

METACOGNITIVE TRAINING FOR STUDENTS PREPARING TO BE KINDERGARTEN AND PRIMARY SCHOOL TEACHERS

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ABSTRACT

Metacognition is generally defined as “thinking about thinking” and represents a major factor in academic performance. Metacognition, through its two dimensions, knowledge about cognition and regulation of cognition, reflects what people know about cognition in general and about their own cognitive processes, in particular, as well as how they use this knowledge to adjust their informational processes and behaviour to specific situations. These dimensions are crucial for any teacher, not only for their own job performance, but also for developing metacognitive strategies in their students. This is why we think that students who are training to become teachers should attend a programme for developing their metacognition. We designed and implemented such a programme, embedded with the fundamental knowledge of the subject matter taught, for the first year students attending compulsory classes of Developmental Psychology. The programme aimed at raising their metacognitive awareness level and at raising knowledge about metacognitive teaching and learning strategies. The results indicate the possibility of teaching and learning the metacognitive skills when integrated in the content to be taught and used continuously during a university semester.

KEYWORDS: metacognition, metacognitive training, pre-service teachers

1. Introduction

Living in a constantly changing world makes educators ask themselves what are they preparing students for? No proper answer can be given, so we should follow an old saying: “do not prepare the road for the child, but the child for the road”. From our perspective, endow the child with skills that will help him overcome future adversities. In the educational field, where the focus is on learning, we should turn to a concept, although not new, little put into practice, namely to metacognition. Thinking about our own cognitive processes seems to be a story-like “power” that can help you adjust to new ways of thinking that may be required by the evolution of technology.

2. THEORETICAL FRAMEWORK

Metacognition is generally defined as “thinking about thinking” and represents a major factor in predicting academic performance. Metacognition, through its two dimensions [5, 15, 18, 20, 23], knowledge about cognition and regulation of cognition, reflects what people know about cognitive processes in general and about their own cognition, in particular, and also how they use this knowledge to adapt their cognition and behaviour to the specificity of certain situations. Metacognition is a concept introduced in the field of psychology by John Flavell in 1979 [5] to define the awareness of thought process: what we think, how we think when facing a certain task or situation and why we think in a certain way. Many researchers highlight the fact that metacognition is both knowledge and control of one’s thinking processes.

Knowledge about cognition can be grouped into three factors: declarative knowledge ("knowing that"), procedural knowledge ("knowing how" - learning strategies are a part of this knowledge), and conditional knowledge (knowing when, where and why a person uses a particular strategy) [12, 18, 20].

The regulation of cognition includes: planning, monitoring, testing, reviewing and evaluation of strategies [18, 20, 23]. Planning which involves selecting the appropriate strategies and allocation of resources necessary to perform a certain task. It may also include establishing the objectives, activating general knowledge and allotting time to each activity. Monitoring aims at awareness about the level of understanding and solving the task during performing that task. Self-testing is a part of the monitoring activity. Flavell [5] talks about cognitive motoring in the context of “cognitive experiences”, represented through perceptions or insights during the process of acquiring new knowledge, expressed in phrases such as “I do not understand this”. He considers that these experiences may serve a “quality control” check, which helps students revise their goals. Testing refers to implementing a strategy, using it in a specific context. The reviewing and evaluation of strategies includes the assessment of the methods used, of the processes involved and of the outcomes, as well as of the objectives [20].

Hartman [8] highlights the following aspects of metacognition: (a) Metacognition is the thinking about thinking; (b) It provides awareness and control over the way the teachers think about teaching; (c) Metacognition allows teacher to adjust their teaching activities according to their students, to the objectives of the activity and to the context; (d) Metacognition has a general part and a domain specific one; (e) Metacognition can be classified into two general parts: the executive management strategies, (which take part in planning, monitoring, assessing and revising the thinking processes and the outcomes) and the strategic knowledge on the

information/strategies/competencies one has, as well as on how, when, where and why should one use them.

We must take into consideration that students are more or less aware of their own thinking processes before we start our inquiry about such processes and they also know how to control their way of thinking. However, metacognition is learned through observation and vicarious learning, which highlights the role the others (peers, teachers, parents) play in this process. Many researchers support the idea of teaching such metacognitive skills [11], but there is still dispute between how to do this: distinctly from the content to be taught in a certain subject matter, embedded in the subject matter content or a mixt form of these two? We chose the summative approach [2, 21] because it encompasses all the advantages of teaching metacognitive skills. We used Beckman's model (2002) for teaching metacognitive skills. He suggested the following steps:

- a. Describing the strategy to be used;
- b. The teacher's modelling of the strategy use;
- c. Practice of the new strategy unde the teacher's guidance;
- d. Promoting self-monitoring and self-assessment in students' independent use of the strategy;
- e. Encouraging students to use the strategy continuously and generaluyed to other learning contexts.

3. METHODology

3.1. Objectives and hypothesis

Our objective was to improve pre-service teachers' metacognitive awareness. We assume that the metacognitive training will lead to an increase of the general metacognitive awareness level. According to the specialty literature, teachers with high metacognitive awareness will be able to teach metacognitive strategies to their students.

3.2. Sample

In the research, there were involved 86 students of Transilvania University of Braşov, training to become pre-school or primary school teachers. There were only female subjects in this study, due to the natural composition of these groups.

3.3. Instruments

We used the Metacognitive Awareness Inventory (MAI), at the beginning and at the end of the semester. *The Metacognitive Awareness Inventory (MAI)* is a scale established by Schraw and Dennison [19] to assess various aspects of meta-cognition. Participants assess each item concerning the

way they study. The scale was founded on Flavell's metacognitive theory and the two scales reveal the two dimensions of metacognition: knowledge of cognition and regulation of cognition. At a similar level to that reported by the authors, the internal consistency of this scale is .76.

3.4. Procedure

We used an experimental design with a pre-test and a post-test phase, during the first semester of the university studies. The students were subjected to a metacognitive training programme, embedded in the content of their Developmental Psychology compulsory subject matter. The programme aimed to make them aware of their metacognition and to develop their ability to consciously use metacognitive strategies. Teaching metacognitive strategies can be done in dedicated courses, during teaching any subject specific content or the two methods can be combined, emphasizing the advantages of the first two approaches [2, 19].

We aimed to inform students about the knowledge about cognition that can be used in learning (knowledge about metacognitive strategies, about how, when, where and why a person should use a particular strategy) and to offer them specific information about regulation of cognition (planning the strategy use, monitoring the implementation of a strategy, testing new strategies, reviewing and assessing the strategies used).

At the beginning of each meeting, a new strategy, method or technique was presented purely theoretically. Then the teacher modelled its use in practice, also using the think-aloud procedure. Afterwards, the course specific content was presented with student applications, especially designed for the use of the method presented.

The metacognitive strategies for teaching, learning and assessment that can be used in school were presented to the students and the specific Developmental Psychology content was presented using these strategies. Also, all practical activities were planned and performed within the metacognitive training framework. The teachers used modelling [7, 14] and presents think-aloud protocols [1, 3, 14, 22] at each activity. Among other methods involved in training students, we mention: reflective journals [1, 3, 6, 10, 14], reflections on activities [4, 7], walking through images [11], checklists of strategies [17], and semantic maps [3, 11, 16].

Modelling offers the teacher the possibility to make visible his own mental activities involved in solving a problem by saying aloud all the mental steps involved in reaching his goal [7, 14]. The *think-aloud protocols* represent a form of recording the students' thoughts while they are solving a problem and they are vocalising aloud all that crosses their mind, in this time [1, 4, 14, 22]. The interviewer can stay with the student until he finishes the problem, asking questions such as: „What are you thinking about?“, „Why did you decide to do

that?”. The protocols are later analysed, and the students are free to use their native language or the language they are learning. Through these protocols data referring to the process of using the strategies can be obtained. In a *reflexive journal*, students record their thoughts on what they are thinking about, on the level of consciousness involved, they comment on the decisions taken [1, 7, 10, 14]. This diary can be a tool for exploring awareness of the use of learning strategies and the learning process because completing such a journal can provide the stimulation necessary for the students to think about their own learning activity, but can also provide information about the effectiveness of the metacognitive. *Reflections on the activity* can be done in order to extract implicit knowledge about how students learn a foreign language, knowledge that will become a basis for the new things learned. It is not limited to the activities already carried out, but it helps to plan the following ones [7]. *Walking through the images* involves throwing a glance at the images that accompany the text to be read to infer the meaning of the text and discussions of the participants [11]. Any instrument designed to measure the level of metacognitive awareness can be used a *checklist of strategies* [17]. After filling in such a questionnaire, it seems useful for the students to talk about their choices and thus identify the most appropriate strategies or even learn new ones. *Semantic maps* [11, 16] assume organizing ideas. Students note what they already know about the topic in question, and then, while reading, then complete the semantic map, reflecting on the proposed topic and as a confirmation of understanding the text. They are considered tools for synthesizing knowledge.

4. RESULTS

The results, presented in Table no. 1, show that there are statistically significant differences between the metacognitive awareness between the two phases of the experiment, which demonstrates the effectiveness of the proposed training program. Students' metacognitive awareness has increased over the semester of training, on all the dimensions taken into consideration.

At the end of the semester, the students in the experimental knew more about their own cognition and knew how to regulate it. When taken apart, the results for each metacognitive dimension significantly improved after the training programme. Not only did the students know more about their own cognitive processes, but they were more able to manage their cognition through the regulatory processes they could employ on their own metacognition. Their overall metacognitive awareness significantly improved at the end of the training programme, as it can be seen in the table below.

Table no. 1. T-test for differences between means for pre-test – post-test phases

Variables	Mean differences	Standard deviation	t	df	p	d Cohen
General metacognition	268.19	44.64	46.91	60	.000	.91
Declarative knowledge	45.77	11.79	30.79	62	.000	.61
Procedural knowledge	25.15	5.14	38.79	62	.000	.61
Conditional knowledge	27.46	5.03	42.96	61	.000	.91
Planning	35.88	6.89	41.30	62	.000	.91
Monitoring	33.68	8.53	31.32	62	.000	.61
Information management	46.53	8.34	44.24	62	.000	.61
Strategies	22.66	3.46	51.86	62	.000	.91
Evaluation	30.14	8.68	27.32	61	.000	.61

5. CONCLUSIONS

The results obtained in the analysed group show that metacognitive skills can be successfully developed in students. Some of the students may have already been using metacognitive strategies intuitively, but the overall level of metacognition rose for all of them. We may conclude that a 14-week training programme, with weekly meetings focused on strategies to improve students' knowledge about cognition and the strategies of regulating their cognitive activity, embedded in the course specific content can improve their metacognitive awareness level.

Teaching metacognition implies that teachers practice metacognition and, even more, it is part of the compulsory curriculum. Under the circumstances of nowadays changing society, we consider metacognition to be the essential skill that teachers should develop both in themselves and their students [1]. Therefore, metacognition should be first learned and used by teachers and applied in teaching and learning methods and in writing textbooks and practiced every day, in all subjects [9]. This is why first year students preparing to become teachers were chosen for our research and we intend to replicate this experiment with following generation. As a future research direction, it would be interesting to do a longitudinal study, analysing the teachers' metacognitive level and their students', too.

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