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Researching students' image of geography: Developing a questionnaire survey

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Abstract

This methodological study developed and validated a 42-item questionnaire to explore an image of geography from the students' perspective. The study aimed to (a) outline the questionnaire's theoretical background, (b) confirm its reliability, (c) and verify its construct validity on a sample of 123 Czech lower secondary students (aged 12–15 years). The dimensions of the questionnaire were as follows: the usefulness of geography, teaching methods, geography teacher, and family background. Data were analyzed using descriptive statistical analysis, item analysis, and exploratory factor analysis (EFA). After solving the challenges associated with the empirical validation of the items, the findings indicated that the final version of the questionnaire is suitable for exploring the image of geography. The reliability of all subscales exceeded 0.75. The preliminary results suggested that Czech students' perception of geography is relatively neutral. Further uses of the tool, suggestions for future research, and study limitations were also discussed.

Keywords: Image of Geography, Students, Questionnaire, Geography Education

1. Introduction

Geography occupies a unique position among scientific disciplines and school subjects, as it brings together knowledge about the environment, space, place, and time (Harvey, 1990). However, despite its synthetic and interconnecting nature, geography has long struggled with student disinterest (Jan Bent et al., 2013; Kidman, 2018), leading to its place in the curriculum being questioned (van der Schee 2014; Béneker et al., 2015). Global trends indicate a decline in the number of hours of geography taught in schools (Boehm et al., 2018), further reducing students' interest in studying geography at higher levels of education (Adey and Biddulph, 2001; Kitchen, 2013; Jan Bent et al., 2013). Czechia is no exception in this respect. Only 58% of Czech students enjoy geography (ČŠI, 2015), while approximately half of students find it an interesting subject (ČŠI, 2019).

In recent years, scholars have started to recognize that geography education is underappreciated and have therefore sought to

defend its usefulness (Parkinson, 2020; Kaplan, 2021). One of the key ways in which the image of geography in society can be reshaped is by focusing on how geography is perceived by students, who encounter geography content on a regular basis throughout their schooling. It should be noted here that although students are frequently the subject of educational research, their opinions, attitudes, and ideas are rarely systematically incorporated into the educational system to make it more student-centered. Although, their perspective could act as a valid and alternative voice in guiding curriculum changes and ensuring that modifications align with students' needs. Despite the many quantitative studies (Aydin and Tülümen, 2018; Burnett and Crowe, 2016; Karolčík et al., 2019; Kubiatko et al., 2012) that have investigated student attitudes towards geography, there is still no standardized tool used to comprehensively assess students' image of geography and that identifies the factors that influence image of geography. The aim of this study, then, is (a) to outline a theoretical model that can capture students' image of geography, (b) to design a questionnaire based on this model, and (c) to verify the questionnaire's construct validity using a sample of 123 lower secondary students (aged 12-15 years).

The first part of this paper deals with its theoretical background, which is based on social constructivism and feminist geographies. The second part outlines the origins of the questionnaire and the modifications made to it based on input analyses. The outcome of the study is an original questionnaire (see the Appendix) that serves as a valid and reliable tool for exploring the image of geography. Lastly, I conclude by presenting brief recommendations, acknowledging the need for further elaboration on my research to actively reshape geography education and how it is perceived.

2. Theoretical backgrounds

2.1 Image of Geography as a social construct

The rationale of this research follows the theory of social constructivism, which emphasizes how, over time, individuals and groups interacting within a social system start to create concepts or mental representations of each other's actions, and that these concepts eventually become habituated into reciprocal roles played by the actors in relation to each other (Berger and Luckmann, 1991). In this process, people's conceptions of what reality is become embedded in the institutional structure of society. Thus, reality is socially constructed; it is created by people. One could argue that people's image of geography is similarly socially conditioned (Murphy, 1991; Marek, 2020), i.e., each person's view of geography is influenced by their environment and circumstances. Accordingly, as someone's social circumstances change, so does their understanding of what geography is, resulting in an endless closed circle. Drawing from this theoretical background, I apply the following definition of image of geography in this paper: "a comprehensive set of attitudes, ideas, and expectations about geography, based on how geography is presented externally. In the context of education, the image of geography can be explored on the basis of sensory qualities without rational assessment, without proper argumentation, or on the basis of the perception of others. The better the understanding of the subject, the better its image, and the higher value of geography and geographers in society" (Korvasová, 2021, p. 350).

Using this socially constructed definition image of geography as a starting point, I focus on the perspective of students, a choice influenced by the thoughts of feminist geography, particularly the second feminist wave (Hancock et al., 2020). This wave, responding to societal shifts, broadened the feminist discourse to encompass not just gender equality but all types of equality in society, shedding light on and critiquing contemporary inequalities in relationships. Purposefully drawing attention to individual differences and the resulting inequalities, this perspective challenges the traditional, single, neutral, and rational viewpoint by highlighting the need to explore alternative sources of knowledge (Harding, 2004). In this case, I see the alternative as the objective reality of students, whose views are often not considered. The educational discourse is dominated by the views

of those in power, i.e., teachers, curriculum designers, or writers of textbooks (Woodward et al., 2017), an imbalance that is reflected by the absence of a student voice in curriculum or textbook design (Lee and Catling, 2017). Advocating for the inclusion of students' voices (Arnot and Reay, 2007; Bragg, 2001; Cook-Sather, 2006) provides a perspective through which we can bring about meaningful changes in education that cater to the specific needs of students (Cook-Sather, 2007). I am therefore concerned with empowering students to actively voice their opinions and co-determine how to plan, implement, and evaluate their learning experiences (Rogers, 2005) and with helping them play a role in shaping educational changes (Cook-Sather, 2006).

In accordance with the theoretical framework, the additional objective of this research is to suggest strategies that either uphold the existing image of geography or that positively reshape it, all while being rooted in an understanding of geography as a school subject from students' perspective. To investigate the image of geography in this way, I adopt a quantitative approach by means of a questionnaire. In doing this, I intend to not only provide insights but to generalize these insights (see below for an overview). While qualitative research is widely used among feminist researchers, quantitative research can also be employed to fulfil feminist goals, as both research paradigms show great potential for social change and social transformation. According to Miner-Rubino, Jaraytne and Konik (2007), collecting data through questionnaire surveys is one of the most effective tools for bringing about social change because it can give individuals a voice; in this case, it gives students the voice needed to make themselves heard by educators at all levels of geography education. Through their voice, we hope to establish a more socially acceptable image of geography. Such an endeavor requires collaboration with educators, who must be consciously involved in the process from the outset and must be aware of the outcome we seek to achieve.

2.2 State of the art

In the previous section, I justified why it is important to capture the process by which the image of geography as a school subject takes shape in the minds of students. A recently published systematic review highlighted 27 empirical studies that have explored various factors influencing students' image of geography (Korvasová, 2021). A total of eight studies (Biddulph and Adey, 2003, 2004; Lam and Lai, 2003; Norman, 2004; Harrison and Norman, 2004; Hopwood, 2009, 2014; Al-Nofli, 2010; Jan Bent et al., 2013; Opoku et al., 2021) were based on qualitative inquiry, giving researchers the opportunity to understand more closely (and even repeatedly) students' internal motives, external factors, and the deeper contexts of the process of geography image formation in students. These qualitative studies indicate that the content and design of geography lessons are crucial to the process of constructing an image of geography, suggesting that teachers play an important role. The most common qualitative method was semi-structured interviews (Hopwood, 2009, 2014; Lam and Lai, 2003).

A more comprehensive picture of the construction of the image of geography is provided by quantitative research, which explores various dimensions of students' perspectives. The 18 questionnaire surveys identified in the review can be categorized into three groups (Korvasová, 2021). The first group of questionnaires compares subjects (including geography) according to popularity (McTeer, 1979; Sack and Petersen, 1998; Hibszer, 2011). This approach allows researchers to work with a large respondent pool, gather substantial data, and offer contextual insights into the position of geography within the chosen group of subjects. The second group of questionnaires features open-ended questions that prompt students to write keywords or associations related to geography, geographical topics, or teaching methods (Adey and Biddulph, 2001; Norman, 2004; Hopwood et al., 2005; Kitchen, 2013; Harrison and Norman, 2004; Senyurt, 2014). When students are willing to collaborate and feel sufficiently motivated, this approach can be an effective means by which to explore their perspectives. The third group consists of questionnaires in which students expressed their

attitudes, interest in, or motivation towards specific statements regarding geography education on a 4–5-point Likert scale (Hubbard and Stoddard; 1979; Tomal, 2010; Bar-Gal and Sofer, 2010; Mularczyk, 2011; Tracz, 2011; Kubiatko et al, 2012; Aydin and Tülümen, 2018; Sözen, 2019; Karolcik et al., 2019). Research designed in this way has greater validity and reliability due to the targeted use of dimensions (variables) into which the items are structured. For example, in a Czech study, Kubiatko, Janko, and Mrazkova (2012) focused on attitudes towards geography and divided the items into four factors: (1) geography as a school subject; (2) geography and the natural environment; (3) the importance of geography; and (4) the relevance of geography lessons to pupils' lives. I describe the research findings of each study in more detail in the following section.

Questionnaires of this nature are commonly used to study students' attitudes towards various school subjects (Osborne et al., 2003), and while the factors and dimensions in questionnaire surveys mostly depend on the specifics of each school subject, some factors remain the same for all subjects. These include the teacher's classroom presence and approach to behavior management (Omolara and Adebukola, 2015; Osborne et al., 2003). Furthermore, the internal setting of the student and their motivation is certainly important (Tuan et al., 2005), especially for science, while the factor of achievement or clarity of the content is also crucial (Osborne et al., 2003). Moreover, for humanities subjects, the individual's family or cultural background is often important (Andrews et al., 2010).

Currently, I am not aware of any research tool available that comprehensively captures students' image of geography and the factors that influence it. Therefore, this study aims to introduce and outline the development of a questionnaire designed to assess the perception of geography, including its dimensions and items, while also examining the reliability and validity of the questionnaire. Specifically, the aim is to capture part of the process during which students' image of geography as a school subject emerges and takes shape. The essential contribution of this study is to describe the process of developing and validating a questionnaire that captures students' image of geography. After incorporating partial modifications, the questionnaire can be considered to be a valid and reliable instrument that enables researchers to explore the sub-dimensions of the image of geography and the factors that influence the process of forming an image of geography among students.

3. Development of the questionnaire

To develop the questionnaire, I synthesized the existing qualitative and quantitative research (Korvasová, 2021) to identify the research constructs that are used to investigate students' attitudes towards geography as well as the factors that influence students' image of geography. After a detailed analysis of previous questionnaire surveys, I designed my own questionnaire with four sets of items (dimensions): (1) usefulness of geography, (2) teacher's presence, (3) teaching methods, and (4) family background.

3.1 Usefulness of geography

The first dimension of the questionnaire focuses on the usefulness of geography—or, put another way, the relevance of geography in everyday life. I included this dimension in my questionnaire because the current image of geography is intrinsically tied up with its relevance – or lack of relevance – to contemporary life (Béneker, 2013). By viewing geography as a product of social construction, it may be possible to increase awareness of its importance and the contributions it makes to society, thereby increasing its perceived value. Indeed, students need to feel a personal, intrinsic desire to learn about geography, because if the educational content is not interesting, relevant to their everyday life, or useful in some way to their future development, they will not appreciate it (Opoku et al., 2021).

The usefulness dimension is directly linked to the attitudes, motivations, and interests of the students themselves. At a theoretical level, this dimension aligns with the feminist approach, particularly in its connection to student voice

theory (Arnot and Reay, 2007; Bragg, 2001; Cook-Sather, 2006). It can also be informed by self-determination theory, which distinguishes between intrinsic and extrinsic motivation (Deci and Ryan, 1985). Intrinsic motivation leads to better achievement, creativity, and interest in the subject. In contrast, extrinsic motivation does not guarantee that students will become more interested in a subject based on their own beliefs; rather, it refers to when students seek success in geography for external validation, such as parental or teacher appreciation or other benefits (Ryan and Deci, 2020). Hence, subject-related motivation is an important driving force, reflecting students' genuine attitudes towards the subject itself (Ryan and Deci, 2020). Related to this is subject-related interest, which, according to Pintrich (2003), has often been used to describe aspects of intrinsic motivation in students' learning. This relationship may be a temporary state or a stable disposition (Kunter et al., 2007), i.e., it may change over time depending on other factors influencing the image of geography.

The usefulness of geography dimension has also been employed by Kubiatko et al. (2012), who conducted a questionnaire to investigate students' attitudes towards geography in the Czech environment. In addition, this dimension has been a recurrent theme in other examined studies (Adey and Biddulph, 2001; Opoku et al., 2021; Lam and Lai, 2003). The piloted questionnaire included 17 usefulness of geography items using a 5-point Likert scale.

3.2 The teacher's presence

The factor that appears to have the greatest influence on students' image of geography is the presence of the teacher. The teacher's attitude towards the subject and also towards their students is crucial in inspiring students to become interested in the subject (Karolčík et al., 2019; Adey and Biddulph, 2001; Hopwood, 2014; Sözen, 2019). If a teacher delivers unengaging lessons, it can have a significant negative impact on the image of geography (McTeer, 1979). Moreover, if students believe that the teacher lacks expertise, lacks academic endorsement (Hibszer, 2011), has a short teaching tenure, or is not yet comfortable in the classroom (Sack and Petersen, 1998), then further doubts about the class may arise. Conversely, if the teacher is helpful, active, and engaging, they are more likely to be highly respected, which in turn will positively influence the perception of the subject (Tomal, 2010; Al-Nofli, 2010). Geographic content can also be a barrier for teachers, especially if the teacher is not connected to the curriculum and its composition (Lam and Lai, 2003; Burnett and Crowe, 2016) or the required geographic topics (Korvasová, 2022). In piloting the questionnaire, I therefore developed six items on the teacher's presence using a 5-point Likert scale.

3.3 Teaching methods

Another factor influencing the image of geography, to which I devoted a third dimension, is classroom teaching methods. This refers to the frequency of incorporating particular methods into teaching that can influence the image of geography. But it can also show what forms of teaching still prevail in schools. A previous systematic review (Korvasová, 2021) showed that the use of active methods contributes to a positive attitude among students (Sack and Petersen, 1998; Hopwood et al., 2005). Students perceive geography as beneficial if they can participate in problem-solving, work with maps, present projects, create posters, or investigate selected phenomena off campus (Biddulph and Adey, 2001; Harrison and Norman, 2004; Opoku et al., 2021). They also have a positive perception of the use of technology in the classroom (Burnett and Crowe, 2016; Aydin and Tülümen, 2018). By contrast, they often have a negative attitude toward working with texts or textbooks (Adey and Biddulph, 2001) and tend to lose interest if they have to listen to explanations or copy notes from the blackboard (Al-Nofli, 2010; Sözen, 2019). Moreover, teaching strategies based on the memorization of things and places are clearly detrimental to geography's image (McTeer, 1979; Karolčík et al., 2019). Taking all these factors into account, in the piloted questionnaire, I designed 11 items in the teaching methods dimension according to the frequency with which various teaching methods were used in the classroom.

3.4 Family background

The fourth dimension concerns family background. Research shows that parental influence plays a major role in students' perceptions of learning (Hopwood, 2014; Karolčík et al., 2019; Opoku et al., 2021). Parents can act as motivators or demotivators by either showing interest in geography or assigning it no importance at all. Kitchen (2013) also documented the influences linked to one's family, such as friends, television, and travel experiences, also play a key role in individual perceptions or attitudes towards geography. I included 8 items assigned to this dimension in the pilot with a 5-point Likert scale.

4. Data collection

The questionnaire survey was administered in April and May 2022 to three lower secondary classes (ISCED A2). The aim was to verify the validity and reliability of the questionnaire in order to refine the items in preparation for a large-scale study of Czech students. The data were collected through nonprobability sampling. All the schools were located in the city of Brno and its surrounding area. The author of the questionnaire or the geography teachers administered the proposed draft questionnaire to students in geography classes. Instructions were read at the beginning of the lesson, either by the author or by the teacher. Afterwards, questionnaires were distributed so that students could complete the survey in person, or a QR code or link was provided to enable students to complete it online. Students were allowed unlimited time to complete the questionnaire. It was observed that the time to complete it varied by school year, with younger students taking the longest time and older students taking the shortest time. After completing the questionnaire, a few students were selected to verbally discuss it with the author in order to verify that they correctly understood the items and to address any ambiguities or other problems.

4.1 Sample

The sample comprised 123 students from the 6th to 9th grade (19% in the 6th, 10% in the 7th, 31% in the 8th, and 40% in the 9th grade). The majority of students were between 14 and 15 years old. In total, six classes were sampled. Approximately two-thirds of the students (n=82) were taught by male teachers, while one-third (n=40) were taught by female teachers. The sample was one of convenience since the assignment of students to teachers and classes was not influenced by the researcher.

5. Findings

All respondents received identical instructions and sufficient time to complete the survey, resulting in a response set with no missing data. Our intention was to determine the validity and reliability of the questionnaire from the perspective of lower secondary students. To do this, it was necessary to determine whether the questionnaire met the basic requirements set for research instruments used in pedagogical practice. Initially, I scrutinized the dataset to ensure its distribution was appropriate and reliable. Following that, I assessed the validity of the questionnaire.

I analyzed the data using SPSS, opting for multivariate exploratory factor analysis (EFA). EFA was chosen for its ability to condense the data by identifying items that statistically belong together or can be used to statistically identify the occurrence of a variable factor (Rabušic et al., 2019). Using this procedure, it was possible to conduct the factor analysis in search of the (four dimensions) that were proposed in the development stage. To address the latter issue, I used principal components analysis (PCA). I conducted the analysis twice: once for items with 5-point Likert (agreement) scale and then a second PCA for items with a frequency 5-point scale. The reliability of the whole questionnaire was calculated using the Cronbach alpha coefficient in STATISTICA software, yielding a reliability value of (α=0.92), indicating an acceptable level of reliability (Nunnally, 1978).

5.1 Exploratory factor analysis for items with 5-point Likert scale (agreement)

The initial dataset underwent factor analysis with oblimin rotation, revealing that items from the three dimensions were categorized into four groups (factors) with eigenvalues greater than 1.0: (I) usefulness of geography (13 items), (II) family background (nine items), (III) teacher presence (six items), and (IV) achievement (three items). These factors collectively explained 56.73% of the total variance. According to Reckas (1979), the first factor should explain at least 20% of the total variance, and the difference between the second and third factors should be lower than the difference between the first and second factors. The suitability of using factor analysis was confirmed by the Kaiser-Meyer-Olkin measure of sampling adequacy (0.867) and Bartlett's test of sphericity ($\chi 2$=2181.677; df=465; Sig=0).

The elevated reliability coefficient in our study indicates that the first part of the instrument employed to explore students' image of geography is reliable and that its usage for further analysis is justified. The values of Cronbach's alpha (α) for specific factors are presented in Table 1. From this, it can be seen that three had a reliability score exceeding 0.80, while the fourth had a score of 0.628. The alpha test suggests that all these factors can be deemed acceptable (Nunnally, 1978).

5.2 Exploratory factor analysis for items with 5-point frequency scale

The second set of data (Table 2) was simultaneously processed using factor analysis. The items with frequency scale were part of one dimension: teaching methods. The suitability of factor analysis was confirmed using the Kaiser-Meyer-Olkin measure of sampling adequacy (0.698) and Bartlett's test of sphericity ($\chi 2$=356.07; df=55; Sig=0). Four factors emerged from the analysis, but one factor had only one item (factor III) and another factor had no eigenvalue greater than 1.0 (factor IV). Overall, the factors accounted for 66.98% of the total variance (Table 2). The Cronbach's alpha values for specific factors warrant attention. The first factor had a value of 0.498 but increased to 0.769 after removing item 25, which was problematic and could fall into multiple factors. The second factor (II), which focused on classwork, had an acceptable value of 0.624 and could therefore be retained. By contrast, factor (III) was removed because it only included one item, which is not sufficient to calculate Cronbach's alpha. Factor (IV) was similarly problematic as the two included items were negatively oriented and even after reverse scaling, the Cronbach's alpha value remained low. Therefore, this factor was also removed. In total, then, four items (24, 25, 27, 32) were removed from the analysis. Only two factors were retained in the teaching methods dimension: innovative teaching methods and traditional teaching methods.

5.3 Final structure of factors

5.3.1 Factors with agreement 5-point scale

In focusing on the factors measured on the 5-point Likert scale, the initial expectation was for three dimensions or factors. However, it eventually transpired that four factors were confirmed instead of the planned three. The usefulness of geography factor was retained and contains the largest number of items. I had originally planned for 17 items, but 13 items were retained in the factor, 12 of which were original, and one item was added to the factor from the family background dimension. The second unproblematic factor was the teacher's presence, for which six original items were retained. The third factor that changed the most was family background, which originally had eight items, five of which were retained. Four items were added to the factor from the usefulness of geography dimension. The new number of items for the family background factor was fixed at nine. The EFA analysis also discovered a new factor that I had not originally accounted for, namely achievement. This factor was created from the three items that were originally planned for the family background dimension (2) and for usefulness of geography (1).

Across the factors, seven of the 30 proposed items were relocated, with the overall distribution changing by 23%. I would rate the validation of these factors as successful as no item exhibited EFA values that were sufficiently low for them to be discarded. Only three items (1, 5, 40) had to be modified to better fit one of the dimensions as they fell into two dimensions based on the resulting values (see Table 1).

		A	I.	II.	III.	IV.
	(I) Usefulness of geography	0.90				
4	Thanks to my geography lessons, I understand what a landscape is and how it changes.		**0.79**	-0.18	0.02	-0.06
11	With my knowledge of geography, I can solve geographical problems or situations.		**0.76**	0.11	-0.11	-0.02
10	Thanks to my geography lessons, I can navigate current geographical issues.		**0.75**	0.19	-0.11	-0.06
12	Thanks to my geography lessons, I know how to use maps.		**0.71**	-0.20	0.23	-0.02
13	Thanks to my geography lessons, I can navigate by maps outdoors.		**0.70**	-0.11	0.15	0.00
14	Thanks to my geography lessons, I understand nature and the interactions that take place in it.		**0.69**	0.12	0.05	0.00
3	Thanks to my geography lessons, I understand concepts like sustainability and climate change.		**0.60**	-0.05	0.14	-0.16
9	Thanks to my geography lessons, I can empathize with the people of foreign countries, different cultures, and customs.		**0.57**	0.19	0.08	0.28
5	Geography lessons have made me interested in the problems and disasters of the world.		**0.53**	**0.33**	-0.08	-0.02
16	Thanks to my geography lessons, I can think critically about the world and the interactions that take place in it.		**0.46**	0.15	0.24	-0.20
42	I am the most geographically oriented of the whole family.		**0.44**	0.13	-0.11	0.04
15	Thanks to my geography lessons I can name the countries of the world and their capitals.		**0.42**	-0.05	0.30	-0.01
2	Thanks to my geography lessons, I can plan a trip abroad.		**0.37**	0.28	0.27	-0.01
	(II) Family background	0.85				
39	I'm mainly interested in geography because of my family (we show each other maps, watch travelogues, talk about travel...).		-0.05	**0.80**	-0.07	0.04
36	My family and I look at maps and atlases together.		0.02	**0.78**	-0.13	0.07
38	The family is interested in what we learn in geography.		-0.19	**0.77**	0.23	0.07
7	Thanks to geography classes, I am considering studying geography in college.		0.02	**0.67**	0.20	0.09
6	Thanks to my geography lessons I voluntarily participate in geography competitions (e.g., Geography Olympiad, Eurorebus...).		0.14	**0.57**	0.06	-0.04
37	My family and I are looking at photos from our trips and places we plan to go.		0.14	**0.56**	0.00	-0.04
8	Thanks to my geography classes, I want to learn as much as I can about the world in my spare time.		0.18	**0.56**	0.15	-0.19
35	We travel with our family to explore selected places in the Czechia or abroad.		0.21	**0.53**	-0.02	-0.06
1	Thanks to my geography lessons, I am finding out more about foreign countries and cultures.		0.21	**0.33**	**0.32**	-0.20
	(III) Teacher's presence	0.91				
18	I like my geography teacher.		0.01	0.05	**0.90**	0.01
23	The geography teacher is willing to explain the subject matter if we don't understand it.		-0.02	-0.01	**0.89**	0.12
22	The geography teacher understands what he/she is talking about.		-0.05	-0.08	**0.87**	0.03
19	The geography teacher can hold my attention.		0.03	0.10	**0.84**	-0.13
21	The geography teacher fairly evaluates our performance.		0.01	0.03	**0.81**	0.12
20	The geography teacher's explanations are interesting in almost every lesson.		0.11	0.16	**0.77**	-0.12
	(IV) Achievement	0.63				
17	In geography lessons, I'm just trying to get good grades.		0.20	-0.26	0.07	**0.86**
41	It is important for my parents that I have good grades in geography.		-0.07	0.14	0.07	**0.70**
40	I'm making effort in geography because my parents expect me to.		-0.24	**0.32**	-0.11	**0.60**
	Eigenvalue		9.84	3.41	2.85	1.48
	Variance (%)		31.74	11.01	9.19	4.79
	Modifications needed **(5)** Geography lessons have made me interested in the problems and disasters of the world. **(1)** Thanks to my geography lessons, I am finding out more about foreign countries and cultures. **(40)** I'm making effort in geography because my parents expect me to.					

Table 1. Exploratory factor analysis for 5-point Likert (agreement) scale.
Source: Author's own data, IBM SPSS, 2022.

5.3.2 Modification of items with agreement 5-point scale

The three items which have been modified are the following.

- (5) "Geography lessons have made me interested in the problems and disasters of the world". The inclusion of "problems" and "disasters" in one item was problematic. It needed to be reworded so that there are not multiple statements within a single item. Hence, the wording has been changed to the following: "Geography lessons have made me interested in world issues".
- (1) "Thanks to my geography lessons, I am finding out more about foreign and cultural countries" presented a similar problem in that it included multiple statements within a single item. Additionally, the item was reassigned to the family background factor, so it needed to be reworded to fit this factor: "In my spare time I look up more information about foreign countries".
- (40) "I'm making effort in geography because my parents expect me to". The item has been reassigned to the achievement factor, although it was originally under family background. Therefore, it needs to be modified to meet the needs of the newly created factor. New wording: "I'm making effort in geography because it is expected of me".

		α	I.	II.	III.	IV.
	(I) Innovative teaching methods	0.50				
30	We use the internet to find out more information.		**0.84**	0.15	-0.01	-0.07
28	We solve the tasks in class in a group.		**0.80**	0.25	0.05	0.23
31	We use digital technology to learn new subject matter.		**0.70**	-0.12	0.18	-0.34
33	Geography lessons are also spent outdoors (e.g., in the form of outdoor lessons around the school, field trips, educational excursions).		**0.68**	-0.05	-0.14	0.07
25	We are required to take notes in a notebook.		**-0.45**	**0.43**	**0.41**	-0.16
	(II) Traditional teaching methods	0.62				
26	We analyze the texts and work with them further.		0.10	**0.85**	-0.20	0.11
29	While discussing the new subject matter, we work with a map or an atlas.		0.07	**0.80**	0.04	-0.10
34	We repeat the knowledge and understanding of previous lessons.		0.00	**0.47**	0.16	-0.24
	(III) Frontal lessons	-				
24	Teaching is based on the teacher's presentation (or even just explanation).		0.00	-0.07	**0.94**	0.12
	(IV) Problem-solving	0.43				
27	We solve the tasks in class independently.		-0.17	0.13	-0.23	**-0.80**
32	We look at how things work in the world and address their causes and consequences.		0.30	0.03	0.22	**-0.68**
	Eigenvalue		2.85	2.37	1.27	0.87
	Variance (%)		25.89	21.58	11.58	7.94
	Deleted items **(24)** Teaching is based on the teacher's presentation (or even just explanation). **(25)** We are required to take notes in a notebook **(27)** We solve the tasks in class independently. **(32)** We look at how things work in the world and address their causes and consequences.					

Table 2. Exploratory Factor Analysis for 5-point frequency scale.
Source: Author's own data, IBM SPPS, 2022.

Designed dimensions	Number of designed items	Confirmation with EFA	Factors based on EFA	Description of the factor	Final number of items in factors based on EFA	Example of an item
Usefulness of geography (agreement)	17	Confirmed	Usefulness of geography (agreement)	A prerequisite for students' interest and motivation is that the educational content is interesting, relevant to everyday life, and useful for their future development.	13	#13 Thanks to my geography lessons, I can navigate by maps outdoors.
Teacher's presence (agreement)	6	Confirmed	Teacher presence (agreement)	The teacher's attitude towards the subject and towards the students is crucial to inspiring students' interest in the subject.	6	#22 The geography teacher understands what he/she is talking about.
Family background (agreement)	8	Confirmed	Family background (agreement)	Parents can act as motivators and determine whether students show interest in geography based on their own interest in the subject.	9	#36 My family and I look at maps and atlases together.
		New factor	Achievement (agreement)	The evaluation factor was identified on the basis of EFA. It is known that some students try their best in subjects just to get good grades in an attempt to receive external validation from their teacher or parents.	3	#17 In geography lessons, I am just trying to get good grades.
Teaching methods (frequency)	11	New factor	Innovative teaching methods (frequency)	The frequency of incorporating particular methods into teaching can affect the perception of geography. It can also show which forms of teaching still prevail in schools and if teachers follow the latest trends and create interesting and variable lessons.	5	#31 We use digital technology to learn new subject matter.
		New factor	Traditional teaching methods (frequency)	The frequency of particular methods of teaching can also demonstrate whether the traditional forms of teaching still prevail in schools and whether only basic teaching aids are used.	3	#26 We analyze the texts and work with them further.

Table 3. Description of dimensions, number of items, and item examples.

5.3.3 Factors with frequency 5-point scale

I used the frequency scale for only one dimension: teaching methods. For the entire dimension, I designed a total of 11 items. After conducting the EFA, the items were categorized into four factors (see Table 2). Factors III and IV saturated only one and two items, which proved to be problematic. Factor III, which had only one item, could not be used (Cronbach alpha requires multiple items), so I discarded the item. Factor IV contained two items with negative values, and since they remained the same after re-polarization, I decided to discard them as well. For the Teaching methods dimension, I only created two factors (innovative teaching methods and traditional teaching methods), which have a total of eight items. Both dimensions of the questionnaire can be considered valid, although the values of Cronbach's alpha were lower than those in the previous dimensions.

5.4 Preliminary results

The overall mean score for students' image of geography was 3.28. Examining the mean scores for each factor (Table 4), it can be seen that "teachers' presence" received the highest mean score (4.04), followed by the other factors directly related to teaching: innovative teaching methods (3.48) and traditional teaching methods (3.32). Surprisingly, family background received the lowest value (2.46). Notably, the nature of these pilot data does not allow for the use of inferential statistics, but, in the main study, I will focus on assessing the relationship between each factor and other variables.

FACTOR	MEAN	SD
Usefulness of geography	3.19	1.25
Family background	2.46	1.31
Teachers' presence	4.04	1.23
Achievement	2.86	1.35
Innovative teaching methods	3.49	1.10
Traditional teaching methods	3.32	1.21

Table 4. Mean scores and standard deviation for each factor of students' image of geography.
Source: Author's own data, IBM SPSS, 2022.

6. Discussion

The final version of the questionnaire (Appendix A) emerged from the findings of a previously published review study (Korvasová, 2021) before being refined and revised based on research findings from piloting the questionnaire. The presentation of the new data in this paper both clarifies and refines the instrument. This type of replication research is common in educational sciences, where researchers validate and enhance the use of an instrument using different subject samples. During the piloting process, I found that the proposed theoretical model of each dimension of the questionnaire exhibited standard acceptable values of validity and reliability. The model's functionality and validity were then further confirmed through an exploratory factor analysis.

Preliminary results suggest that Czech students' image of geography is relatively ambivalent. Thus, geography does not appear to be among the most attractive subjects from the perspective of students, as evidenced in retrospect by research conducted by Kubiatko et al. (2012) more than a decade ago. If we look at the perception of geography as a social construct, the primary factor in the process of shaping geography's image as a school subject in students' consciousness is the teacher. Indeed, the teacher's presence and other factors directly related to the teacher have been shown to be key in influencing students' image of geography (Karolčík et al., 2019; Opoku et al., 2021; Osborne, Simon, Collins, 2003; Sözen, 2019). By contrast, the findings of Hopwood (2014), supported by the findings of Andrews, McGlynn, and Mycock (2010), who revealed the important role of family in the process of shaping one's image of geography, have not been confirmed. It is worth pointing out here, though, that the preliminary findings are not generalizable to the population due to the limited sample size and the non-random sampling method. The primary purpose of this study was to validate the questionnaire, the final form of which (Appendix 1) will subsequently be used to collect data on a representative sample of Czech students.

Although this study has numerous benefits, it

is also important to acknowledge its limitations. In the review section I listed multiple methodological approaches that could be used to capture the image of geography (questionnaires, interviews, vignettes, essays, and concept maps). However, only one of these approaches was used in this study. A more comprehensive and robust methodology would involve triangulating the questionnaire with other approaches to enhance the study's validity. In particular, concerns related to social desirability bias in responses must be considered. Moreover, the sociocultural context must be taken into account. Furthermore, given that this was a questionnaire validation, convenience sampling was employed. However, in the main study, a randomized research sample will be implemented to enhance generalizability and reduce sampling biases.

It is also possible that the construction of the theoretical model and the underlying questionnaire construction was to some extent subjectively burdened by the assumed lack of interest in the subject among the students. To mitigate potential biases stemming from the random completion of questionnaire items, the research data underwent multiple rounds of careful reading and cleaning. Despite these efforts, complete elimination of all flawed data cannot be guaranteed.

In addition, it should be noted that the questionnaire does not measure the image of geography in relation to geographical content (in the form of themes and topics). I excluded this dimension in the questionnaire survey because geographical themes and topics are linked to tradition, the content of the national curriculum, the degree of teachers' autonomy, and the wider context of geographical education; yet, in Czechia, specific geographical themes and topics are not set at the curriculum level; rather, only broadly defined expected outcomes are binding for teachers (Spurná et al., 2021). Therefore, it is very difficult to compare the results of research that focuses on determining the popularity of selected geographical themes and topics from the perspective of students, as has been done in the past by researchers like Hemmer and Hemmer (2017) or Kidman (2018).

7. Conclusion

Although the research is based on a quantitative method, its ideological foundation lies in the theory of the social construction of reality and feminist influences. The decision to explore students' perceptions of geography as a school subject was motivated by my interest in these theories. A major contribution of this study is the description of the process of developing and validating a questionnaire that captures students' image of geography. After partial modifications, the questionnaire can be considered a valid and reliable instrument that enables investigation into the selected factors that influence the process of forming an image of geography among students. Thus, the instrument is presented as viable for replication research in the future.

Preliminary results suggest that Czech students' image of geography is primarily influenced by the teacher's presence and other characteristics that are directly related to the teacher's behavior. Preliminary findings also suggest that geography is not among the most popular subjects among Czech students. Considering the several assumptions emanating from the survey data, I will propose and further elaborate (in my next study) on the recommendations displayed below. Based on my data, I conclude that the first feasible step in reshaping geography's image should be to highlight the usefulness of geography. Geography lessons need to be more closely aligned with students' needs and expectations, and lessons need to be more interesting and more relevant to students' everyday life. Therefore, geography teachers should abandon blind memorizing of facts and continue to use innovative teaching methods while abandoning more traditional methods. However, these results may pose certain challenges for geography teachers, while also presenting valid and thought-provoking insights for teacher training institutions. As educators of future teachers, it is imperative for us to embody the role-model teacher, champion suggested changes, and actively contribute to reshaping the perception of geography. By setting examples of good practice and enhancing academic efforts, we can initiate the transformative process needed in the field.

The next step of the research will be to collect data on a representative sample of Czech students' image of geography in order to *increase* the meaningfulness of the results and the validity of the research tool presented. I believe that reshaping the image of geography is not only important in the context of learning and teaching at all educational levels but also for sustainable civil society.

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Appendix 1

The final set of items in the questionnaire survey measuring the perception of geography (with transparently shown *modified* and ~~deleted~~ items)

1. In my spare time, I look up more information about foreign countries.

2. Thanks to my geography lessons, I can plan a trip abroad.

3. Thanks to my geography lessons, I understand concepts like sustainability and climate change.

4. Thanks to my geography lessons, I understand what a landscape is and how it changes.

5. Geography lessons have made me interested in world issues.

6. Thanks to my geography lessons, I voluntarily participate in geography competitions (e.g., Geography Olympiad, Eurorebus...).

7. Thanks to geography lessons, I am considering studying geography in college.

8. Thanks to my geography lessons, I want to learn as much as I can about the world in my spare time.

9. Thanks to my geography lessons, I can empathize with the people of foreign countries, different cultures, and customs.

10. Thanks to my geography lessons, I can navigate current geographical issues.

11. With my knowledge of geography, I can solve geographical problems or situations.

12. Thanks to my geography lessons, I know how to use maps.

13. Thanks to my geography lessons, I can navigate by maps outdoors.

14. Thanks to my geography lessons, I understand nature and the interactions that take place in it.

15. Thanks to my geography lessons, I can name the countries of the world and their capitals.

16. Thanks to my geography lessons, I can think critically about the world and the interactions that take place in it.

17. In geography lessons, I'm just trying to get good grades.

18. I like my geography teacher.

19. The geography teacher can hold my attention.

20. The geography teacher's explanations are interesting in almost every lesson.

21. The geography teacher fairly evaluates our performance.

22. The geography teacher understands what he/she is talking about.

23. The geography teacher is willing to explain the subject matter if we don't understand it.

~~24. Teaching is based on the teacher's presentation (or even just explanation).~~

~~25. We are required to take notes in a notebook.~~

26. We analyze the texts and work with them further.

~~27. We solve the tasks in class independently.~~

28. We solve the tasks in class in a group.

29. While discussing the new subject matter, we work with a map or an atlas.

30. We use the internet to find out more information.

31. We use digital technology to learn new subject matter.

32. We look at how things work in the world and address their causes and consequences.

33. Geography lessons are also spent outdoors (e.g., in the form of outdoor lessons around the school, field trips, educational excursions).

34. We repeat the knowledge and understanding of previous lessons.

35. We travel with our family to explore selected places in the Czechia or abroad.

36. My family and I look at maps and atlases together.

37. My family and I are looking at photos from our trips and places we plan to go.

38. The family is interested in what we learn in geography.

39. I'm mainly interested in geography because of my family (we show each other maps, watch travelogues, talk about travel...).

40. I am making effort in geography because it is expected of me.

41. It is important for my parents that I have good grades in geography.

~~42. I am the most geographically oriented of the whole family.~~

