Application of Critical Thinking Strategies in Educational Practice of Lower Secondary Education

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Abstract

The study analyses the identified teaching strategies for the development of critical thinking and the extent of their use by teachers of lower secondary education in the Slovak Republic. We have identified a significant relationship between the application of individual strategies by teachers and the level of critical thinking regarding the factors, such as interpretation, assumption recognition, deduction, self-regulation and argument evaluation – therefore, this study focuses on whether there is a significant difference in application of strategies for development of critical thinking by teachers. We have identified the level of application of strategies for self-regulation, development of systematic and interpretative skills, strategies for argumentation, drawing conclusions and problem-solving, strategies for evaluation development and development of reading skills in teaching. Based on the results, we found that the application of strategies for development of critical thinking by teachers differs statistically significantly. The most widely used strategies are strategies for developing systematic and interpretative skills (leading to the summary of learning content, application of practices for understanding, identification and definition of basic concepts and relationships by teachers, making notes, using associations, preferring cognitively challenging tasks, encouraging pupils to create original ideas, using categorizations, leading pupils to deduction). Less often used strategies are those aimed at the development of argumentation skills, strategies for drawing conclusions and problem solving, and the least used strategies in teaching are those for the development of assessment and reading skills.

Keywords: Critical Thinking, Creative Thinking, Management of Strategies Selection, Teacher's Managerial Competence, Teaching Strategies for Development of Critical Thinking.

1. Introduction

Ability to think critically is nowadays considered to be essential for effective way of life in 21. Century. It is a key competence of every individual, which includes "abilities creatively and critically solve problems, identify them, analyse, suggest solutions, revaluate them and learn from them.
E. R. Lai [1], implements in definition of the essence of critical thinking these categories:
deduction based on inductive or deductive arguments, analysis of arguments, claims or evidence; deduction based on inductive or deductive arguments; review and evaluation; decision-making or solution of problems; answers to clarification questions; definition of terms; identification of hypotheses; explanation; verbal reasoning particularly regarding the phenomenon of probability and uncertainty; prediction; looking at a problem from several points of view; rigorous mental activity aimed at evaluation of arguments or statements for formulation of conclusions.
In an attempt to define the key constructs of critical thinking required for the evaluation of education outcomes, the experts attempted to create a consensual definition that was published in the Delphi Report [2]. The core of critical thinking consists of two dimensions:

1. *specific categories of cognitive capabilities: interpretation, analysis, evaluation, judgment, explanation, self-regulation;*
2. *dimension of personality dispositions*

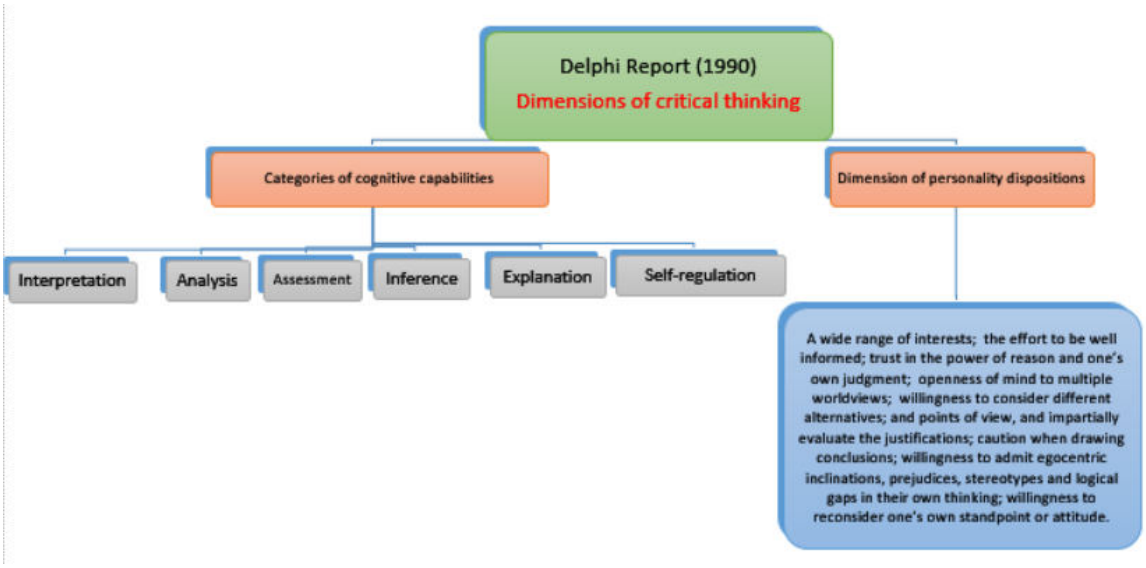


Fig.1.Dimension of critical thinking in Delphi Report [2]

These features as evolving qualities of a personality [3] require effective educational strategies and their expert application. In the teaching profession expertise generated by systematized professional knowledge covers the rationalization and verbalization of hidden or silenced (tacit knowledge) prerequisites for decision-making and action. Expertise includes the teacher's own theory in a unique situation (for each case a new theory). An expert autonomously selects teaching strategies that ensure the transformation of subject content and brings about a permanent reflection of practical activity and the self-reflection.
As previous researches showed, the level of applying strategies of critical and creative thinking (or the very level of critical and creative thinking) differs regarding the subject, study programs of the education students and also the school type, degree of education [4, 5, 6, 7, 8].

2. Strategies for developing critical thinking in the educational process

Based on theories of critical thinking [2, 9, 10, 11], and other and operationalized constructs of critical thinking, we have formulated various educational strategies that help to develop individual factors of critical thinking [12]. Through factor analysis, methods and procedures were classified into 6 factors - strategies for developing critical thinking in the teaching process. These are:
Strategies for Development of Self-regulation – present mainly strategies for developing personality, volition and emotion connected with critical thinking such as: widening the circle of interests, motivation and stimulation of the need to be well informed, strengthen the trust in the power of reason and one's own judgment, openness of mind towards diverse worldviews, willingness to consider different alternatives and points of view and without prejudice to consider substantiation, caution in drawing conclusions, willingness to admit egocentric inclinations, prejudices, logical gaps in one's own thinking, willingness to re-evaluate one's own opinion and also the development of metacognitive skills, monitoring and correction of one's own thought processes, identification of emotions, prejudices, stereotypes, cognitive abbreviations, in one's own judgement and argumentation and control of the adequacy of the chosen problem-solving strategy.
Strategies for Development of Systematic and Interpretive Skills – present mainly strategies aimed at recognition of a problem, identification of main idea, classification of information in a broad professional text, clear definition of terms, paraphrasing, interpretation of data in tables, graphs, recognition of the meaning of non-verbal signals in communication and so on.
Argumentation Strategies - represent procedures leading to the identification and analysis of arguments, determination of relationships and connections, similar and dissimilar characters, recognition of arguments and evidence in an argument, identification of unexpressed assumptions.
Strategies for Drawing Conclusions and Problems Solutions – these include mainly procedures leading to the formulation of alternative suggestions to solutions of a problem, prediction of consequences, presentation of conclusions, results, presenting in the form of tables, schemes, creation of models expressing of relations between variables, justification of procedures, methodological approach, formulation of arguments , anticipation of counter-arguments.

Development Assessment Strategies - assessment presents the judgement of the reliability of arguments and the quality of the arguments. It also includes judgement of the reliability of the source of information, identification of logical gaps in argumentation, assessing of strengths and weaknesses of alternative theories, judgement of the justifications.
Strategies for Development of Reading Skills - we have included mainly strategies based on work with text that led to reading comprehension.

3. Methods and Participants

Our research aim was to find out if there exists a significant difference in inclusion of strategies developing critical thinking in teachers of lower secondary education, respectively if some of these strategies are used in educational processes more often. Targeted group are teachers of lower secondary education.
We hypothesized that there exist statistically considerable differences in application of strategies and methods for development of critical thinking in teachers of lower secondary education.
As part of collecting the data we used a questionnaire Duchovicova, J. [12]. For testing of the hypothesis we used the non-parametric Friedman ANOVA (0,05).

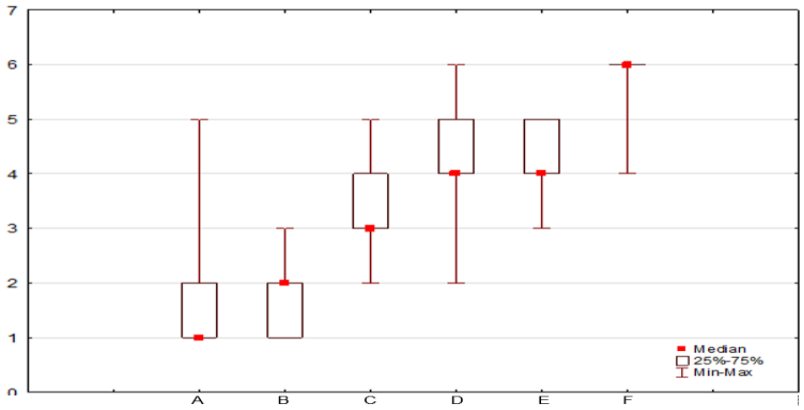
4. Results

For the testing of the hypothesis we used non parametric tests for the individual variables don't show normal divisions, what we checked with normality test- Shapiro-Wilks-W- Test.

	Friedman ANOVA and Kendall Coeff. of Concordance ANOVA Chi Sqr. (N = 125, df = 5) = 93,73143 p = ,00000 Coeff. of Concordance = ,74985 Aver. rank r = ,73943		
	average	total	SD
B: Strategies for Development of Self-regulation	1,760000	220,0000	1,051982
A: Strategies for Development of Systematic and Interpretive Skills.	1,640000	205,0000	0,637704
C: Argumentation Strategies	3,160000	395,0000	0,943398
D: Strategies for Drawing Conclusions and Problems Solutions.	4,320000	540,0000	1,144552
E: Strategies for Development of Assessment.	4,360000	545,0000	0,700000
F: Strategies for Development of Reading Skills.	5,760000	720,0000	0,597216

Table 1. Application of strategies for the development of critical thinking in teaching.

Results showed that between the choices or the actual use of the individual methods and strategies for development of critical thinking of students in lessons of lower secondary education teachers are statistically high relevant differences (p=0.0000).



Variable codes: 1 - I always use, 2- I use it often, 3- I use it occasionally, 4 I use it rarely, 5 - I hardly use it, 6- I don't use it

Fig.2. Application of strategies for the development of critical thinking in teaching.

To measure the consensus between the choices and use of the methods and strategies by the teachers we used the Kendall concordance coefficient, so called Kendall W. The value of W= 0.739 shows a strong consensus by choosing methods and strategies in teaching among the teachers that we examined. Based on our findings we can proclaim that the hypothesis about uneven usage of strategies for development of critical thinking in teaching process was confirmed.
As results in the graph show, teachers unambiguously prefer interpretation and self-regulation methods (average 1.64 or 1.76 which means these methods are being used often). Teachers statements show that they often use methods leading students towards deduction, concretization, they use procedures for understanding, remembering, methods leading to summarize and interpret the curriculum.
As we found out, lower secondary education teachers only rarely or almost never use strategies for drawing conclusions and problem solving, strategies for assessment development and strategies for development of reading skills. Average score for using strategies for development of reading skills leading to development of reading with understanding is very low, what we see as very alarming.

5 Conclusions

Effective learning aimed at learning how to think critically gives the individual the best hope for successful life as postulate the key thesis in many documents of declared needs of lifelong education. The aim of modern didactics becomes the need to give the teachers such psycho didactic competences so they will be able to use cognitive oriented teaching and implement adaptive teaching strategies aimed at development of argumentative abilities leading to identification and analysis of arguments, addressing of relations and contexts, similar and different characteristics, identifying claim and evidence in arguments, identifying unstated presumptions.

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