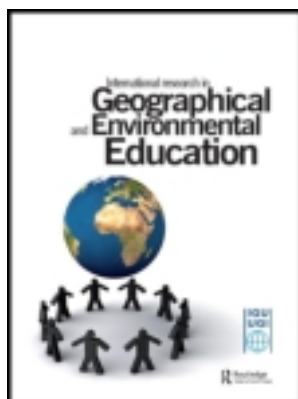


This article was downloaded by: [Milan Kubiátko]

On: 24 April 2012, At: 08:31

Publisher: Routledge

Informa Ltd Registered in England and Wales Registered Number: 1072954 Registered office: Mortimer House, 37-41 Mortimer Street, London W1T 3JH, UK



International Research in Geographical and Environmental Education

Publication details, including instructions for authors and subscription information:

<http://www.tandfonline.com/loi/rgee20>

The influence of gender, grade level and favourite subject on Czech lower secondary school pupils' perception of geography

Milan Kubiátko ^a, Tomas Janko ^a & Katerina Mrazkova ^b

^a Institute for Research in School Education, Faculty of Education, Masaryk University, Brno, Czech Republic

^b Department of Geography, Faculty of Education, Masaryk University, Brno, Czech Republic

Available online: 24 Apr 2012

To cite this article: Milan Kubiátko, Tomas Janko & Katerina Mrazkova (2012): The influence of gender, grade level and favourite subject on Czech lower secondary school pupils' perception of geography, *International Research in Geographical and Environmental Education*, 21:2, 109-122

To link to this article: <http://dx.doi.org/10.1080/10382046.2012.672675>

PLEASE SCROLL DOWN FOR ARTICLE

Full terms and conditions of use: <http://www.tandfonline.com/page/terms-and-conditions>

This article may be used for research, teaching, and private study purposes. Any substantial or systematic reproduction, redistribution, reselling, loan, sub-licensing, systematic supply, or distribution in any form to anyone is expressly forbidden.

The publisher does not give any warranty express or implied or make any representation that the contents will be complete or accurate or up to date. The accuracy of any instructions, formulae, and drug doses should be independently verified with primary sources. The publisher shall not be liable for any loss, actions, claims, proceedings, demand, or costs or damages whatsoever or howsoever caused arising directly or indirectly in connection with or arising out of the use of this material.

The influence of gender, grade level and favourite subject on Czech lower secondary school pupils' perception of geography

Milan Kubiatio^{a*}, Tomas Janko^a and Katerina Mrazkova^b

^aInstitute for Research in School Education, Faculty of Education, Masaryk University, Brno, Czech Republic; ^bDepartment of Geography, Faculty of Education, Masaryk University, Brno, Czech Republic

Geography is an important school subject that brings pupils' description and explanation of social, economic and/or political aspects of the changing world. It has been affirmed that the interest in a subject depends on the attitude to this subject. This study investigates Czech lower secondary school pupils' perception of geography. The research was performed on a sample of 540 pupils from six lower secondary schools. The investigation focused on the influence of gender, grade level and favourite subject on the perception of geography in general and in four specific dimensions: Geography as a school subject, Geography and environment, Importance of geography, and Relevance of geography lessons to pupils' lives. Results suggest that the grade level and subject popularity significantly influence the perception of geography, but gender does not. The implications for teaching practice are also presented.

Keywords: lower secondary school pupils; perception of geography; questionnaire; science

Introduction

Geography is an important part of science. It has a unique position within science because of its multidisciplinary nature. It interconnects the spatial analysis of natural and human phenomena and the interrelationships between them. Understanding geography could lead to the correct human treatment of the environment. The similar ideas are provided in the study of Hopwood (2009). Geographical literacy is an important skill in the globalized world and geographical education has the potential to bring pupils an explanation of the changing world phenomena that originate from the dialectic relation between the nature and the society. However, research suggests that such an effect appears only if the pupils are interested in the school subject. It has been found that interest in a school subject depends on the attitude to this subject (Jones, Howe, & Rua, 2000; Sack & Petersen, 1998).

Geography in the Czech curriculum

Geography is a traditional part of the Czech educational curricula, but there has been little research into students' attitudes towards geography in the Czech Republic after the 2005 curricular reform.

*Corresponding author. Email: mkubiatio@gmail.com

According to the actual curricular documents that are valid in the Czech Republic, geography is embedded in science subjects, such as biology, chemistry and physics. In this research, we divided subjects into groups according to the Czech Republic curricular documents.

Geography as a school subject is quite specific. Its uniqueness comes from its position on the border of science and social sciences. This has resulted in many discussions about where the place of geography in the curriculum is (Herink, 2009). This concept is different from American or British education where geography is a part of social science subjects, as well as history, economy or civics. The most significant document in the Czech Republic, Educational Framework, includes contents for every school subject. Geography is included into the Human and Nature group, as well biology, chemistry and physics (<http://en.vuppraha.cz/>). The Czech Educational Framework divides geography into seven basic educational fields: (1) Geographic Information, Sources of Data, Cartography and Topography; (2) A Natural Picture of Earth; (3) Regions of the World; (4) The Social and Economic Environment; (5) The Natural Environment; (6) The Czech Republic and (7) Geographical Fieldwork, Practice and Application. Lower secondary education in the Czech Republic consists of four years of schooling. Geography is implemented in every school year. The task of teachers is to include all educational fields (mentioned above) during these four years. But, the teachers have the liberty of creating the content of the school years. The order of the educational fields is not necessary to keep as they are presented, but the fields have to be learned during four years of lower secondary education.

Theoretical background

As mentioned above, geography stands between social and science subjects. For the purposes of our study, it is considered a science subject, so when science subjects are evaluated and investigated, geography belongs to them. On the basis of this, we will provide brief information about students' attitudes towards science, and next will be presented the investigation regarding to pupils attitudes towards geography from several points of view. In the text is often mentioned the concept "perception of geograhny"; probably, this concept gives a better true picture of the subject.

Research suggests that students are motivated to learn if the science content is interesting, connected with their everyday life and useful for their lives and future development. The development of positive attitudes towards science is one of the most important goals of the curriculum (Koballa & Crawley, 1985), as interest in science subjects is declining (Osborne, 2003). One's attitudes can be influenced by many factors, e.g. previous experience and social influences. Attitudes towards science can be defined as, "... favourable or unfavourable feelings about science as a school subject ... " (Morrell & Lederman, 1998). Weinburgh (1998) showed that from all variables that may influence attitudes towards science, gender is a consistent influence. Research dealing with the differences in attitudes towards science between men and women is conducted quite frequently. Several studies have shown that men have better attitudes towards science than women, and that men are more apt to continue science education (Weinburgh, 1998).

It is quite difficult to find some recent studies that investigated attitudes towards geography. From the published studies, some are more informative and more valuable than others. In the following overview, we will mention the country where the research was conducted, provided this information is available. The presented research studies are divided into groups. The ranking of geography among other science subjects was evaluated in the study of McTeer (1979). In this research, geography was rated poorly in comparison

with other subjects. The study was conducted in Georgia, USA. Sack and Petersen's study (1998), conducted in Texas, USA, focused on children's attitudes towards geography as a school subject. The attitudes were found to be negative. Geography was rated as the worst subject among other science subjects in the study.

Another group of studies focused on the influence of different variables on attitudes towards geography. Brook (1977) examined the general attitudes towards geography held by teachers of junior high schools and high schools, and by undergraduate students. Education level, gender and students' individual conceptualizations of geography were examined as possible influences on the attitudes towards geography. The results were not significant among independent variables. Detailed results showed that the youngest students (in this case ninth grade) had better attitudes towards geography in comparison with the older ones (10th grade and college students). Sack and Petersen (1998) found out that American boys had more positive attitudes towards geography in comparison with American girls. Okuranstifa (1975) examined differences between Nigerian boys and girls during their school research activities and found out that boys achieved higher scores than girls.

Gökce (2009) did not focus on the investigation of attitudes towards geography, but on the main problems of geography education, which can influence attitudes towards geography. The study showed that the main problems lie in the instructors not being sufficiently prepared for geography education, the removal of some geography courses and the low motivation of the teacher trainees in the field.

As for the other science subjects, research dealing with attitudes was conducted also in biology and chemistry (e.g. Cheung, 2009; Dawson, 2000; Prokop, Prokop, & Tunnicliffe, 2007; Prokop, Tuncer, & Chudá, 2007; Spall, Barrett, Stanistreet, Dickson, & Boyes, 2003; Uşak et al., 2009). Research showed that pupils had a positive attitude towards biology lessons and that biology lessons were the most popular among younger students. Students' interest in biology differed with gender. Girls were more interested in biology. Attitudes towards chemistry with respect to grade level and gender were investigated by Cheung (2009). The relationship between grade level and gender proved to be significant. Generally, both males and females were just marginally positive about chemistry lessons at secondary school. Salta and Tzougraki (2004) found that there were no gender differences in student attitudes towards chemistry regarding interest, usefulness and importance. Attitudes of English and Finnish students towards physics together with their knowledge about this subject were also investigated (for details see Johnston & Ahtee, 2006). Teaching of physics activities was rated unpopular both in Finland and England, although English students were more confident but not more knowledgeable.

The purpose of the study

In this study, we investigated lower secondary school pupils' perception of geography. We also examined the effects of specific variables (gender, grade level and favourite subject) on pupils' perception of geography. Gender is among the most important variables of research. In the field of research towards geography, investigators have reported inconsistent results. In one study, boys had more positive attitudes and in another, it was the opposite. Our study is trying to determine if there is a difference between boys and girls in the Czech Republic. The age of pupils plays a significant role in the field of attitudes towards geography. Many studies have shown declining perception of geography as age increased. We were interested if this was also true for the Czech Republic. The authors would like to add further informative research to the few papers focused on pupils' perception of geography. This is

the first study of this kind in the Czech Republic which examined such a large number of participants.

This study explores the following research questions:

- (1) Are there any differences in the perception of geography regarding the gender of the respondents?
- (2) Are there any differences in the perception of geography considering the favourite subject of the respondents?
- (3) Does the grade level influence pupils' perception of geography?

Research hypotheses were formulated according to the above research questions:

- (1) Boys have more positive perception of geography in comparison with girls.
- (2) Pupils who have a science subject as their favourite achieve a higher score in perception of geography in comparison with pupils who do not.
- (3) Younger pupils achieve higher score in perception of geography in comparison with older respondents.

Methods

Participants

The sample consisted of 540 lower secondary school pupils attending six Czech schools. Two schools were located in the town, with the average number of 30 pupils in the class. Three of the schools were located also in the town, but the average number of 20 pupils in the class, and the last one was a small school located in a village, with the average number of 15 pupils in the class. In all schools, teaching was typically traditional, characterized by the teacher being the controller of the learning environment. Power and responsibility are held by the teacher, who plays the role of instructor (in the form of lectures) and decision-maker (in regard to curriculum content and specific outcomes). The teacher regards students as having "knowledge holes" that need to be filled with information. In short, the traditional teacher views that it is the teacher who causes learning to occur. Learning is chiefly associated within the classroom and is often competitive. The lesson's content and delivery are considered to be most important and students master knowledge through drill and practice (such as rote learning). Content need not be learned in context.

Selection of participants was not intentional but based on teachers' willingness to administer questionnaires in selected schools. In all cases, teachers administered questionnaires to all pupils in the classes, regardless of the pupils' perception of geography. The participants ranged from 11 to 15 years ($x = 13.04$, $SD = 1.18$). They attended lower secondary education in the Czech Republic: 94 pupils were from the sixth grade, 165 from the seventh grade, 155 from the eighth grade and 126 from the ninth grade. The sample consisted of 315 females and 225 males. Pupils were divided into groups according to their favourite subject; five groups originated: (1) science subjects (biology, chemistry, physics and geography), (2) technical subjects (mathematics, IT), (3) humanities (history, language, civics, arts and crafts, music lessons), (4) health subjects (physical education and health education) and (5) students who do not have a favourite subject. The highest number of pupils was in the "humanities subjects" group ($n = 188$). The smallest number of pupils was in the "without favourite subject" group ($n = 67$).

The construction of the geography attitudes questionnaire (GAQ)

Pupils' perceptions of geography were measured on a five-point scale of Likert type (Likert, 1932). The items were adapted from the biology attitudes questionnaire (BAQ) (Prokop et al., 2007) and were developed in a similar way. Attitude items were prepared following the questionnaires published in similar studies (Prokop et al., 2007; Salta & Tzougraki, 2004; Uşak et al., 2009). The questionnaire is divided into two parts. The first part consists of demographic variables such as gender, age, grade level and favourite subject, and the second part is composed of attitude items. The original form of the questionnaire was developed in the Czech language and then was translated into English for publication purposes with the assistance of a native speaker.

The question items related to geography as a school subject ("I like geography more than other subjects"), the importance of geography ("Geography is not important in comparison with other courses"), the difficulty of geography ("Geography lessons are very difficult for me"), the interest in geography ("I would like to have geography lessons more often) and on using didactic tools in geography lessons ("We use a lot of geographical aids in geography lessons").

The items were presented in random order; they were not grouped together with other items having a similar character. The questionnaire consisted of 27 items, which were rated by the participants from 1 (strongly disagree) to 5 (strongly agree). There were items worded both positively (e.g. "I like geography more than other subjects") and negatively (e.g. "Geography is not important in comparison with other courses") (Oppenheim, 1999). Negative items were reversed in scoring. The total score of individual participants provides a composite index of perception of geography. A low score reflects a relatively negative perception and a high score reflects a relatively positive perception of geography.

The validity of the questionnaire was established through review by experts in the field of science education and experts on questionnaire development. Reviewers were asked whether the items were relevant to the aim of the study. Revisions were based on their comments and suggestions. The full version of the questionnaire is available on www.kubiatko.eu.

Procedure

The questionnaires were administered in six Czech lower secondary schools. Pupils were reassured that the questionnaire was anonymous, that it was not a test but rather a research attempt to explore their perception of geography. The order of administering of questionnaires was random. No time limit was given for the completion of the questionnaire, but the longest time taken to complete it was about 20 minutes. The distribution of the questionnaires was done by researchers or by teachers who were instructed about its distribution. All questionnaires ($n = 540$) were filled in correctly and were included into the analysis.

Statistical procedure

The scores were subsequently processed using factor analysis with Varimax rotation and four factors with eigenvalues greater than 1.0 were derived: (1) Geography as a school subject (five items), (2) Geography and environment (six items), (3) Importance of geography (five items) and (4) Relevance of geography lessons to pupils' lives (nine items). These four specific dimensions explained 44.28% of the total variance. According to Reckase (1979), the prime factor should explain at least 20% of the total variance, and the difference between the second and the third factor should be lower than the difference

between the first and the second factor. In agreement with this suggestion, the first factor explained 25.57% of the total variance, the second factor explained 7.54%, the third factor 6.58% and the fourth factor 4.59% of the total variance. Two items with factor scores lower than 0.30 were excluded from the subsequent analyses (Anastasi & Urbina, 1996) (Table 1). The suitability of factor analysis as an approach for data analyses was evaluated by the Kaiser—Meyer—Olkin (KMO) measure (the index for comparing the magnitude of the observed correlation coefficients with that of the partial correlation coefficients). The value of KMO is 0.90, which allowed us to apply factor analysis. Bartlett's test of sphericity was used for testing the null hypothesis, variables of which are uncorrelated in the population correlation matrix. The observed significance level was high ($\chi^2 = 4116.14$, $df = 351$, $p < 0.001$). On the basis of this result, we rejected the null hypothesis. These indicators thus allowed us to use factor analysis for the data.

The reliability of the questionnaire was calculated using Cronbach's alpha coefficient. The value of reliability of GAQ was $\alpha = 0.87$, which indicated high reliability of the questionnaire (Nunnally, 1978). The high value of the reliability coefficient in our study denoted that the instrument used for investigation of pupils' perception of geography is reliable and its usage for further analysis is appropriate. The values of Cronbach's alpha for specific dimensions were: (1) Geography as a school subject ($\alpha = 0.72$), (2) Geography and environment ($\alpha = 0.66$), (3) Importance of geography ($\alpha = 0.67$) and (4) Relevance of geography lessons to pupils' lives ($\alpha = 0.84$). Two of the factors achieved reliability score lower than 0.70; i.e., according to Nunnally (1978), they should not be considered reliable. However, in the study of Dhindsa and Chung (2003) and Francis and Greer (1999), reliability scores between 0.59 and 0.75 were considered acceptable. That is why we considered the scores in all four factors reliable.

Analysis of variance (ANOVA), with the results for whole questionnaire, and multivariate analysis of variance (MANOVA), with the results for specific dimensions as dependent variables and demographic variables (gender, residence, grade level and favourite subject) as independent categorical variables, were also conducted. For more detailed results, we used Tukey post-hoc test. Tukey post-hoc test was used in the analysis of independent variables grade level and favourite subject, because these two variables included more than two groups, i.e. four grades (sixth, seventh, eighth and ninth) and five groups of favourite subject (see subsection "Participants"). Post-hoc tests (in our case Tukey post-hoc test) were used because we did not know how the means differed, we just knew that the means were not equal to each other. To solve this little mystery, we could use post-hoc tests. Post-hoc means "after this", as this is a test we conduct after we already know that there is a difference among the means we are comparing. The last analysis that we used was Pearson product moment to find the relation among the dimensions, whether the relation was positive or negative. Results showed statistically significant differences on the levels: $p < 0.05$, $p < 0.01$ and $p < 0.001$.

Results

General perception of geography

As we reported above, a high value of the questionnaire reliability ($\alpha = 0.87$) has been found. The factor analysis has been carried out on the obtained results. We established four dimensions, names of which are shown in Table 1, together with values of Cronbach's alpha per dimension. In Table 1, are also shown the factor analysis values. We eliminated two items from further analysis as their values of factor score were lower than 0.30.

Table 1. Factor analysis of GAQ.

	α	I	II	III	IV
(I) Geography as a school subject	0.72				
1. I like geography more than the other subjects.	0.58	0.06	0.23	0.27	
4. Geography lessons are very difficult for me.	0.62	0.02	0.06	0.24	
6. I would like to have geography lessons more often.	0.59	0.13	0.22	0.24	
16. It is necessary to pay more attention to understand geographical learning.	0.63	-0.05	-0.16	-0.20	
27. I suppose, geography is one of the easiest subjects.	0.69	0.10	0.11	0.17	
(II) Geography and environment	0.66				
3. Geography and nature are strange for me.	0.27	0.32	0.19	0.08	
10. Geographical knowledge can help with solving a problem which is connected with the environment.	0.06	0.62	0.21	0.13	
17. Nature is a fundamental part of human life.	0.08	0.59	-0.09	-0.09	
18. When I finish my study, I would like to work in the field of science.	0.22	0.39	0.28	-0.14	
23. I consider the processes taking place in the environment as very interesting.	0.15	0.60	0.23	0.17	
24. I suppose that geography as a subject is able to explain the impact of humans on the nature.	0.01	0.67	-0.03	0.27	
(III) Importance of geography	0.67				
7. Geographical knowledge is important for understanding other subjects.	-0.02	0.11	0.59	0.16	
11. I use geographical knowledge in everyday life.	0.03	0.07	0.67	0.17	
12. I will use geographical knowledge in my future job.	0.20	0.14	0.65	0.04	
15. I suppose, geography compared to other subjects is not important.	0.08	0.10	0.32	0.24	
26. I suppose geography as a subject enables us to understand thinking and behaviour of people from other countries.	-0.10	0.28	0.39	0.28	
(IV) Relevance of geography lessons to pupils' live	0.84				
5. Geography lessons develop my knowledge and skills.	0.10	0.17	0.22	0.38	
8. I am bored with geography lessons.	0.13	0.10	0.11	0.67	
9. Teacher's explanations in geography lessons are interesting for me.	0.11	0.28	0.12	0.69	
13. Geography is interesting for me because we are taught by a professional teacher.	0.09	0.11	0.12	0.78	
14. Maps, atlases and globes used in geography lessons are interesting for me.	-0.02	0.14	0.22	0.45	
20. I do not like geography lessons.	0.29	0.12	0.14	0.62	
21. I do not like my geography teacher.	0.12	0.10	-0.07	0.75	
22. We use a lot of geographical aids in geography lessons.	-0.17	0.01	0.29	0.44	
25. Teaching materials (books, magazines, video, souvenirs, etc.) connected with geography are interesting for me.	0.15	0.22	0.21	0.36	
Eigenvalue	6.90	2.04	1.78	1.24	
Variance (%)	25.57	7.54	6.58	4.59	
Deleted items					
2. We do not use any aids in geography lessons.	-0.03	0.06	0.11	0.13	
19. Geographical knowledge is not important in everyday life.	-0.09	0.11	0.20	0.22	

α = Cronbach's alpha. The numbers of items are identical with the number in the questionnaire. Bold values are factor loading scores.

Table 2. Mean score of pupils' attitudes towards geography with respect to grade and favourite subject of pupils.

	x	SD
Grade		
6th	3.53	0.06
7th	3.44	0.04
8th	3.34	0.04
9th	3.15	0.05
Favourite subject		
Technical	3.35	0.06
Social	3.36	0.04
Humanities	3.38	0.05
Science	3.55	0.06
Nothing	3.10	0.07

x = mean score, SD = standard deviation.

The overall mean score of pupils' perception of geography was 3.36. This suggests that geography lessons might be interesting and important for students but not difficult. Our proposition follows the fact that pupils achieved score higher than 3.00 in all dimensions.

There was no significant difference found between boys and girls ($x = 0.94$, $p = 0.32$). Boys achieved slightly higher score ($x = 3.38$, $SD = 0.04$) in comparison with girls ($x = 3.34$, $SD = 0.03$). A statistically significant difference was found among grades ($F = 10.21$, $p < 0.001$). The sixth-grade pupils achieved the highest score, whereas the ninth-grade pupils achieved the lowest score (Table 2). Tukey post-hoc test showed that pupils from the ninth grade achieved statistically significantly lower score in comparison with other grades (ninth vs. eighth: $p < 0.05$ and ninth vs. seventh, ninth vs. sixth: $p < 0.001$) and the sixth-grade pupils achieved statistically significantly higher score in comparison with eight-grade pupils ($p < 0.05$).

The influence of the favourite subject on the perception of geography was significant ($F = 6.07$, $p < 0.001$). Pupils with a science subject as the favourite subject achieved the highest scores and pupils who did not have a science subject as their favourite achieved the lowest scores (Table 2). Tukey post-hoc test showed that pupils who did not have a favourite subject achieved statistically significantly lower scores than the other groups of students according to their favourite subject: technical and social subjects ($p < 0.05$), humanities ($p < 0.01$) and science subjects ($p < 0.001$).

Interactions among independent variables were not statistically significant (Table 3).

Table 3. Values of analysis of variance (ANOVA).

Variable	F	p
Gender	0.97	0.32
Class	10.21	< 0.001
Subject	6.07	< 0.001
Gender \times grade	0.56	0.64
Gender \times subject	0.39	0.82
Grade \times subject	1.42	0.15
Gender \times grade \times subject	1.37	0.17

F = F-value of ANOVA.

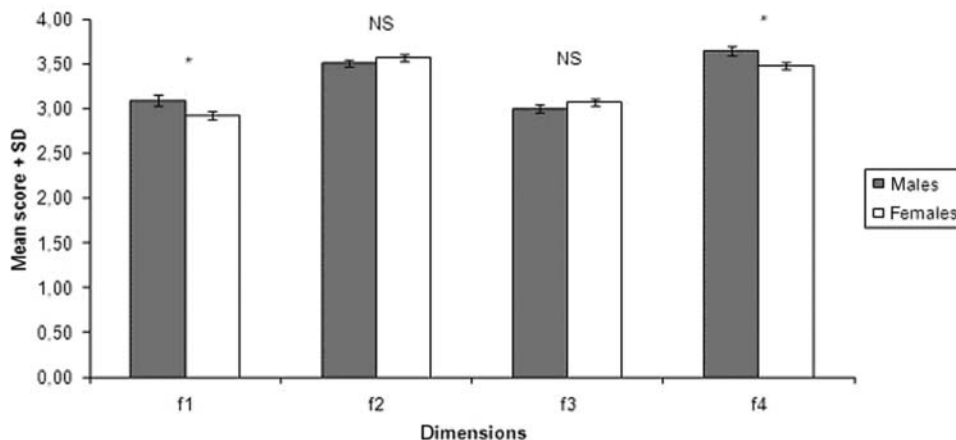


Figure 1. Mean score of pupils' attitudes towards geography, in dimensions, with respect to gender. NS = not statistically significant difference, * $p < 0.05$, f1 = dimension 1 "Geography as a school subject", f2 = dimension 2 "Geography and environment", f3 = dimension 3 "Importance of geography", f4 = dimension 4 "Relevance of geography lessons to pupils' lives".

Statistical analysis of specific dimensions

The influence of independent variables on the specific dimension was found in all three categorical variables (gender, grade level and favourite subject) during investigation. The influence of gender was statistically significant ($F = 4.87, p < 0.01$). Detailed analysis showed a statistically significant difference between results in the specific dimensions "Geography as a school subject" and "Relevance of geography lessons to pupils' lives" when boys and girls were compared. In both these specific dimensions, boys achieved a higher score in comparison with girls. In the other two specific dimensions (mentioned previously), a statistically significant difference was not found (Figure 1).

The influence of grade level was statistically significant ($F = 8.27, p < 0.001$). Detailed analysis showed statistically significant differences among grades in two specific dimensions, i.e. in dimension 2 "Geography and environment" and dimension 4 "Relevance of geography lessons to pupils' live" (Figure 2).

The influence of a favourite subject on the results was statistically significant ($F = 3.26, p < 0.001$). Detailed analysis showed a statistically significant difference among all specific dimensions except dimension 3. In all specific dimensions, pupils who have a science subject as their favourite achieved the highest score and pupils who do not have any favourite subject achieved the lowest score in all specific dimensions (Figure 3).

The relation among specific dimensions was measured by Pearson's product moment. Correlations among specific dimensions were statistically significant ($p < 0.05$) (Table 4). The highest correlation was between "Importance of geography" and "Relevance of geography lessons to pupils' lives" ($r = 0.55$). A possible explanation is that the use of didactical aids and the influence of desirable educational methods used by a teacher could have a positive influence on the perception of the importance of geography to everyday life. The next relatively high correlation was between "Importance of geography" and "Geography and environment" ($r = 0.49$). This could imply that pupils perceive geography as a part of their education, which is important for the development of awareness of environmental issues. There was a high correlation ($r = 0.45$) between specific dimensions "Relevance of geography lessons to pupils' live" and "Geography as a school subject". This could be

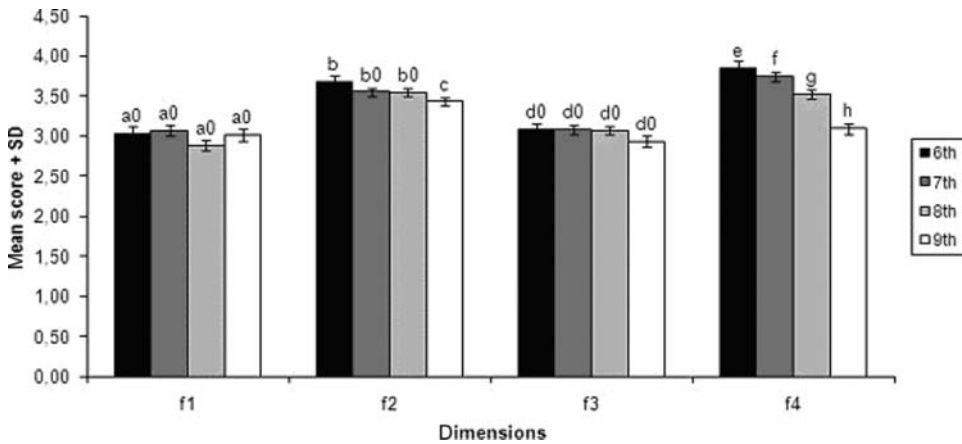


Figure 2. Mean score of pupils' attitudes towards geography, in dimensions, with respect to grade level (letters indicate statistically significant difference; letters with "0" indicate not statistically significant difference). f1 = dimension 1 "Geography as a school subject", f2 = dimension 2 "Geography and environment", f3 = dimension 3 "Importance of geography", f4 = dimension 4 "Relevance of geography lessons to pupils' lives".

interpreted as follows: when pupils appreciated the personality of the teacher and his/her educational methods and educational materials were used in a desirable way, geography was perceived more positively, compared with when these conditions were not present.

Discussion

The study examined lower secondary school pupils' perception of geography in six lower secondary schools in the Czech Republic. The sample consisted of 540 pupils aged 11–15 years. The study focused on examining pupils' perception of geography. Subsequently, the influence of variables such as gender, grade level and favourite subject on pupils'

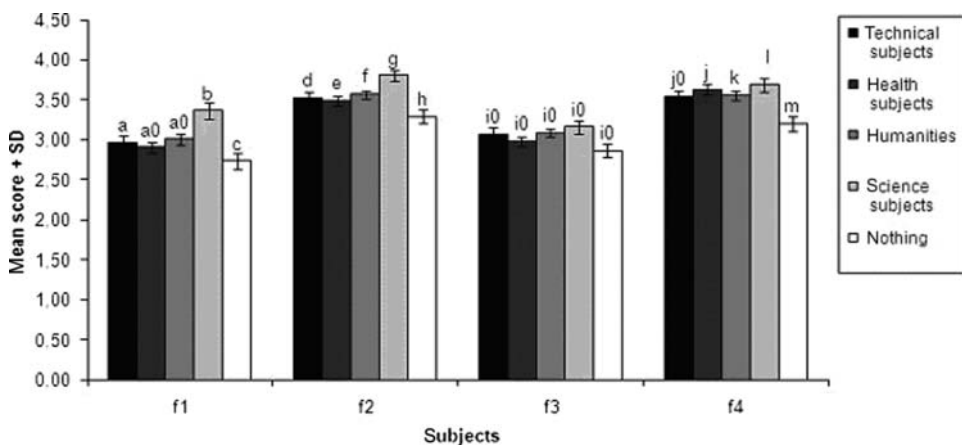


Figure 3. Mean score of pupils' attitudes towards geography, in dimensions, with respect to favourite subject (letters indicate statistically significant difference; letters with "0" indicate not statistically significant difference). f1 = dimension 1 "Geography as a school subject", f2 = dimension 2 "Geography and environment", f3 = dimension 3 "Importance of geography", f4 = dimension 4 "Relevance of geography lessons to pupils' lives".

Table 4. Values of correlations among dimensions.

	Geography and environment	Importance of geography	Relevance of geography lessons to pupils' lives
Geography as a school subject	0.30	0.29	0.45
Geography and environment		0.49	0.43
Importance of geography			0.55

All correlations are statistically significant $p < 0.05$.

perception of geography were investigated. Factor analysis with Varimax rotation divided items into four specific dimensions: (1) Geography as a school subject, (2) Geography and environment, (3) Importance of geography and (4) Relevance of geography lessons to pupils' lives. For statistical evaluation methods of descriptive and inductive statistics were used, such as ANOVA, MANOVA and Pearson's product moment.

The overall score indicated a relatively neutral perception of geography among Czech pupils. This result correlates with other studies, which focused on similar problems (Sack & Petersen, 1998). Reasons that can cause such a situation are described by McTeer (1979). These reasons can be valid also for the learning of geography in the Czech Republic. The first reason is that pupils experience geography lessons as being taught with a great amount of new information to be remembered. Second, geography lessons are quite often taught by teachers not certified in geography. The third reason is that many novice teachers get an insufficient amount of practice during their university studies and therefore are not yet so skilled in teaching geography.

Our first hypothesis was not confirmed. ANOVA was used for investigating significant differences between genders. It was established that boys achieved higher scores than girls, but the difference was not statistically significant. The difference in perception of geography between genders was not found to be statistically significant in the study of Brook (1977) either. Sack and Petersen's study (1998) showed similar results. When we look at other studies that focused on the investigation of gender differences in geography, the results were similar to those in our study, i.e. boys have more positive perception of geography in comparison with girls (Francis & Greer, 1999; O'Brien & Porter, 1994; Simpson & Oliver, 1985).

The second hypothesis was confirmed as pupils who marked one of the science subjects as their favourite achieved more positive perception of geography in comparison with other groups of students. ANOVA was used for investigating significant differences. Similar results are quoted in the study of Brook (1977), who found out that pupils who perceived geography as their favourite subject showed more positive perception of this subject in comparison with other pupils. The study we present revealed an interesting fact – pupils without a favourite subject achieved the lowest score. This finding suggests that it is important to stimulate pupils' interest in school activities. It can subsequently improve their perception of all subjects, including geography.

The third hypothesis could be accepted, because the youngest pupils achieved higher score in comparison with older respondents. ANOVA was used for investigating significant differences. There is concordance between ours and other research focused on attitudes towards geography. Brook (1997) found that older pupils have less positive attitudes towards geography in comparison with younger pupils. The study of Sack and Petersen (1998) did not find any difference among different age groups. If we look at research on attitudes towards other science subjects (Prokop et al. 2007), we find that pupils had less positive attitudes with increasing age.

Limits of study

This study investigated the influence of demographic variables such as gender, grade level and favourite subject on the perception of geography. We examined especially these three variables, but a follow-up study could investigate other variables such as influence of teachers' attitudes towards geography or travelling experience, influence of pupils' aspirations or influence of pupils' residence area on attitudes towards geography. It is possible that the place where pupils live can affect their perception of geography as well as a lot of experience with travelling.

Another limit of this study is the method used for data evaluation. There are more possibilities on how to evaluate data and how to interpret the results. We have chosen the influence of demographic variables on the overall score and the influence on dimensions extracted from factor analysis. An alternative way could be to investigate chosen dimensions in more detail.

The data were obtained from the Czech Republic lower secondary schools only. A follow-up study could examine high school students and/or college students' perception of geography and compare the results. Investigations about perception of geography from other countries could also bring new knowledge in this area of research.

The sample size was also one of the limits. When divided into groups according to gender, favourite subject and grade level, the students did not differ in their responses (see the small SDs). A bigger sample from more countries could cause a higher variance in responses. However, the low value of SDs indicates certain uniformity in responses of students groups and the differences are really significant.

Conclusion

In our study, we focused on pupils' perception of geography and how they are influenced by demographic variables such as gender, favourite subject and grade level. Results suggest that Czech pupils' perception of geography are neutral. This finding is surprising because we expected that pupils' perception of geography would be more positive after the curricular reform. This situation may be caused by the persisting didactic style of teaching in geography lessons at Czech basic schools that places emphasis on memorizing. The solution could be to implement activating educational methods that would deal with current geographical problems with greater effort and would implement new technologies (GIS, earth observation techniques, etc.), which would engage pupils more deeply into geographical phenomena.

To make geography lessons more interesting and thereby improve Czech pupils' perception of geography, we suggest the following educational implications, which can make more valuable geography lessons:

- Teachers should try to connect geography lessons with the real world and bring real-world problems (e.g. social, political, economical) to geography lessons. They should attempt to teach students how to use geographical skills to interpret these "everyday" problems as pupils have got a poor idea about the use of geographical knowledge in their future job and everyday life. This idea is supported by our findings, e.g. pupils did not see the use of geographical knowledge in their future life.
- Teachers could try to enrich geography lessons by teaching through the use of games. It can make it easier to understand complicated parts of geography and consequently pupils might consider geography one of the clearest and most stimulating subjects and the content of lessons might become easier to understand for them.

- Teachers could try working with pupils' own personal geographies and teach students how to perceive the world in a better-rounded way. Linking geographical problems with students' everyday lives could improve the lessons and students' attitudes. These suggested activities could also influence pupils' perception of geography. Many pupils might consider geography a boring subject realized only in classrooms and the outside activities could positively influence their perception of geography.
- There should be an increased use of more educational materials such as globes, atlases, maps and new technologies, e.g. GIS or GPS, which could motivate students and positively influence their perception geography. This suggestion is supported by Aladağ (2010) and Favier & van der Schee (2009). Teachers should also consider how to use currently popular media in geography lessons (e.g. Internet, *Facebook*, iPod). The similar opinions about IT in the geography lessons can be found in the study of Yeung (2010).
- Pupils' interest in geography could be increased through meetings with professional geographers and sharing their ideas about the role of geographical knowledge in everyday life. Students display a lack of interest in geography in connection with their future job and so these facts and the facts mentioned above could help improve the popularity of geography.
- Teachers could use the specific position of geography, as it stands between science and social subjects. In a geography class, information from not only subjects with social focus but also those with technical and mathematical focus should be used, e.g. calculation of different mathematical problems relating with geographical problems.
- Educational environment might also play a role. May be the reason for lower attitude scores in higher grades is the fact that education through educational games predominates in the lower grades, generating more positive attitudes towards school subjects; while transmission of curriculum content without any "entertainment" elements that could enrich the lesson predominates in higher grades.

Ultimately, we were not able to investigate all aspects that influence pupils' perception of geography in this research. To find more about improving geography education, further research should also be considered.

Acknowledgement

We are very grateful for Eva Minarikova's contribution to the improvement of the English language in this paper.

References

- Aladağ, E. (2010). The effects of GIS on students' academic achievement and motivation in seventh-grade social studies lessons in Turkey. *International Research in Geographical and Environmental Education*, 19, 11–23.
- Anastasi, A., & Urbina, S. (1996). *Psychological testing*. New York: Prentice Hall.
- Brook, D.L. (1977). Students' attitudes towards geography. *Journal of Social Studies Research*, 1, 60–69.
- Cheung, D. (2009). Students' attitudes toward chemistry lessons: The interaction effect between grade level and gender. *Research in Science Education*, 39, 75–91.
- Dawson, C. (2000). Upper primary boys' and girls' interests in science: Have they changed since 1980? *International Journal of Science Education*, 22, 557–570.
- Dhindsa, H.S., & Chung, G. (2003). Attitudes and achievement of Bruneian science students. *International Journal of Science Education*, 25, 907–922.

- Favier, T., & van der Schee, J. (2009). Learning geography by combining fieldwork with GIS. *International Research in Geographical and Environmental Education*, 18, 261–274.
- Francis, L.J., & Greer, J.E. (1999). Attitude toward science among secondary school pupils in Northern Ireland: Relationship with sex, age and religion. *Research in Science and Technological Education*, 17, 67–74.
- Gökce, N. (2009). The problems of geography education and some suggestions. *Educational Sciences: Theory and Practice*, 9, 757–768.
- Herink, J. (2009). *The geography: The position and notion of geography in national curricular documents in the world summary, conclusions and suggestions*. Retrieved from <http://clanky.rvp.cz/clanek/c/Z/2920/GEOGRAFIE-JEJI-POSTAVENI-A-POJETI-V-NARODNICH-KURIKULECH-VESVETE—SHRNUTI-ZAVERY-A-DOPORUCENI.html>
- Hopwood, N. (2009). UK high school pupils' conceptions of geography: Research findings and methodological implications. *International Research in Geographical and Environmental Education*, 18, 185–197.
- Johnston, J., & Ahtee, M. (2006). Comparing primary student teachers' attitudes, subject knowledge and pedagogical content knowledge needs in a physics activity. *Teaching and Teacher Education*, 22, 503–512.
- Jones, M.G., Howe, A., & Rua, M.J. (2000). Gender differences in students' experiences, interests, and attitudes toward science and scientists. *Science Education*, 84, 180–192.
- Koballa, T.R., & Crawley, F.E. (1985). The influence of attitude on science teaching and learning. *School Science and Mathematics*, 85, 222–232.
- Likert, R. (1932). A technique for the measurement of attitudes. *Archives of Psychology*, 27, 44–55.
- McTeer, J.H. (1979). High school students' attitudes toward geography. *Journal of Geography*, 78, 55–56.
- Morrell, P.D., & Lederman, N.G. (1998). Students' attitudes toward school and classroom science: Are they independent phenomena? *School Science and Mathematics*, 98, 76–83.
- Nunnally, J.C. (1978). *Psychometric theory*. New York: McGraw-Hill.
- O'Brien, J., & Porter, G.C. (1994). Girls in physical science: The impact of a scheme of intervention projects on girls' attitudes to physics. *International Journal of Science Education*, 16, 327–341.
- Okuranstifa, P.O. (1975). A pilot study of Nigerian pupils' attitude toward and achievement in a programmed unit of geography. *Journal of Negro Education*, 44, 538–546.
- Oppenheim, A.N. (1999). *Questionnaire design, interviewing and attitude measurement* (New ed.). London: Continuum International Publishing.
- Osborne, J. (2003). Attitudes towards science: A review of the literature and its implications. *International Journal of Science Education*, 25, 1049–1079.
- Prokop, P., Prokop, M., & Tunnicliffe, S.D. (2007). Is biology boring? Student attitudes toward biology. *Journal of Biological Education*, 42, 36–39.
- Prokop, P., Tuncer, G., & Chudá, J. (2007). Slovakian students' attitudes toward Biology. *Eurasia Journal of Mathematics, Science and Technology Education*, 3, 287–295.
- Reckase, M.D. (1979). Unifactor latent trait models applied to multifactor tests: Results and implications. *Journal of Educational Statistics*, 4, 207–230.
- Sack, D., & Petersen, J.F. (1998). Children's attitudes toward geography: A Texas case study. *Journal of Geography*, 97, 123–131.
- Salta, K., & Tzougraki, C. (2004). Attitudes toward chemistry among 11th grade students in high schools in Greece. *Science Education*, 88, 535–547.
- Simpson, R., & Oliver, S. (1985). Attitude toward science and achievement motivation profiles of male and female science students on grades six through ten. *Science Education*, 69, 511–526.
- Spall, K., Barrett, S., Stanistreet, M., Dickson, D., & Boyes, E. (2003). Undergraduates views' about biology and physics. *Research in Science and Technological Education*, 21, 193–208.
- Uşak, M., Prokop, P., Özden, M., Özel, M., Bilen, K., & Erdoğan, M. (2009). Turkish university students' attitudes toward biology: The effects of gender and enrolment in biology classes. *Journal of Baltic Science Education*, 8, 88–96.
- Weinburgh, M. (1998). *Gender, ethnicity, and grade level as predictors of middle school students' attitudes toward science*. Retrieved from www.ed.psu.edu/CI/Journals/1998AETS/s5_1_weinburgh.rtf
- Yeung, S.P. (2010). IT and geography teaching in Hong Kong secondary schools: A critical review of possibilities, trends and implications. *International Research in Geographical and Environmental Education*, 19, 173–189.