

Athletic Championship General Education High School

in Racibórz

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Summary of the doctoral dissertation entitled

Variety of students' learning practices in the light of effects of education

Doctoral thesis in the field: social science; discipline: pedagogy

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The issues discussed in this thesis refer to the conditions of long-term school education of mathematics and its effects. They are classified into research on learning and teaching, on the methods of independent discovery and actions as well as on the methods of initiation of educational situations that engage and motivate students to effective learning. The analysis of the Polish students' results in their maturity exam in mathematics at the basic level led to undertaking scientific research explaining the reasons of students' successes and failures.

The thesis consists of two parts: the theoretical one and the empirical one. The theoretical part contains three chapters. The first chapter is focused on the explanation of the term of learning as the central pedagogical category. It presents its various perspectives in the definitions of pedagogues and psychologists as well as the factors that impact its effectiveness. The competence of learning understood as the ability to organize own learning, awareness of the preferred style of learning, the level of knowledge and skills were discussed in the context of the constructivist theory of knowledge. Moreover, it was pointed out to the theory and practice of the teachers' actions in the context of teaching and learning and to the most characteristic assumptions of the didactics inspired by constructivism. Then the subject of analyses was the target of constructivist education as actions aimed at supporting a student in the formation of autonomous attitude towards learning. The styles and principles, the

methods, the aspects and types of learning as natural and engaged student's activities taking place in deliberately created conditions that are to enable such activities and lead to socially accepted and socially determined changes in their psyche were also discussed. The technical, standard and system-creating aspects described in literature were analysed.

The second chapter is focused on the analysis of the meaning context of teaching, its principles, methods and effectiveness as well as connection with learning. In particular it refers to the person of a teacher, his class planning skills, the application of activating methods, creation of didactic situations engaging the students and personal characteristics significant for treating the students with respect. The following paradigms were discussed: the functional and behavioural paradigm, the humanist and adaptive paradigm, the constructivist and social paradigm and the critical and emancipatory paradigm as well as their reference to the process of learning. The analysis of the principles and methods of teaching defined by the selected pedagogues was made. Moreover, the problem of effective teaching connected with effective learning was highlighted. Based mainly on the English-language literature the author of the thesis addressed the principles listing the teacher's actions that support effective teaching and learning by the students, in particular emphasizing such elements of effective education as: engagement of parents, organization of education, teaching the students learning strategies, tutoring, team work, adjustment of the content to the needs and abilities of individual students, educating assessment, the standards of effective practices of mathematics teaching and other. However, one should note that none of the mentioned methods guarantees full educational success without the person of a teacher and therefore the last subchapter refers to the role of a teacher in supporting the students in their education.

The third chapter regards the conditions of the educational process. It discusses the pedagogical, individual and environmental factors that are of significance for the results of learning. The theoretical considerations focused on the Polish or foreign literary opinions connected with successful education as an effect of talent or the teacher's application of academic theories. In this chapter the factors that most strongly effect the students' school achievements such as: self-assessment, constructive criticism, motivation, attitude, engagement, expectations, tutorials as out-of-school support, health, school stress and other, are subject to a critical analysis. The theoretical analysis on the subject closes the theoretical part of the thesis.

The methodological basics of own research included in the fourth chapter constitute the beginning of the empirical part. It presents the subject and object of research as well as the research targets, problems and hypotheses. Then it characterizes the research methods,

techniques and tools. It also justifies the selection of the group of the tested students, teachers and school headmasters from eight high schools from the Opole region as well as of a group of expert teachers. Moreover, the area of research and the method of test performance were described.

The fifth chapter characterizes out-of-school factors that impact organization and performance of actions connected with education of mathematics at the fourth educational stage and indicates relationships between them.

The sixth chapter presents the results of research that illustrate the difference between the effects of students' education measured with maturity exam results and the effects measured with the author's diagnostic test exploring the students' mathematical competence. The interpretation of these results points out to certain connections with the methods of mathematical education.

The beliefs of students, teachers and experts on individual, environmental and pedagogical factors that influence the effects of education are the subject of analyses in the following, seventh chapter.

Whereas the content of the eighth chapter deals with the dependencies between the internal factors of the examined students and the effects of mathematical education.

In general the research confirmed the thesis that educational success of the students taking the maturity exam depends on external factors lying in the school and out-of-school environment and on the internal factors of the tested students and teachers.

The thesis is closed with the discussion of the results and recommendations for the educational practice.

The main aim of the research was to find the links and dependencies between the conditions and the results of education of students who upon finishing their education should dispose of mathematical competence indispensable for functioning in information society based on knowledge. The explanatory aim was to present the methods of students' learning and to determine the grounds of maturity results achieved in mathematics at the basic level and the practical aim was to prepare recommendations for students and teachers so as to improve the quality of mathematical education in schools.

The research was placed in the quantitative research model and supplemented with the qualitative analysis. The main method assumed was the diagnostic poll. The questionnaires, the diagnostic test of the students' mathematical skills, open, individual and group (focus) interviews, examination of documents and materials (the provisions of educational law, educational reports as well as directives connected with assessment and examinations) and

questionnaire psychological and pedagogical tests were used. The tools were: the author's questionnaire for the students entitled: *Conditions of education*; the author's standardized test of school achievements along with the answer key, the M. Widerszal – Bazyl questionnaire to measure achievement motivation; the author's questionnaires of individual and focus interviews and Environment R for advanced statistical analyses – for computing and graphics of results based on inter alia logistic regression and correlation matrixes.

The tested group were the 3rd grade high school students drawn from the general population of high school teenagers and high school mathematics teachers and educational experts in the Opole voivodship. The questionnaires comprised drawn 8 schools, the total of 385 of the tested students. The criterion of school selection was its position in the Educational Value Added.

The collected material was subjected to the quantitative and qualitative analysis.

The research proved that:

1. The transfer of content of the Core curriculum in mathematics at the 4th educational stage is focused on achieving by the students instrumental knowledge and skills that are unfavourable for their development of reflexivity, the skills of analysing, interpreting, drawing conclusions or arguing.
2. The location of schools in the Educational Value Added category impacts the level of the pass rate of the maturity exam in mathematics.
3. The schools apply the behaviourist and adaptive approaches to teaching and not the constructivist or the emancipatory ones.
4. A student who wants to succeed in the exam must engage and perform real work. The work consists in the performance of the activity of learning.
5. The student's support in the process of learning is environment, that is parents and peers, as well as the teacher. The most important factors that influence mathematical education are the teacher's communication skills and the teacher's ability to inspire the student to independent work.
6. Students who are interested in mathematics and science achieve better results in learning.