The Informative-Formative Value of the Strategies based on the Practical Action – Modeling Teaching

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Abstract

Curricular reform promotes the transition from classical pedagogy, based on the traditional model of information transmission, to the pedagogy based on training and personal reflection model. From the large and diverse spectrum of teaching methods, this study focuses on the role of the based- action methods in training students skills, in the training context focused on skills. The study takes into account current approaches, the differentiation and personalization of teaching approaches.

The study analyzes the specifics of teaching modeling, analyzed from different perspectives: as a teaching strategy, independent teaching method or teaching process in the demonstration method, simulation and training using the computer. Study findings highlight the formative value of modeling teaching in teaching and learning didactic content, especially its role in students skills training to experiment, investigate, act, thus facilitate the development of knowledge by their own force, constructive, interactive. Modeling becomes a teaching strategy, a way to design and conduct the educational process that generates human and material resources management and the election of teaching methods and procedures that are going to be used. It underlies learning by analogy, in this approach, teaching modeling being a superior form of learning organization.

Keywords

Training focused on skills; activation, teaching differentiation and customization; models based on practical action; teaching modeling; teaching model.

I. Introduction

The new approach of the National Curriculum has generated a curriculum culture characterized by centering the educational process on skills and abilities training targets, transforming teacher-centered school in a pupil-centered school by promoting interactive learning methods, cultivating pupils creative skills and creating varied learning situations

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(inter- and transdisciplinary approach of the school curriculum, curriculum approach correlated with school performance evaluation problem and with initial and ongoing training of teaching staff (Korka, 2000).

The interest shown by practitioners over time, towards activating and participatory strategies, was decisive in shaping a complex array of interactive training conceptual approaches. Teaching methodology approach, as the main factor supporting the educative activities, emphasizes the importance the quality of teaching strategies has in increasing school performance.

National pedagogical literature, and not only, regarding the identification of ways or factors to streamline educational approaches, in most analysis, places in this spectrum teaching methods. In this context, we defined methods formative and informative value based on action, focusing our attention on teaching modeling method, considered as significant for an interactive approach to teaching and learning.

The development of interactive pedagogy, cognitive and constructivist approaches imposition in education, requested the reconsideration of the pedagogical triangle elements status: student - teacher - content. The student is viewed from the point of view of its potential and capacity to learn, to be active and become autonomous. Knowledge and support are considered a pretext for the construction and development of new purchases by students themselves. The teacher has the role to organize learning situations designed as a pretext for the establishment of interactions and dynamic relationships between students and learning content (Bocos, 2012). From other point of view, this reconfiguration has as a premise the optimization of the three-dimensional integration: "pedagogical action - interpersonal relationships and real life" (Chis, 2002, p. 17). Interactive learning comprises three main types of interaction. The first is the content-student, in which the student interacts with the facts, readings and information. The second type of interaction, student-teacher, student interacts mainly with the teacher. In the third format, called student-student, students collaborate with each other to build and develop knowledge.

II. A theoretical basis of the theme

The training focused on skills

Moving from objectives to competencies in all school subjects and reorganizing contents in content areas is part of the experiential learning

current promoted by the constructivist paradigm (Raynal, Rieunier, 1997; Siebert, 2001; Joita, 2006; Ciolan, 2008; Cerghit, 2008), centered on the student's direct involvement in the studied reality, on capitalizing the knowledge, skills and learned values in real contexts. (Tudor, 2015, p. 59)

Competency-based didactic gives importance to what the student needs to know to do with what he knows. "Knowing" is converted to "become capable of solving life situations, professional or not, by mobilizing all things learned. And "learning" is the ability to solve, gradually, increasingly complex situation problems (Gerard, Pacearca, 2013).

The teaching approach will be done according to the pursued competences (Tudor, 2011):

- if the objectives are centered on assimilating the terminology, on learning concepts, teaching contents are knowledge, concepts, laws, principles; in this case, it is recommended observation based strategies or based on experiment, solving case studies, discussions, role-play, exercises;
- if objectives involve skills and abilities formation, operational capacities, contents are activities, actions, operations, operational knowledge and act - specific contents; in this case, practical strategies will be effective, project-based, simulation, role-play, individual and group exercises, practical actions;
- if objectives aim at training of skills, attitudes, interests and beliefs, values formation, personality traits, the contents are either in the form of knowledge, actionable contents or situations and life experiences, affective states, ideological and social contents and actions; in this case, it is going to be used practical strategies, project based strategies, simulation, role-play, strategies based on individual and group exercises, interactive and communication strategies, simulation-based strategies, analysis models, motivation strategies, nonformal strategies .

Activation, differentiation and customization through teaching methodology

Activation is a requirement of modern education, active and effective that promotes thinking growth, motivation to learn, creativity stimulation, making learning and training active and interactive, in which the learner to engage effectively intense, deep and full, with all his personality sizes.

Learning is an built act, and to encourage this effort, students should be involved in the act of learning to find, formulate, analyze, communicate, interpret, exemplify (Popescu, 2013, p. 113)

Focusing on the mentally transformation of information, active strategies are promoted, that activate, stimulate and support domestic processing of information. To achieve such a learning process, Lebrun (in Joiţa, 2002) recommend, as a methodological suggestion, that in the design phase of the work, after the teacher and the student set the learning context, to establish "a prototype (as a processing and organization technique of information) of the application of active methods". The author suggests making a personalized and differentiated approach that ensures the transformation of taught information and the progressive building of new knowledge. In this way, each student uses cognitive resources and operates variously with teaching duties, to develop them, combine, recombine, apply, corect them under teacher´s guidance. (Tudor, 2015, p. 31)

The student has an active attitude by continuous stimulating the capacities for personal reflection, critical thinking, imagination, creativity, and interactive, being put in a position to interact with others to solve teaching tasks.

In skills-centered teaching model, traditional strategies are redefined (using methods like exposure, heuristic conversation, manual work, demonstration, problem solving, observation, modeling, experiment, exercise, practical work); they undergo a modernization process of redefinition, in various combinations with strategies considered modern (case study, project methods, simulation methods and techniques to develop creativity, conceptual map).

Building the teaching process in a constructivist manner involves making changes, interpretations, constructions and reconstructions; the need to combine reception/ traditional based strategies with strategies based on search, discovery, practical action, problem solving (Joita, 2006)

Methods based on practical action. Modeling training

The diversity of taxonomic approaches expresses flexibility and openness of teaching methodology that accepts novelty, it is amended according to society actual needs, it adapts to the teachers working needs with students and to curricular paradigms.

We identify taxonomies of teaching methods in various analysis criteria. Constantin Cucos (2014, pp. 188-289) identified several development trends of teaching methodology, from formative perspective:
- "the implementation of new training methods and procedures to appropriate solve learning situations (using brainstorming methods);
- wider use of active-participative methods, by activation students cognitive structures and operators and by resorting to passive methods only when needed; fructification of size and "quality" aspects of the method;
- extended use of methods requiring rational components of teaching, respective communication aspect on teacher - students axis or on students - students direction; strengthening the student's right to learn through participation;
- increased formative-educative tendency of teaching method; expanding search methods and those of knowledge identification, and not transmitting them on one's own account; cultivation of permanent self-education methods; promoting effective methods that help students in the desired direction; adapt methods to the existing reality.

Gliga L. and J. Spiro (2001) identifies three general inclusion and classification criteria for active methods, from which we can retain ranking modeling teaching in the category of methods that stimulate thinking and creativity, leads students to seek and develop solutions for different problems, make critical reflections, compare and analyze the given situation, together with other teaching methods, such as heuristic conversation, case study, problem solving, didactic game, exercise, brainstorming.

Pedagogical literature deals with many variations in the definition of modeling teaching. Most consider modeling as a self-contained method (Musata Bocos, Miron Ionescu, Ioan Cerghit, Iucu Romita) because, through modeling, principles, which are inaccessible to direct observation, are expressed. There are also different opinions, who appreciate predominant use of modeling as a teaching process (framed in the method of demonstration - demonstration with models; as a process in experiment method etc.), especially in small school period when students assimilate quite difficult the model with the surrounding reality. When the model is seen as a means of research, experimentation, modeling exceeds its demonstration valences, having the status to discover some scientific truths and thus modeling goes beyond the process status, becoming a self-contained teaching method with formative valence.

Others approach modeling as a learning form, learning through modeling. Underlying learning through modeling is the action with the model, "this material or ideal system, which reproduces more or less faithful to the original in order to facilitate the discovery of his new properties." (Ionescu, Radu, 2001, p. 146). Learning using the model has formative and informative value because the student understands components better, the relationship between different objects, phenomena and links established between them.

Analyzed as a teaching strategy, modeling along with simulation are part of the methods based on practical action and imply the construction of a model. It facilitates the study and explanation of complex actions, observing the parties and their operation and execution of operations. Through simulation, opportunities are created to make actions similar to real ones. Simulation methods are used when it is impossible to solve analytically and indirect experimentation on the original is non-operational. These involve methods of description, modeling and analysis of real systems or in progress. The simulation is always based on the use of the model. In this approach, modeling 'foster the spirit of experimentation in mental plan, models become support of the intuitive and productive thought and its development, it grows reasoning by analogy, inventive ability, hypothesizing, alternatives formulation, choosing solutions "(Cerghit, 2006).

As we already proved, imposing a certain context for the application of the model, modelling has the force to organize around it a whole didactic strategy, "to regulate an entire process and not only a sequence of learning" (Cristea, S. cf. Potolea, D., 2000, in Glava, 2011).

Modeling is an active method that helps the teacher to seek and engage students' thinking, because the models are simplified objects and biological phenomena, reduced to essential, easily understood by students. Modeling is based on the analogy between the built model and the original system that it represents. Teaching modeling involves "action with the model" (Barna, Pop, 2002, p. 230).

In technical training, demonstration using models and simulators is successfully used. Modeling is the way to study objects, phenomena, processes etc. through their material and ideal copies, named models, capable to highlight (reproduce) essential features (meaning) of the studied reality or to provide information about it. Modeling is an active - participatory method, formative and heuristic, stimulating the training and the development of creative intellectual capacity, also through this enhancing the quality and effectiveness of teaching and learning.

Modeling method supports the implementation of the intuition principle in training. Moreover, modeling exceeds the demonstration made only by illustration because understanding patterns involves the analysis and the abstraction of the model being a combination between intuition and abstract. The model simplifies (schematizes or reduces) giving only the essential elements that lead to sense and understand the structures, principles and mechanisms of the essence of processes or facts.

Being the teaching method which involves developing a model depicting a real phenomenon of reality, using modeling requires compliance of some methodological criteria regarding the development of the model:

- the model is an intermediate link between objective reality and theoretical knowledge with direction in both ways - from the perceived reality as a theory and vice versa - from theory to reality being under observation;
- to include elements of scientific interest;
- to be appropriate to the topic of the study;
- to reproduce the essential characteristics of the original, to ensure an effective study;
- to be used as a tool for discovering new features of the original;
- the model should be a closed system because it has a certain number of features and the original - an open system because it could reveal whenever a new feature;
- iconic and ideal models must be interlinked with objectual models demonstration

The term model was first used in 1868 by the mathematician Beltrami (Euclidean model for neeuclidean geometry), from the Latin root, "modus", meaning means or instrument for scientific knowledge. Cezar Barzea distinguishes three meanings of the term model (1995):

Normative sense:

- imitated or reproduced conduct, due to its value and significance;
- person, fact or being with representative qualities for a whole category;
- original object after which similar objects can be replicated in an infinite number of copies;

Artistic sense:

- person or object whom the artist reproduces the image
- object of the same form with another object, bigger or smaller;
- miniaturized or enlarged form.

Scientific sense:
- simplified and three-dimensional graphical representation of an idea, process or system;
- assembly of elements or variables that make up a symbolic or social system;
- logical or mathematical representation of a theory.

III. Discussion and conclusions

The didactic strategy describes the methodological context in which the model and the modelling will be used as didactic instruments. The didactic efficiency of the model and of the modelling depends on the characteristics of this context and of the didactic strategy which includes the modelling. Actually, the characteristics of the strategic context are already taken into consideration as part of the process of elaborating the model. The creation of the favourable environment adequate to the teaching in the context of the use of the respective model can be a much more difficult task than the realization of the model itself. (Glava, 2003).

Didactic modelling implies selecting or designing the models, in function of the applicative context. But, equally, the specific of the model determines certain characteristics of the application context. Modelling determines the application context in the same manner in which the application milieu requires certain features for modelling and model (Glava, 2011)

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