

PERSONAL REFLECTION AND LEARNING EFFICIENTIZATION

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Abstract: *The study analyses the efficiency of the constructivist teaching models in forming the reflexive capacity of the students – the future teachers. The goals of the research aimed at establishing connections, correlations between the use of some constructivist teaching models (the ERR model; the 5E's model; the ETER model; the CETP/SIS model; the OSIOS model; the ABERA model) and the development of the reflexive competence of students as well as the improvement of their academic results. To establish the statistical relevance of both the correlations and the difference between the averages of grades obtained at the end of the research, compared to the initial period, we used the Pearson correlation index and the Z test. Some of these models proved their efficiency in forming the reflexive competence of students. The results obtained following the Z test, pointed out the efficiency of using the constructivist teaching in improving the academic performances of students.*

Keywords: *personal reflection, constructivism, metacognition, metacognitive strategies, reflexive competence*

1. Introduction

The educational theory and practice have imposed lately, as a condition for the efficientization of the educational-teaching activity, the promotion of the reflexive thinking as an essential component of the teacher's competence profile. The principles and ideas that the constructivist paradigm is based on, are not all new, some of them being related to the thinking of some philosophers in the period of Antiquity, such as the Socratic learning method, which can be considered as a precursor of the cooperative learning (Lam, 2011). But, although the constructivist theory in its essence is not new, nevertheless, the necessity of its affirmation is even more real in a postmodern society (Cook-Sather, 2008).

In essence, the constructivism is based on the idea of building own knowledge, by those learning, analyzing, commenting and interpreting individually the objective, external reality (Iran-Nejad, 2001; DeVries, 2003; Danforth, Smith, 2005; DeVries, Zan, 2005; Diallo, 2005; Loyens, Gijbels, 2008; Gordon, 2009). Depending on the types of constructivism (Doolittle, Hicks, 2003), in the act of knowledge, the individual or the social activity can be dominant, given that the subjectivism of one's own knowledge needs an external referential for objectivization. Thus, it is underlined the role of the social environment in the process of learning as well as the importance of

the collaborative learning (Jager, Janse, Reezigt, 2005; Schraw, Crippen, Hartley, 2006; Maxim, 2009).

We present a few characteristics of the constructivist learning (Cooperstein, Kocevar-Weidinger, 2004; Joița, 2006): building own understanding by those learning; acquiring new knowledge based on the previous knowledge; learning is improved thanks to the social environment and therefore is socially mediated; learning is based on an authentic, real task or situation. Although the majority of opinions accept the idea of the efficiency of the constructivist strategies in teaching, there are also points of view that question this efficiency (Vogel-Walcutt, Gebrim, Bowers, Carper, Nicholson, 2011).

In general, the constructivist teaching and the constructivist learning promote both metacognition and reflection, as a way of learning but also of evaluation.

The metacognitive strategies refer to the awareness of a cognitive approach and the possibility to identify steps or phases, difficulties, obstacles, weaknesses and strengths. The metacognitive capacities are in many cases decisive when it comes to pupils' success or failure. There is a multitude of metacognitive strategies. Of these strategies, we review the following (Du Toit, Kotze, 2009; Cubukcu, 2009; Jian, Yujun, 2012):

- Planning the learning strategy (awareness and internalization of rules, learning stages, time horizon, etc.
- Posing questions – must be done both at the beginning of the teaching situation as well as throughout the process, to eliminate misunderstandings and clarify concepts.
- Awareness of the decisions made – implies, on behalf of the pupils, to understand the connection between their decisions, actions and the results, consequences of these decisions.
 - Setting and pursuing the goals of the teaching situation or the long-term goals.
 - Self-management of both time and teaching space.
 - Assessment of the way of thinking and action – implies awareness on behalf of the pupils/students, regarding the assessment criteria.
- Identifying difficulties – pupils must be encouraged to identify the resources, competences and information they need, to have results regarding their learning, make a distinction between the knowledge and competences they need and what they need, recognize the difficulties they have in acquiring/building this knowledge.
- Paraphrasing, elaborating ideas, theories, opinions of others, reflecting on them – pupils must be taught to comment, interpret the ideas of others, but also express their own point of view.
- Terminological clarification, delimitation, for a better understanding of the basic concepts.
 - Problem solving - represents a good way to practice the metacognitive strategies, due to the capitalization on the knowledge and competences existent in new situations, finalized with new psycho-cognitive, psycho-behavioral and psycho-attitudinal enrichment.
- Using diaries, as they are instruments which allow the practice of metacognition, because they offer the possibility to become aware of own thoughts, feelings and actions.

•Promoting both cooperative learning and learning based on the capitalization of the social environment in learning, which allows the correction, adjustment and improvement of personal thinking, by relating it to the others' thinking.

Many models of constructivist teaching integrate reflection as an important stage, whose aim is to ensure an efficient and thorough learning. We present several of these models (in Joița, 2006):

•**E-R-R model** (Evocation-Realization of meaning-Reflection);

•**5 E's model** - Engage, Explorer, Explain, Elaborate, Evaluate;

•**ETER model** (Experience, Theory, Experimentation, Reflection)

•**CETP/SIS model** – achievement of a constructivist learning in 6 distinct stages: updating the knowledge regarding the specific topic or issue; identifying and analyzing the necessary information; identifying errors, confusions, preconceptions regarding the topic at stake; making associations, correlations for a better embedment of the new knowledge; making personal reflections with regard to the researched topic and the achieved, finalized actions; creating openings towards situations that can ensure a continuation of what has been achieved.

Apart of these models acknowledged by the literature, we want to signal also own teaching models based on reflection (Junor Clarke, 2007) as well as instruments of self-reflection achievement, elaborated and implemented in the educational practice (Kitsantas, Baylor, Hu, 2001; Joița, 2008).

There are presented a couple of the models conceived by us within a Grant Research Project, which was developed between 2005-2007, on the theme of cognitivism and constructivism, seen as new educational paradigms. The project was coordinated by university professor Ph.D Elena Joița. These models focused on the constructivist knowledge/learning (Ștefan, 2007, pp. 131-137) have been taken up and exploited in the present study (table 1).

Table 1. Facilitating the constructivist learning – personal/own models

<i>Constructivist models (elaborated personally)</i>	Constructivist knowledge/learning
OSIOS Model	<ul style="list-style-type: none"> - Orientation in the new theme – supplying the resources, the necessary conditions to facilitate the approach of the new theme; - Scanning the support material offered – orienting, observing, direct investigation of the offered material; holding the signifying information; recording the observation; - (Own/Personal) Interpretations – asking questions to facilitate the understanding, identifying the key words; critical analyses; shaping a personal opinion. - Organizing the new knowledge – group debate; making classifications, comparisons; drawing conclusions. - Schematization – structuring the acknowledgement; representing graphically the new knowledge.

- ABERA Model**
- **Analysing the task** – at this stage students are presented the tasks, materials and necessary actions are organized; students are oriented/guided in the text; each of them has to reflect over the context, the situation in a subjective way, personalized, by means of previous experience;
 - **Building the understanding** – the student is trained to intuit an own/self model of building the understanding and solving the task, in organizing the search and analyse actions, in comprehending the text; there is a reference at the self way of understanding.
 - **Expanding the field** – being integrated in a group, the student learns the knowledge under the shape of a discussion; by enlarging the field of comparison they get to acknowledge the degree of efficiency of the strategies used and, if necessary, to correct it, to replace the inefficient strategies; the group collaboration allows confrontation, comparison, reciprocal evaluation and in this way stimulating the metacognition; at this stage, students manage to expand the field of understanding, elaborating the cognitive map, as a result of the way in which they solve the task and optimize the process; the cognitive maps highlight the students' progress in learning, the evolution of the degree of complexity of the corresponding cognitive structures.
 - **Reflections** – students have to verbalise their own reflections on their way of understanding, knowledge, decision and solving.
 - **Appreciation** – it is the stage of a post-processing, an overview of that certain theme, on the way in which the tasks have been accomplished and on the cognitive and action progress.

The constructivist education models, elaborated by us, have proven their efficiency in shaping the reflexive ability of the students – future teachers.

Some authors (Zeichner & Liston, Van Manen, Handal & Lauvas apud Le Cornu, Peters, 2005; Taggard, Wilson, 2005; York-Barr, 2006) distinguish between different levels of reflection and in accordance with these levels, different types of reflection: *technical* reflection (regarding actions); *practical/theoretical* reflection (regarding the reasons behind the taken actions); *critical* reflection (regarding the values and compatibility of actions with the social notions of honesty and justice); *deliberative* reflection (regarding the intentions and perspectives affirmed); *contextual* reflection (refers to the analysis of the context and the concatenation of all elements and variables of a teaching situation); *personalized* reflection (implies the affirmation of the own way of interpreting an idea or situation in relation to the reflections of the others); *dialectical* reflection (refers to different moral and social manifestations).

The role and implications of reflection can be analyzed on two levels: outside the classroom and within the classroom (Le Cornu, Peters, 2005). Thus, outside the classroom, the mentioned authors recommend meetings and discussions between the teaching staff, on issues regarding teaching and education and the subsequent

reflections Within the classroom, there are recommended a few ways of stimulating the reflection capacity of pupils: development of a reflexive attitude; explicit mentioning of the metacognitive skills and processes; creation of opportunities for reflection within the classroom; use and encouragement of an interactive and receptive style.

Moreover, we mention a few methods and ways of realizing personal reflections (Joița, 2008, pp. 259-267): posing of questions, elaboration of hypotheses and personal assessments; elaboration of own interpretations and critical analyses; elaboration of reflections in solving real situations, but also techniques and instruments of work such as: observation and self-observation; reflexive journal; expressing of own opinions at the end of the action; post-action own analyses; registering of activity; filling of rubrics for criterial assessments; elaboration of special letters; initiation of a reflexive dialogue; description of own way of interpretation and argumentation; comparison of several points of view; correction of other people's arguments; identifying and respecting the ideas of other people; elaboration of portfolios with comments and different analyses; commentated accounts; personal metaphors; spontaneous personal notes etc.

Other techniques for training and stimulating the reflexive capacity have been capitalized on, by some authors, (Joița, 2005, p. 119) in the initial training of the future teachers, starting from the premise of the importance of the reflexive competence within the structure of the future teacher's competence profile: elaboration of essays; reflexive exercises on certain topics; elaboration of hypotheses and their argumentation; identification of keywords and their commenting; elaboration of possible ideas on a certain topic and their subsequent sorting out; use of ideas in the form of metaphors or versifications; elaboration of counterarguments or involvement in a controversy; commenting or capitalizing on different elements or ideas; drawing up various cognitive maps; elaboration of critical assessments regarding construction actions; elaboration of own works based on own interpretations; establishing various correlations and commenting them; elaboration and commenting of projects; elaboration of journals with opinions on different issues of teaching; developing suggestions for own interpretations (quotes, maxims, proverbs, hypotheses, etc.).

We specify a few rules for easing the formulation of personal reflections (Joița, 2008, p. 257): it must be personal and simple; it must contain own comments and express personal ideas; arguments should be formulated to support ideas; it must be related to the pedagogical or situational context; the opinions of the other members of the group must be respected.

From the point of view of its moment, the reflection can be (Mogonea, 2007, pp. 131-132; 2008, pp. 224-225):

- A pre-action analysis, for instance: assessing both the level and quality of the previous knowledge as well as the capacities and competences necessary for solving the task; assessing difficulties, obstacles during similar learning activities as well as the ways of overcoming them; anticipating the difficulty level of the task; establishing strategies for solving the task; assessment of the theoretical/praxeological contribution of the task to be solved etc.

- Analysis conducted at the same time with the action – examples: putting in practice the plan previously established and monitoring the action; identifying the

obstacles and mistakes made and becoming aware of the ways of overcoming them; elaborating throughout the activity some schemes whose goal is to describe synthetically the stages reached; becoming aware and registering the progress realized throughout the activity, in relation to the criteria imposed, the colleagues' achievements and one's own activity, analyzed from different temporal perspectives; assessing if time has been correctly managed etc.;

- A post-action analysis – examples: assessing the level of difficulty of the solved task and identifying both the difficult moments and those easily overcome during the process of solving the task; assessing the level of gained knowledge following the finalized learning experience and establishing ambiguities emerged throughout the process of learning; identifying the aspects that should be repeated in future learning activities; identifying the use of the gained knowledge and of the skills and capacities formed; assessing the efficiency of the ways and strategies used in solving tasks; identifying the possibilities of integrating the new acquisitions into the already existent notional systems; drawing conclusions regarding the efficiency of the learning style.

Reflection is a process carried out individually for most of the times, but also collectively (Frederiksen, White, 1997).

2. Research methodology

This experimental approach is a part of our latest interests regarding the promotion of the constructivist teaching, as an alternative within the academic teaching, and more exactly within the didactical professionalization. Also, the metacognition topic, analyzed for the category of children with SEN (Mogonea, 2013) is discussed in this study, but from a different perspective. Hence, we enlarge upon the sphere of issues regarding the efficiency and efficacy of some theories, models, instruments of work, capitalized on within a research project, carried out between 2005 and 2007 (project manager: Professor PhD Elena Joița). The necessity to train the future teachers through the Program regarding the certification of the competences for the didactical profession in accordance with quality criteria, has determined the thoroughness of some aspects on the efficientization of work strategies, together with the development and pursuit of the new outlined research hypotheses.

Within this general framework, we mention the **hypotheses** that the current experimental approach was based on. Hence, the **general hypothesis** was the following one: *The use of reflection, as a constructivist learning technique within the teaching activities, carried out with the Future Teachers students, will lead to the efficientization of this activity.*

Starting from the general hypothesis, we pursued two **particular hypotheses**:

a) The models, methods, techniques and instruments based on the use of personal reflection, employed frequently, can stimulate the formation of the reflexive capacity of the Future Teachers students; b) There is a connection between the personal reflection and the improvement of the students' learning style, i.e. their school results.

The independent variables implemented within this experimental approach consisted of models, methods, techniques and instruments of promotion of personal

reflection, capable of determining the formation of the future teachers' reflexive capacity and implicitly their school results (dependent variables).

The purpose of our research was the development of the reflexive competence of students through some constructivist teaching models.

In close connection with this purpose, we pursued the following **objectives**:

- To know students' opinion regarding the efficiency of the constructivist teaching within the academic learning in general, and the didactical professionalization in particular;

- To know students' capacities to achieve personal reflections;

- To implement some models, methods, techniques and instruments for stimulating personal reflection within the activities carried out with students.

Within the research, we aimed at pointing out the following correlations between: the use of both constructivist models and instruments and constructivist models based on the stimulation of personal reflection and the formation of the reflexive competence; the formation of the reflexive competence and the improvement of their learning style, i.e. their school results.

The group of subjects was composed of Future Teachers students, from representative faculties for the fields and specializations existent within the University of Craiova. We selected 208 subjects – students in their first year of the psycho-pedagogical teaching Program. Of the 207 subjects, 80 formed the experimental group while 127 formed the control group. With respect to the content group, it was established in accordance with the Curriculum for the certification of competences regarding the didactical profession. We made a selection of some topics included in the syllabus of Pedagogy (structured into two semesters), given the importance of this discipline in forming future teachers.

Hence, the research was carried out throughout two academic semesters (2nd semester of the 1st Year and 1st semester of the 2nd year of psycho-pedagogical studies).

The research methods and instruments that were used are the following : the questionnaire enquiry (we applied an opinion questionnaire to students to find out their opinion on the specific of the constructivist teaching and its role in the didactical professionalization); the pedagogical test of knowledge (in the observation phase we applied the pre-test while at the end of the research we applied the post-test to signal the progress realized by the subjects of the experimental group); the systematic observation through observation grids, whose indicators aimed at identifying both the ways regarding the training of the personal reflection and their frequency within the activities carried out with students.

The conducted psycho-pedagogical experiment consisted of using models, methods and instruments of work, based on the training, promotion and stimulation of the reflexive competence of the Future Teachers students. Hence, we used the following models of constructivist teaching: *the ERR model*; *the 5 E's model* (Bybee, 2001); *the ETER model* (Beliveau, Peter, 2002); *the CETP/SIS model* (Summer Institute, in Joița, 2006); *the OSIOS model*; *the ABERA model* (Ștefan, 2007, 133-137).

Of the methods and instruments for stimulating personal reflection, we used the following ones: question posing, hypotheses, personal assessments; own interpretations

and critical analyses; elaboration of various cognitive maps; expression of own opinions at the end of the action; formulation of reflections in solving real situations; formulation in a personal way of metaphors; spontaneous personal notes; elaboration of essays; reflexive exercises on certain topics; elaboration of counterarguments or involvement in a controversy; elaboration of journals with opinions on different issues of teaching; journals to identify the stages in solving a task within an activity; grids, questionnaires to identify the mistakes made in solving a task or to identify the positive aspects of an activity as well as to point out the theoretical and praxeological contribution of the solved task.

3. Findings and interpretations

Starting from the premise that the promotion of models, methods and instruments of constructivist teaching determines the formation of the reflexive competence of students, we used two instruments: on one hand, a survey applied to students, in order to find out their opinion on the efficiency/inefficiency of the constructivist teaching models (used in the experimental phase) in forming the reflexive competence, and on the other hand, a grid, in order to establish the level of development of the reflexive competence, practiced and stimulated throughout the experiment.

In order to point out the correlations between the constructivist teaching models and their role in forming the reflexive competence, we used the Pearson Correlation index. The findings are presented in table no. 2.

Table 2. The findings of the Pearson Correlation Coefficient

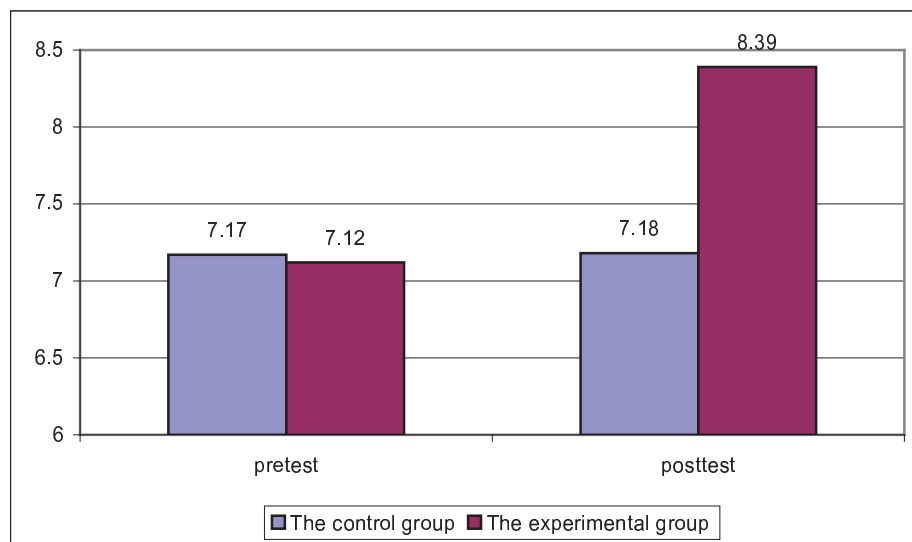
Constructivist models		Development level of the reflexive competence	
		High	Low
ABERA	Pearson Correlation	,227**	
	Sig. (1-tailed)	,000	,000
ETER	Pearson Correlation	,152*	
	Sig. (1-tailed)	,014	,014
the_5_E's	Pearson Correlation	,245**	
	Sig. (1-tailed)	,000	,000
ERR	Pearson Correlation	,121*	
	Sig. (1-tailed)	,041	,041
OSIOS	Pearson Correlation	,781**	
	Sig. (1-tailed)	,000	,000
CETP/SIS	Pearson Correlation		,239**

Sig. (1-tailed)	,000	,000
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As it can be noticed, the findings presented in table no. 2, point out the efficiency of some of the constructivist models in forming the reflexive competence, that is, the efficiency of the ABERA model (.227, significant at a significance threshold of 0.01); The 5 E's (.245) and the OSIOS models (.781) –are significant also at a significance threshold of 0.01. For the ETER and EAR models, the values (.152, and .121, respectively) are significant at a 0.05 threshold. On the other hand, for the CETP/SIS model, the significances are negative, which in students' opinion demonstrates their inefficiency in forming the reflexive competence.

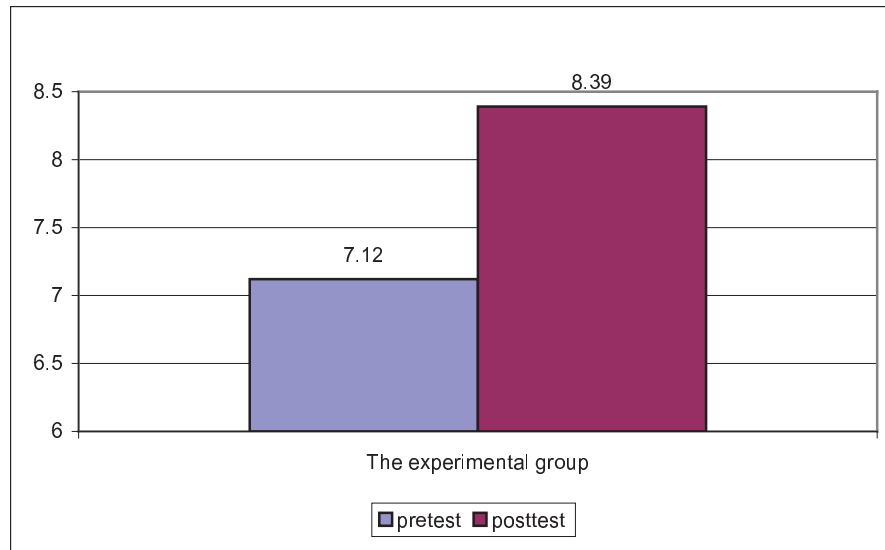
In order to point out the effects that the development of the reflexive competence has on the improvement of students' school results, we registered and quantified the results obtained by students in the pretest and posttest, to be able to highlight the progress made by the subjects of the experimental group. The evaluation items for the two tests applied, requested students' competence to formulate personal reflections regarding the carried out activity as well as their utility and efficiency in formulating hypotheses and ameliorative proposals.

The averages obtained by the two groups in the pretest and posttest are presented in the following graphics (1 and 2):



Graphic 1. Comparative results of the two groups of subjects, in pretest and posttest

The comparison of results can be done not only between samples, but also at the level of the experimental group, in relation to the two different temporal moments, that is, the pretest and the posttest.



Graphic 2. The comparison of the results obtained by the experimental group

The results obtained were then interpreted statistically, to establish the statistical significance of the difference between the averages registered during the two moments of the research (pretest and posttest), by the two groups of subjects (control group and experimental group).

For interpretation, we used the Z test for independent samples, its calculation formula being the following one (see formula 1):

$$Z = \frac{|m_1 - m_2|}{\sqrt{\frac{\sigma_1^2}{N_1} + \frac{\sigma_2^2}{N_2}}} \quad (1)$$

The comparison of results registered by the subjects of the experimental group in the posttest with those registered by the subjects of the control group, allowed us to establish the statistical relevance of the difference, as it can be noticed in table 3.

Table 3. The statistical relevance of the difference between the average of the experimental group and the average of the control group, in the posttest

Group	Average (m)	Deviation (σ^2)	N	Z value
Control	7.18	2.11	127	5.52
Experimental	8.39	2.52	80	

In order to enhance the statistical relevance of the difference between averages, we also compared the results for the same group, by relating them to the two different temporal moments (pretest and posttest). The results are presented in table 4:

Table 4. The statistical relevance of the difference between the average of the experimental group in the posttest and that of the experimental group in the pretest

Phase	Average (m)	Deviation (σ^2)	N	Z value
Pretest	7.12	2.11	80	
Posttest	8.39	2.52	80	5.26

In both situations, the value of Z is higher than 2.58, which allows us to state that the difference is significant at a significance threshold of 0.01.

4. Conclusions

The results obtained confirm the efficiency of some of the constructivist models based on the stimulation of reflection, used in the formative activities carried out with the Future Teachers students. The educational practice and the instruments used in determining the subjects' opinion pointed out students' preference for some of these models (for instance: the OSIOS model, the 5 E's model, the ABERA model), which turned out to be also efficient in stimulating the reflexive competence of the future teachers.

Given the importance of this competence in the general profile of a successful teacher, we insist on using these constructivist teaching models that can also assure academic success.

At the same time, the carried out research has opened up new perspectives on approaching some of the researched topics or subtopics, such as, for instance, the outline of a general competence profile of the teacher, from the perspective of the constructivist paradigm.

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