

Teaching Methodology of Geography

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LEARNING ACHIEVEMENTS OF EIGHT GRADE PRIMARY SCHOOL STUDENTS IN THE 2007/2008 SCHOOL YEAR AND ATTITUDES OF GEOGRAPHY TEACHERS REGARDING GEOGRAPHIC SKILLS

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***Summary** –This paper analyzes eighth grade pupils' achievements in Geography and opinions of primary school teachers of geography regarding the frequency of teaching geographic skills. The analysis is based on the results of the external evaluation exam in Geography on a sample of 50% of eighth grade pupils (21 485) and data which has been collected by survey of 308 primary schools teachers of geography. The results of the external evaluation exam have been analyzed according to the dimensions of knowledge. Permanent knowledge and geographic skills has been compared with other knowledge examined by this exam. The level of geographic skills development was determined at the end of primary school education with the evaluation and opinion of teachers about frequency of teaching of those geographic skills. Pupils are better in solving tasks by which knowledge about facts has been examined rather than in tasks by which multi dimensional knowledge (conceptual and procedural knowledge) was examined. Acquisition of permanent knowledge and development of geographic skills is somewhat weaker than important and valuable knowledge.*

***Key words:** external evaluation, geographic skills, geography, permanent knowledge, self evaluation in teaching*

INTRODUCTION

The introduction of external evaluation exams¹ into the Croatian educational system, give more reliable and objective results of students learning achievements than the current indicators emerging from school assessments. The results obtained from external evaluation exams enable measurement of real student achievement and their comparison with set standards. Systematic analysis of student achievement in particular subjects enables a better insight into realizing the standards, detecting factors which influence student achievement but also creates room for aimed interventions in learning and teaching, as well as offering support for the needed. The results of the external evaluation exams should be interpreted with caution and placed into an appropriate context. Measuring student achievement is only one segment of the quality of the educational system. In evaluating the system it is important to establish the teaching quality, correlation of the teaching quality and student achievement, and especially the contribution of teaching quality to student achievement (Palekčić, 2007; Bašić, 2007).

The external evaluation of learning achievement of eight grade students took place in the 2007/2008 school year. The aim of the external evaluation of learning achievement of eight grade students was to establish the degree to which students are equipped for applying acquired knowledge, skills and abilities from particular subjects, i.e., teaching areas upon the termination of particular phases of education. Furthermore, it would show the degree to which they are equipped for independent problem solving by thinking and strategic, that is, meaningful learning (*External evaluation strategy, 24*)².

External evaluation of student achievement in the subject Geography³ was conducted on a sample of 50% of eight grade students (21 485 students). The attitudes and opinions of primary school geography teachers were collected by means of a questionnaire on a sample of 308 participants. The paper analyzes:

- differences in the degree of knowledge acquisition by students according to dimensions of knowledge,
- acquisition of permanent knowledge and skills in Geography upon completion of primary school education,
- evaluation and opinions of Geography teachers regarding the frequency of teaching and development of particular geographic skills.

¹ External evaluation is a mechanism used for objective evaluation of the educational system in the Republic of Croatia and is based on standardized tests and carried out by a school independent institution, i.e. *National Center for External Evaluation of Education*.

² The report on the implementation of the project of external evaluation of learning outcomes of fourth and eighth grade students in primary school in the Republic of Croatia.

³ The test consisted of three parts: Geography, History, integration of Geography and History teaching content.

AIM, TASKS AND HYPOTHESES

The basic aim of this paper is to present the results of the external evaluation examination in the subject Geography. A comparative analysis of the exam and attitudes of Geography teachers on the frequency of teaching geographic skills will yield suggestions for making corrections in teaching and learning that geographic content which had been examined. By knowing the source of mistakes which occur in tasks and by systematic work the learning achievements in Geography can be improved (Bašić, 2007). Insight of more frequent teaching of geographic skills and insistence on higher dimensions of knowledge, considering that students showed low results in this segment, are important for the teaching practice.

Several tasks were set which emanate the hypotheses of the paper which are further tested through a research procedure.

The first task of the paper was to establish whether there were differences in the acquisition of factual, conceptual, procedural knowledge of the students examined. The second task was to compare the acquisition of permanent knowledge and geographic skills on the one hand and important and valuable knowledge in particular content areas on the other. The third task was to analyze the evaluations and opinions of Geography teachers on the frequency of teaching particular geographic skills.

The following hypotheses were tested:

- Eight grade students are more successful in solving tasks which examine factual knowledge in Geography, and less successful in solving tasks which examine higher cognitive levels and dimensions of knowledge (conceptual and procedural knowledge)
- Eight grade students acquired permanent knowledge and geographic skills better than knowledge from particular content units (important and valuable knowledge)
- The degree of development of particular geographic skills is greater if teaching particular geographic skills is more frequent

RESEARCH METHODOLOGY, INSTRUMENTS AND METHOD

For the purpose of this paper the results of the external evaluation of learning achievement of 21 458 students were tested in the area of Geography. By means of a questionnaire 308 geography teachers working in primary schools were surveyed⁴.

⁴ The questionnaire entitled *Self-evaluation in Geography teaching* was conducted at inter-county professional councils of Geography teachers in primary and secondary schools from July 2008 to December 2008.

The Geography exam in the external evaluation of learning achievement project⁵ on eight grade students⁶ is a written exam consisting of 20 Geography questions. The exam was made up of different types of tasks – open and closed type (*Exam catalogue for subject area teachers in the primary school, 2008: 180*). The first type of task in the exam was multiple choice tasks. There were nine tasks of this type, of which six tasks examined knowledge of area structures, processes and one concept, and three tasks which examine area relations and characteristics. The second type of task used in the exam was matching (4 tasks) and an ordering task. The remaining six tasks were open ended questions. Only the correct answers were evaluated in the exam. Each group of tasks carried a different number of points, depending on the difficulty and complexity of the task. Incorrect answers did not carry negative points. In developing the tasks for this type of assessment of knowledge and skills were defined as general teaching aims in Geography in the primary school. Specific aims of the subject, i.e. short and concise statements of concrete knowledge, skills and competences students have at the end of an educational cycle (primary school education). In defining specific aims (learning outcomes) of a subject, a hierarchical classification of competences and skills expected of students at the end of an educational cycle was used, i.e. a revised Bloom's taxonomy of knowledge and cognitive processes⁷. The specific aims are defined at various levels of complexity of cognitive processes (memorizations, understanding, application, analysis, evaluation and creativity) and according to various dimensions of knowledge (factual⁸, conceptual⁹, procedural¹⁰ i metacognitive¹¹). Cognitive processes of evaluation, creativity and the metacognitive dimension of knowledge were not tested in the external evaluation exam. Prior to the implementation of the external evaluation exam the catalogue

⁵ Project leaders are: *National Center for External Evaluation of Education* and *Institute for Social Sciences* Ivo Pilar.

⁶ The authors of the external evaluation of student achievement exam in the subject Geography are associates of the *National Center for External Evaluation of Education*, members of the Professional work group for Geography: Ružica Vuk, MSc, Tomislav Štancl, BSc, Zoran Ljubić, BSc, Jasmina Grabrić, BSc. and Anđelka Bilić, BSc.

⁷ In 1956 Benjamin Bloom suggested a taxonomy of learning outcomes. The revised version used was work of Anderson and Krathwohl 2001.

⁸ Factual knowledge encompasses basic elements which student must know in order to become familiar with the subject area and in order to solve problems.

⁹ Conceptual knowledge is knowledge of categories and classifications within the subject, and their relationships.

¹⁰ Procedural knowledge is knowledge about how to do something, knowing procedures, that is, sequence or series of steps in order to do something.

¹¹ Metacognitive knowledge is knowledge on awareness and cognitive processes in general, and awareness and knowledge of personal awareness and learning strategies. It encompasses strategic knowledge (basic learning strategies and methods, thinking and problem solving), knowledge of cognitive tasks (contextual and conditional knowledge – which strategies to use and when for particular tasks, e.g. knowledge that to answer a short answer task is more difficult than a multiple-choice task), knowledge of personal advantages and disadvantages relating to awareness and learning. This dimension of knowledge is not tested in this type of exam.

was available at the web site of the *National Center for External Evaluation of Education*, and Geography teachers had a presentation on the methodology of task development and the evaluation system.

The opinions and attitudes of teachers regarding Geography teaching were collected using a questionnaire¹² made up of 19 close-ended and 11 open-ended questions. The aim of the questionnaire was to collect evaluations and opinions of Geography teachers with respect to the three basic determinants of the subject and teaching (questions and statements relating to students, teachers and their mutual interaction). The questionnaire asked about the opinions on the implementation of the external evaluation exam, student motivation, geographic skills, student autonomy, student engagement in teaching, teacher preparation for teaching, teaching types and work methods, application of teaching materials and aids, correlation between teaching content in Geography with other subjects, the support teachers give to students and indicators of quality teaching. Using open-ended questions, Geography teachers evaluated statements depending on the frequency of occurrence on a scale of 1 to 5 where 1 means *never*, 2 *rarely*, 3 *occasionally*, 4 *frequently* and 5 *always*. For the purpose of this paper a quantitative analysis was done for the question relating to the frequency of teaching geographic skills. The evaluated geographic skills were: spatial orientation, data collection (mapping, survey,...), statistical analysis, interpretation and development of thematic maps, and interpretation and development of graphs and diagrams. By qualitative analysis of content the answers to open-ended questions: *How to be more efficient in teaching geography skills?*

The results of students work achievements were presented at the state level, while the mean in test achievement for the subject Geography was presented at the county level. The results of the questionnaire "Self-evaluation in Geography teaching" was done using the program Statistical Package for Social Sciences (SPSS), and the results were presented graphically using Microsoft Excel. The results of the external evaluation exam are a good starting point for further research and preparation for the next evaluation which we are hoping could take place in the 2011/2012 school year.

¹² The questionnaire was developed by Biljana Vranković, MSc, professional advisor at the National Center for External Evaluation of Education. The survey was conducted in all counties of the Republic of Croatia in cooperation with higher advisors for Geography at the Education and Teacher Training Agency: Vesna Milić, BSc Geography, Marijana Šarlija, BSc. and Mario Mimica, BSc Geography.

RESEARCH RESULTS

Metric characteristics of the Geography exam, results at the level of state and county

A total of 28 points could be achieved on the external evaluation exam in Geography. The exam evaluated geographic knowledge and skills. The average score was 11.89 points per student and the percentage of solvability was 42.7%. The frequencies of the results shown in Figure 1 indicate a slightly asymmetric distribution where a greater number of students achieved lower results in this part of the exam (in relation to the History exam and integration of teaching content in the subjects Geography and History). Of the total number of students examined (21 485 students) the Geography exam differentiates between participants with higher scores from those with average or low scores. Nevertheless, the exam difficulty was appropriate and has solid discrimination (*Research report, 2008:53*).

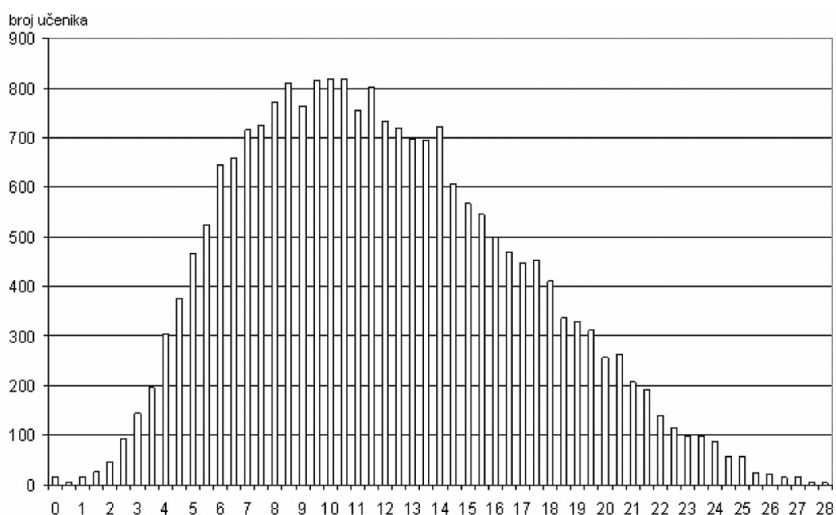


Figure 1. Frequencies of the results of eighth grade students in the 2007/2009 school year in the Geography exam (Source: Research report, 2008)

The Geography and History exams took place in 797 schools in the Republic of Croatia of the total of 842 schools which participated in the external evaluation. The average results of student achievement according to counties are between 36.7% in the Bjelovar-Bilogora county and 46.7% in the Šibenik-Knin county (Fig.2). The aim of the examination was not ranking counties according to student achievement, considering that the student sample was not the same in all counties neither are the work conditions in particular schools and counties the same and with respect to the methodological limits of these types of research¹³. In addition

¹³ Evaluation of the school system has to be oriented towards the results (student achievement) but also on the quality of the teaching and learning processes (Palekčić, 2007)

to that, the difference between average student achievement in counties with greatest averages results and the average achievements of students in counties with lowest achievement results is 10%. Expressed in points the difference is approximately 2.5 points. More significant differences in student achievement can be seen in analyzing results at the level of schools. The lowest average results in the Geography exam was in one school in the Istra county 20.9% of the total number of points, while the maximum average result 85.5% was achieved by students in one school in the Split-Dalmatia county. However, it should be mentioned that all counties which have schools in the 100 top schools in Croatia participated in the Geography exam (*Research report, 2008:139*).

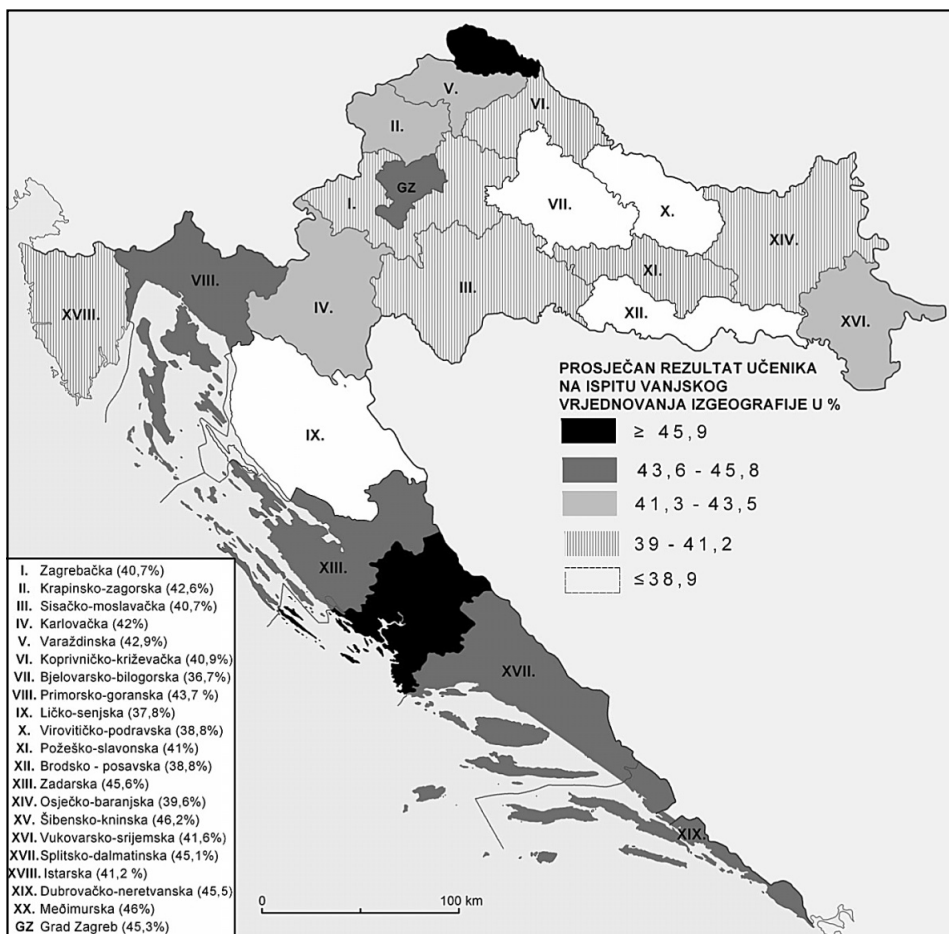


Figure 2. Average results of students in the external evaluation exam in the subject of geography in percentages

COMPARATIVE ANALYSIS OF EXAM ITEMS IN THE GEOGRAPHY EXAM ACCORDING TO DIMENSIONS OF KNOWLEDGE

The Geography exam consisted of a total of 20 tasks or more precisely 40 exam items. The exam contained eight exam items which tested factual knowledge¹⁴. Such knowledge encompasses knowledge of terminology such as the term *mariculture* and specific detail and elements (e.g. locations, export products of particular countries) within the subject. The range of the results of the tested students in these exam items is from 37% to 77%.

In other words, 37% of tested eight grade students knew that the headquarters of the European Central Bank (task 5) is in Frankfurt am Main. What is of concern in this exam item is the fact that a quarter of the students examined stated that the headquarters of the European Central Bank was in London, capital city of the United Kingdom, where the Euro has not replaced the national currency. A relatively small percentage of correct answers in this task points to fact that students did not satisfactorily acquire knowledge of the headquarters of leading institutions of the European Union. The term *mariculture* (task 6) was defined correctly by 77% of the students examined. This task also had the highest average of tasks solved in the Geography exam. The key concept (*mariculture*) is mentioned in various contexts throughout the four years of learning geography in primary school.

The biggest number of test items (25 items) tested conceptual knowledge¹⁵. These tasks encompassed knowledge of categories and classification (e.g. language structure of the population), principles (e.g. logical range of selected countries entering the EU), and generalization (e.g. generalization on the location of a particular point on the geographical net, spatial perception), models (e.g. schematic displays of particular geomorphological structures). The range of the results achieved by students in these items was between 15% and 77%.

Surprisingly low percentages of correct answers are observed for questions 14.c and 15. for which students had to recognize the town marked on a map. The percent of correct answers to test item 14c could have been greater had the students read the question more carefully especially since the beginning of the question stressed that it was the biggest European sea port. Fifteen percent of students tested answered correctly (Rotterdam), while 29% correctly placed that city on the river Rhine (task 15). Approximately 40% of the students did not even attempt to solve these tasks. An example of a low percentage of solvability for this dimension of knowledge was task 7 with four task items 7.a, 7.b, 7.c and 7.d. In this task, the

¹⁴ Those are tasks 3., 5., 6., 13.a, 13.b, 13.c, 13.d and 17. in the exam (*See external evaluation exam Geography at www.ncvvo.hr*).

¹⁵ Those are tasks: 1., 2., 4., 7.a, 7.b, 7.c, 7.d, 8.a, 8.b, 8.c, 8.d, 9., 10.a, 10.b, 11.a, 11.b, 11.c, 11.d, 12.a, 12.b, 12.c, 12.d, 14.c, 15. and 19.

students had to arrange the countries mentioned according to the order by which the countries entered the European Union membership. Based on logical deduction and recognition of cause and effect relationship they were supposed to conclude that the last country to become member of the European Union was Bulgaria, and the first among the mentioned countries was Belgium. Only 25% of the students marked Belgium as 1, while 61% of the tested students also wrote number 1 for the United Kingdom. The results in this task indicate inadequate understanding of geopolitical relationships in Europe after WW2 and inadequate knowledge of integration processes in Europe.

An example of exam items which test conceptual knowledge and whose solvability is somewhat higher are tasks 11.a and 11.b. For task 11. students had to link furthest points in Croatia to an appropriate geographical area. The northernmost point in Croatia was correctly located by 77% of students, the southernmost by 70% and the most western point by 68% of the students tested. What is disturbing is the fact that only a third of the students located the most eastern point in Croatia to be in Srijem, while 38% of the students placed the most eastern part in Baranja.

Procedural knowledge was tested through seven items¹⁶. It encompasses knowledge of skills, techniques and methods, and criteria in selecting adequate procedures in order to produce something. The range of the results of exam items which test these dimensions of knowledge is between 15% and 45%. The lowest result 15% was achieved in two items (16. and 20.b).

In task 16. students had to calculate the air distance between port B and port C in nature in km given the data on the shortest distance on a map 1:200 000 000 which is 5 cm. 15% of the students knew that the distance was 10000km, 48% did not even attempt to solve the task, and 37% gave the incorrect answer. Of the students who gave an incorrect answer, a large number said that the actual distance was 4km. The solvability of this task shows an inadequate level of spatial perception and spatial relations, that is, an inadequate development of geographic skills in application of measurements.

By analyzing a climate diagram (task 20a) students had to determine the most humid season. 39% of the students gave the correct answer – winter. 53% answered incorrectly and most of the students actually referred to the most humid month. In task 20.b students had to calculate the approximate yearly amplitude of air with the help of a climate diagram. 74% of the students calculated the yearly temperature amplitude of air and 59% had the wrong calculation, i.e. only 15% of the students gave a correct answer to this item.

Items 14.a and 14.b are examples of procedural knowledge in which the average solvability was around 30%. With the help of a map, students had to apply a learned procedure by which they can determine the temperature zone of a port marked on the map. That task was correctly solved by only 29% of the students.

¹⁶ Those are tasks 14.a, 14.b, 16., 18., 20.a, 20.b and 20.c.

Such content, which represent permanent knowledge should be practiced and revised continually when learning various content of regional geography of the world, Europe, or Croatia. In test item 14.b students had to use the familiar technique for determining which season is October 1 in the port marked on the map by the letter C (Sydney). 29% of the students knew that it was spring in Australia (Sydney) when it is autumn in Croatia and 61% gave an incorrect answer leaving 10% of the students without even attempting to solve this task. When the teaching content is placed into a new context or when they are tested using a different formulation than the one in textbooks, students do not manage so well. This is in opposition with one of the aims of education – to prepare students for possibilities and temptations which await them in life (*Nastavni plan i program, 2006:10*). Task 18. is also an example of procedural knowledge in which based on procedures applied they should have answered what part of day is it in port C (marked on the map) when it is 7 o'clock in the morning in port B. 45 % of the students gave the correct answer to this question.

The average solvability of test items examining factual knowledge is 53.7% (Fig. 3). The average solvability of test items examining conceptual knowledge is 43%, while solvability of test items examining procedural knowledge is 29.7%. These results confirm the first hypothesis: students are better in solving tasks which test factual knowledge than in tasks which test higher cognitive levels and dimensions of knowledge (conceptual and procedural knowledge). In teaching and learning of Geography more attention should be given to procedural knowledge.

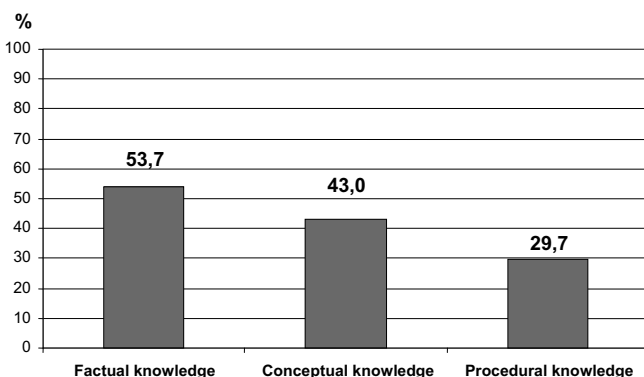


Figure 3. Solvability of test items according to dimensions of knowledge in the Geography test in the 2007/2008 school year.

ACQUISITION OF PERMANENT KNOWLEDGE AND DEVELOPMENT OF GEOGRAPHY SKILLS OF EIGHT GRADE STUDENTS IN PRIMARY SCHOOL

In 13 test items¹⁷ permanent knowledge which students were supposed to acquire and develop by the end of primary school were tested. The tasks carried a total of 10 points (35.7/ of the total number of points). The average number of points realized per student was 4 (percentage of solvability: 40.1%). For other test items it was possible to achieve 18 points (64.3% of the total number of points). The average per pupil was 7.9 points (percentage of solvability: 43.8%). For items that tested permanent knowledge and geographic skills the percentage of solvability is somewhat lower than the total exam solvability and items that tested valuable and important knowledge. In that respect the second hypothesis was not confirmed, however it should be mentioned that the deviations are not big. That is relevant information for teaching practice.

In tasks that measured the degree of acquisition of permanent knowledge and development of geographic skills the solvability of some test items was from 15% to 77%. The percent of solvability was influenced by task types, dimensions of knowledge and cognitive levels (Tab. 1). Students show better achievement in close ended tasks as well as in examining lower dimensions of knowledge and lower cognitive levels.

Table 1. Acquisition of permanent knowledge and development of geographic skills of eight grade students in the external evaluation exam in the 2007/2008 school year

Content examined	% solvability	Dimension of knowledge	Task type*	Cognitive level**
Key term (mariculture)	77	factual	1	1
Movements of litospheric plates	65	Conceptual	1	3
Delta	52	Conceptual	2	2
Lagoon	48	Conceptual	2	2
time zones	45	Conceptual	1	3
Annual precipitation	39	Conceptual	3	4
Fiord	38	Conceptual	2	2
Type of climate	31	Procedural	1	4
Heat belts	30	Conceptual	3	4
Earth revolution	29	Conceptual	3	3
Estuary	25	Conceptual	2	2
Numerical map ratio	15	Procedural	3	3
Annual temp. amplitude	15	Procedural	3	3
* 1 multiple-choice tasks, 2 matching task zadatak povezivanja, 3 fill-in tasks				
** 1 memorization, 2 understanding, 3 application, 4 analysis				

¹⁷ Those are tasks: 6., 8.a, 8.b., 8.c., 8.d, 9., 14.a., 14.b., 16., 18., 20.a., 20.b and 20.c.

ANALYSIS OF THE EVALUATION OF ATTITUDES AND OPINIONS OF GEOGRAPHY TEACHERS REGARDING THE FREQUENCY OF TEACHING AND DEVELOPING GEOGRAPHIC SKILLS

Although the results of the survey of teachers and student achievement at the external evaluation exam are not statistically comparable¹⁸, it is indicative that the results of the evaluations of the surveyed teachers on the frequency of teaching orientation skills, coincide with the results of student achievement in the external evaluation exam in tasks that tested that skill (Fig. 4 and 5). Half of the teachers surveyed stated that this skill is *always* present in Geography teaching while the average results of student achievement regarding tasks testing the orientation skill¹⁹ is 55.9%. Information that more than 85% of the surveyed teachers stated that they frequently and always develop this skill with students is important and presents one of the aims of Geography teaching. Interpretation and creation of thematic maps is one of the most important skills which are developed by students in Geography classes. The acquired skill of interpretation and development of thematic maps²⁰ in the external evaluation exam was tested in 16 test items. The average solvability was 39.3%. 34 % of the surveyed teachers stated that they develop this skill *frequently* while only 12 % do so *always* in Geography teaching. 36% of the surveyed teachers *occasionally* interpret thematic maps, and 14% *rarely* work on teaching this skill.

Interpretation and development of graphs and diagrams is appropriate for logical acquisition of a greater part of geography content such as interpretation of climatic diagrams in acquiring knowledge on type of climate on Earth which was also tested in the external evaluation exam²¹. The average solvability of such test items was 35%. It is interesting that the frequency of developing this skill is greater than interpreting thematic maps. While 45% of the surveyed teachers estimated that they frequently and always develop the skill of interpretation and thematic maps in their teaching, about 60% frequently or always develop the skill of interpretation and development of graphs and diagrams

Only 5% of the teachers stated that the skill of statistical analysis is always represented in Geography teaching, and the task in which this skill was tested²² was correctly solved by 15% of the students. A third of the surveyed teachers stated that this skill was developed *frequently*, while 43% of the teachers

¹⁸ 308 teachers participated in the survey, and students from 797 primary schools in the Republic of Croatia participated in the Geography exam.

¹⁹ Tasks which tested the orientation skill: 10.a, 10.b, 11.a, 11.b, 11.c, 11.d, 14.a i 18.

²⁰ Knowledge acquired through the skill of interpretation and development of thematic maps were tested in tasks: 1., 2., 4.,5.,7.a, 7.b, 7.c, 7.d, 9., 12.a, 12.b, 12.c, 12.d, 15., 16.and 19.

²¹ Those are tasks 20.a and 20.b.

²² Task testing skills in statistical analysis was 20.b.

occasionally work with students on statistical analyses. About 20% of the teachers stated that they developed this skill *rarely* or *never*.

The questionnaire tested teachers' opinions on the development of other skills by students which could not be tested in the external evaluation exam. Such skills are: data collection, writing seminar papers and communication and presentation skills. The results of the questionnaire showed that about half of the surveyed teachers *occasionally* encourage students to develop data collection skills as well as writing seminar papers, while about 80% of the teachers say that they *very often* and *frequently* encourage development of communication and presentation skills.

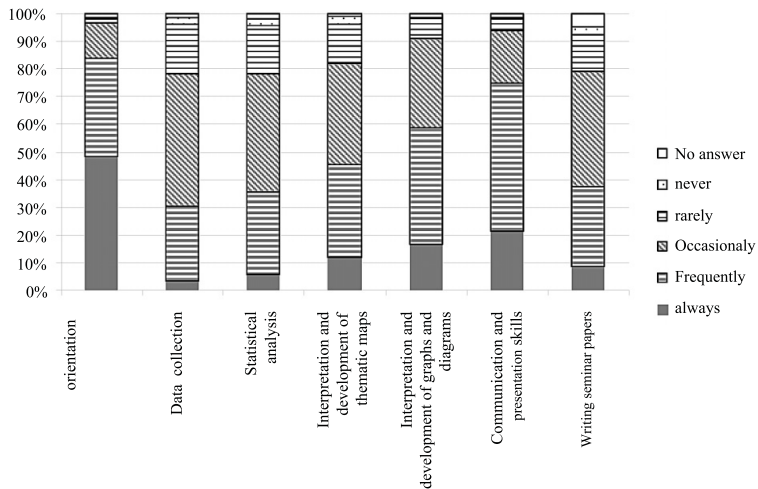


Figure 4. Evaluations of primary school teachers on the frequency of teaching particular geographic skills

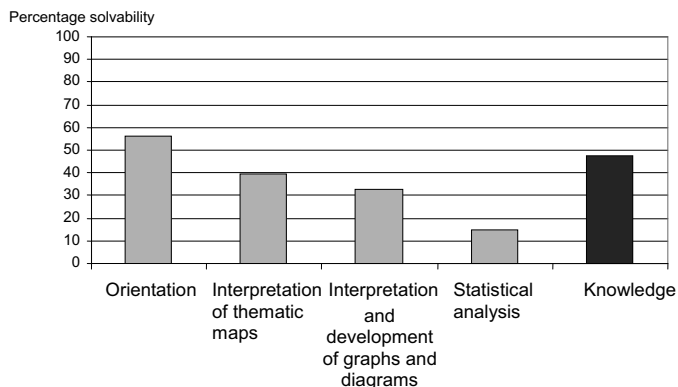


Figure 5. Learning outcomes of students on the external evaluation exam in Geography on tasks testing particular geographic skills

HOW TO TEACH GEOGRAPHIC SKILLS MORE EFFICIENTLY?

Geography teachers' attitudes which presented various opinions on how to more efficiently develop geographic skills are a valuable contribution to the profession and improvement of Geography teaching. By qualitative analysis of content six areas were mentioned which require change in order to make teaching geographic skills more efficient (see Figure 6 and Table 2).

Of the total number of statements (N=116) somewhat less than half (43%) related to the opinions describing changes related to the application of teaching methods and work forms in Geography classes. Within that area Geography teachers stated that developing geographic skills would be more efficient if students were exposed to more contact with the immediate environment, i.e. more field work (N=31). It is important to note that field work should require a more demanding role from the students and good teacher preparation. As for work forms, a suggestion for more efficient teaching of geographic skills a small number of statements referring to individual work and less frontal work while about 14% of the statements related to the application of various methods of work and combinations of several teaching methods during a teaching hour (N=16). In doing this it is important to assign appropriate methods to particular aims (Mattes, 2007:13) which will be marked individually by each teacher depending on the geographic skill and content taught so as to achieve the final aim, making teaching interesting and efficient for students.

The second area relating to more efficient development of geographic skills is the application of various teaching materials and aids. In doing so, the opinion of a greater number of teachers (N=24) refers to applying various didactic equipment, supply of numerous teaching aids, application of various thematic and maps as well as other graphic displays. This indicates that some schools are missing necessary geographic teaching materials and aids and students should be enabled to learn geographic content with the help of the necessary and appropriate didactic equipment.

The third place according to frequency of teachers' opinions was the human factor, i.e., teacher and student motivation (12.1% statements) where the larger number of those referred to the need to increase student motivation. Also, a certain number of teachers find it important to motivate teachers by increasing their salaries or other ways of appreciating teacher work.

The fourth area refers to organizational conditions. The expressed opinions of teachers imply *increase in teaching hours for the subject of Geography* so as to devote more teaching hours to revision and practice, which contribute to the development of geographic skills. A smaller number of statements referred to *reducing teaching content* in order to create more time for "practice, revision and content systematization". Furthermore, several statements relating to *reducing the number of students per classroom* (N=14).

Revision and practice of permanent knowledge and skills is the fifth area. Teachers' opinions refer to increased work on geographic content which are revised from grade to grade, i.e. continuous and regular revision of that content which represents permanent knowledge.

The area marked *other* included statements and opinions relating to continuous professional development of Geography teachers, correlation with other subjects and raising awareness on the importance of Geography in life and emphasizing the usefulness of learning geographic content to students.

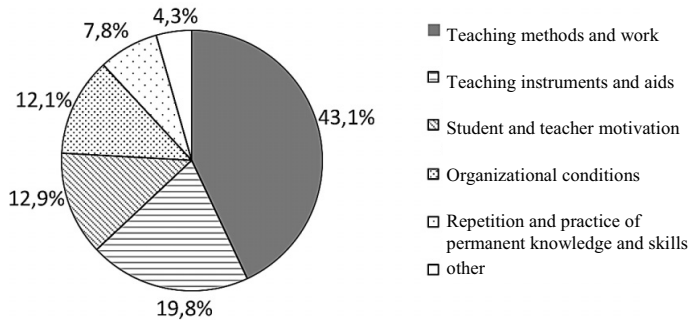


Figure 6. Attitudes of primary school teachers regarding areas of more effective teaching of geographic skills

Table 2. Frequencies and percentages of expressed attitudes of primary school Geography teachers regarding various areas of more effective teaching of geographic skills

AREAS OF IMPROVEMENT	Frequencies	%
Teaching methods and types of work	50	43,1%
Teaching instruments and aids	23	19,8%
Student and teacher motivation	15	12,9%
Organizational conditions	14	12,1%
Revision and practice of permanent knowledge	9	7,8%
other	5	4,3%
total	116	100,0%

CONCLUSION

The first external evaluation exams of student achievement in Geography for eight graders took place in 2008. The results of student learning achievements in the subject of Geography as well as the results from other subjects should serve as a starting point for initiating a process of self-evaluation in primary schools in the Republic of Croatia. Schools are obliged to use the results of the national

examinations and all other indicators of educational work for analysis and self-evaluation in order to permanently improve the quality of work in schools (article 88. *Act on education in primary education and high school*). Although referring to a relatively small number of tasks in comparison the overall geographic content from the Geography Teaching Program for primary school, the teaching profession can find the results of the metric characteristics of the test according to each task as an important indicator for introducing change in manners of teaching and in accepting directions for improving the quality of teaching that content which was covered by the exam.

The external evaluation exam showed that the average number of points achieved per student in the subject Geography was 11.89, and the solvability percentage 42.7%. The average result on the county level was between 36.7% and 46.7%. With respect to the History exam and integration of teaching content of Geography and History, the results are somewhat lower. The Geography exam is appropriate in difficulty and has a proper discrimination; however it differentiates participants with higher results better than those with average or lower results. The analysis of achievement with respect to the dimensions of knowledge prove the hypothesis that students are better in solving tasks which test factual knowledge, considering that the average solvability of test items testing that dimension of knowledge is 53.7%. In testing higher dimensions of knowledge the results were not as good. The average solvability of test items examining conceptual knowledge was 43% and solvability of test items examining procedural knowledge was 29.7%. The mentioned percentages suggest that in teaching and learning Geography more attention should be given to procedural knowledge. There are no significant differences in the degree of acquisition of permanent knowledge and geographic skills with respect to important and valuable knowledge. The weakest solvability of tasks was among those testing the skill of calculating annual temperature amplitude with the help of a climatic diagram and in the skill of applying a numeric measure. Those are very important geographic skills which prepare students for life and the data on the low degree of development indicates necessary corrections in the teaching and assessment of student achievement.

The evaluation of the frequency of teaching particular geographic skills by primary school Geography teachers was obtained by survey method and shows a high representation of geographic skills in teaching Geography. Most attention is given to orientation, interpretation of graphs, diagrams and communication and presentation skills, while data collection, statistical analysis, writing seminar papers, and development of interpretations of thematic maps are not as representative. The results regarding the development of particular geographic skills are highly correlated with the representation of skills in Geography teaching. Geography teachers find that teaching geographic skills would be more effective if there were more hours of field work and if schools (which are inadequately equipped) would be better equipped with modern teaching materials and aids. Among factors which would improve efficiency in teaching geographic skills,

Geography teachers find increase in teacher and student motivation important, as well as changing organizational conditions such as reducing the number of students in classes and increasing the number of teaching hours for the subject.

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