge, strategies, and skills in various knowledge domains applied in school settings, it does not appear in literature such a complex intervention, involving both teachers and students (at the primary and secondary level) which simultaneously promotes metacognitive, epistemic, and ToM skills (Papaleontiou-Louca, 2023).

Participant teachers have initially been informed about the results and evidence of previous educational interventions on ‘Metacognition’ in order to better understand the logic of the present intervention program. Though many

interventions have been applied in school settings aimed at fostering metacognitive knowledge, strategies, and skills in various knowledge domains, the literature does not seem to refer to an Intervention of this complexity, involving both teachers and students (of both elementary and secondary educational levels) and promoting simultaneously metacognitive, epistemic and ToM skills (Papaleontiou-Louca, 2023).

Besides, the program aimed in supporting teachers and students to transfer their self-regulating metacognitive knowledge and skills to new tasks and contexts.

All these aims and benefits have been pursued through the development and implementation of 'Action research' where teachers' acted as researchers in their own classrooms and with the final aim being to explore the actual results of teachers and students' metacognitive development through pre-tests, post-tests and follow-up tests few months later.

During the intervention period, we have tried sharing broadly the project's objectives, processes and results through an interactive online platform aiming at both providing continuous support of students and teachers' participating in the project and advising teachers who want to implement it in their schools or countries.

The next step after the intervention and the completion of the program, is to disseminate the content, activities and results both nationally and internationally so as to multiply the target group in more schools and countries, through a specifically developed web- page, conferences and publications (Papaleontiou-Louca, 2023).

The Methodology Used: Action Research

The Methodology used in this particular training program was based on the philosophy of 'Action Research', where teachers asked to be acting as researchers in their own classes, they plan, teach, evaluate, reflect and re-act based on reflection and feedback received.

"Action Research" is defined as a participatory, inductive procedure of teacher professional development, and its development cycle (planning, teaching, evaluation-reflection, re-planning, re-action) is described. Useful tools such as reflective diaries, observations, evaluative reflection, feedback, and re-action are discussed and an inductive analysis of diaries based on grounded theory (Glaser & Strauss, 1967) is promoted (Papaleontiou-Louca, 2023).

Additionally, the project plans to analyze the teachers' diaries including comparative analysis, coding, categories of change, as well as the teachers' role as mentors/critical friends (Koutselini, 2020; Papaleontiou-Louca, 2023).

So, about four out of the twelve on-line sessions of the *Pro-Me-ToM Teachers' Training Program* where devoted in discussions and feedback between teachers' trainees and educators, who shared their thoughts, plans, activities, concerns, difficulties and/or possible satisfaction of both themselves and their students and asked for more assistance and guidance to continue their educational trials on metacognition.

The Three Basic Pillars of the Content of the Intervention

The content of our '*Pro-Me-ToM*' Teachers' Training Program has been designed by five academics and was built on three main pillars:

- a. Metacognitive Skills (in general)
- b. Epistemic beliefs and
- c. Theory of Mind skills, which we analyze below in more details:

1st Pillar -The Concept and Value of Metacognition

After a brief introduction to the concept of metacognition, its importance in educational settings was analyzed and discussed. Metacognition has been defined as "cognition about cognition" and a secondary meta-representational process. We also referred to three aspects of metacognition: metacognitive knowledge, metacognitive experience, and metacognitive control and their subcategories: namely, metacognitive knowledge (as either declarative, procedural, or conditional), metacognitive experience [including feelings and judgments about cognitive tasks (Efklides, 2008; Efklides et al., 2018)] and metacognitive control as a way of coordinating cognition, including metacognitive strategies of the learning process (e.g., planning, monitoring, controlling, and evaluating).

Having presented and analyzed the concept and importance of metacognition, the emphasis shifted to teaching and learning, and practical ways to teach metacognitive skills in the classroom were discussed. In this way, an effort was made to familiarize teachers with different metacognitive strategies and ways to teach them in order to promote students' metacognitive skills. These methods included direct instruction, indirect experience, and elicitation through practice (e.g., collaborative learning projects).

More specifically, two basic methods of teaching metacognition were presented:

- a. explicitly teach what metacognition is and how it is important to develop students' minds; students explain the benefits and examples of leading their own minds

and

- b. implicitly, becoming a model for students' thinking, by using a variety of metacognitive techniques
(Papaleontiou-Louca, 2023)

To make the program more practical, we encouraged teachers to discuss how they could help students build a knowledge base with all three types of metacognitive knowledge (declarative, procedural, and conditional), and to give students tasks to practice and apply new strategies as well as to receive useful feedback regarding their learning and effectiveness.

The current program also discusses ways on how teachers can implement metacognitive strategies on a daily basis. More specifically, the intervention program focuses on raising teachers' awareness of the importance of metacognitive control processes (planning, monitoring, evaluation, etc.) (Papaleontiou-Louca, 2023).

2nd Pillar - Epistemic Beliefs

The second pillar of this intervention is focused on 'Epistemological Beliefs'. This pillar discusses how students' epistemological beliefs are related to their academic performance and various cognitive tasks (e.g., comprehending multiple texts and engaging in critical thinking).

Special emphasis was placed on how epistemological beliefs develop. The developmental task underlying the achievement of mature epistemic understanding appears to be the reconciliation of the subjective and objective dimensions of knowing (Hofer & Pintrich, 1997; Kuhn et al., 2000; Iordanou, 2016). Initially, the objective dimension dominates and subjectivity is excluded. It is also noted how people's epistemological beliefs influence their motivation to engage in critical thinking and, ultimately, their learning and decision-making processes. According to Kuhn et al. (2000, pp. 2-3) in (Papaleontiou-Louca, 2023):

“Someone at the absolutist level sees knowledge as an objective entity, as located in the external world. ... the multiplist relocates the source of knowledge from the known object to the knowing subject, hence becoming aware of the uncertain, subjective nature of knowing. ... The evaluativist reintegrates the objective dimension of knowing, by acknowledging uncertainty without forsaking evaluation. Thus, two people can both have legitimate positions - can both “be right” - but one position can have more merit than the other” (Papaleontiou-Louca, 2023).

3rd Pillar - Theory-of-Mind Skills

The third fundamental pillar of this intervention refers to the development and promotion of students' ToM skills.

As such, the discussion focused on the following questions related to the concept and development of "theory of mind": e.g., "What is theory of mind?"; "Why is theory of mind important?"; "How does theory of mind develop from infancy to mid-childhood?"; "Can theory of mind be taught or improved?" etc. (Papaleontiou-Louca, 2023).

Teachers were introduced to the meaning and definition of ToM and its importance in social interaction and communication was discussed. Its importance was also discussed in terms of the impact of ToM deficits on different areas of functioning. Teachers were also familiarized with challenges and research findings showing that ToM emerges early in life, while advanced ToM skills emerge in middle age. Finally, findings from intervention programs were presented, focusing on interventions aimed at promoting ToM skills in early childhood. Examples of activities were provided and stories/scenarios were presented that could be used to teach children ages 10-11 to improve their ToM skills (Misailidi et al., 2013).

Since the whole intervention cannot be presented in details within the scope of a single article, more information about it can be provided upon request to the authors of this program (Papaleontiou-Louca, 2023).

Practical Applications

In combination to the theoretical part of the program, much emphasis has also been given in developing practical activities, asking teachers to suggest ways to engage students in hypothetical scenarios, encourage students to think about - and discuss - an actor's thoughts, feelings, or future actions and behavior. More importantly, we asked teachers to refer to real classroom examples, suggesting at least one educational activity to promote metacognitive skills, and share their ideas with their colleagues.

Some specific examples of practical applications based on the three pillars include:

1st Pillar -The Concept and Value of Metacognition

Metacognitive activities and techniques include reviewing reading passages to make sure they understand them, monitoring their own minds to check that they are moving optimally to achieve their goals, thinking aloud, writing summaries, making ‘mistakes’ deliberately, evaluating one's own reading comprehension, etc.).

For example, we asked ‘How comprehensible (easy to understand) does the story you just read seem to you? (circle a number)

1. Not at all understandable
2. A little
3. Quite a bit
4. Very understandable

2nd Pillar - Epistemic Beliefs

Examples include *asking students questions such as:*

“What do you do when you talk to a friend about a topic and argue about who is right?”

How often do you research to find out how expert someone is on a subject to decide whether to trust what she/he say?

3rd Pillar - Theory-of-Mind Skills

An Example of 'Theory-of-Mind' Activity is the 'Reading the Mind in the Eyes' Test

Below there are pictures of people's eyes. Each picture has four words under it. I want you to look carefully at the picture and then indicate the word that best describes what the person in the picture is thinking or feeling.

Look at this person. Do you think he is feeling jealous, scared, relaxed or hate?



An example of Teachers' Theory of Mind questions on related Practices is referred below:

Below is a list of statements about the ways you talk to your students about their own minds and emotions and those of others. Please read each statement carefully and rate how strongly you "agree" or "disagree" by selecting the appropriate option on the right of each statement.

Definitely disagree/Slightly disagree/Slightly agree/Definitely agree

- I talk with my students about the distinction between different mental activities (e.g., remembering, imagining, having dreaming, desiring, deciding, foreseeing and thinking)
- I encourage my students to name and distinguish their own emotions
- I explain to my students that in order to understand someone's behavior, it is important to know her/his mental states (e.g., thoughts, wishes, etc.)
- I ask my students to find in their school textbooks words describing the mind (e.g., want, believe, aim to, know) and think about their meaning
- I engage in discussions with my students about the way lies can mislead other people
- I frequently use questions/questioning to trigger my students see things from other people's point of view

Deliverables

It is expected that the analysis and discussion of the results (in progress) of this project, along with the basic conclusions and related proposals, will lead to at least 2-3 scholarly (Scopus) articles to be submitted to international peer-reviewed

journals and some presentations will disseminate our results at international conferences.

Additionally, a Toolkit/Guide booklet for teachers is being prepared as a helping guide for developing students' metacognitive skills (in all partners' languages) (Papaleontiou-Louca, 2023).

Among other deliverables of this project, teachers have been asked to prepare a 'Reflection Diary' where they express their thoughts, feelings and reactions by both students and themselves, related to the program, as well as comments which will go under a qualitative analysis and results will be published.

Some preliminary results, though, mainly from teachers' reflective diaries can be presented below indicating that the program seemed to have succeeded its basic aim in promoting teachers' and students' thinking and metacognitive skills.

Preliminary Results

Preliminary -Qualitative results have been drawn based on the Teachers' Reflective diaries, a sample of which are presented below:

- *“The students began to reflect and think critically for each scenario they were given. They became more observant and paid more attention to things that they previously considered as unnecessary details. There was also a change in their attitudes and in their relationships with each other. They were puzzled and put themselves in the other person's shoes to think about the reasons that made them act the way they did. At the same time, they were able to express their feelings, to justify their actions and in terms of learning, they felt more able to express the way they thought to arrive at an outcome. The difference was evident compared to the original questionnaire. To a large extent, students applied metacognitive skills cultivated during the year” (N. E. & Y. P.).*
- *The program gave me the opportunity to reflect on my teaching and to see that many of the activities I used in my lessons involved metacognitive skills and were in line with the Theory of Mind. It also gave me the opportunity to enrich my quiver with new ideas for developing metacognitive skills. In addition, with the start of the training, I went through the process of thinking about and incorporating metacognitive skill development activities into my lessons more systematically (D.P.).*
- *I do not believe it! I feel satisfied! I learned and I am implementing many new things that seem to work well!*
- *I feel very happy and the same my students. One of my students said at the end of the lesson: this is the reward! Finally, many teachers asked that the program is repeated and one of the colleagues said characteristically:*
- *“I thank you very much for the valuable knowledge I gained! It was really one of the most useful seminars I attended! (S.D.)”.*

Teachers views, as shown above and as they are revealed from their diaries seem quite positive, both for themselves and for their students. By the end of the project teachers felt more confident how to work and how to promote metacognitive skills, epistemic beliefs and theory-of-mind skills to their students. Some of the activities developed in the program were familiar to them, though not all of them realized that what they were doing was quite 'metacognitive' in nature. What seems to be a consensus in their reflections, though, was that they can now apply more systematically and more consciously and purposefully the various types of metacognitive thinking in their teaching.

From a qualitative point of view the above indications so far seem to suggest that such programs will be promising in the enhancement of our educational system and people's thinking skills. Such educational programs seem to benefit both the educators and the students and to promote higher types of thinking and learning skills. That's why we suggest that training programs on the promotion of metacognition need to be included both in teachers' basic studies at the University as well as in their professional development in the process of their educational career.

As per our quantitative analysis, we planned to do a lot of statistical testing and we have already started some exploratory testing on the tools which seem to give good results.

More specifically, we started with validation and reliability of our tools/measures, which were established through pilot-testing in all participating countries, and then we finalized our coding schemes.

We then contacted Standardization/Reliability of the final tests (Cronbach's alpha).

Our Post-tests to students and teachers included self-assessments/measurements (via qualitative measurements, observations, focus group interviews, diaries, etc.) and there has been a follow-up-test to students of both educational levels, to assess the educators' training impact on the formers' skills

Our Data Analysis included a. Quantitative Analysis (comparison of pre- and post-test and quantitative separately) of b. Follow-up assessments' analysis in each country's students, and c. Qualitative Data Analysis of Teachers' Assessments.

We then proceed with confirmation, induction per time point and induction between time points.

Our statistical data so far are going to be presented soon in an educational Conference.

Discussion and Conclusions

Though the Training Program has been just completed and the results need yet to be analysed, it might be noted that the interest by the side of teachers is great as well as it is their willingness to participate and apply the program in their classrooms.

The detailed design of the training program by five professors, who can be considered experts in the field (with many years of experience and many

publications in the area), gave it a strong scientific basis and succeeded in gaining the educators' trust.

Teachers have shown much reflection and they made remarkable efforts to shift from traditional teaching and emphasis on memorization towards a more reflective way of teaching.

Their enthusiasm helped them to become creative enough in inventing new ways of teaching promoting higher thinking skills, critical and reflective thinking and therefore students' deeper learning.

As teachers shared with us during our on-line sessions, students found much more interesting the topics that engaged them in a more thoughtful and reflective way of acting and demanded deeper thinking than activities used to take place in traditional lessons.

Of course, time is needed for these metacognitive skills to be acquired and effectively used in various school subjects. Similarly, appropriate training is required to be offered, not only for teachers but also for students. Such educational programs should ideally begin at a very young age and fully blossom in primary and secondary education (Metallidou & Moraitou, 2021).

Especially in our rapidly changing world, programs such as the Pro-Me-ToM project, seem to consist a necessity, if we really aim to create thinking and reflective people and promote students' thinking skills and develop active learners through life.

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