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İlkokul Öğrencileri Arasında Harita ve Atlasların Kartografik Kaynak Olarak Kullanımında Öğretmenlerin Etkisi: Kuzey Makedonya Örneği

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ÖZET

Bu çalışma, ilkokul ortamında harita ve atlasların eğitim araçları olarak etkili bir şekilde uygulanmasını kolaylaştırmada öğretmenlerin rolünü incelemektedir. Öğretmenlerin kartografik kaynakların kullanımı üzerindeki etkisini araştırarak, çalışma öğretmenler tarafından benimsenen pedagojik stratejilere ve çocukların mekansal okuryazarlık becerilerini artırmaya yönelik etkilerine ışık tutmayı amaçlamaktadır. Araştırma, öğretmenlerin uygulamaları, algıları ve öğretim teknikleri hakkında veri toplamak amacıyla ilkokul öğretmenleri için ön-atlas anketi ve son-atlas anketi içeren karma bir yöntem yaklaşımı kullanmaktadır. Bu araştırmanın bulguları, harita ve atlasların ilkokul müfredatında en iyi şekilde kullanılmasını arzulayan öğretmenler ve politika yapıcılar için kanıta dayalı önerilerin geliştirilmesine katkı sağlayacaktır. Aynı zamanda, bu çalışmanın sonuçları, ilkokul öğrencileri için özel olarak tasarlanmış bir atlasın geliştirilmesi gerekliliğiyle ilişkilendirilecek, eğitim sistemi içinde bu tür kaynakların şu anki eksikliğine çözüm olma amacını taşımaktadır. İlkokul öğretmenlerine uygulanan iki anket, tez çalışması çerçevesinde formüle edilen hipotezler ve araştırma sorularıyla uyumludur. Ardından, elde edilen sonuçlara dayalı olarak bu hipotezlerin doğrulanması veya çürütülmesi konusunda bir tartışma ortaya çıkmıştır. Öğretmenlerin sınıf ortamında kartografik materyallerin entegrasyonu üzerindeki etkisi, büyük önem arz etmektedir.

The Impact of Teachers on the Utilization of Maps and Atlases as Cartographic Resources among Primary School Pupils: Example of North Macedonia

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ABSTRACT

This study examines the role of teachers in facilitating the effective implementation of maps and atlases as educational tools within the primary school setting. By investigating the influence of teachers on the utilization of cartographic resources, the study aims to provide insights into the pedagogical strategies employed by teachers and their impact on enhancing children's spatial literacy skills. The research employs a mixed-methods approach, including pre-atlas questionnaire and post-atlas questionnaire for primary school teachers to gather data on teachers' practices, perceptions, and instructional techniques. Findings from this research will contribute to the development of evidence-based recommendations for teachers and policymakers seeking to optimize the use of maps and atlases in primary school curricula. Simultaneously, the outcomes of this study will be correlated with the pressing requirement to develop an atlas specifically tailored for primary school pupils, aiming to address the current dearth of such resources within the educational system. The two questionnaires administered to primary school teachers are aligned with the hypotheses and research questions formulated within the framework of the diploma study. Subsequently, a discussion ensued regarding the validation or refutation of these hypotheses based on the obtained results. The impact of teachers on the integration of cartographic materials within the classroom setting appears to be of paramount significance.

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INTRODUCTION

It is crucial to maintain an openness towards acquiring new approaches and innovations within the teaching and learning process [1]. Constructivism, as a theoretical perspective on learning and development, underscores the active engagement of the learner in constructing understanding and comprehending the world around them, wherein the acquisition of information alone is insufficient for knowledge formation; instead, knowledge is synthesized by assimilating new information or ideas into the pre-existing cognitive framework of the learner [2-4]. Critical thinking abilities, such as using concepts, employing principles, predicting impacts, and problem-solving, are all categorized as fairly good, while creative thinking ability, including making decisions, working within competency limits, and thinking divergently, also falls within a fairly good category [5]. Education, being an essential factor in improving human quality, necessitates various efforts to enhance the quality of the community [6]. In primary schools, teachers bear the responsibility of imparting fundamental concepts and skills, and play a critical role in building pupils' fundamental knowledge and abilities to their pupils [5, 7]. Education constitutes the process through which knowledge, skills, values, and attitudes are transmitted from one generation to the next, ensuring their continuity among human being [8]. Consequently, education strives to establish a foundation for social, moral, and economic advancement. The primary objective of education is to ensure equitable access to quality education for all children within the age range of primary school attendance [9]. Children necessitate an education system that safeguards their social, ethical, and economic well-being, serving as an authentic catalyst for societal transformation. Such an education system empowers each individual learner to recognize and embrace their unique potential, enabling them to lead a life of dignity [10]. Teaching, both as a specialized field within primary education and as a profession in general, has consistently held a distinctive position, not only within the higher education system but also in everyday life [11]. It is widely acknowledged that while good teaching resources cannot supplant the role of a teacher, teachers leverage these resources to effectively attain their teaching and learning objectives [12]. A teacher who possesses sufficient and pertinent teaching resources exhibits greater confidence, effectiveness, and productivity [13]. Instructional materials play a vital role in the process of learning and that the implementation of the curriculum would be significantly hindered without their presence [14]. The classroom can be considered a natural setting conducive to the development and learning of children [15]. Children engaged in small group work exhibit heightened focus in their learning activities, avail themselves of opportunities to assist one another with comparable tasks, and demonstrate decreased reliance on the teacher for support and guidance in their learning endeavors [16]. Children exhibited limited effectiveness in engaging with group work, and a substantial number of them continued to rely on the teacher for procedural guidance, answers to inquiries, and validation of task completio [17]. It is crucial to acknowledge that the assignment of both teachers and pupils or students within schools and school districts is not a random process [18, 19]. Teachers possess the ability to ascertain whether students have comprehended the subject matter and whether they can construct an appropriate framework for assimilating new information [20]. Teachers can facilitate the enhancement of pupils' and students' critical thinking abilities and creativity by incorporating mind mapping techniques, in conjunction with other instructional methods, in alignment with the principles of the constructivist approach [21]. Mind mapping is a cognitive tool and organizational technique employed for note-taking purposes, enabling individuals to effectively structure and organize factual information and thoughts [22]. The mind mapping technique and materials associated with mind maps were pioneered by Tony Buzan in the late 1960s [23]. Mind mapping is rooted in the utilization of words, images, and colors as foundational component [24]. Teachers endeavoring to address the needs and enhance the learning outcomes of their students must take into consideration the defining characteristics that shape the contemporary student population [25]. Geographic education strives to foster an understanding of the intricate system of

geographical space, encompassing the principles governing both natural and human phenomena [26]. A school world atlas often serves as the initial systematic cartographic resource that students encounter during their educational journey [27]. A map serves as an essential instrument for geographers and functions as a fundamental document in numerous geography teaching endeavors [28]. Traditionally, the practice of creating simple maps and the utilization of atlases have constituted significant, if not primary, components of geography education, particularly at the elementary and intermediate school levels [29]. The intended recipients of school atlases are students; nevertheless, the interpretation of school atlas content relies on the guidance of their teachers. Teachers play a pivotal role in shaping students' perception, utilization, and comprehension of the atlas's content [26]. The process of reading a map entails the perception of the map itself, utilization of the map's legend, and comprehension of the map's content [27]. The interpretation and comprehension of symbols constitute a significant aspect in the analysis and comprehension of cartographic representations. The purposefully crafted symbols in the atlas enhance young learners' understanding and appreciation of the diverse characteristics of different regions, fostering a sense of connection and familiarity with their country's geography and culture [30]. Maps and atlases are essential visual aids used in primary education to promote children's spatial understanding, navigation skills, and overall geographical literacy. Maps, as fundamental manifestations of cartographic representation, are extensively accessible and widely appreciated across various fields and disciplines; they are employed within the educational system to facilitate a range of pedagogical activities [31-34]. The deliberate and systematic development of map-reading methods is essential for acquiring cartographic competence and fostering cognitive activity in pupils, while theoretical analysis indicates that consistent use of maps in geography lessons enhances their success in understanding cartographic concepts [35, 36]. However, the effective integration of these cartographic resources into the classroom largely depends on the pedagogical approaches adopted by teachers. This study aims to investigate the influence of teachers on the utilization of maps and atlases among primary school children. Specifically, it seeks to identify the instructional techniques employed by teachers, explore their perceptions regarding the use of cartographic resources, and examine the impact of these practices on children's spatial literacy development.

MATERIALS AND METHODS

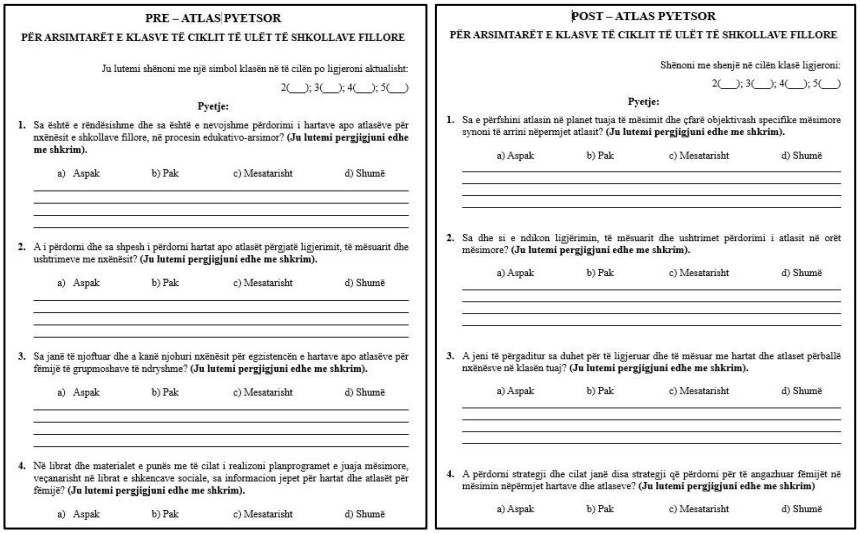
The study involves a sample of primary school teachers from four diverse primary schools, in the city of Tetovo, North Macedonia. Participants were selected through purposive sampling as part of the primary schools, to ensure representation across different educational contexts and experience levels. Questionnaires are distributed among teachers to gather data on their instructional techniques, utilization of maps and atlases, and perceptions of their effectiveness. Classroom observations are conducted to qualitatively assess the teachers' implementation of cartographic resources and their impact on pupils' engagement and learning outcomes. Questionnaires are conducted with teachers to gain deeper insights into their pedagogical decision-making processes. Collected data from surveys are analyzed using statistical techniques. The data obtained from the questionnaires administered to the teachers is presented through pertinent tables, showcasing the questionnaire results in terms of response percentages and their respective significance. The North Macedonian education system lacked a product tailored specifically for primary school pupils, such as a comprehensive atlas. Existing maps and atlases were outdated in both design and content, and they failed to adequately address the needs of younger pupils. Recognizing this significant gap, a decision was made to create a new atlas from the ground up. This involved designing, compiling, and rigorously testing symbols, maps, and additional materials, such as population representative tables and practice map stickers. The objective was to produce an atlas that is not only visually appealing and modern but also age-appropriate and educationally enriching for primary school pupils in the Republic of North Macedonia.

Participants

A total of 48 primary school teachers, spanning grades two to five, actively participated in the evaluation of pre-atlas and post-atlas questionnaires. The questionnaires consisted of a series of 15 inquiries specifically focusing on the utilization of maps within classroom settings, along with inquiries tailored to the Atlas and its application. The distribution of participants encompassed 8 from the second grade, 10 from the third grade, 15 from the fourth grade, and 15 from the fifth grade. To mitigate potential influences stemming from socio-economic factors and environmental variations, four comparable schools were meticulously selected in the city of Tetova, situated in the northwestern region of North Macedonia. Among these schools, three were situated within the city limits, while one was in a peripheral village. This deliberate selection aimed to ensure a representative and diverse range of contexts for the questionnaire phase.

Designed questionnaires

The pre-atlas questionnaire consists of 15 questions specifically tailored for primary school teachers in lower grades. These questions are designed to assess the significance and necessity of utilizing maps and cartographic materials within the educational system for lower primary school classes. The questions encompass various aspects such as the compilation, design, and use of maps, the content of existing materials, their relationship with maps, the connection between current maps and pupils, and pupils' reactions during the use and learning of maps and similar resources. The overarching aim is to address the longstanding deficiency in the compilation and design of maps and atlases for lower primary school classes. Conversely, the post-atlas questionnaire also comprises 15 questions specifically formulated for primary school teachers in lower grades. These questions pertain to the implemented maps and the atlas specifically created for pupils aged 6 to 10 years in lower primary school classes. The questions revolve around the integration and use of the compiled maps and atlas in the teaching and learning process, their impact on pupils, how pupils respond while working and learning with them, and their role in meeting curriculum requirements through atlas products and similar maps. The pre-atlas questionnaire and the post-atlas questionnaire are expected to yield essential findings, serving to validate and identify the influence of teachers in working with maps and cartographic materials, as well as the significance that teachers hold throughout this entire process. The figures below depict two instances of assessments administered to lower-grade primary school pupils: the pre-atlas test and the post-atlas test, as follows:



PRE – ATLAS PYETSOR

PËR ARSIMTARËT E KLASVE TË CIKLIT TË ULËT TË SHKOLLAVE FILLORE

Ju lutemi shënoni me një simbol klasën në të cilën po ligjeroni aktualisht:

2(___); 3(___); 4(___); 5(___)

Pyetje:

1. Sa është e rëndësishme dhe sa është e nevojshme përdorimi i hartave apo atlasëve për nxënësit e shkollave fillore, në procesin edukativo-arsimor? **(Ju lutemi pergjigjuni edhe me shkrim).**

a) Aspak b) Pak c) Mesatarisht d) Shumë

2. A i përdorni dhe sa shpesh i përdorni hartat apo atlasët përgjatë ligjerimit, të mësuarit dhe ushtrimeve me nxënësit? **(Ju lutemi pergjigjuni edhe me shkrim).**

a) Aspak b) Pak c) Mesatarisht d) Shumë

3. Sa janë të njoftuar dhe a kanë njohuri nxënësit për egzistencën e hartave apo atlasëve për fëmijë të grupmoshave të ndryshme? **(Ju lutemi pergjigjuni edhe me shkrim).**

a) Aspak b) Pak c) Mesatarisht d) Shumë

4. Në librat dhe materialet e punës me të cilat i realizoni planprogramet e juaja mësimore, veçanarisht në librat e shkencave sociale, sa informacion jepet për hartat dhe atlasët për fëmijë? **(Ju lutemi pergjigjuni edhe me shkrim).**

a) Aspak b) Pak c) Mesatarisht d) Shumë

POST – ATLAS PYETSOR

PËR ARSIMTARËT E KLASVE TË CIKLIT TË ULËT TË SHKOLLAVE FILLORE

Shënoni me shenjë në cilën klasë ligjeroni:

2(___); 3(___); 4(___); 5(___)

Pyetje:

1. Sa e përfshini atlasin në planet tuaja të mësimit dhe çfarë objektivash specifike mësimore synoni të arrini nëpermjet atlasit? **(Ju lutemi pergjigjuni edhe me shkrim).**

a) Aspak b) Pak c) Mesatarisht d) Shumë

2. Sa dhe si e ndikon ligjërimin, të mësuarit dhe ushtrimet përdorimi i atlasit në orët mësimore? **(Ju lutemi pergjigjuni edhe me shkrim).**

a) Aspak b) Pak c) Mesatarisht d) Shumë

3. A jeni të përgaditur sa duhet për të ligjeruar dhe të mësuar me hartat dhe atlaset përballë nxënësve në klasën tuaj? **(Ju lutemi pergjigjuni edhe me shkrim).**

a) Aspak b) Pak c) Mesatarisht d) Shumë

4. A përdorni strategji dhe cilat janë disa strategji që përdorni për të angazhuar fëmijët në mësimin nëpërmjet hartave dhe atlaseve? **(Ju lutemi pergjigjuni edhe me shkrim)**

a) Aspak b) Pak c) Mesatarisht d) Shumë

Figure 1

First page of pre-atlas questionnaire (left side) and first page of post-atlas questionnaire (right side), administered to primary school teachers – first pages of the pre and post questionnaires

RESULTS

Pre-atlas questionnaire for teachers

A total of 30 teachers from the lower grades of primary schools participated in the pre-atlas questionnaire specifically designed for their needs. The pre-atlas questionnaire involving primary school teachers was conducted prior to the design and compilation of the atlas for primary school pupils.With the completion of the pre-atlas questionnaire for primary school teachers, the results derived from this assessment are now presented in the subsequent Table 1, as follows:

Table 1
Pre-atlas questionnaire for the primary school teachers

Questions	Importance Percentages
1. How important and how necessary is the use of maps or atlases for primary school pupils in the educational process?	93.33 %
2. Do you use and how often do you use maps or atlases during lectures, learning and exercises with pupils?	80.83 %
3. How informed are pupils and are pupils aware of the existence of maps or atlases for children of different age groups?	75.83 %
4. In the books and work materials with which you implement your lesson plans, especially in social science books, how much information is given about maps and atlases for children?	66.66 %
5. Are the use of maps within the materials of social science books sufficient and how sufficient are they for primary school pupils?	79.17 %
6. How much do pupils enjoy using maps that are part of social science books, during lectures, learning and exercises?	88.33 %
7. How much do you think maps and atlases influence the development of children's capacity and perception of various phenomena?	90.00 %
8. How much do you think the use of maps and atlases in the educational process improve and develop pupils' knowledge?	95.83 %
9. How much do you think maps and atlases help you in the realization of your lesson plans and programs?	85.00 %
10. How much do you think that maps and atlases for children will develop the level and productivity of learning among pupils?	91.66 %
11. How much do you think that products such as maps and atlases for children will meet and help the requirements, needs and objectives of the Ministry of Education and Science in North Macedonia?	79.17 %
12. Do you want to work and do you like to work with products such as maps and atlases?	95.00 %
13. How satisfied would you be if you had a children's atlas as a working tool with which you would carry out lessons and curriculum?	98.33 %
14. How effective and efficient would be working with maps and atlases for children in lectures and learning?	94.17 %
15. How much do you think that the maps that are used in social science books are adequate for the age group of pupils of lower grades of primary school?	79.17 %

Based on the information presented in the table, it can be inferred that question number 13 records the highest average importance rating, reaching 98.33%. This rating signifies the level of satisfaction among teachers concerning the availability of an atlas designed for children. Conversely, question number 4 registers the lowest average importance rating, standing at 66.66%. This rating pertains to the information provided in social science books regarding maps and atlases. The percentages presented in the preliminary table regarding the questions in the questionnaire prepared for teachers are also depicted in the chart in Figure 2.

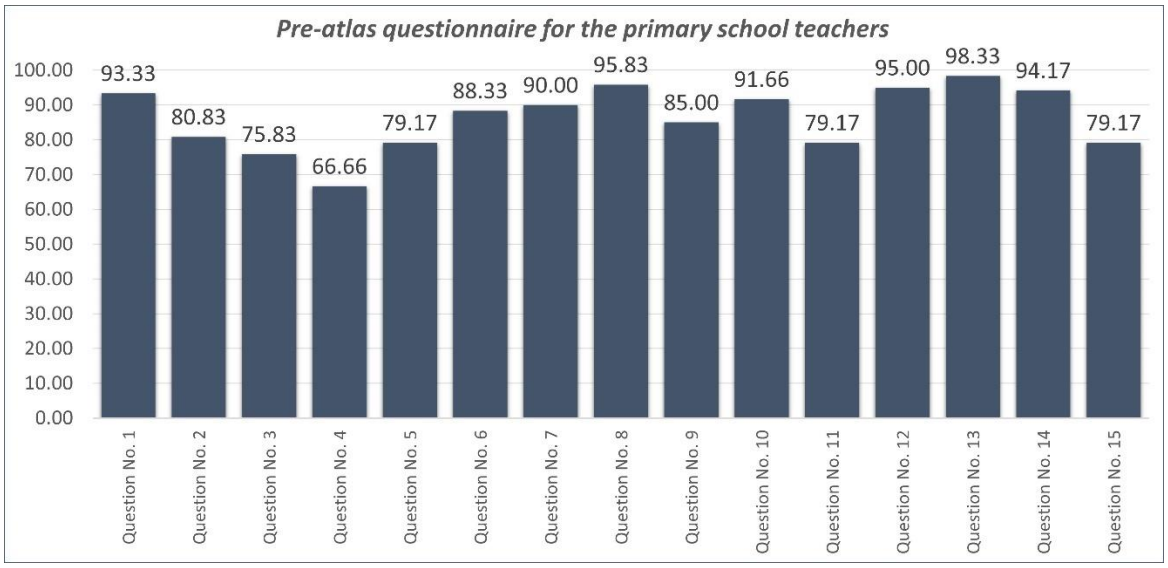


Figure 2

Pre-atlas questionnaire for primary school teachers – percentages represented in chart form

The responses most frequently provided by teachers of the lower grade levels of the primary school during the questioning and survey completion are detailed below. These responses are organized based on the ordinal number of the questions, as follows:

Answer 1: Using maps and atlases in lessons improves teaching clarity and efficiency. It's crucial for both primary and secondary school pupils. Integrating them enhances geographic understanding, skills, and knowledge. Maps are especially important for primary pupils' orientation and positioning skills, becoming essential in the curriculum.

Answer 2: In second grade, map usage is limited, mainly determined by prescribed teaching materials. Atlases aren't used at this level. Maps and atlases are introduced only when directly related to teaching topics, more so in lower grades due to limited curriculum content. Maps are occasionally used, but the absence of atlases shows a need for them. Teachers rely on maps in textbooks, but the lack of both resources underscores an educational deficiency.

Answer 3: In early grades, in 2nd and 3rd, pupils know less compared to 4th and 5th grades. Most pupils are familiar with maps but less so with atlases. Few have good knowledge, mainly about maps, due to limited atlas availability in the curriculum.

Answer 4: Textbooks provide valuable information but often lack enough detail, leading teachers to enhance pupils' knowledge. Social science books for lower grades generally have some useful information, but their adequacy depends on the subject and teaching units. Information sufficiency varies, sometimes satisfactory but often average, showing the need for more emphasis on maps and atlases in the curriculum.

Answer 5: Maps are used more in 4th and 5th grades compared to 2nd and 3rd grades. There's a significant emphasis on maps in these higher grades, improving pupils' understanding. However, social science books lack enough maps, showing a need for improvement. Maps from educational materials are often outdated and poorly formatted, highlighting the need for modernization in curriculum resources.

Answer 6: Pupils enjoy using maps in textbooks because there aren't many alternatives like atlases. Their enthusiasm grows when maps are used occasionally, making learning more interesting. This enjoyment increases curiosity and appreciation for maps, suggesting that using diverse resources

could further enhance educational engagement.

Answer 7: Maps and atlases greatly help pupils learn, improving their understanding and thinking skills. They're especially important for younger pupils, fostering curiosity and intelligence. Using maps and atlases is crucial for teaching geography in early education.

Answer 8: Using various tools, like maps and atlases, is crucial for improving education. They make learning more interesting and interactive. Innovations in education, like new textbooks, help develop pupils' skills, improving education continuously.

Answer 9: Maps and atlases are crucial in our curriculum, especially for teachers. While maps are sometimes included in educational materials, the lack of atlases shows their importance. These resources greatly impact how teachers conduct lessons, improving their quality. In social science books, maps are fundamental for educational plans, aiding improvement and emphasizing their vital role in teaching and learning.

Answer 10: Maps and atlases are key for pupils' learning, improving its quality and efficiency. They enhance productivity and learning levels, showing the significant growth achieved through active use of these tools.

Answer 11: Maps and atlases, when matched with class materials and pupils' ages, meet educational requirements. They fulfill Ministry of Education standards and are crucial for meeting educational goals in our country.

Answer 12: We like the maps in our textbooks but want more in different formats, especially atlases. People are excited about using maps and atlases because they're interesting and engaging, showing a big demand for them in educational materials.

Answer 13: Pupils are very happy about having maps, atlases, and other tools in class because they really need them. They're not just satisfied; they really want these resources and would be thrilled to have them. Teachers and pupils would both appreciate and value the introduction of new educational tools like maps and atlases.

Answer 14: Using maps, atlases, and other tools can greatly improve teaching efficiency and effectiveness. It's a productive way to help pupils understand their local areas better, making learning valuable.

Answer 15: Current map materials are insufficient, lacking the necessary information and not meeting educational needs. They have many omissions, errors, and absences, showing a clear need for better resources.

Post-atlas questionnaire for teachers

A total of 18 teachers from the lower grades of primary schools participated in the post-atlas questionnaire specifically designed for their needs. The post-atlas questionnaire involving primary school teachers was conducted after the atlas for primary school pupils had been designed, compiled, and tested with the pupils. This survey was administered after teachers had incorporated the atlas into their classroom teaching and practices. With the completion of the post-atlas questionnaire for primary school teachers, the results derived from this assessment are now presented in the subsequent Table 2, as follows:

Table 2
Post-atlas questionnaire for the primary school teachers

	Questions	Importance Percentages
1.	How much do you incorporate the atlas into your lesson plans and what specific learning objectives do you aim to achieve through the atlas?	86.11 %
2.	How much and how does the use of the atlas in the classroom affect the lecture, learning and exercises?	95.83 %
3.	Are you prepared enough to read and learn about maps and atlases in front of pupils in your class?	94.44 %
4.	Do you use strategies and what are some strategies you use to engage children in learning through maps and atlases?	87.50 %
5.	Do you think that the atlas meets and fulfills the requests, needs and objectives of the Ministry of Education and Science in North Macedonia?	94.44 %
6.	How often do you encounter challenges and problems and what are some of the challenges or problems you encountered when using maps and atlases in the classroom and how did you deal with them?	65.28 %
7.	How much do you think that the maps, symbols and tables that are used within the atlas are adequate for the age groups of pupils in the lower grades of primary schools?	87.50 %
8.	How often do pupils encounter problems when using maps and what are some creative ways you have used in the classroom to engage and encourage children's learning and practice?	79.17 %
9.	How satisfied are you with the atlas and are the requirements and needs for the development of lessons through the atlas met?	98.61 %
10.	Are the pupils satisfied with the use of maps and atlases during the teaching process and what are the most frequent regimes you receive from pupils in this regard?	97.22 %
11.	How often do you use maps and atlases and do you think that their use will develop the level and productivity of pupils' learning?	91.67 %
12.	Do maps, symbols, tables and atlases in general affect the increase of interest in pupils to learn and research more?	97.22 %
13.	How often pupils want and ask you to work with products such as maps and atlases?	94.44 %
14.	How much and how do you encourage pupils to become active users of maps and atlases in the future as well?	100 %
15.	How much the effectiveness and efficiency of learning with maps and the atlas for children has increased in lectures and learning?	100 %

Based on the presented table, it is evident that question number 14 and question number 15 showcases the highest average significance associated with the correct answers, reaching 100%. In contrast, question number 6 portrays the lowest average significance attributed to the correct answers, also amounting to 65.28%. The percentages presented in the preliminary table regarding the questions in the questionnaire prepared for teachers are also depicted in the chart in Figure 3.

The responses most frequently provided by teachers of the lower grade levels of the primary school during the questioning and survey completion are detailed below. These responses are organized based on the ordinal number of the questions, as follows:

Answer 1: We try to use it as much as possible, but its limited inclusion in the Ministry of Education's curriculum restricts its use. Still, we use it in almost every lesson related to social sciences.

Answer 2: Using an atlas in class boosts teaching and learning by providing visual aids that deepen understanding and engage pupils. It helps them explore visually, improving comprehension. Using atlases means enriching the educational experience.

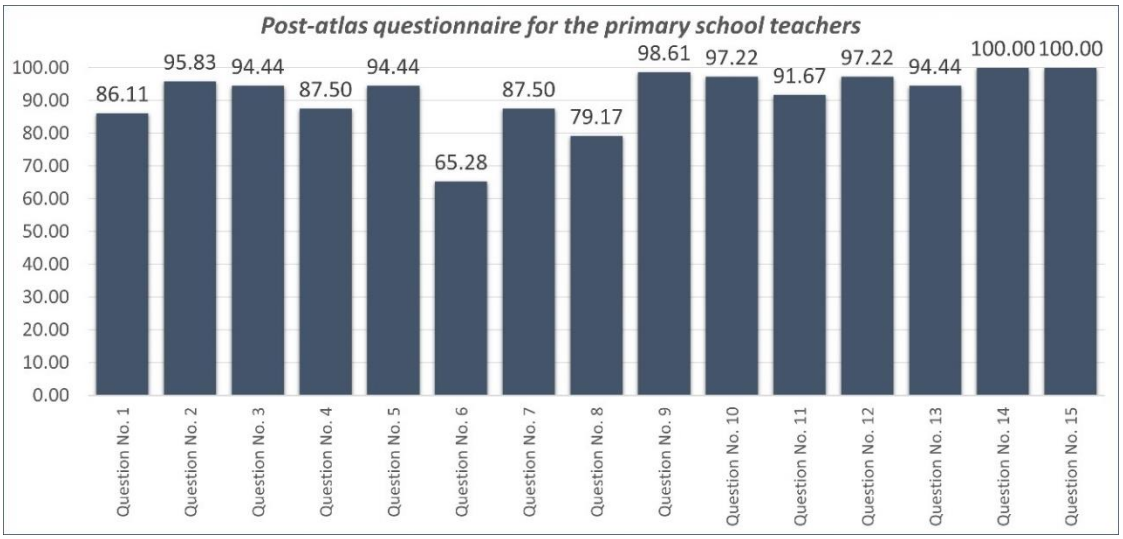


Figure 3

Post-atlas questionnaire for primary school teachers – percentages represented in chart form

Answer 3: I'm confident in teaching pupils about maps, but I'm open to learning more and getting feedback to improve my teaching, because it is a complex duty in principle. Of course, it would be great if there is any training performed for learning new methods of teaching maps.

Answer 4: Using real-world examples and cultural contexts makes the material more relatable and engaging. These strategies help pupils stay curious and participate actively by learning new things and gaining new information.

Answer 5: The atlas meets the Ministry of Education and Science's needs in North Macedonia. It provides comprehensive geographic information and detailed maps, supporting curriculum goals. Overall, it enriches education and helps achieve ministry objectives in North Macedonia.

Answer 6: Encountering challenges with maps and atlases in class is common. Some issues include difficulty keeping pupils engaged. To tackle this, despite challenges, using stickers which are part of the atlas, to ensure effective use of maps in class is very helpful and very interesting.

Answer 7: The atlas's maps, symbols, and tables are suitable for young primary school pupils. They're designed with clear visuals for easy understanding. The atlas effectively supports the educational needs of young learners, helping them explore and understand the country they are living in.

Answer 8: Pupils often struggle with maps due to issues like understanding legends, scale, and directions. For this kind of problem, teamwork and interactivity always helps.

Answer 9: The atlas meets classroom lesson needs well, and satisfaction is purchased. It offers comprehensive and up-to-date geographic information with engaging visuals for pupils. Its user-friendly layout caters to different learning styles, allowing for meaningful exploration.

Answer 10: Pupils are highly satisfied with using maps and atlases in class. They appreciate the visual aids, exploring different regions and cultures, and mastering map-reading skills, and enjoy interactive and hands-on activities facilitated by the atlases.

Answer 11: Integrating them into lessons enhances understanding of geography, history, and culture. Maps help pupils grasp complex concepts visually and appreciate the world.

Answer 12: Using maps, symbols, and tables in class encourages active engagement, sparks curiosity, and motivates further study. Symbols and tables add context and enrich understanding,

prompting pupils to explore further. Overall, their use together with maps boosts pupils' interest in learning and inspires them to seek more knowledge.

Answer 13: Pupils consistently show strong enthusiasm for using maps and atlases in lessons. They eagerly request opportunities to engage with these materials, demonstrating a keen interest in exploring and expanding their understanding.

Answer 14: Encouraging pupils to use maps and atlases enthusiastically now and in the future increases dedication and fosters love for geography and cartography in the future. Creating a supportive environment where pupils can explore at their own pace, fostering curiosity and critical thinking.

Answer 15: The use of maps and atlases has greatly improved children's learning effectiveness and efficiency. These resources engage them deeply with the material, aiding comprehension, and retention of geographical concepts. Using maps promotes curiosity, thus leading to deeper understanding and essential cognitive skill development.

Preliminary findings indicate that a majority of teachers incorporate maps and atlases into their teaching practices, albeit to varying degrees. Some teachers employ interactive map-based activities, while others use atlases for individual or group assignments.

Teachers generally recognize the value of cartographic resources in enhancing children's spatial literacy. However, a subset of teachers expressed concerns about the time required for instruction, limited access to up-to-date maps, and insufficient professional development opportunities.

The study reveals a positive correlation between teachers' effective use of maps and atlases and children's spatial literacy development. Engaging instructional strategies, such as interactive discussions, hands-on map exploration, and collaborative map interpretation, appear to foster pupils' spatial reasoning abilities and geographic knowledge.

DISCUSSION

This study sheds light on the significant role of teachers in optimizing the use of maps and atlases for primary school children. The findings underscore the importance of providing teachers with adequate resources, training, and support to promote effective integration of cartographic resources into the curriculum. Furthermore, policymakers should consider strategies to address challenges faced by teachers, such as limited access to up-to-datemaps and professional development opportunities. The findings from both the pre-atlas and post-atlas questionnaires shed light on the pivotal role of maps and atlases in primary school education, particularly in North Macedonia. The discussions provided by the participating teachers offer nuanced insights into the current landscape of map utilization within the curriculum, the challenges encountered, and the perceived effectiveness of integrating cartographic resources into teaching practices.

The variation in participants between the pre-atlas and post-atlas questionnaires is due to their respective administration times. The pre-atlas questionnaire was distributed before the atlas was designed and compiled, whereas the post-atlas questionnaire was administered after the atlas had been completed and tested with primary school pupils. The post-atlas questionnaire was conducted exclusively with teachers from the classes involved in the atlas presentation and the subsequent testing with primary school pupils.

The survey questions for the pre-atlas and post-atlas questionnaires were carefully designed to comprehensively address several key areas related to the use of maps and atlases in primary school education. They were crafted to align with the educational objectives and standards set by the Ministry of Education and Science in North Macedonia, ensuring they capture how maps and atlases support curriculum goals. The questions focus on the practical application of these tools in the classroom,

evaluating how often teachers use them and how they incorporate them into lesson plans. Additionally, they gauge the engagement levels of both teachers and pupils, assessing interest and enthusiasm for these resources. The survey also evaluates the knowledge and awareness levels regarding the existence and use of maps and atlases, identifying potential gaps in knowledge and the need for further training. Questions assess the perceived importance and necessity of these tools, their impact on educational outcomes, and satisfaction levels with their availability and use. The post-atlas questionnaire addresses challenges and problems encountered, and strategies used to overcome them, identifying areas for improvement. Furthermore, questions explore the future use and development of maps and atlases, ensuring the survey considers both current practices and future enhancements. This comprehensive approach ensures the survey effectively informs the design and implementation of educational resources, ultimately enhancing the learning experience for pupils.

The importance percentages in the tables are derived from the responses of the teachers to the pre-atlas and post-atlas questionnaires. Teachers respond to each question on a Likert scale, where higher values indicate greater importance. For each question, the scores from all teachers are averaged by summing the numerical values of the responses and dividing by the total number of responses. This average score is then converted to a percentage by dividing the average score by the maximum possible score on the Likert scale and multiplying by 100. Each question in the questionnaire is designed to assess a specific aspect of the importance or necessity of maps and atlases in the educational process. Teachers respond to these questions, typically on a Likert scale from 1 to 4, where a higher number indicates a higher level of agreement or importance. The responses from all participating teachers are collected. For instance, in the pre-atlas questionnaire, responses from 30 teachers are gathered for each question, and for the post-atlas questionnaire, responses from 18 teachers are gathered for each question too. Each response on the Likert scale is assigned a numerical value. For example, if a 5-point scale is used: Strongly Agree (highly) = 4, Agree (on the average) = 3, Disagree (slightly) = 2, Strongly Disagree (not at all) = 1. For each question, the scores from all teachers are averaged. This involves summing the numerical values of the responses for a question and then dividing by the total number of responses (Figure 4):

$$\text{Average Score for Question} = \frac{\sum(\text{Individual Scores for Question})}{\text{Number of Responses}}$$

Figure 4
Post-atlas questionnaire for primary school teachers – percentages represented in chart form

The average score is then converted to a percentage. If a 4-point Likert scale is used, the percentage can be calculated as follows (Figure 5):

$$\text{Importance Percentage} = \left(\frac{\text{Average Score for Question}}{4}\right) \times 100$$

Figure 5
Importance percentage calculation

This converts the average score to a percentage out of 100, representing the level of importance

as perceived by the teachers. This process is repeated for each question in the questionnaire, resulting in the percentages shown in Table 1 and Table 2. The exact percentages shown in the tables are based on similar calculations, tailored to the specific responses and the scale used in the survey.

To further elucidate the findings from the pre-atlas and post-atlas questionnaires, descriptive statistics were employed to analyze the teachers' responses, providing a comprehensive overview of their perceptions regarding the use of maps and atlases in primary education. The data were collected from 30 teachers for the pre-atlas questionnaire and 18 teachers for the post-atlas questionnaire, and the results were summarized in Table 3 and Table 4 below. The mean, standard deviation, and range of responses were calculated for each question, offering insights into the central tendency and variability of the teachers' opinions. These descriptive statistics highlight the general agreement among teachers on the importance and necessity of maps and atlases, while also identifying specific areas where improvements can be made. For instance, the mean importance rating for question 13 in the pre-atlas questionnaire, which pertains to teachers' satisfaction with the availability of an atlas, was the highest at 3.93 (out of 4), with a relatively low standard deviation of 0.25, indicating strong consensus. Conversely, question 4, regarding the adequacy of information on maps and atlases in social science books, had the lowest mean rating of 2.67, with a higher standard deviation of 0.61, reflecting more varied opinions. Similarly, in the post-atlas questionnaire, the highest mean ratings were observed for questions 14 and 15, both scoring 4.00, suggesting unanimous satisfaction with the atlas's effectiveness in enhancing learning. The lowest mean rating was for question 6, at 2.61, highlighting challenges in using the atlas effectively. These findings underscore the transformative impact of introducing dedicated atlases and the need for ongoing support and resources to maximize their educational benefits.

Table 3

Descriptive Statistics regarding Pre-Atlas questionnaire for the primary school teachers

Question No.	Pre-Atlas Mean	Pre-Atlas SD	Pre-Atlas Range
1	3.73	0.45	3.00 – 4.00
2	3.23	0.63	2.00 – 4.00
3	3.03	0.52	2.00 – 4.00
4	2.67	0.61	2.00 – 4.00
5	3.17	0.65	2.00 – 4.00
6	3.53	0.51	2.00 – 4.00
7	3.60	0.49	3.00 – 4.00
8	3.83	0.38	3.00 – 4.00
9	3.40	0.56	3.00 – 4.00
10	3.67	0.48	3.00 – 4.00
11	3.17	0.65	2.00 – 4.00
12	3.80	0.41	3.00 – 4.00
13	3.93	0.25	3.00 – 4.00
14	3.77	0.43	3.00 – 4.00
15	3.17	0.65	2.00 – 4.00

Table 4
Descriptive Statistics regarding Post-Atlas questionnaire for the primary school teachers

Question No.	Pre-Atlas Mean	Pre-Atlas SD	Pre-Atlas Range
1	3.44	0.61	2.00 – 4.00
2	3.83	0.38	3.00 – 4.00
3	3.78	0.43	3.00 – 4.00
4	3.33	0.49	2.00 – 4.00
5	3.61	0.58	2.00 – 4.00
6	2.61	0.77	1.00 – 4.00
7	3.50	0.62	2.00 – 4.00
8	3.94	0.23	3.00 – 4.00
9	3.72	0.46	3.00 – 4.00
10	3.83	0.38	3.00 – 4.00
11	3.83	0.38	3.00 – 4.00
12	3.94	0.23	3.00 – 4.00
13	4.00	0.00	4.00 – 4.00
14	4.00	0.00	4.00 – 4.00
15	4.00	0.00	4.00 – 4.00

These descriptive statistics highlight the teachers' perceptions and experiences before and after the introduction of the atlas, providing a clear picture of the changes and improvements in their teaching practices and the educational outcomes for pupils.

However, a comparative analysis between Pre-Atlas and Post-Atlas questionnaires has been developed as follows:

Integration of Cartographic Resources in Teaching Practices:

Pre-Atlas Perspective: Teachers underscored the pivotal role of maps and atlases in augmenting pedagogical clarity and efficacy. They articulated the significance of seamlessly integrating these resources to fortify pupils' geographic comprehension and skills, particularly within the lower echelons of primary education.

Post-Atlas Perspective: Teachers delineated concerted endeavors to assimilate atlases into their instructional repertoire, notwithstanding constraints imposed by curricular limitations. They acknowledged that the utilization of atlases enriched pedagogy and scholarly engagement by furnishing visual aids that deepened cognitive apprehension and engendered scholastic involvement.

Accessibility and Utilization Dynamics of Cartographic Materials:

Pre-Atlas Perspective: Teachers voiced apprehensions regarding the paucity of atlases and maps within the educational fabric, especially discernible within lower primary tiers. Noteworthy was the sporadic utilization of maps, primarily contingent upon topical relevance, juxtaposed against a conspicuous dearth of atlases.

Post-Atlas Perspective: Teachers espoused endeavors to incorporate atlases across a spectrum of scholastic contexts, albeit within the confines of a circumscribed curriculum. They underscored endeavors to imbue instructional content with real-world contexts and cultural salience, thereby fostering scholarly engagement and cognitive resonance.

Impacts on Pupils' Cognitive Domain and Engagement:

Pre-Atlas Perspective: Teachers noted the palpable enjoyment evinced by pupils when interfacing with maps ensconced within textbooks, albeit with heightened fervor when confronted with sporadic map usage, thus evincing an exigency for diversified pedagogical resources to galvanize scholarly engagement.

Post-Atlas Perspective: Teachers attested to a heightened level of pupil satisfaction face to face the incorporation of maps and atlases within the pedagogic milieu. Pupils evinced an appreciative disposition towards visual pedagogical aids, interactive learning modalities, and tactile exploration facilitated by atlases, thereby fostering scholastic engagement and mastery of cartographic literacy.

Perceived Efficacy and Efficiency of Cartographic Pedagogy:

Pre-Atlas Perspective: Teachers underscored the salience of maps and atlases in ameliorating pedagogical efficiency and efficacy, particularly in augmenting pupils' comprehension of local geographies and fostering an ethos of scholarly curiosity.

Post-Atlas Perspective: Teachers opined that the incorporation of maps and atlases engendered a discernible enhancement in the effectiveness and efficiency of scholastic praxis. These resources engendered profound scholarly engagement, thereby facilitating cognitive comprehension, retention, and the cultivation of essential cognitive competencies.

Navigating Challenges and Employing Pedagogical Strategies:

Pre-Atlas Perspective: Teachers grappled with challenges such as antiquated and inadequately formatted maps within educational materials. They advocated for curricular modernization and espoused pedagogical strategies aimed at augmenting scholarly engagement.

Post-Atlas Perspective: Teachers acknowledged the omnipresent challenges associated with the utilization of maps and atlases within the pedagogical arena, including impediments to sustained pupil engagement. In response, teachers availed themselves of strategies such as the judicious use of stickers from atlases to optimize map utilization and the cultivation of collaborative learning environments to surmount pedagogical hurdles.

The responses underscore the unanimous agreement among teachers regarding the importance of incorporating maps and atlases into the educational process. The majority of teachers recognize the profound impact of these resources on pupils' spatial literacy, comprehension of geographical concepts, and overall engagement in learning. Such consensus among educators emphasizes the significance of cartographic materials in facilitating effective pedagogy and enhancing pupils' educational experiences.

However, despite the acknowledged benefits, several challenges and limitations associated with the integration of maps and atlases into teaching practices have been articulated. These include constraints imposed by the prescribed curriculum, inadequate access to up-to-date cartographic resources, and a perceived lack of professional development opportunities. Addressing these challenges is imperative to maximize the potential of maps and atlases in enriching the learning environment and promoting spatial reasoning skills among pupils.

Furthermore, the discrepancy between the pre-atlas and post-atlas questionnaire results highlights the transformative impact of introducing dedicated atlases into the classroom. The post-atlas responses reflect a notable increase in the perceived effectiveness and efficiency of teaching practices, as well as heightened satisfaction among both teachers and pupils. This suggests that the availability of specialized cartographic resources not only addresses existing educational needs but also enhances the overall quality of teaching and learning experiences.

The qualitative insights provided by teachers offer valuable recommendations for future educational initiatives aimed at optimizing the use of maps and atlases in primary school settings. Strategies such as incorporating real-world examples, fostering interactive learning environments, and providing targeted professional development opportunities emerge as key avenues for promoting effective map utilization and enhancing spatial literacy among pupils.

CONCLUSIONS

The comprehensive analysis of teachers' perceptions and experiences regarding the use of maps and atlases in primary school education provides valuable insights into the effectiveness and challenges associated with integrating cartographic resources into teaching practices. Through the pre-atlas and post-atlas questionnaires, it becomes evident that maps and atlases play a crucial role in enhancing pupils' spatial literacy, comprehension of geographical concepts, and overall engagement in learning. The unanimous agreement among teachers regarding the importance of incorporating maps and atlases into the educational process underscores the significance of these resources in facilitating effective pedagogy. Despite facing challenges such as curriculum constraints and limited access to up-to-date resources, educators demonstrate a strong commitment to leveraging cartographic materials to enrich the learning environment and promote spatial reasoning skills among pupils. The introduction of dedicated atlases into the classroom has proven to be transformative, resulting in increased satisfaction among both teachers and pupils, as well as heightened effectiveness and efficiency of teaching practices. This highlights the value of specialized cartographic resources in addressing educational needs and enhancing the quality of teaching and learning experiences. Moving forward, it is imperative for educational stakeholders to address the identified challenges and capitalize on the insights shared by educators to optimize the use of maps and atlases in primary school settings. Strategies such as incorporating real-world examples, fostering interactive learning environments, and providing targeted professional development opportunities emerge as key avenues for promoting effective map utilization and enhancing spatial literacy among pupils.

In conclusion, this study highlights the influential role of teachers in facilitating the effective use of maps and atlases among primary school children. The findings emphasize the need for comprehensive support systems to enhance teachers' pedagogical practices and ensure access to up-to-date cartographic resources. By fostering the development of spatial literacy skills, teachers contribute to the overall geographical knowledge and cognitive abilities of pupils. Future research should explore additional factors that may influence the utilization of cartographic resources in primary schools and investigate the long-term impact on pupils' spatial understanding and academic achievement. The findings from this study underscore the indispensable role of maps and atlases in primary school education and highlight the transformative potential of integrating these resources into teaching practices. By addressing the challenges identified and capitalizing on the insights shared by educators, educational stakeholders can work towards creating an enriched learning environment that nurtures pupils' spatial literacy and fosters a deeper understanding of the world around them.

Future studies in the field of cartographic resources utilization in primary school education could explore several avenues to further enhance understanding and inform educational practices. Longitudinal studies could track pupils' spatial literacy development over several years, assessing the sustained benefits of integrating maps and atlases into primary school curricula. Comparative analysis could evaluate the effectiveness of different types of cartographic resources, such as traditional paper maps versus digital atlases, in supporting primary education, investigating their influence on pupil engagement, comprehension, and spatial reasoning skills. Additionally, specialized teacher training programs could be designed and implemented to enhance educators' proficiency in utilizing maps and atlases effectively in the classroom, with evaluations focusing on pedagogical practices and pupil outcomes. Furthermore, research could examine strategies for seamlessly integrating cartographic resources into existing primary school curricula, aligning map-based activities with learning objectives across various subject areas. Emerging technologies, including Geographic Information Systems (GIS) and virtual reality, present opportunities to augment the use of maps and atlases in primary education, enhancing pupil engagement and facilitating interactive learning experiences. Moreover, exploring the role of cultural context in shaping pupils' perceptions and utilization of cartographic resources, and

investigating strategies for making these resources more accessible to diverse learners, can promote cultural sensitivity and inclusive education. Cross-disciplinary collaboration between cartography experts, educators, psychologists, and other relevant disciplines can provide a holistic understanding of the cognitive, social, and pedagogical dimensions of map utilization in primary education, enriching research methodologies and informing evidence-based practices. Lastly, analyzing existing education policies and curriculum standards to advocate for changes that prioritize spatial literacy development and support effective map-based instruction can further advance the integration of cartographic resources into primary school education, ensuring all pupils have access to high-quality resources that foster critical thinking and a deeper understanding of the world around them.

Ethical Declaration

This study is derived from a master's thesis entitled “İlkokul Çağındaki Öğrenciler İçin Atlas Tasarımı: Kuzey Makedonya Örneği” or “Atlas Design for Primary School Pupils: The Example of North Macedonia”, submitted under the supervision of Doç. Dr. Hüseyin Zahit SELVİ on 27/06/2024.

Ethics Committee Approval

Ethical approval was granted by the ethics committee of Necmettin Erbakan University, on 11/05/2023 with the number 2023/07 and Ethics Committee Decision number 13945.

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