VIRTUAL VISUALISATION OF LOGICAL FOUNDATION OF SUBJECT MATTER IN EDUCATION II. (EXPERIMENTAL RESEARCH)

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3 Empirical Research Application in Teaching Process (Experimental verification of their didactic effectiveness in the conditions of real school)

The method of pedagogical experiment was used to compare the two teaching systems in the experimental group (the NIESVL system) and the control group (traditional teaching system).

The main aim of the experimental research was to investigate the possibilities of the NIESVL system application in order to increase the effectiveness of the teaching process.

3.1 Initial Hypothesis of the Research

H. The initial hypothesis: the proposed experimental teaching system (hereinafter NIESVL) will be more effective than the traditional teaching system. In order to be able to conduct successful quantitative and qualitative verification we divided the initial hypothesis into the following subhypotheses:

H1 The cognitive learning performance (the results of the output didactic test) of the students thought by means of NIESVL will be better than of those thought traditionally.

H2 At the end of the experimental period the students thought by means of NIESVL will achieve better or the same level of memory performance in comparison with the students thought in a traditional way (in the subtest N1 of the output didactic - test the learning taxonomies of Niemierko.).

H3 At the end of the experimental period the students thought by means of NIESVL will achieve better or the same level in knowledge comprehension (in the subtest N2 of the output didactic test - the learning taxonomies of Niemierko) compared with the students thought in a traditional way.

H4 At the end of the experimental period the students thought by means of NIESVL will achieve better or the same performance in the knowledge application (in the subtest N3 of the output didactic test - the taxonomies of Niemierko.) compared with the students thought in a traditional manner.

We present here only the central subhypotheses in the cognitive area.

The effectiveness of the NIESVL application in the natural and technical teaching process at (teachers) faculties was verified during a continuous series of long-term empirical research in 1997 – 2002.

In the process of our research the following methods (the method of pedagogical investigation and psychological-pedagogical method) were used:

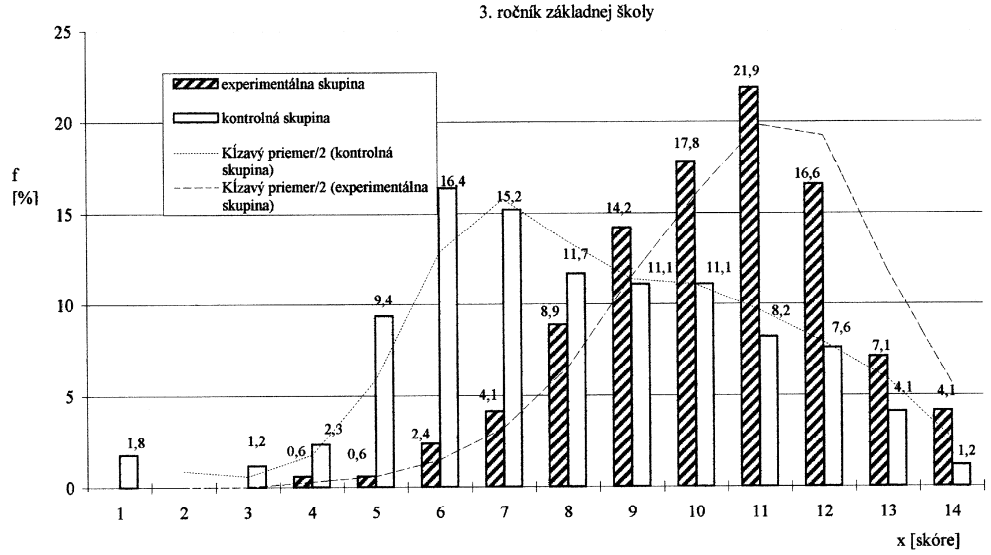
1/ the pedagogical experiment – the main method, a two-group model of the experiment (an experimental and a control group) conducted synchronously and simultaneously; 2/ didactic tests 3/ the questionnaire method 4/ the method of dialogue 5/ the method of observation, 6/ the statistical methods of research data analysis.

3.2 The Major Experimental Research Analyses Findings

The statistical interpretation of the research analyses findings is concise as the graphs are explicatory enough. They include the digital data related the values in question as well as the basic characteristics of the statistical ensembles arranged into the tables. As we find them sufficiently descriptive we do not provide any additional verbal explanations.

Graf11.3

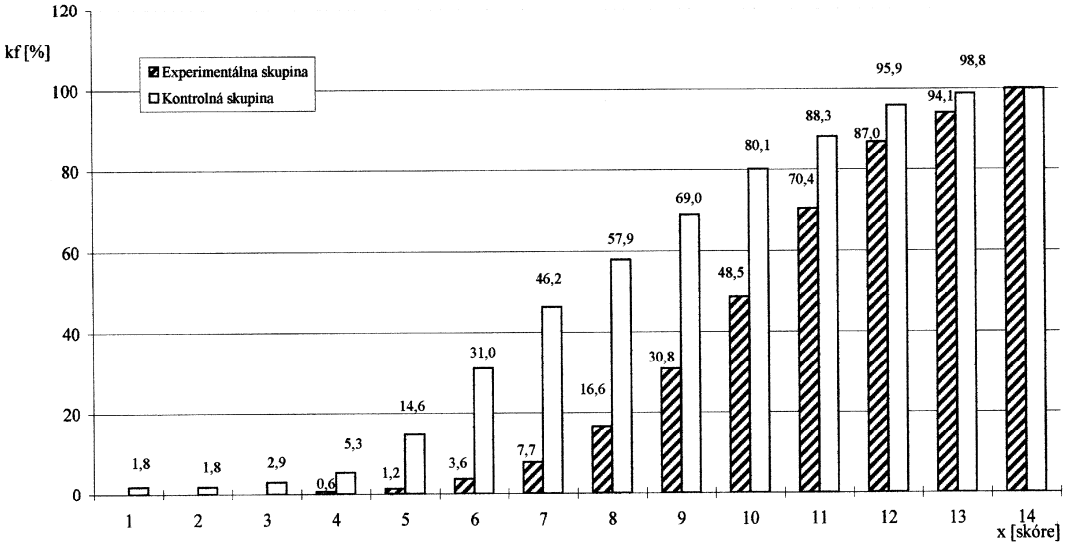
Graf rozdelenia frekvencie výskytu výkonov žiakov dosiahnutých vo výstupnom didaktickom teste z prírodovedy pre 3. ročník základnej školy



Štat.charakteristiky:	n_e =	169	n_k =	171									
$X_{max\,E}$ =	14	$X_{MAX\,K}$ =	14	$priemer_E$=	10,2071	test normality:	vyhovuje			$modus_E$=	11	$modus_K$=	6
$X_{min\,E}$ =	4	$X_{MIN\,K}$ =	1	$priemer_K$ =	8,216374	test normality:	vyhovuje			$median_E$=	10	$median_K$=	7
Štat.výz.diferen.(E-K)	k=	2	ni1=	1	ni2=	338	Fkr=	6,76		F=	55,27014	signifik.	

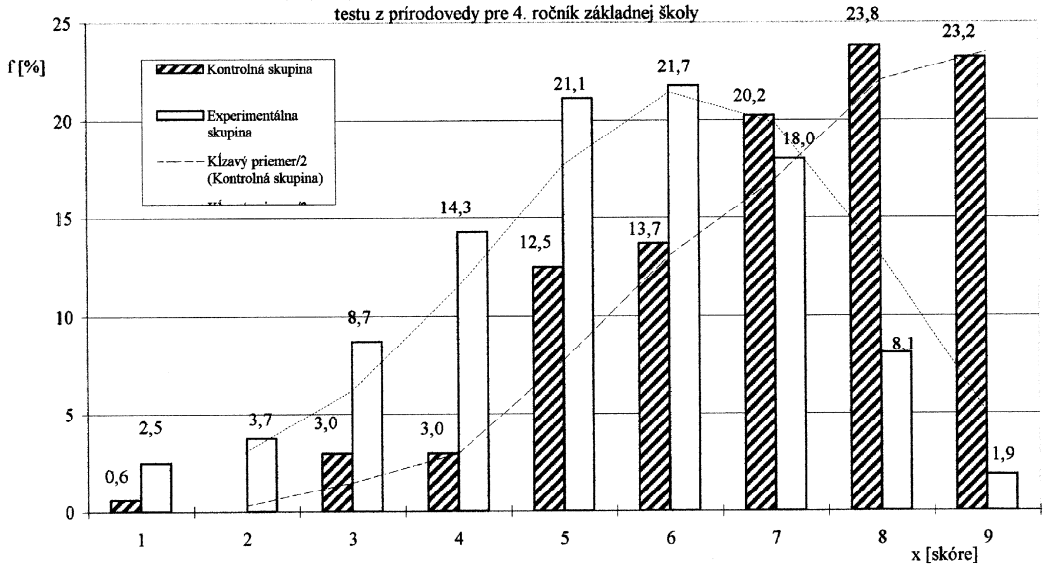
Graf12.3

Graf distributívnej funkcie rozdelenia výkonov žiakov dosiahnutých vo výstupnom didaktickom teste z prírodovedy pre 3. ročník základnej školy



Graf13.4

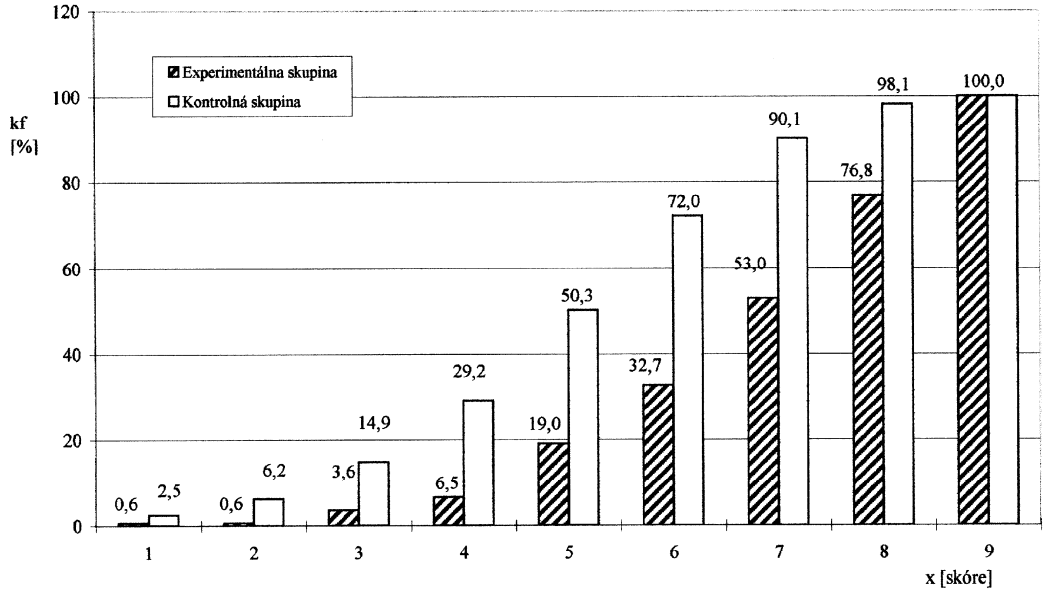
Graf rozdelenia frekvencie výskytu výkonov žiakov dosiahnutých v subteste 2 (porozumenie) výstupného didaktického testu z prírodovedy pre 4. ročník základnej školy



Štat.charakteristiky:		n_e =	168	n_k =	161						
$X_{max\,E}$ =	9	$X_{MAX\,K}$ =	9	$priemer_E$=	7,955357	test normality:	vyhovuje		$modus_E$=	8	$modus_K$= 6
$X_{min\,E}$ =	1	$X_{MIN\,K}$ =	1	$priemer_K$ =	6,037267	test normality:	vyhovuje		$median_E$=	7	$median_K$= 5
Štat.výz.diferen.(E-K)		k=	2	ni1=	1	ni2=	327	Fkr= 6,76	F=	87,75572	signifik.

Graf14.4

Graf distributívnej funkcie rozdelenia výkonov žiakov dosiahnutých v subteste 2 (porozumenie) výstupného didaktického testu z prírodovedy pre 4. ročník základnej školy



3.3 The Interpretation of the Major Experimental Research Analyses Findings

The overall analysis of the application of the present innovative teaching system proves the good prospectives of the introduction of the innovative system into school practice. Moreover, it proves the system to become a valuable tool for increasing the effectiveness of the teaching of teachers faculties. Furthermore, it provides evidence to

be a helpful means for achieving positive qualitative changes in students' knowledge structure. The most encouraging is the fact that the present innovative system can be introduced into the teaching process without any radical transformation of the traditional teaching system (and in our view it is its crucial advantage).

In addition, the NIESVL system was regarded as much more attractive and motivating than the traditional one by the participants of the research. What is more, the experiment students said that they were looking forward to being taught by means of NIESVL.

Conclusion

The contribution contributes to Slovak pedagogy in various ways. The graphic form of visualized thematic foundation as an instrument of subject and operational object have the ability to become an informational pipeline leading students towards comprehension of logical structure of the content, and thus towards easier acquirement of the given information. This medium - experimentally proved in real conditions of a contemporary school - makes material clearer; it classifies and systemizes the knowledge, and in this way it guides pupils so as to approach deeper understanding and more permanent saving of the material in their memories. The priority of visualisation utilization in contemporary school rests in its economical accessibility. Other advantages offer the time saving during teacher's preparation and no "revolutionary intervention" into tradional educational system. The already mentioned small entries into methodology bring a desirable output in the form of a higher effectiveness of teaching.

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