What does it mean to be gifted in geography education? A systematic review

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ABSTRACT This systematic review examines what it means to be geographically gifted within geography education. It asks how geographical giftedness is defined in the literature and what manifestations or performances are attributed to gifted students. Following the PRISMA 2020 approach, eight key publications were identified through database searches and snowballing, and analysed using hybrid content analysis. The results show that the concept of geographical giftedness is ambiguously defined and often overlaps with general cognitive abilities or with curriculum requirements. The analysis identifies six thematic areas of giftedness in geography: difficulties in defining and anchoring the concept; manifestations of gifted, bright, or intelligent students; criteria for their identification; educational strategies for stimulation and recognition; the role of the Geography Olympiad in identification; and the Olympiad's potential in fostering giftedness. The review highlights the need for a systematic definition, valid identification strategies, and effective support for geographically gifted students.

KEY WORDS geographical giftedness – gifted students – geography education – systematic review – abilities and skills

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1. Introduction

The changing needs of society may reflect the growing importance of geography in education (Toops et al. 2021). Within the Czech national curriculum, geography has recently been established as a distinct educational domain, signalling a shift in the way the discipline is approached and acknowledging its significance in fostering critical thinking and spatial awareness (MoEYS 2024). Geography has progressively moved from the margins of the curriculum to become a key subject in many states of USA and also in Czechia, thanks not only to its interdisciplinary nature, but also to its potential to prepare students for the complexities of the 21st century (MoEYS 2024; Anthamatten et al. 2018; Johnson et al. 2020). As global challenges grow more intricate, there is a likely increase in demand for individuals with exceptional geographical abilities – those capable of analysing and addressing environmental, societal, and cultural issues (Ablak, Ergün, Uzun 2022; Crane 2020; Kučerová, Řezníčková, Růžičková 2012). This shift necessitates a renewed focus on how we identify and support students who exhibit exceptional capabilities in geography.

In this context, and with the increasing recognition of the educational value of geography as a subject that develops specific cognitive skills, spatial reasoning, critical thinking, and the ability to analyze geography (Biddulph et al. 2020, Lambert 2024, Solem et al. 2021), the notion of geographical giftedness has emerged (Ferretti 2005, 2007; Kučerová, Řezníčková, Růžičková 2012). It is estimated that 5–10% of students in each year group may be considered geographically gifted (Ferretti 2007). However, only a limited number of studies have explicitly addressed geographically gifted students, leaving the topic relatively underexplored. A more systematic approach is therefore needed to define, identify, and support giftedness in geography education (Kučerová, Řezníčková, Růžičková 2012; Trahorsch, Svobodová 2023).

More broadly, there has been a noticeable shift in how giftedness is conceptualised, moving from unidimensional definitions based on a single factor to multidimensional models (Sternberg 2011; Subotnik, Olszewski-Kubilius, Worrell 2011). Giftedness is generally understood as a set of dispositions that, under favourable conditions, enable individuals to achieve exceptional performance (Gagné 2015). These dispositions involve a dynamic interaction between various components, including analytical, creative, and practical intelligence (Sternberg 2011), the developmental nature of giftedness (Subotnik et al. 2011), a combination of above-average ability, motivation and creativity (Renzulli 2011), and a distinction between innate giftedness and developed talent (Gagné 2015). The National Association for Gifted Children (NAGC 2019) defines giftedness as an exceptional level of ability or competence in one or more domains.

Definitions of giftedness often refer to "exceptional performance", "advanced ability" or "competence", and emphasise the notion of being above average. In this context, we ask: what exceptional and above-average abilities and performances do authors associate with geography education? At its core, this review study addresses a basic but important question: what does geographical giftedness mean? In doing so, it also considers related questions such as: in what contexts is the term used in geography education? And what kinds of student manifestations or performances are described in the literature?

The theoretical background outlines distinctions between giftedness and talent, with particular attention to the roles of ability and skill. The methodological section presents a systematic approach for selecting relevant publications from the Scopus and Web of Science databases. The results section discusses six key themes identified in the literature: the difficulty of anchoring the concept of giftedness in geography and geography education; recognising the signs of an intelligent, gifted, or bright learner; criteria for identifying gifted students in geography education; educational strategies for stimulating and identifying gifted students; the Geography Olympiad as a potential space for identification or development of gifted students; and the potential for recognising giftedness through participation in the Geography Olympiad. Key findings reveal the absence of consensus on defining geographical giftedness and identify the emergence of two distinct concepts – geographical giftedness versus giftedness in geography, that are often conflated in current literature. We provide concrete recommendations for redefining geographical giftedness as truly exceptional performance that exceeds standard curriculum expectations rather than aligning with them, while establishing clear distinctions between general cognitive abilities and domain-specific geographical competences.

2. Theoretical background: talent or giftedness

Given the Czech doctoral research context, Czech scholarly contributions receive enhanced attention in this theoretical framework. There is no clear consensus among scholars as to whether the terms giftedness and talent are interchangeable or distinct (Bakken, Rotatori, Obiakor 2014; Ballam, Moltzen 2017; Jurášková 2003; Klimecká 2010; Subotnik, Olszewski-Kubilius, Worrell 2011). Gagné (1993) distinguishes between the two, defining giftedness as natural, spontaneously developed abilities, whereas talent refers to systematically developed skills that result in expertise in specific domains. Ballam and Moltzen (2017) also treat the concepts separately, associating giftedness with intellectual capacity and advanced abilities in subjects such as mathematics or languages, and linking talent to non-intellectual

Table 1 – Distinction between the concepts of giftedness and talent by the authors

Author	Giftedness	Talent
Gagné (1993)	Natural and unsystematically developed abilities	Systematically developed skills that create expertise in a particular area of human activity
Jurášková (2003)	Basic ability	A higher level of this ability
Sternberg, Grigorenko (2003)	An individual's potential to develop abilities that results from a combination of innate dispositions (genetic factors) and environmental influences	A higher level of ability or proficiency that arises from the purposeful development of talents in specific activities.
Kahneman (2011)	N/A	Skills
Bakken, Rotatori, Obiakor (2014)	Genetically determined	An ability that develops under the influence of the environment
Gagné (2015)	In various fields of human activity	Per field
Ballam, Moltzen (2017)	Intellect, including special skills in areas such as maths or foreign languages	Non-intellectual areas such as sports, music or painting

Source: Own elaboration

domains such as sport, music, or the visual arts. Bakken, Rotatori and Obiakor (2014) emphasise a distinction based on heredity, viewing giftedness as genetically determined and talent as shaped by environmental factors. According to some perspectives, giftedness may manifest across multiple domains, whereas talent tends to be concentrated in a specific area (Gagné 2015). According to Jurášková (2003) in the Czech context, giftedness is commonly understood as a set of general cognitive abilities, with talent representing a higher, more developed level of these abilities. Portešová (2021) notes that numerous conceptualisations of these terms exist. Table 1 provides an overview of selected definitions. In general, giftedness can be viewed as an innate potential applicable across various domains, while talent refers to developed – often non-intellectual – abilities influenced by environmental conditions.

2.1. Abilities, skills, and intelligence in the development of geographical giftedness

Examining the concepts of giftedness and talent requires understanding ability and skill. Ability is an individual's potential to solve problems, perform activities, and learn new skills (Psychology Lexicon, n.d.). *Abilities* can develop through practice and education, interacting with intelligence for giftedness development (Sternberg, Kaufman 2023). According to Sternberg, Ehsan, and Ghahremani (2022), abilities are fundamental to science education, including geography and potential geographical giftedness. In geography education, abilities focus on spatial perception, analytical thinking, and interpreting geographical information,

which can develop into specific skills with proper stimulation (Ackerman 2022; Sternberg, Ehsan, Ghahremani 2022).

Skills are complex activities developed through practice that transform potential into expert performance (Ackerman 2022; Cooper 2015; Kulikowski, Ganzach 2024). In geography, this transformation is evident in the development of geographical skills from basic spatial perception. While most individuals possess some degree of innate spatial perception, it is only partially predictive of how effectively one applies this ability in geographic contexts. Inadequate spatial perception may limit the development of geographical skills, particularly in education, although such skills remain malleable and can be improved through targeted interventions.

In addition to domain-specific skills, contemporary research highlights the importance of so-called 'soft skills', such as creative problem solving and adaptability, as critical for addressing global challenges and digitalisation (Asensio, Fernández-Mera, Duñabeitia 2023; Bukartaite, Hooper 2023; Kulikowski, Ganzach 2024). Though often seen as transversal, these skills are now considered key to giftedness in real-world contexts. Within this broader conceptualisation, skills are closely linked to talent. Kahneman (2011), for instance, suggests that talent emerges when cognitive or perceptual potential is refined through experience and deliberate effort (see Table 1). Sternberg and Grigorenko (2003) distinguish between cognitive and psychomotor skills, where talent requires both. Abilities and skills are intertwined – giftedness cannot be based solely on one or the other.

Giftedness is associated with cognitive academic abilities, while talent relates to practical, expressive, and motor abilities (Ballam, Moltzen 2017). Top performance in chess or surgery requires thousands of hours of deliberate practice, not just innate abilities (Cooper 2015; Kahneman 2011, Subotnik, Olszewski-Kubilius, Worrell 2011). Intelligence comprises complex cognitive abilities, including learning from experience, adapting to new situations, understanding abstract concepts, and using knowledge effectively (Snow 1994). In geographical giftedness, intelligence represents a cognitive potential enabling higher-level processing of geographical information (Kovacs, Conway 2021; Schneider, Newman 2022; Sternberg, Kaufman 2023). The multidimensional nature of intelligence includes verbal and mathematical reasoning, and spatial intelligence for geographical analysis (Sternberg, Kaufman 2023). Intelligence provides the foundation for geographical abilities and skills (Sarno 2012). While intelligence enables the development of geographical thinking and giftedness, targeted educational interventions are needed to transform this potential into geographical expertise (Amaluddin et al. 2019; Sarno 2012; Schneider, Newman 2022).

In addition to the traditional perspectives, more recent frameworks interpret abilities and skills in a broader, hierarchical way. The Cattell – Horn – Carroll (CHC) theory distinguishes three levels of cognitive abilities: general intelligence (g), broad abilities such as spatial or crystallised intelligence, and narrow abilities

(McGrew et al. 2023). Within this hierarchy, geographical giftedness can be seen as spanning broad spatial abilities and narrow geographical abilities, including spatial thinking and map work (cf. Lee, Bednarz 2012; Sarno 2012). The CHC framework may provide a basis for understanding the cognitive foundations of geographical giftedness, though its application in geography education requires further research (McGrew et al. 2023).

By defining abilities, skills, giftedness and talent in the context of geography education, we establish a conceptual basis for interpreting the following analysis. Understanding these distinctions provides a framework for examining how the literature defines excellence in geography education – whether as the application of general cognitive abilities or as the development of specific geographical skills.

3. Method and objectives

The main objective of the research is to conduct a systematic review of publications on geographical giftedness in geography education and to identify how the concept is defined, and what manifestations are attributed to gifted students. The chosen systematic review study, inspired by the PRISMA 2020 approach (Preferred Reporting Items for Systematic reviews and Meta-Analyses; Page et al. 2021), allows us to identify fundamental questions regarding giftedness in geography education: What does geographical giftedness mean and in what contexts is the term used in geography education? How do authors describe gifted students in terms of their manifestations and performance?

4. Procedure and criteria

The search in Scopus and Web of Science databases included peer-reviewed articles, review articles, and conference papers. To avoid omitting important sources, the search term included commonly used synonyms for "geographical giftedness". Using an unlimited time frame, we searched titles, abstracts, and keywords using: "geographical giftedness" OR "geographically gifted students" OR "giftedness in geography" OR "geographies gifted students" OR "scientifically gifted".

The search yielded 85 results from Scopus and 84 from Web of Science. After excluding 57 duplicates, 112 potentially relevant records were identified (see Fig. 1).

Publications for the final analysis required:

- internationally recognized English-language publications such as books, research studies, and theoretical texts
- abstract or keywords containing "giftedness" or "talent"
- abstract or keywords containing "geography"

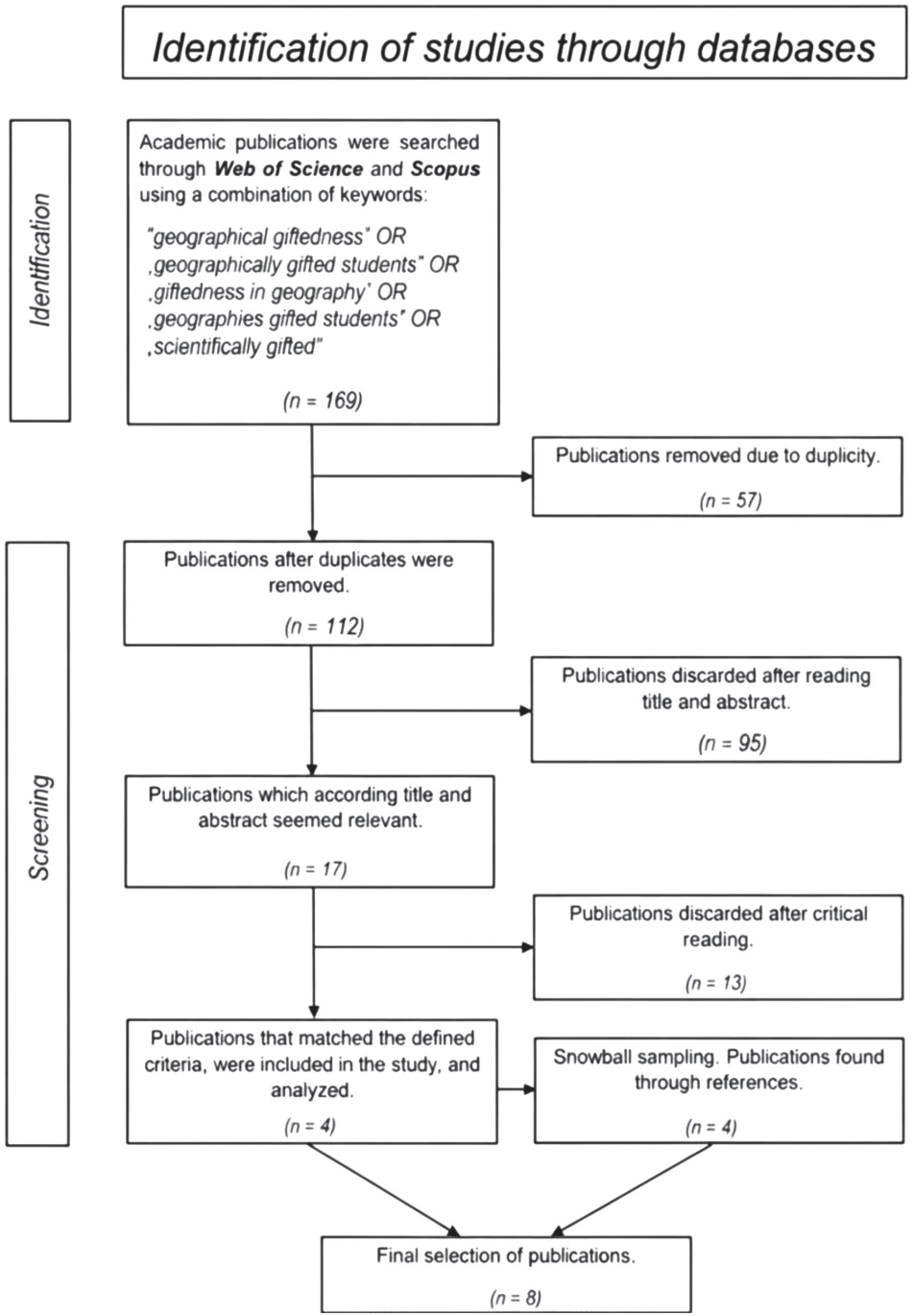

Fig. 1 – PRISMA diagram showing the selection of studies for the review study. Self-illustration.

After reviewing titles and abstracts, 95 titles were discarded due to low relevance or mismatch in conceptual focus (i.e., "giftedness" used outside geographical giftedness or giftedness in geography). The remaining 17 publications underwent critical assessment. After critical reading and completion of the PRISMA diagram, which provides a systematic overview, the final number was 4 (Page et al. 2021; see Fig. 1).

The main reasons for excluding publications (in systematic steps 2 and 3) were:
- authors only mentioned geographical giftedness marginally
- geography appeared in a context unrelated to giftedness, making it impossible to deduce the meaning of talent in geography education.

Due to limited publications, we used the snowball method, adding four more suitable publications. Ferretti's (2005) publication was included despite lacking identified keywords because it addressed geographically gifted students. Similarly, Svobodová and Trahorsch (2024), which showed possibilities of operationalizing giftedness in geography, was included. Research by Hanus and Marada (2014) and an article by Kučerová, Řezníčková, and Růžičková (2012) were included despite not being in English, which limited their visibility in international databases. However, they provide essential insight into the Czech geography education context and complement the international perspective of the review. The final selection appears in Table 2.

A hybrid content analysis provided an overview and revealed latent information from written sources, based on objective description of content (Neuendorf 2016). The first analysis step was thematic, focusing on terms like "gift" and "talent". The second step involved inductive analysis to uncover relevant topics (connection to research questions). This method of content analysis enables us to extract maximum analytical value from the data and to gain a deeper understanding of the data (Fereday, Muir-Cochrane 2006).

For clarity of the analysis and research sample, Table 2 presents the most relevant information by type of publication. For theoretical texts, we provide information on the main objective of the work and the type of students included in the text. For empirical studies, we provide the selected type of research (qualitative/quantitative), the objective, and the research sample (students).

5. Results

Using hybrid content analysis, basic thematic areas reflecting challenges of conceptualizing giftedness in geography education emerged. Results reveal six interrelated themes: The difficulty of anchoring giftedness in geography and geography education; Identifying manifestations of intelligent, gifted, or bright students?

Table 2 – Final selection of publications

Author (year)	Type of publication	Basic characteristics of publications
Sternberg (1982)	book chapter	aim: emphasize educating gifted children by developing skills in problem finding, solving, rethinking and scientific reporting that reflect professional scientists' practices. involved students: students in general
Ferretti (2005)	theoretical article (added by snowball method)	aim: discuss identification and stimulation of gifted geography students. Emphasizes providing appropriate challenges to develop their skills and understanding. Advocates recognizing and nurturing potential to enhance learning experiences. involved students: Key stage 3
Ferretti (2007)	theoretical article	aim: explore characteristics of geographically gifted students for recognition and support, including opportunities to develop their potential. involved students: year 7–13, Key stage 3
Kučerová, Řezníčková, Růžičková (2012)	theoretical article (added by snowball method)	aim: explore characteristics and identification of gifted geography students. Discusses giftedness definitions and distinguishing traits, emphasizing proper identification of educational needs. involved students: high school students
Hanus, Marada (2014)	empirial article (added by snowball method)	research: qualitative approach aim: overview international trends in mapping skills research to inspire Czechia studies and strengthen mapping skills development in education. involved students: younger and older school age students
Sternberg, Ehsan, Ghahremani (2022)	empirial article	research: qualitative approach aim: present hierarchical model for teaching science thinking to gifted students across three levels. Emphasize developing scientific reasoning for future challenges. involved students: students in general
Trahorsch, Svobodová (2023)	empirial article	research: qualitative approach aim: analyze the spatial differentiation of the success of competitors in the district round of the Czech Geography Olympiad in 2021 and 2022 and identifying regional patterns in student performance involved students: students in general
Svobodová, Trahorsch (2024)	empirial article (added by snowball method)	research: quantitative approach aim: analyze Czech Geography Olympiad district results (2020/2021 and 2021/2022). involved students: primary and secondary school students

Source: Own elaboration

Criteria for identifying gifted students in geography education; Educational strategies for stimulating and identifying geographically gifted students in geography lessons; Geography Olympiad: identifying or developing gifted students in geography lessons; and Potentially gifted students in geography competitions. These topics answer research questions: What does geographical giftedness mean and in what contexts is the term used in geography education? How do authors describe gifted students in terms of their manifestations and performance?

5.1. The difficulty of anchoring the concept of giftedness in geography and geography education

There is no consensus among experts about what a gifted student should demonstrate in geography (Kučerová, Řezníčková, Růžičková 2012). Ferretti (2007) notes that educational institutions rarely identify students as exceptionally gifted in geography, emphasising the inherent challenges of defining and recognising geographical giftedness. The author points out that geography, unlike mathematics or music, rarely produces prodigies (Ferretti 2005). This difficulty may stem from the interdisciplinary nature of geography, which integrates elements from both scientific and artistic domains and combines them with a holistic understanding of the world (Ferretti 2007). According to Kučerová, Řezníčková, and Růžičková (2012), identifying geographically gifted students is further complicated by the diverse and wide-ranging content of geography. Most authors adhere to the standard definition of giftedness, although some, such as Sternberg (1982), Trahorsch and Svobodová (2023), and Svobodová and Trahorsch (2024), use the terms "giftedness" and "talent" interchangeably.

5.2. Identifying signs of an intelligent, gifted, or bright student?

Ferretti (2005, 2007), Kučerová, Řezníčková, Růžičková (2012) and Trahorsch, Svobodová (2023) agree that geographical giftedness is hard to pin down.

Table 3 – The main differences between a bright child and a gifted child

Bright child	Gifted child
knows the answers	asks questions
is interested	is curious
got good ideas	has unusual ideas
answers questions	is interested in details, they works out, he finishes
listens with interest	shows strong emotions while listening
easy to learn	already knows "everything". They has knowledge beyond the required range and depth of the curriculum
successfully solves the given tasks	initiates new projects
accepts tasks and obediently carries them out	accepts tasks critically, doing only what he enjoys
exactly replicates the algorithms of the tasks	creates new solutions
receives information, absorbs it	uses information, looks for new application possibilities
is satisfied with its learning and results	is very self-critical

Source: Author's translation from Kučerová, Řezníčková, Růžičková (2012), originally adapted from Machů (2006, p. 28).

Nevertheless, Ferretti (2007) points to general cognitive abilities, social skills, and personality traits. She defines student manifestations in relation to geographical giftedness as:

- understanding concepts that they can apply to new situations and create interpretations, hypotheses, draw conclusions, and seek solutions
- communicating effectively in spoken and written language
- recognizing patterns and sequences in which they will apply logical reasoning, argumentation, and the ability to manipulate abstract symbols
- enjoying visual tools such as graphs, maps, tables, and diagrams
- having a deep general knowledge of the world that can be transferred across subjects
- showing a more developed system of values than peers
- building strong relationships and demonstrating leadership traits (e.g. leading, influencing, empathising)
- demonstrating self-confidence and contributing in informal learning settings
- thinking originally and creatively going beyond conventional problem boundaries.

Similarly, Kučerová, Řezníčková, and Růžičková (2012) emphasise a geographical way of thinking when referring to manifestations of gifted students (see Table 3), which can be perceived as cross-curricular skills. They describe an inner passion typical of such students, which manifests in their desire to communicate knowledge through visual materials, written texts, or verbal expression. According to the authors, geographically gifted students are expected to demonstrate the ability to carry out complex mental operations and to reach higher-order cognitive goals in geography lessons – abilities that can be considered general academic skills. The publication also highlights a conceptual overlap between gifted and bright students. It notes that certain manifestations of advanced cognitive performance may also be exhibited by bright, high-achieving learners, as illustrated in Table 3.

Beyond the general manifestations of giftedness described earlier in the text, geography-specific skills such as reading, analysis, interpretation, or map creation are typically not developed in other subjects (Hanus, Marada 2014). While Kučerová, Řezníčková, and Růžičková (2012) do not explicitly mention these competences, they can be inferred through connections with intelligence typologies proposed by Gardner (1999) and Řezníčková (1999), as applied to geographically gifted students. According to Kučerová, Řezníčková, and Růžičková (2012), such students may demonstrate above-average abilities in three key types of intelligence, interpreted as cognitive potential for developing domain-specific skills (Kovacs, Conway 2021; Schneider, Newman 2022; Sternberg, Kaufman 2023). The first is spatial intelligence, involving the manipulation of spatial relationships and mental imagery. The second is logical-mathematical intelligence, evident in deductive and inductive reasoning. The third is naturalistic intelligence, reflected

in perceiving relationships between environment and society, or humans and nature (Kučerová, Řezníčková, Růžičková 2012).

A geographically gifted student with spatial intelligence is expected to think across multiple scales from global to local and understand how phenomena operate concurrently at various levels (Kučerová, Řezníčková, Růžičková 2012). In addition to map-related abilities, Hanus and Marada (2014) emphasise further geographical skills, such as observation and mapping, interpretation of secondary data, statistical processing of geographical information, and the ability to formulate questions, collect data, analyse it, and draw conclusions. Several of these abilities can be considered domain-specific manifestations of geographical giftedness.

5.3. Criteria for identifying gifted students in geography lessons

In geography, mastery of memory-intensive operations (numerical data, encyclopedic knowledge) may not indicate a geographically gifted student (Kučerová, Řezníčková, Růžičková 2012). Ferretti (2005) similarly notes that gifted geography students cannot be identified by a single set of criteria, but that conclusions must be drawn from multiple sources.

Providing extra tasks is sometimes used to identify gifted learners. However, simply assigning more of the same tasks as extension activities is not effective (Ferretti 2007). The objective is not to keep gifted students busy while others catch up (Ferretti 2007; Kučerová, Řezníčková, Růžičková 2012). Instead, teachers should avoid tasks that may not engage gifted learners and focus on activities that enhance teaching for all and inspire further learning (Ferretti 2005).

The dichotomous division between bright and gifted students can be overly simplistic and potentially misleading (Cvetković-Lay, Kroflič 2002; Stehlíková 2016). Cvetković-Lay and Kroflič (2002) distinguish between bright and gifted students, suggesting that bright students tend to have good ideas, whereas gifted students demonstrate unusual ones. However, what qualifies an idea as 'good' or 'unusual'? This distinction may risk implying that bright students lack curiosity or creativity (Cvetković-Lay, Kroflič 2002; Portešová 2021). Yet curiosity, commonly associated with giftedness, does not necessarily indicate giftedness or the capacity for higher-order thinking, such as geographical reasoning (Spurná, Horutová 2024). The boundary between quick-wittedness and giftedness is often blurred, as quick-witted students may exhibit traits that influence both their social interactions and information processing. Gagné (2015) adds that with appropriate support, bright students are also capable of achieving high performance.

5.4. Educational strategies for stimulating and identifying geographically gifted students in geography lessons

Stimulation that reflects students' actual thinking and learning processes can support the identification of geographically gifted learners. Ferretti (2005) suggests that involving external organisations or experts who use scientifically grounded educational approaches may help reveal such students. She recommends asking challenging questions, teaching complex geographical skills, offering opportunities for extended writing, and integrating thinking skills into instruction.

According to Sternberg (1982), the stimulation of gifted students should follow the scientific approach to problem-solving comprising problem identification, solution development, re-evaluation, and reporting. In a more recent contribution, Sternberg, Ehsan, and Ghahremani (2022) propose a structured teaching model for geographically gifted students based on three levels:

- Level 1 – earning scientific knowledge to understand basic principles, including declarative, conceptual, and procedural knowledge.
- Level 2 – learning scientific problem-solving through research analysis (analysing good and poor research, understanding methodology, and participating in research).
- Level 3 – learning to identify scientific problems to foster creativity, where students learn to formulate significant research questions.

These strategies can help teachers identify geographically gifted students (Sternberg, Ehsan, Ghahremani 2022).

5.5. Geography Olympiad: identifying or developing gifted students in geography lessons

The Geography Olympiad is considered one of the most comprehensive tools for identifying students gifted in geography (Trahorsch, Svobodová 2023). Geography competitions offer opportunities to solve challenging problems and carry out professional activities such as atlas work, the use of geographic information systems, landscape evaluation, and spatial thinking—nurturing gifted students in the process. Identifying gifted students typically occurs through standardised tasks, district competitions, or SATs and CATs (Ferretti 2007; Trahorsch, Svobodová 2023). Geography competitions are widely recognised as tools for identifying and supporting gifted students (Svobodová, Trahorsch 2024). In Czechia, the Olympiad is described as "one of the most popular competitions for gifted students" (Svobodová, Trahorsch 2024, p. 4). However, participation numbers do not necessarily indicate giftedness, as competitions may attract bright students who later become competent geographers (Ferretti 2007; Kučerová, Řezníčková,

Růžičková 2012). Similarly, active class participation and excellent grades do not always signify geographical giftedness (Kučerová, Řezníčková, Růžičková 2012).

5.6. Potentially gifted students in geography competitions

Geography competitions are held worldwide in various formats, but participants are typically challenged with similar theoretical, practical, and field-based tasks across diverse branches of geography (Hanus, Marada 2014; Svobodová, Trahorsch 2024; Trahorsch, Svobodová 2023). These competitions are expected to include tasks that stimulate geographical thinking and related skills, going beyond memory-based operations (Kučerová, Řezníčková, Růžičková 2012; Svobodová, Trahorsch 2024; Trahorsch, Svobodová 2023). The primary aim is to offer potentially gifted students opportunities to engage in activities that promote critical and geographical thinking through the solving of complex problems (Trahorsch, Svobodová 2023).

The Geography Olympiad fosters the development of geographically gifted students by engaging them in:

- complex thinking and spatial relationships between landscape components, including nature–society interaction (Trahorsch, Svobodová 2023)
- work with visuals such as maps, photographs, graphs, diagrams, and tables (Hanus, Marada 2014)
- observation and evaluation of geographical phenomena during field trips (Hanus, Marada 2014)
- use of knowledge with spatial information (Svobodová, Trahorsch 2024)
- geoinformation skills (Trahorsch, Svobodová 2023)
- atlas test requiring map reading and knowledge synthesis (Svobodová, Trahorsch 2024)
- skills in working with visuals (Svobodová, Trahorsch 2024)
- creative problem-solving in geographic tasks (Svobodová, Trahorsch 2024)
- effective fieldwork (Svobodová, Trahorsch 2024)
- ability to collect, analyse, and process data to form professional judgement (Svobodová, Trahorsch 2024)
- observation and mapping skills during field-based learning (Hanus, Marada 2014)
- ability to formulate questions, analyse data, and draw conclusions (Trahorsch, Svobodová 2023)

Trahorsch and Svobodová (2023) emphasise that competition tasks must span a range of geographical topics, with increasing complexity across competition levels and educational stages. However, the Czech Geography Olympiad has shown lower internal consistency between sections compared to the International

Geography Olympiad (iGeo), along with reduced overall validity (Svobodová, Trahorsch 2024), which may limit its effectiveness for identifying gifted students (Sternberg 2011). Furthermore, an analysis of iGeo tasks from 1996 to 2022 concluded that Olympiad tasks often failed to meet essential structural requirements (Artvinli, Dönmez 2023). Successful students tend to be those equipped with general academic skills and developed domains of intelligence, which are reflected not only in geography competitions but also in their broader academic performance.

6. Discussion

By asking research questions (what does geographical giftedness mean and in what contexts is the term used in geography education? How do authors describe gifted students in terms of their manifestations and performance?) we uncovered problematic observations for discussion.

6.1. Exceptional abilities and skills of students in geography education

The first observation is that giftedness refers to exceptional performance (Gagné 2015), combining above-average abilities, motivation, and creativity (Renzulli 2011), and exceptional abilities in one or more areas (NAGC 2019). We have argued that the abilities demonstrated by students should be based on intelligence as a predisposition (Sternberg 2011). Based on this, we characterise giftedness as a general ability prevailing over specific skills. In geography education, emphasis is placed on the following abilities and skills (see Table 4):

- ability to manipulate mental images and spatial relationships (Kučerová, Řezníčková, Růžičková 2012, according to Gardner)
- ability to perceive interrelationships between environment and society, and humans and nature (Kučerová, Řezníčková, Růžičková 2012, according to Gardner)
- ability to think analytically across levels and apply systematic thinking to understand relationships between natural and social phenomena (Kučerová, Řezníčková, Růžičková 2012, according to Gardner)
- ability to understand concepts and apply them to new situations (Ferretti 2007)
- ability to read information from different maps and perform comparison and synthesis (Svobodová, Trahorsch 2024)
- ability to solve geographic problems creatively (Svobodová, Trahorsch 2024)
- ability to collect, sort, process information, analyze data, perform synthesis, and formulate professional judgment (Svobodová, Trahorsch 2024)
- advanced skills in working with visual representations (Svobodová, Trahorsch 2024)

- skills in effective fieldwork (Svobodová, Trahorsch 2024)
- skills in applying concepts to new situations, making interpretations, hypotheses, drawing conclusions and finding solutions (Svobodová, Trahorsch 2024)
- skills in effective communication in spoken and written form and the use of infographic tools for presenting information (Svobodová, Trahorsch 2024)
- skills that reflect leadership traits such as leading, guiding, influencing others, and valuing others' opinions and emotions (Ferretti 2007)
- skills in reading, analysis, interpretation, or creating maps (Hanus, Marada 2014)
- skills in asking challenging questions, teach complex geography skills, provide opportunities for writing, and incorporate thinking skills into instruction (Ferretti 2005)
- skills in working with GIS and spatial data, including dynamic geoinformation skills (Hanus, Marada 2014; Lukinbeal 2014; van der Schnee, Notté, Zwartjes 2010; Trahorsch, Svobodová 2023)

The list of geographical abilities and skills reveals a degree of conceptual ambiguity in how these terms are defined. In several cases, specific skills are mistakenly described as abilities—for instance, "to read information" or "to collect, sort, and process information"—which are more accurately classified as skills (Snow 1994). In contrast, geographical abilities may be regarded as general, innate traits of an individual, such as spatial ability, which encompasses spatial perception, visualisation, and orientation (Lee, Bednarz 2012).

6.2. Exceptional performance of students and general competences

The second perspective concerns the distinction between general and specific abilities and skills within the context of giftedness. Authors who define the manifestations of gifted students in geography education tend to frame giftedness through general, cross-curricular constructs (Kučerová, Řezníčková, Růžičková 2012; Ferretti 2007; Sternberg, Ehsan, Ghahremani 2022), rather than through subject-specific skills and abilities (Trahorsch, Svobodová 2023; Svobodová Trahorsch 2024). These include general cross-disciplinary abilities, such as understanding concepts and applying them to new situations; forming interpretations, hypotheses, and solutions; or generating unusual ideas (see Table 4). When defined in this way, such abilities and skills can be seen as manifestations of general or transversal competences.

6.3. Exceptionally demanding expectations in the Czech national curriculum

The third observation concerns the perception of giftedness as exceptional and above-average performance (Gagné 2015). When comparing the abilities and skills defined by various authors (see Table 4) with the expected performance of students according to the national curriculum, it appears that the current version of the geography framework (MoEYS 2024) includes similarly demanding – if not more advanced – requirements. These outcomes, stipulated for Year 9 students, include, for example:

- "critically uses maps and other sources of geographical data for their own learning and everyday exploration of the world"
- "uses geographical thinking to understand causes and consequences of changes in places and regions"
- "derives solar radiation for a specific place and time, its causes and consequences for natural processes and human activities"
- "assesses the geographical location, functions, internal structure and development potential of various settlements"
- "evaluates how the fulfilment of the needs of individuals, society, and the natural environment in a specific place contributes to or hinders the sustainability of life on Earth"

Key competences are formulated in a similar way and correspond to the characteristics described by the authors analysed. For example: "analyses objective information and presented conclusions of scientific knowledge when making decisions and solving problems" (MoEYS 2024).

A simple idea emerges: the geography curriculum outlined in the FEP BE (MoEYS 2024) sets out exceptionally demanding expectations. In other words, the framework appears to require from all students what research literature associates with the gifted. If we reverse the rhetoric and consider what is stipulated by the Ministry of Education (MoEYS 2024), it can be said that the abilities and skills (manifestations) described by the analysed authors are treated as standard performances that most students are expected to attain. This overlap makes it more difficult to distinguish gifted students based solely on observable manifestations of ability or performance.

6.4. Geographical giftedness or giftedness in geography?

These insights lead to a fourth observation. Throughout this paper, we have used the neutral term gifted students in geography education. However, the authors of the analysed publications employ two distinct concepts: geographical giftedness

Table 4 – Overview of gifted students' performance and achievements

According to Stenberg (1982)	According to Ferretti (2007)	According to Kučerová, Řezníčková, Růžičková (2012), taken from Gardner (1999)
Potentially geographically gifted student	**Geographically gifted student**	**Gifted student**
learning scientific knowledge with the aim of understanding basic scientific principles	has deep general knowledge with transferability between subjects	spatial intelligence, which includes the ability to manipulate mental images and relationships in space
learning scientific problem solving – learning how to conduct research correctly and analyze research scientifically	the ability to understand concepts and apply them to new situations	skills in deductive and inductive reasoning, including numerical abilities
learning to identify scientific problems with the aim of promoting creativity and innovation among students	creating interpretations, hypotheses, and searching for solutions to problems	ability to perceive the interrelationships between the environment and society, as well as between humans and nature
N/A	effective communication in both spoken and written language	N/A
N/A	good interpersonal skills and leadership abilities	N/A
N/A	self-confidence in less formal teaching situations	N/A
N/A	the ability to manipulate abstract symbols	N/A
N/A	recognizing patterns and logical thinking.	N/A
N/A	original thinking and a creative approach to problem solving	N/A
N/A	use of infographic tools (graphs, maps, tables)	N/A
N/A	a more developed value system than their peers	N/A

Source: Own elaboration

According to Kučerová, Řezníčková, Růžičková (2012), taken from Machů (2006, p. 28)	According to Trahorsch, Svobodová (2023)	According to Svobodová, Trahorsch (2024)
Gifted child	**Potentially geographically gifted student**	**Potentially geographically gifted student**
asks questions	in complex thinking and spatial contexts, the relationships between components of the landscape sphere (including interactions between nature and society)	test with an atlas, which requires the ability to read information from different types of maps and perform comparison and synthesis of this knowledge.
is curious	high degree of work with various types of visuals (maps, photographs, graphs, diagrams, tables, etc.)	be equipped with high skills in working with visuals (multimedia test, written test)
has unusual ideas	monitoring, recording, and evaluating geographical phenomena and processes during field trips	the ability to creatively solve problem geographic tasks (written test, fieldwork)
pays attention to detail, develops ideas, and completes tasks	use of knowledge and cognitive operations with spatially bound information	and skills in effective fieldwork
shows strong emotions while listening	dynamically developing geoinformation skills	ability to collect, sort, and process information, analyse data, perform their synthesis, and formulate their own professional judgement on the given issue.
"everything" already knows. Has knowledge beyond the required scope and depth of the curriculum	critical and geographical thinking	ability to read information from different types of maps and perform comparison and synthesis of this knowledge.
initiates new projects	problem solving	N/A
approaches tasks critically, doing only what he enjoys	N/A	N/A
creates new solutions	N/A	N/A
uses information, seeks new application possibilities	N/A	N/A
is very self-critical	N/A	N/A

and giftedness in geography. We maintain a neutral stance, as we perceive a meaningful distinction between the two.

Geographical giftedness refers to exceptional performance in geography, grounded in subject-specific abilities and skills. It is based on the intrinsic nature of geography as a discipline and may include a unique capacity to perceive geographical patterns, relationships, and meanings. It may also involve the ability to ask geographical questions and a strong interest in contemporary spatial phenomena (Kučerová, Řezníčková, Růžičková 2012; van der Schee, 2000, 2010; Gersmehl, Gersmehl 2007). Nevertheless, we acknowledge that these characteristics do not always constitute exceptional performance.

If geographical giftedness is considered a form of natural academic potential – an innate sensitivity to geographical phenomena regardless of educational context – then giftedness in geography refers to outstanding achievement that may arise within the school environment. Such achievement is influenced by factors including teaching quality, teacher support, and enrichment opportunities (e.g., competitions, field trips, or outdoor learning; Everhart 2016). These students typically exhibit well-developed general attributes such as competence and intelligence, reflected in the rapid acquisition of geographical knowledge, the application of theory to practice, and high performance in competitive settings (Sternberg 2005; Subotnik, Olszewski-Kubilius, Worrell 2011).

7. Conclusions

This review study analysed a total of eight publications focused on giftedness in geography education. While this relatively small number might suggest that the topic is of marginal significance, the reviewed texts demonstrate otherwise, offering important insights into the characteristics and educational needs of geographically gifted students. Although the main limitation lies in the small number of sources, even this limited sample makes it possible to ask what giftedness may mean in geography education, in which contexts the term is used, and how authors describe the manifestations and performances of gifted students.

In relation to the first research question, what geographical giftedness means and in what contexts the term is used in geography education, we found a lack of consensus. Authors tend to emphasise general cognitive (broad) abilities, while geography-specific (narrow) abilities and skills remain underdeveloped.

This finding leads to the second research question, how do authors describe gifted students in terms of their manifestations and performance, the literature points mainly to traits such as conceptual understanding, problem-solving, communication skills, leadership, or pattern recognition. Yet these correspond more to general academic competences than to geographical excellence, creating overlap

between what is labelled as giftedness and what is expected from students by the curriculum (MoEYS 2024). In terms of identifying gifted students in geography classes, our analysis points to confusion in the terminology of abilities and skills, overlap with standard curriculum expectations, a lack of specificity in the field, and challenges in using tools such as the Geography Olympiad, where validity is contested. These issues reveal how difficult it is to establish criteria that clearly distinguish exceptional from average performance (Ferretti 2005).

The authors most often mention that approaches such as inquiry-based learning, enrichment tasks, or problem-solving activities can stimulate and help identify geographically gifted students. However, these are largely generic strategies, and there is still little evidence of targeted methods that would specifically support and foster geography-specific abilities. While approaches such as inquiry-based learning may indeed contribute to the development of geographical giftedness, they more often cultivate general competences or subject-related outcomes commonly stipulated in national curricula. Through our analysis, we therefore seek to highlight the importance of distinguishing between geographical giftedness, referring to exceptional domain-specific abilities such as spatial thinking, pattern recognition, and human–environment interaction, and giftedness in geography, understood as the use of general cognitive abilities within geography education.

Based on these findings, we recommend: (1) a clear distinction between general cognitive abilities and geography-specific giftedness; (2) validated identification tools and criteria distinguishing exceptional from standard performance; (3) specialised support programmes and teacher preparation for recognising geography-specific abilities; and (4) the establishment of standards and interventions that extend beyond curriculum expectations.

This study provides a first framework for separating geographical giftedness from general academic ability and offers a starting point for research and pedagogical practice aimed at defining, identifying, and supporting students with exceptional geographical abilities.

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