

Teacher's Concept of Constructivism in Real Conditions of School Teaching*

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Abstract

In the paper is observed the teacher's concept and realization of the conception of constructivism in the real conditions of school teaching. Constructivist pedagogy, despite numerous curricular reforms, is not sufficiently implemented in the real conditions of school teaching. We ask ourselves a question about which of the didactic implications has the constructivist epistemology in teaching. Teacher's concept of teaching as a general strategy for teacher's thinking and negotiation is the basis for planning constructivist-oriented teaching and for its actual practice in the lesson. In the theoretical part of the paper is represented the significance of the term teacher's conception of constructivist-oriented teaching and its real understanding of the constructivism theory in terms of school teaching. Based on the results of a research conducted through a questionnaire survey and a direct observation of lessons, we bring closer the reality of teaching of this epistemology, different perspectives, the teachers themselves as constructors of this paradigm.

Keywords: constructivism, critical thinking, RWCT methods, critical thinking methods, structured lesson observation, three-phase learning model, constructivist didactics, modern paradigm of education

1. Introduction

Many creative innovative teachers in the 21st century take such a concept of teaching that is consistent with constructivist learning. However, it is possible to observe the misconceptions of those who are in the role of the teacher as the guarantor of the truth, i.e. who know and pass on knowledge to those who do not know. Many teachers in real-world schooling perceive critical thinking as a dimension in constructivist learning. In this way, as one of the dimensions in constructivist learning, defines the conception of constructivism by Kim, Fisher & Fraser, 2006, Taylor, Fraser, & White, 1994, Taylor, Fraser, & Fischer, 1997. It is well known that critical thinking has a long tradition in European didactics and is based on the well-known and frequently used taxonomy of cognitive goals of B.S. Bloom. Lai (2011) considers critical thinking in Bloom's taxonomy as the cognitive goals of the level of analysis, synthesis, and evaluation. The advantage of such perceived critical thinking is its direct grasp in teaching and learning. Aebli (1951) develops the concept of J. Piaget's developmentally psychological and epistemological findings, which he attempts to evaluate for didactics and teaching purposes. Aebli's didactics is based on the belief that thinking is based on action. The key concept of this didactics is the above-mentioned thought operations.

In didactic concepts based on constructivism, teaching is understood as creating situations in which pupils are given the opportunity to (re) construct - to create, modify and improve their existing knowledge. Assessing the learning outcomes by distinguishing right / wrong does not seem reasonable, because no knowledge is itself privileged. Learning is an act of constructing in a community of learners.

Constructivism is not a clearly defined theory, it cannot be defined and explained from a single scientific point of view, but it consists of many streams, constantly evolving. According to Janík (2010), constructivist didactics in theoretical constructions articulates quite radically; with respect to practice is supported rather moderate positions. Thus, in terms of practice, pedagogues talk about critical thinking in connection with higher degrees of Bloom's taxonomy and the application of concrete methods of critical thinking.

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The use of constructivist education is spoken by Fosnot, 2005, "Constructivism is a theory about learning, not a description of teaching. No 'cookbook teaching style' or pat set of illustrational techniques can be abstracted from the theory and proposed as a constructivist approach to teaching. Some general principles of learning derived from constructivism may be helpful to keep ill mild, however, as we rethink and reform our educational practices". However, the teacher's teaching approach enters the whole process as a general strategy for teacher's thinking and acting which is the basis for planning constructivist-oriented teaching and for its real acting in the lesson.

The challenge is therefore to find out what these paradigms bring in practice. The experience speaks more about such a concept of teacher teaching, where the methods of critical thinking are classified into the classical frontal organizational form. In this context, we ask: Do the teachers understand critical thinking as the most dominant dimension of constructivist thinking? What is their understanding of this epistemology? What didactic implications constructivist epistemology has in teaching?

2. Method

For the determination of the main goal we come up from problematic questions: What didactical consequences constructivist epistemology has in teaching? The aim of this research is to describe and subsequently explain the concept of constructivism and critical thinking, which is perceived as its integral part in the teaching of school practice. Together with the concept of Taylor, Fraser, & Fischer, 1997, critical thinking can be considered an integral conceptual and practical element of constructivism. We focus on the teachers themselves. The parallel aim of the research is: To find out whether there are differences in concepts and features of constructivist learning and in critical thinking due to the qualification of teachers.

Population – sampling

The research sample consists of 20 teachers of Secondary Medical School and College of Higher Medical Education. A vocational school was chosen intentionally. In the sample of teachers are represented men and women. The average length of teaching practice of teachers is 18 years. The largest representation is provided by teachers with a length of teaching practice of 6-29 years (75%). The following table 1 shows the characteristics of the examined group of teachers. We visited 20 lessons of these 20 selected teachers.

Table 1.Characteristic of examined group of teachers

	Teachers of general subjects	Teachers of vocational subjects	Σ
Length of teaching practice 1–5 years	1	1	2
Length of teaching practice 6–29 years	7	8	15
Length of teaching practice 30 years and more	2	1	3
Σ	10	10	20
Degree of education			
University education Bachelor's degree	0	3	3
University education Master's degree	10	7	17
Σ	10	10	20

From the descriptive data in Table 1 it can be seen that the number of males and females corresponds to the expected layout. The representation of women is characteristic in the group of teachers of vocational subjects. The examined file is balanced in terms of length of pedagogical practice. All teachers have higher education.

Data collection tools

Two research tools are created to meet the main goal: direct structured monitoring of 20 lessons and non-standardized questionnaire for teachers who have been directly surveyed. The observation sheet of direct structured observation includes the following selected categories: teaching methods, organizational forms, structure of the teaching unit, activities of the teacher, activities of pupils, didactic tools.

On the pre-prepared "observation sheet" we noted the occurrence, duration of the observed categories. At the same time, we recorded the activities of the teacher and the activities of the pupils in lesson and used didactical tools.

The following table 2 gives an overview of selected categorical systems of direct structured observation.

Table 2. Categorical system of teaching methods, organizational forms and phases of teaching

Teaching methods (Maňák, Švec, 2003)	Classical methods, activation methods and complex methods
Organizational forms (Vališová, Kasíková a kol., 2007)	frontal (collective) individual form of teaching individualized forms of teaching pair teaching group teaching
Phase of teaching (Maňák, 1999)	Introduction, motivation, exposure, fixation, diagnostic, application.
Three-stage learning cycle E-U-R	Three-stage learning cycle Evocation, realization of meaning, reflection

The questionnaire survey examines the concepts of constructivism and methods of critical thinking and allows the results to be compared with the findings from the observation of the individual lessons. The process of critical thinking is the process that leads to creativity in thinking and can be viewed as thinking and reasoning at its full strength. Teaching students how to think deeply while in their online course is one of the goals of this project with the main goal is to reach the highest level of quality thinking (MacKnight, Carole (2000), Ennis, Robert H. (2011b)).

The questionnaire consists of individual items that are divided into sub-sections and problems related to the research goal, containing 20 questions (closed, semi-closed, enumerated, open, scale). The questionnaire is not listed in the attachment.

3. Findings

Observation results

After processing of results of structured observations of 20 lessons in ten elected courses, it is possible to present the main repertoire of teaching methods applied by teachers of vocational and general subjects. Critical thinking methods can be categorized according to current concepts, definitions and uses, both in the activation and complex methods. According to the categorical system of teaching methods according to Maňák and Švec, 2003, we put them in complex methods. We recorded the representation and frequency of teaching methods, the duration of individual teaching methods, the duration of the categories of classical, activation and complex methods. Last but not least, the representation of specific methods of critical thinking and their time representation.

Of 10 observations of the lessons of teachers of vocational subjects, the following facts arise. Teachers mostly applied classical and complex methods, activation methods were used in three subjects. Most of the time teachers devoted to classical (155 minutes) and complex (173 minutes) methods, activation methods occupy total 60 minutes. The total time devoted to critical thinking methods is 73 minutes.

By evaluating 10 observations of lessons of teachers of general education subjects we have reached the following results. In the teaching of teachers of general subjects, classical methods clearly prevailed over complex methods. Activation methods have not been applied at all. Most of the time teachers spent using the classical methods (303 minutes). Only 85 minutes of the time take complex teaching methods, 44 minutes of which are devoted to critical thinking methods.

The most commonly used classical method is simple interpretation and takes the most time. Interpretative exposures lasted for an average of 19 minutes. General teachers spent on average 27 minutes on interpretative exposures. Teachers of vocational subjects spent on it on average 7 minutes. Activation methods were applied only by teachers of vocational subjects and used the heuristic method of problem solving and role playing. Of the complex teaching methods, independent work of pupils is the most represented. From the methods of critical thinking, teachers used most often the five-leaf method and mind map.

To analyze the results of the didactic category of the organizational form we use the classification according to Vališová, Kasíková 2007. The analysis of organizational forms of teaching focuses on the examination of the specific organizational framework in which the process of transformation of the subject matter takes place. It shows the ways the teacher organizes the teaching process. Attention is paid to the time representation of organizational forms in the teaching of general and vocational subjects.

In the frame of the organizational form of frontal education is strongly represented in the general subjects (Czech language, German language, Maths, Civics, Biology). In the teaching of vocational subjects (Nursing, Psychology, Somatology, Ped/Psych.) is used both the frontal as well as group teaching. From the analyzed data, it is clear that in the general educational subjects strongly dominate the teacher-oriented organizational form. The evidence is that the frontal organizational form is represented in the ratio of 323: 28 minutes of group work. In the teaching of vocational subjects, the proportion of the frontal organization form to the group one is 270:118 minutes. There is also predominance of frontal organizational form here.

The specific organizational forms of teaching correspond to the application of specific teaching methods and in relation to them the mutual cooperation of teachers and pupils. It is this synergy that is one of the essential aspects of developing creativity.

The methods of critical thinking that we include in complex methods are conducted predominantly frontally. Group organizational form is another used category. Classical teaching methods are logically applied more in cooperation with the frontal organizational form. Activation methods are applied with frontal and group organizational forms. Teaching methods must be set within a certain meaningful sequence of learning steps. A critical thinking strategy based on the E - U - R principles was not recorded in any lesson. We therefore evaluate classical teaching units. In many didactic textbooks, the learning process can be differentiated into parts: introduction, motivation, exposure, fixation, diagnostic and application. From the observed data we first evaluated the time representation of the teaching phases.

The observed lesson of 20 lessons is mainly focused on the transfer of new subject matter, i.e. the exposition where it is given the most teaching time. The fixation phase follows when the teacher consolidates the knowledge by practicing, repeating. The phase "other" relates to organizational issues that are not directly related to learning (welcoming pupils in classroom, student moves, the distribution of pupils into groups, but also solving some discipline issues). This was a situation that could not be categorized into any of the above categories. From a certain point of view, the introductory phase could in many cases be included in this category, since the teachers just devoted the introduction of lessons to the above mentioned activities. The introductory phase was represented briefly or practically at all. Teachers presented the theme of the lesson, briefly introduced what was going to take place and went straight to the phase of passing on new knowledge. For the motivation stage, when the teacher tries to captivate the pupil for further work, it is 74 minutes. Relatively little time teachers spend on the application phase. The diagnostic phase, when the teacher identifies the level of knowledge acquisition, evaluates and classifies, was not represented in any teaching unit.

Both groups of teachers spend most of their time in exposing and fixing the subject matter. Only teachers of vocational subjects have applied the application phase. These teachers motivate pupils to a greater extent than teachers of general subjects.

The frontal organizational form and group teaching teachers used at most in the exposure and fixation phase. In the application stage is more often used group teaching. At the motivation stage there is a frontal organizational form.

Classical teaching methods are most applied in the exposure phase. The same finding applies to activation and complex methods. Both groups of teachers in the motivation phase applied complex teaching methods. Teachers fix most using classical methods and apply by means of complex methods. Both the teachers of general subjects and the teachers of vocational subjects applied the most classical teaching methods at the exposure stage. The differences between the surveyed groups in the mentioned phase are evident in the case of complex methods where the teachers of the vocational subjects devote them more time. Only this group of teachers applied the activation methods for this phase.

Both groups of teachers most fix the subject matter using classical teaching methods. Only teachers of vocational subjects to the fixation phase have also included activation methods. On the contrary, teachers of general subjects have more applied complex teaching methods at this stage. Teachers of vocational subjects for the application phase have applied both activation and complex methods. Both groups of teachers in the motivation phase worked with complex methods. Didactic tools we found as usual in the observed lessons. In the classroom environment, which should express the principles of pupils' learning activities, prevailed the traditional layout of teaching facilities, including classroom furniture.

Results of the questionnaire survey

After completion of the observation of twenty classes of randomly selected teachers, questionnaires were distributed to these teachers. In total 20 questionnaires were distributed. The return of properly filled and valid questionnaires was 100%. Questionnaires were distributed to 10 teachers of vocational subjects and 10 to teachers of general subjects. The results of the questionnaire survey showed how teachers perceive the category of constructivism and critical thinking. Under term constructivism, teachers understand the active participation of pupils in teaching with an emphasis on the development of their creative thinking. In such lesson predominates activating character of learning (learning by doing). As an essential characteristic of constructivism, they stated the active role of the pupil in the teaching and interaction of teacher-pupil. The active participation of pupils in teaching is, according to them, directly dependent on the use of activation methods, but only a small part of teachers refers to methods of critical thinking. Critical thinking is seen primarily in active involvement in teaching. Critical thinking is perceived as a process that pupils perform with the facts they learned with the help of a teacher. According to them, it is one dimension in constructivist learning.

The term "constructivism" is perceived in a broader sense. The concept of constructivism can be applied in school practice especially through the use of group work and research-oriented teaching.

Comparing teachers' answers from questionnaires and conclusions from structured observation, we find no consensus between the declared and the observed. All teachers stated that they prefer a combination of classical and activation and activation methods use in their teaching very often. However, the declared application of these teaching methods does not correspond to what could be observed in lessons. Activation methods were applied only by teachers of vocational subjects and used a heuristic method of solving problem, didactic play and role playing. Methods of critical thinking were more applied by teachers of vocational subjects. In this group, however, a limited repertoire of critical thinking methods appeared (brainstorming, five-leaf method, mind map, learning one another, yes-no method). Teachers of general subjects have used two methods of critical thinking (mind map, learning one another). Time representation of these methods is low for both groups of teachers. A critical thinking strategy based on the E - U - R principles has not been recorded in either case critical thinking is therefore developed at pupils just limitedly.

4. Conclusions

Conducted research on a specific case of school responded to the following questions: Do teachers regard critical thinking as the most dominant dimension of constructivist thinking? What is their current understanding of this epistemology? What didactic consequences does constructivist epistemology have in teaching?

Teachers do not effectively promote the practices of constructivist pedagogy in their professional activities and teaching. Teachers' concept is close to the description according to Škoda, 2002, p.9. "Structurally conceived teaching is based on less traditional organizational forms and learning methods than commonly used frontal teaching and interpretation (Škoda, J., 2002, p. 9). This has shown the results of observation where the activation methods and methods of critical thinking are part of lesson, but the nature of the lessons correspond to the traditional teaching.

This fact shows the applied learning phases, their distribution over time and applied organizational forms of teaching. In researched lessons prevailed the phases and organizational forms in that teacher was more active than pupils. Both groups of teachers apply the classical methods of teaching at stage of exposure, which means they cannot expose new knowledge otherwise than by classical methods, mostly by interpretation. This finding also suggests a very limited repertoire of critical methods. We have also confirmed this in the number of use of individual methods of critical thinking.

Real application of constructivism for teachers would be the use of the methods of critical thinking by means of the E-U-R three-phase learning cycle. Although the curriculum in the Czech Republic emphasizes the development of the pupil's key competences and the development of his personality, we are still facing a concept that emphasizes the subject matter. Compare http://www.vuppraha.cz/wp-content/uploads/2009/12/RVP_ZV_EN_final.pdf.

Now there are significant innovations and updates of the concept of tertiary education in the critical thinking of future teachers. At our Faculty of Education in Olomouc, the compulsory subject of Activation Methods is a part of the education of students of all teaching professions. Students practically deal with principles of constructivism, methods of critical thinking and activation teaching methods in order to actively use this epistemology in practice. The reflection for us is increased interest of students in this subject. We react to this fact, among other things, by realizing the ESF project, where we open up another space for the realization of this concept of teaching.

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