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Classifying Geography Textbook Visuals According to the Concept of Direct, Indirect, and Symbolic Experience of Nature

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Abstract: Geography textbooks have many visuals, such as maps, graphs, tables, photographs, and illustrations, which makes geography a highly visual school subject. However, previous studies show that geography students can pay surprisingly little attention to textbook visuals. In this article, it is asked what sorts of visuals are there in geography textbooks if they do not attract students' attention. In order to answer the research question, a visual method to approach textbook visuals is developed. The visual method is motivated by Stephen Kellert's concept of direct, indirect, and symbolic experience of nature. Based on the three types of experience of nature, three categories for geography textbook visuals are established respectively: snapshot visuals (deriving from direct experience), landscape visuals (deriving from indirect experience), and abstract visuals (deriving from symbolic experience). The sample covers eight Finnish geography textbooks for grades 7–9 and for one upper secondary school course. The results show that most of the visuals depict landscapes. In addition, there are many abstract visuals, such as maps and illustrations, depicting geographical processes. Instead, only a few snapshots of people in action and snapshots of geographical hazards were identified. In the article, it is suggested that enhancing the role of snapshot visuals in geography education could increase students' interest towards textbook visuals, as well. This is because snapshot visuals can draw students' attention and enable students to express their own feelings and thoughts.

Keywords: geography education; geography textbook; visual methodology

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1. Introduction

Due to the influence of social media, communication has taken on a highly visual aspect. As an academic discipline, as well as a school subject, geography, too, is a highly visual enterprise [1,2]. For instance, photographs and illustrations are commonly used to illuminate geographical phenomena to geography students. However, geography students seem to face challenges when interpreting textbook visuals; moreover, they do not seem to pay much attention to images in textbooks [3,4]. According to Antje Schlottmann and Judith Miggelbrink [5] (p. 1), images and visuality might "be a geographical blind spot for the very reason that they play such a prominent role in geography". Therefore, it is relevant to investigate how approachable geography textbook visuals are for students.

In Finland, the role of visuals in geography education is highlighted by the concept of geomedia. It was introduced to both basic education and upper secondary education curricula, which were reformed and implemented in schools in 2016. However, there is still no consensus among Finnish geographers as to what is meant by geomedia. For instance, some of the Finnish geographers underline that the geolocative information must be present in order for the dataset to be called geomedia [6]. In the international research literature, geomedia is often linked to the use of geographic information systems (GIS) [7]. In the Finnish curricula, however, geomedia is understood more broadly. For instance, in the Finnish National Core Curriculum for General Upper Secondary Education [8] (p. 242), geomedia is described as follows: "Geomedia refers to the ways geographical information is collected and presented, such as maps, geospatial information, diagrams, images,

videos, written sources, media, and verbal presentations. The versatile use of geomedia supports the students in the acquisition, analysis, interpretation, and visual presentation of geographical information". Therefore, in this article, geography textbooks, along with their visuals, are understood as part of geomedia resources.

The primary question addressed in this article is: are visuals used in geography textbooks appealing to students? In order to answer the research question, a visual method utilizing Stephen Kellert's [9] concept of direct, indirect, and symbolic experience of nature is developed. Consequently, the visuals of the investigated geography textbooks are classified into three categories, respectively. Kellert's concept of direct, indirect, and symbolic experience of nature is described in Section 3, as it offers the framework for the classification of the textbook visuals.

2. Aspects on Geography Textbook Visuals

When it comes to textbooks, two fundamental questions can be asked: is the textbook yesterday's technology for yesterday's schools, and why should research on textbooks be worthwhile? As an answer to the first question, John Widdowson and David Lambert [10] state that textbooks are not yesterday's technology, but an important part of 'resource ecology' when it comes to educational media—even "the most important educational medium in schools" according to Yvonne Behnke [11] (p. 160). Thereby, textbooks have a strong influence on geography education, and not least because they emphasize some topics at the cost of others [12–14]. However, there is no such thing as a 'perfect' textbook that would support the learning processes of each student in the best possible manner. As André Hanaire [15] puts it, teachers must use textbooks according to their conception of the topic and must supplement it as they think necessary. As an answer to the second question, textbooks are a reflection of the society that produces them [16]. Textbooks tend to reveal the authors' conception of geography as an academic discipline and a school subject, as well as its educational purpose [17]. Textbooks indicate the institutional structure of geography, give examples on how work in the discipline of geography is performed, and demonstrate the boundaries of the discipline, as well [18]. Therefore, research on textbooks is certainly worthwhile.

According to John Thornes [19] (p. 793), "[t]he creation and interpretation of visual images has always been important to geography and is what makes geography unique". When it comes to the distinction between 'everyday thinking' and 'thinking geographically', the role of pictures and illustrations is essential [20]. For instance, planetary phenomena are quite abstract topics and difficult to observe in students' everyday life, which is why they are often illuminated with different sorts of visuals in geography textbooks. Consequently, these visuals have a great contribution to the processes of teaching and learning geographical issues. Geography textbooks have a wide range of visuals, such as maps, graphs, tables, photographs, and illustrations, which makes geography a highly visual school subject. In their research, Okan Yasar and Mehmet Seremet [21] (p. 166) suggest that photographs and drawings in geography textbooks can be classified under ten headings (Table 1). Alternatively, Tomáš Janko and Petr Knecht [22] (pp. 98–99) suggest that geography textbook visuals can be classified under the following categories: cartographic (e.g., maps), cartographical–statistic (e.g., cartograms), statistical–graphic (e.g., graphs), tabular (e.g., tables), pictorial (e.g., photographs and drawings), schematic (e.g., geographical cross-sections), others (e.g., logos and signs), and combined (e.g., pictorial series) visuals. However, neither of these classifications is utilized in the methodology of this article; instead, the classification of textbook visuals is motivated by Kellert's concept of direct, indirect, and symbolic experience of nature (see, Section 3).

Table 1. Classification of photographs and drawings in geography textbooks according to Yasar and Seremet [21] (pp. 166–169).

Picture Type	Definition
Decorative pictures	They aim at activating the imagination of the students and attracting their attention.
Text-complementary pictures	They are used to introduce a name, a concept, or a fact that is new to students.
Explanatory pictures	They are used to explain certain facts or concepts, carrying the same content with the related text.
Situational pictures	They are used at the introduction or summary stage, covering all the sub-steps of an issue or all the elements of a fact.
Concentration pictures	These are detailed pictures that aim at attracting students' attention to a particular issue. For instance, they are related to finding a different element among other elements or finding two similar elements.
Creative pictures	The best examples for this category include labyrinths, unmarked maps, and coloring pictures.
Animated pictures	These are a series of pictures that shows an event in sequences. They may make up a story by putting numbered pictures into order.
Before-after pictures	A before–after relationship exists between events, and so too does a cause-and-effect relationship. Sometimes it may be easier for students to solve a before-and-after relationship than a cause-and-effect relationship.
Problem pictures	These enable students to realize problems, rather than to solve them. Students need to realize the clear cause-and-effect relationship shown in the picture.
Criticism pictures	These can benefit students in gaining critical thinking skills. These types of pictures must include events that students can observe in their immediate environment.

As James Craine [23] argues, geographers should understand that representations are "produced and consumed in historically specific and carefully constructed ways, and many factors combine to frame how meaning and expression are generated". When it comes to making and choosing visual representations for geography textbooks, special attention and caution are required [24]. For instance, the content of illustrations should be adjusted to the age of the students. Photographs should, among others, provide useful information, support knowledge construction, and be visually appealing to students [25] (p. 9). According to Yasar and Seremet [21] (p. 165), each photograph in geography textbooks should reflect a separate and independent idea. To carry out an educational purpose, the main idea should be in the foreground of the photograph, and subsidiary and unimportant issues should be kept in the background. In addition, pictures in textbooks should be very clear and should not be blurred or erased. Pictures should reflect genuine points of view, and there should be no unnecessary details. Lastly, Yasar and Seremet [21] (p. 165) argue that photographs reflecting events in the environment should be natural because unreal and artificial photographs are not convincing.

When it comes to students' mental images of different regions of the world, landscape images in geography textbooks play a significant role [26] (pp. 45–47). There is a risk that stereotypical images in textbooks can lead to alternative conceptions. "For example, photographs of mountains with pointed peaks and deserts full of sand may lead students to believe falsely that all mountain and desert landscapes are like this" [27] (p. 195). Therefore, students should be presented with a variety of different images of one landform to reduce stereotyping. For instance, students can observe how the same natural and man-made scenes look in satellites images (aerial views) compared to photographs taken from the ground (terrestrial views), as the first mentioned type of images is probably novel to most viewers [28]. In addition, teachers should remind students that photographic images can be incorrectly interpreted [27] (p. 196). However, photographs do not only convey information, but can also evoke emotions. Robert Poole [29] has noted how the articles in the National Geographic Magazine consist of three elements: text, captions, and photographs. According

to Poole, the role of the plain text is to deliver the substance, while the photographs provide an emotional impact. In a Finnish study about news photographs, it was found that "emotions were regarded as proof for the authenticity of the photograph" [30] (p. 29).

Indeed, "geography textbooks are highly visual multimodal constructs with complex image-text structures" [25] (p. 16). These multimodal image–text combinations are considered "didactic dream couples" [31] (p. 45) because they complement each other in their cognitive and communicative functions [32]. Text relatedness means that the information in the text corresponds at least partly with the information comprised in the visuals and vice versa. A caption offers a link between the visual and the textual element in the textbook; it can direct the student's attention to crucial aspects of the visual, outline the context, and, as such, help to interpret and understand the content of the visual [22] (p. 97). However, is the educational potential of images fully acknowledged in geography education? According to Steffen-Peter Ballstaedt [31], the way in which students interact with images in educational media is still a marginal topic in educational research. Moreover, Peter Felten [33] (p. 60) states that "living in an image-rich world does not mean students naturally possess sophisticated visual literacy skills". For instance, Behnke [3,4] monitored students' eye movements with an eye tracking method while the students were observing German geography textbook spreads. The results show that the students looked at graphics rather superficially; that is, little attention was paid to the depicted photographs, and more attention was paid to the textual elements. Therefore, students' competencies in visual literacy should be mediated more intensely and practiced regularly [3,34]. This leads to the guiding question throughout this investigation: what sorts of visuals are there in geography textbooks if they do not attract students' attention?

3. Materials and Methods

In Finland, geography is an independent school subject in grades 7–9 [35] and in upper secondary school, in which there is one compulsory geography course entitled 'The World in Change' [8]. Consequently, the sample covers two textbooks for each grade, including the upper secondary school course. The textbooks are published by two major Finnish publishing houses, Otava and Sanoma Pro, whose geography textbooks are widely used in Finnish schools. Bibliographic information about the textbooks is presented in Table 2. In this research, the most recent versions of digital textbooks were used (i.e., the year of publication was not mentioned in the digital textbooks).

Table 2. Bibliographic information about the investigated geography textbooks [36–43].

Grade	Publisher	Title of the Textbook	Authors	Visuals Classified
Upper secondary school	Otava	Manner 1 Maailma muutoksessa The World in Change	Brander, N.; Hiekka, S.; Paarlahti, A.; Ruth, C.; Ruth, O. [36]	n = 99
Upper secondary school	Sanoma Pro	Geos 1 Maailma muutoksessa The World in Change	Cantell, H.; Jutila, H.; Kolehmainen, J.; Lappalainen, S.; Sorvali, M. [37]	n = 203
9	Otava	Maa Suomesta maailmalle From Finland to the World	Fabritius, H.; Jortikka, S.; Mäkinen, L.-L.; Nikkanen, T. [38]	n = 466
9	Sanoma Pro	Geoidi Ihmiset ja kulttuurit People and Cultures	Cantell, H.; Jutila, H.; Keskitalo, R.; Moilanen, J.; Petrelius, M.; Viipuri, M. [39]	n = 139
8	Otava	Maa Kotina maailma The World as Home	Fabritius, H.; Jortikka, S.; Mäkinen, L.-L.; Nikkanen, T. [40]	n = 230

Table 2. *Cont.*

Grade	Publisher	Title of the Textbook	Authors	Visuals Classified
8	Sanoma Pro	Geoidi Muuttuvat maisemat ja elinympäristöt Changing Landscapes and Environments	Cantell, H.; Jutila, H.; Keskitalo, R.; Moilanen, J.; Petrelius, M.; Viipuri, M. [41]	*n* = 151
7	Otava	Maa Elämän planeetta Planet of Life	Fabritius, H.; Jortikka, S.; Mäkinen, L.-L.; Nikkanen, T. [42]	*n* = 185
7	Sanoma Pro	Geoidi Elämän edellytykset Conditions of Life	Cantell, H.; Jutila, H.; Keskitalo, R.; Moilanen, J.; Petrelius, M.; Viipuri, M. [43]	*n* = 135

Altogether, 1608 visuals were included in the dataset. In order to determine which visuals to include in the dataset, the following rules were applied. If the visual had a title, a caption, or at least a reference to geolocative information (which was the case with textbooks published by Sanoma Pro), or if the visuals were marked with continuous numbering throughout the textbook (which was the case with textbooks published by Otava), they were included in the dataset. As the investigated textbooks were in a digital format, they included a few videos, as well, but they were excluded from the dataset. In addition, tasks and attachments were excluded from the dataset (e.g., tasks were separated from content sections in the digital textbooks published by Otava).

According to Gunther Kress and Theo van Leeuwen [44] (pp. 1–2), not much explicit and systematic attention has been paid to the meaning of regularities in the way image elements are combined, that is, the meaning of composition. Therefore, they have provided descriptions of compositional structures of images and analyzed how they are used in the active production of meaning in image-making and image interpretation. When it comes to dealing with large numbers of images, content analysis remains an important visual research method. Visual content analysis is based on rules and procedures that must be rigorously followed; these concern the selection, coding, and quantitative analysis of the images [2] (pp. 85–86).

This article looks for a reason why geography students might not necessarily pay much attention to textbook visuals. Consequently, visual content analysis is used as a means for researching how approachable textbook visuals are for geography students. In other words, the question is about how accessible the textbook visuals are, or how easy it is for the students to identify with them. Additionally, the question is about the extent of abstractness of the visuals; in brief, the more abstract the representation, the less approachable it might be. According to Janko and Knecht [22] (p. 96), "research into the extent of visuals' abstractness is rarely conducted within the area of textbook research".

But how is one to measure the approachability or the extent of abstractness of the textbook visuals? In this research, it was felt that utilizing the typologies by Yasar and Seremet [21] or Janko and Knecht [22], both presented in Section 2, would not succeed in answering the research question in the most fruitful way. Firstly, Yasar's and Seremet's classification (Table 1) only covers photographs and drawings, leaving maps, graphs, and tables, among others, outside the classification. Secondly, Janko and Knecht [22] (p. 99, p. 103) assess the abstractness of visuals by classifying textbook visuals either as realistic (e.g., photographs and drawings in which objects and phenomena are depicted as what they look similar to in reality), partially realistic (e.g., line drawings), or unrealistic (e.g., abstract visuals, such as graphs and schemes, depicting objects or phenomena by conventional means of specific graphic characters or systems of characters). However, they do not indicate how maps, among others, were classified according to the above-mentioned categories of abstractness. Thirdly, and most importantly, neither the classification by Yasar and Seremet, nor by Janko and Knecht, recognizes the role of snapshots.

For these reasons, the concept of direct, indirect, and symbolic experience of nature by Kellert was chosen as the framework for the classification of the textbook visuals. Kellert's continuum of nature experiences proceeds from experiences closest to the individual to mediated ones. In this research, direct experience is applied to the least abstract representations, whereas symbolic experience is applied to the most abstract representations. As an architect, Kellert interprets the built environment as an intersection between nature and culture. Kellert [9] (p. 64) underlines children's direct and spontaneous opportunities for experiencing nature in order for them not to become separated and estranged from the natural environment. Instead of direct experiences, children today encounter a wide range of images and symbols of the natural world [9] (p. 66). Next, the three types of nature experiences and their application to the visual content analysis is elaborated in more detail.

Kellert's direct experience refers to interaction with plants, animals, and habitats that function mostly independent of human input and control. Direct experience of nature is often spontaneous and unplanned, occurring in relatively unmanaged areas, such as a forest, but sometimes even a park or a backyard [9] (p. 65). Robert Pyle [45] (p. 319) describes these settings as places where children are "free to climb trees, muck about, catch things, and get wet". In other words, children's activity is not guided by an adult; instead, children's own experiences, emotions, and freedom to explore the environment are emphasized. The concept of direct experience of nature was applied to snapshots, in which the situation might change rapidly; that is, the photograph is taken somewhat spontaneously, and it would look different had it been taken a few moments earlier or later. Consequently, snapshots of people in action and snapshots of geographical hazards were classified to this category. In order to avoid confusion with Kellert's terminology, this category is named 'snapshot visuals'. Two examples of snapshot visuals are given in Figure 1.



Figure 1. Exemplary visuals classified as 'snapshot visuals' (Claudia Manzo/MVphotos and Omer Koclar/Shutterstock in 'Geos 1: Maailma muutoksessa' [37] (p. 24, p. 102) by the Finnish publishing house Sanoma Pro in 2023).

Indirect experience of nature, although involving actual contact, occurs in created and highly controlled environments that depend on ongoing human management and intervention. Indirect experience of nature is highly structured, organized, and planned; it may occur in settings such as zoos, parks, museums, and botanical gardens. In addition, indirect experience takes place in situations where an adult guides children's observation [9] (p. 65). The concept of indirect experience of nature was applied to textbook visuals that depicted landscapes and objects, in addition to people in a portrait-like manner. Basically, these visuals show that 'this is how it looks here' in the same way people go to the zoo to see what different species of animals appear to be. In order to avoid confusion with Kellert's terminology, this category is named 'landscape visuals'. Two examples of landscape visuals are given in Figure 2.

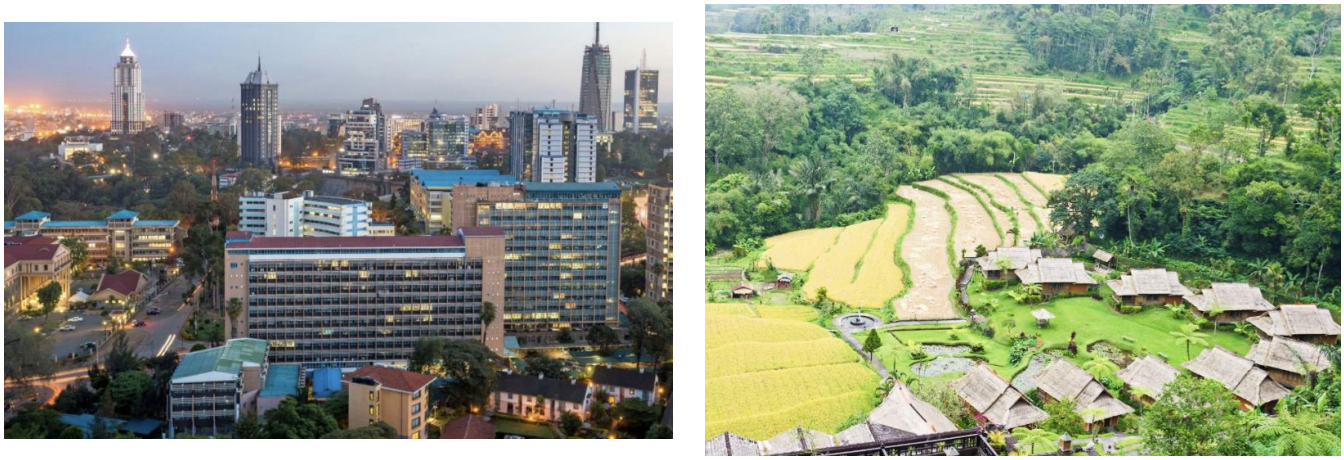


Figure 2. Exemplary visuals classified as 'landscape visuals' (Istock and Shutterstock in 'Geos 1: Maailma muutoksessa' [37] (p. 84, p. 99) by the Finnish publishing house Sanoma Pro in 2023).

Symbolic experience of nature does not involve contact with actual living organisms or environments but, rather, with their representations; that is, with books, films, comics, magazines, photographs, television, and other metaphorical expressions of nature. In other words, symbolic experience of nature means a mediated environmental experience [9] (p. 66). It is good to keep in mind that, according to Kellert's original classification, all the geography textbooks and their visuals have to do with symbolic experience. In this study, however, the concept of symbolic experience of nature was applied to textbook visuals that represent the world in the most abstract manner, furthest from students' everyday life experiences. These sorts of abstract visuals include all the maps, graphs (charts), and tables in the textbooks, in addition to illustrations (drawings) that demonstrate geographical processes. In order to avoid confusion with Kellert's terminology, this category is named 'abstract visuals'. Two examples of abstract visuals are given in Figure 3.

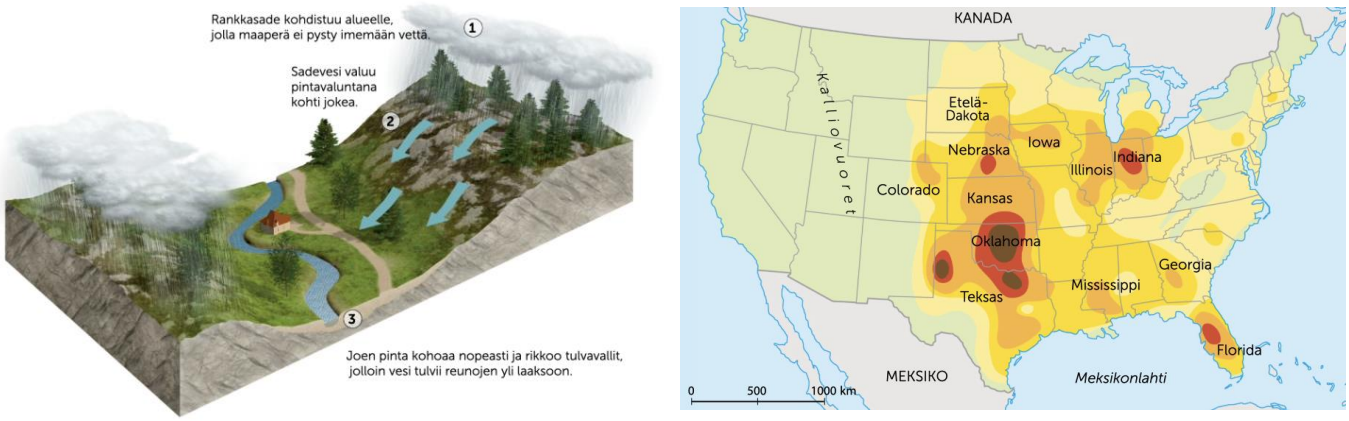


Figure 3. Exemplary visuals classified as 'abstract visuals' (Kauko Kyöstiö/Spatio Oy and Kalleheikki Kannisto/Rectoverso graafinen suunnittelu in 'Geos 1: Maailma muutoksessa' [37] (p. 60, p. 68) by the Finnish publishing house Sanoma Pro in 2023).

In summary, the coding scheme deriving from Kellert's concept of direct, indirect, and symbolic experience of nature is presented in Table 3. The visuals in a grade nine textbook by Otava, which had the most visuals in the dataset, were classified altogether three times in order for the classification to be clarified.

Table 3. Attributes for snapshots visuals, landscape visuals, and abstract visuals.

Snapshot Visuals	Landscape Visuals	Abstract Visuals
• Snapshots of people in action • Snapshots of geographical hazards	• Visuals depicting landscapes and objects • Visuals depicting people in a portrait-like manner	• Maps, graphs (charts), and tables • Illustrations (drawings) depicting geographical processes

4. Results

In Table 4, the results are presented in a visual manner, as suggested and demonstrated by Jari Eskola [46] (p. 193) and Essi Aarnio-Linnanvuori [47] (p. 145). In Table 4, the darker the color, the more visuals in the category; that is, light color marks the least and dark color the most visuals. For instance, in the upper secondary school textbook by Otava, the fewest images are classified as snapshot visuals, the second most images are classified as landscape visuals, and the most images are classified as abstract visuals. As seen in Table 4, all the investigated digital textbooks have the fewest images classified as snapshot visuals. In addition, in grades seven to nine textbooks, most of the images are classified as landscape visuals, whereas, in upper secondary school textbooks, most of the images are classified as abstract visuals. However, the number of landscape visuals and abstract visuals in the textbooks is quite the same.

Table 4. The number of snapshot visuals, landscape visuals, and abstract visuals in the investigated Finnish geography textbooks [36–43] presented in a visual manner; that is, the darker the color, the more visuals in the category.

Grade	Publisher	Snapshot Visuals	Landscape Visuals	Abstract Visuals
Upper secondary school	Otava [36]	15%	33%	52%
Upper secondary school	Sanoma Pro [37]	22%	37%	41%
9	Otava [38]	8%	57%	35%
9	Sanoma Pro [39]	25%	40%	35%
8	Otava [40]	22%	40%	38%
8	Sanoma Pro [41]	15%	46%	39%
7	Otava [42]	9%	53%	38%
7	Sanoma Pro [43]	16%	43%	41%

Tables 5–7 show the chapter titles and the number of snapshot visuals, landscape visuals, and abstract visuals in each chapter of the textbooks. In accordance with Tables 4–7 indicate that the investigated digital textbooks have the fewest images classified as snapshot visuals. However, textbooks published by Sanoma Pro have more snapshot visuals than Otava's textbooks. Although one could think that Finnish landscapes are somewhat familiar to Finnish students, then geography of Finland is presented, namely, with the help of photographs, not with abstract visuals (e.g., in a grade nine textbook by Otava). On the other hand, when geographers' work (e.g., in grades seven, eight, and nine and upper secondary school course textbooks by Otava) and the concept of geomedia (e.g., in the upper secondary school course textbook by Sanoma Pro) are presented, it is performed specifically with the help of maps and tables, not with photographs or landscape visuals. For eighth graders, though, Sanoma Pro uses photographs in describing how geomedia can be produced.

Table 5. The number of observations of snapshot visuals in the investigated Finnish geography textbooks [36–43]. Light color marks chapters with the least and dark color the most snapshot visuals within one textbook.

		Grade								Publisher				Chapter Titles and Number of Snapshot Visuals in Each Chapter					
Upper secondary school	Otava [36]	What is geography? $n = 0$	Location matters $n = 0$	Changing climate $n = 0$	Climate change as a challenge $n = 1$	Deserti-fication and drought $n = 3$	Storms and extreme weather events $n = 2$	Floods $n = 2$	Population growth $n = 3$	Clean water and food production $n = 1$	Wealth, poverty, and well-being $n = 0$	Refugeedom and migration $n = 2$	Sustainable develop-ment and Agenda 2023 $n = 1$						
Upper secondary school	Sanoma Pro [37]	Geography as a discipline $n = 2$	Geomedia $n = 2$	Causes and mechanisms of climate change $n = 1$	Conse-quences of climate change $n = 3$	Mitigation of climate change and adaptation to climate change $n = 3$	Storms $n = 6$	Floods $n = 4$	Drought, lack of clean water, and hunger $n = 4$	Wealth and poverty = 9	Refugee-dom $n = 5$	Sustainable develop-ment commit-ments $n = 2$	Responsible consump-tion $n = 3$						
9	Otava [38]	Mapped Finland $n = 0$	Finland of stable bedrock $n = 4$	Eroded Finland $n = 1$	Finland after the Ice Age $n = 0$	Finland of thousand lakes $n = 2$	Finland of the seasons $n = 5$	Forests in Finland $n = 1$	Inhabited Finland $n = 2$	Multicultural Finland $n = 6$	Energy-using Finland $n = 3$	Business Finland $n = 4$	Sustainable develop-ment in Finland $n = 5$	Regional planning in Finland $n = 0$	International Finland $n = 4$	Regional researcher's Finland $n = 0$			
9	Sanoma Pro [39]	Earth is humans' home $n = 2$	The world's population is increasing $n = 1$	People have different cultures $n = 0$	Wealth and poverty on Earth $n = 3$	Human rights belong to everyone $n = 3$	People move near and far $n = 4$	Cities are growing $n = 3$	Livelihoods are changing $n = 1$	Traffic increases $n = 2$	Borders shift and change $n = 1$	Regional conflicts $n = 5$	Regional planning aims at the future $n = 1$	A sustainable lifestyle takes the environment into account $n = 4$	Bioeconomy is a sustainable economy $n = 1$	The Baltic Sea is protected together $n = 3$			
8	Otava [40]	Future world $n = 3$	World of growing population $n = 6$	Multicultural world $n = 10$	World of natural resources $n = 5$	World of agriculture $n = 8$	World of work $n = 4$	World of the poor and the rich $n = 7$	World of consumers $n = 7$	World of research $n = 2$									
8	Sanoma Pro [41]	Geomedia is regional information $n = 4$	Topographic map is accurate and versatile $n = 0$	Man and nature are changing landscapes $n = 0$	Different landscape regions in Finland $n = 2$	Urban and rural landscapes are changing $n = 0$	How to take part in one's own region? $n = 2$	Ice Ages and warm periods on Earth $n = 1$	Traces of the Ice Age can be seen in the landscape $n = 1$	The Ice Age still affects human life $n = 1$	Mountains in different parts of the world $n = 3$	Coasts are densely populated $n = 2$	Use of the arctic region's natural resources will accelerate in the near future $n = 0$	Temperate zone has rich industri-alized countries $n = 0$	Mediterranean region is a popular tourist destination $n = 1$	Deserts are sparsely populated $n = 0$	Rice is cultivated in monsoon regions $n = 3$	Human activity threatens rainforests $n = 3$	
7	Otava [42]	Earth as a research object $n = 0$	'Spaceship' Earth $n = 1$	Blue Earth $n = 3$	Earth of a changing climate $n = 1$	Earth of forests and deserts $n = 0$	Rock planet Earth $n = 2$	Inhabited Earth $n = 4$	Man-made Earth $n = 3$	Geographer's Earth $n = 2$									
7	Sanoma Pro [43]	Geographic informa-tion is everywhere $n = 1$	The map depicts the globe $n = 2$	Coordinates tell the location $n = 0$	There is life on Earth $n = 1$	Earth moves in the space $n = 1$	Climates and weather conditions vary across the globe $n = 1$	Climate change affects the future $n = 1$	Human activities affect air quality $n = 1$	Water circulates on Earth $n = 4$	The oceans are shared $n = 0$	Clean water is essential $n = 2$	Earth has a rocky crust $n = 1$	Advantages and disad-vantages of mining $n = 1$	Natural resources are consumed too much $n = 2$	Food plants are grown in different vegetation regions $n = 1$	Many sorts of meat are eaten in the world $n = 1$	Food is unevenly distributed on Earth $n = 2$	

Table 6. The number of observations of landscape visuals in the investigated Finnish geography textbooks [36–43]. Light color marks chapters with the least and dark color the most landscape visuals within one textbook.

Grade	Publisher	Chapter Titles and Number of Landscape Visuals in Each Chapter																		
Upper secondary school	Otava [36]	What is geography? $n = 4$	Location matters $n = 2$	Changing climate $n = 3$	Climate change as a challenge $n = 2$	Deserti-fication and drought $n = 4$	Storms and extreme weather events $n = 1$	Floods $n = 4$	Population growth $n = 3$	Clean water and food production $n = 4$	Wealth, poverty, and well-being $n = 2$	Refugeedom and migration $n = 3$	Sustainable develop-ment and Agenda 2023 $n = 1$							
Upper secondary school	Sanoma Pro [37]	Geography as a discipline $n = 6$	Geomedia $n = 3$	Causes and mechanisms of climate change $n = 2$	Conse-quences of climate change $n = 3$	Mitigation of climate change and adaptation to climate change $n = 7$	Storms $n = 8$	Floods $n = 7$	Drought, lack of clean water, and hunger $n = 16$	Wealth and poverty $n = 9$	Refugee-dom $n = 4$	Sustainable develop-ment commit-ments $n = 4$	Responsible consump-tion $n = 6$							
9	Otava [38]	Mapped Finland $n = 14$	Finland of stable bedrock $n = 29$	Eroded Finland $n = 25$	Finland after the Ice Age $n = 14$	Finland of thousand lakes $n = 16$	Finland of the seasons $n = 19$	Forests in Finland $n = 36$	Inhabited Finland $n = 19$	Multicultural Finland $n = 19$	Energy-using Finland $n = 13$	Business Finland $n = 19$	Sustainable develop-ment in Finland $n = 5$	Regional planning in Finland $n = 17$	International Finland $n = 18$	Regional researcher's Finland $n = 4$				
9	Sanoma Pro [39]	Earth is humans' home $n = 4$	The world's population is increasing $n = 0$	People have different cultures $n = 13$	Wealth and poverty on Earth $n = 4$	Human rights belong to everyone $n = 2$	People move near and far $n = 1$	Cities are growing $n = 1$	Livelihoods are changing $n = 2$	Traffic increases $n = 2$	Borders shift and change $n = 6$	Regional conflicts $n = 2$	Regional planning aims at the future $n = 8$	A sustainable lifestyle takes the environment into account $n = 3$	Bioeconomy is a sustainable economy $n = 4$	The Baltic Sea is protected together $n = 4$				
8	Otava [40]	Future world $n = 7$	World of growing population $n = 8$	Multicultural world $n = 11$	World of natural resources $n = 15$	World of agriculture $n = 17$	World of work $n = 12$	World of the poor and the rich $n = 6$	World of consumers $n = 13$	World of research $n = 2$										
8	Sanoma Pro [41]	Geomedia is regional information $n = 3$	Topographic map is accurate and versatile $n = 1$	Man and nature are changing landscapes $n = 10$	Different landscape regions in Finland $n = 6$	Urban and rural landscapes are changing $n = 2$	How to take part in one's own region? $n = 2$	Ice Ages and warm periods on Earth $n = 2$	Traces of the Ice Age can be seen in the landscape $n = 4$	The Ice Age still affects human life $n = 3$	Mountains in different parts of the world $n = 3$	Coasts are densely populated $n = 5$	Use of the arctic region's natural resources will accelerate in the near future $n = 3$	Temperate zone has rich industri-alized countries $n = 11$	Mediterranean region is a popular tourist destination $n = 3$	Deserts are sparsely populated $n = 4$	Rice is cultivated in monsoon regions $n = 3$	Human activity threatens rainforests $n = 4$		
7	Otava [42]	Earth as a research object $n = 9$	'Spaceship' Earth $n = 5$	Blue Earth $n = 7$	Earth of a changing climate $n = 6$	Earth of forests and deserts $n = 22$	Rock planet Earth $n = 11$	Inhabited Earth $n = 13$	Man-made Earth $n = 21$	Geographer's Earth $n = 4$										
7	Sanoma Pro [43]	Geographic information is every-where $n = 5$	The map depicts the globe $n = 2$	Coordinates tell the location $n = 4$	There is life on Earth $n = 7$	Earth moves in the space $n = 1$	Climates and weather conditions vary across the globe $n = 0$	Climate change affects the future $n = 7$	Human activities affect air quality $n = 2$	Water circulates on Earth $n = 2$	The oceans are shared $n = 3$	Clean water is essential $n = 2$	Earth has a rocky crust $n = 2$	Advantages and disad-vantages of mining $n = 5$	Natural resources are consumed too much $n = 8$	Food plants are grown in different vegetation regions $n = 1$	Many sorts of meat are eaten in the world $n = 4$	Food is unevenly distributed on Earth $n = 3$		

Table 7. The number of observations of abstract visuals in the investigated Finnish geography textbooks [36–43]. Light color marks chapters with the least and dark color the most abstract visuals within one textbook.

Grade	Publisher	Chapter Titles and Number of Abstract Visuals in Each Chapter																
Upper secondary school	Otava [36]	What is geography? *n* = 6	Location matters *n* = 6	Changing climate *n* = 6	Climate change as a challenge *n* = 4	Deserti-fication and drought *n* = 3	Storms and extreme weather events *n* = 5	Floods *n* = 2	Population growth *n* = 4	Clean water and food production *n* = 4	Wealth, poverty, and well-being *n* = 4	Refugeedom and migration *n* = 2	Sustainable development and Agenda 2023 *n* = 5					
Upper secondary school	Sanoma Pro [37]	Geography as a discipline *n* = 2	Geomedia *n* = 12	Causes and mechanisms of climate change *n* = 1	Consequences of climate change *n* = 8	Mitigation of climate change and adaptation to climate change *n* = 3	Storms *n* = 10	Floods *n* = 7	Drought, lack of clean water, and hunger *n* = 9	Wealth and poverty *n* = 11	Refugee-dom *n* = 2	Sustainable developmen commitments *n* = 4	Responsible consumption *n* = 3					
9	Otava [38]	Mapped Finland *n* = 16	Finland of stable bedrock *n* = 8	Eroded Finland *n* = 7	Finland after the Ice Age *n* = 9	Finland of thousand lakes *n* = 7	Finland of the seasons *n* = 10	Forests in Finland *n* = 15	Inhabited Finland *n* = 10	Multicultural Finland *n* = 7	Energy-using Finland *n* = 10	Business Finland *n* = 14	Sustainable development in Finland *n* = 7	Regional planning in Finland *n* = 7	International Finland *n* = 9	Regional researcher's Finland *n* = 26		
9	Sanoma Pro [39]	Earth is humans' home *n* = 6	The world's population is increasing *n* = 6	People have different cultures *n* = 4	Wealth and poverty on Earth *n* = 3	Human rights belong to everyone *n* = 2	People move near and far *n* = 1	Cities are growing *n* = 2	Livelihoods are changing *n* = 6	Traffic increases *n* = 2	Borders shift and change *n* = 5	Regional conflicts *n* = 1	Regional planning aims at the future *n* = 6	A sustainable lifestyle takes the environment into account *n* = 1	Bioeconomy is a sustainable economy *n* = 2	The Baltic Sea is protected together *n* = 2		
8	Otava [40]	Future world *n* = 3	World of growing population *n* = 16	Multicultural world *n* = 3	World of natural resources *n* = 8	World of agriculture *n* = 8	World of work *n* = 10	World of the poor and the rich *n* = 11	World of consumers *n* = 9	World of research *n* = 19								
8	Sanoma Pro [41]	Geomedia is regional information *n* = 2	Topographic map is accurate and versatile *n* = 5	Man and nature are changing landscapes *n* = 0	Different landscape regions in Finland *n* = 7	Urban and rural landscapes are changing *n* = 2	How to take part in one's own region? *n* = 1	Ice Ages and warm periods on Earth *n* = 2	Traces of the Ice Age can be seen in the landscape *n* = 6	The Ice Age still affects human life *n* = 4	Mountains in different parts of the world *n* = 3	Coasts are densely populated *n* = 3	Use of the arctic region's natural resources will accelerate in the near future *n* = 4	Temperate zone has rich industrialized countries *n* = 4	Mediterranean region is a popular tourist destination *n* = 3	Deserts are sparsely populated *n* = 4	Rice is cultivated in monsoon regions *n* = 5	Human activity threatens rainforests *n* = 4
7	Otava [42]	Earth as a research object *n* = 12	'Spaceship' Earth *n* = 9	Blue Earth *n* = 11	Earth of a changing climate *n* = 12	Earth of forests and deserts *n* = 6	Rock planet Earth *n* = 7	Inhabited Earth *n* = 6	Man-made Earth *n* = 4	Geographer's Earth *n* = 4								
7	Sanoma Pro [43]	Geographic information is everywhere *n* = 2	The map depicts the globe *n* = 4	Coordinates tell the location *n* = 7	There is life on Earth *n* = 2	Earth moves in the space *n* = 4	Climates and weather conditions vary across the globe *n* = 8	Climate change affects the future *n* = 3	Human activities affect air quality *n* = 3	Water circulates on Earth *n* = 3	The oceans are shared *n* = 3	Clean water is essential *n* = 6	Earth has a rocky crust *n* = 4	Advantages and disadvantages of mining *n* = 2	Natural resources are consumed too much *n* = 0	Food plants are grown in different vegetation regions *n* = 3	Many sorts of meat are eaten in the world *n* = 0	Food is unevenly distributed on Earth *n* = 1

5. Discussion

In her article, Verónica Hollman [48] (p. 144) invites readers "to rethink what visual literacy means in the education of future geographers". She argues that "visual training should experience a shift from a technical to a critical and interpretative approach oriented to the acquisition of knowledge and methodologies to place images in relation to practices of looking, geographical knowledge, and power" [48] (p. 144). This article, in turn, is an invitation to rethink the role of textbook visuals in geography education. Because, how are we to achieve what Hollman describes, when, for instance, Behnke [3,4] argues that students do not necessarily pay attention to geography textbook visuals? After all, printed and digital textbooks are still a valuable teaching resource in geography education.

Thus, the guiding questions throughout this article have been: what sorts of visuals are there in geography textbooks if the premise is that students do not pay much attention to them, and how approachable are geography textbook visuals for students? An attempt was made to classify textbook visuals according to Kellert's [9] concept of direct, indirect, and symbolic experience of nature. The textbook visuals were classified into three categories, respectively: snapshot visuals (deriving from direct experience), landscape visuals (deriving from indirect experience), and abstract visuals (deriving from symbolic experience).

It was evident that most of the textbook visuals in this investigation were classified as landscape visuals, depicting landscapes and objects, in addition to people in a portrait-like manner. Traditionally, in geography education, students are introduced to the world's regions, its peoples and cultures, and physical and environmental systems with the help of textbooks and their photographs [18] (p. 142). In addition to landscape visuals, many visuals were classified as abstract visuals; that is, the textbooks had many maps, graphs (charts), and tables, in addition to illustrations (drawings) that demonstrate geographical processes. These sorts of visuals depict geographical phenomena in the most abstract manner, furthest from the students' everyday life experiences. There is nothing wrong with the result that landscape visuals and abstract visuals dominated geography textbook visuals, but it can be difficult for students to identify with these sorts of visuals. In addition, they can be challenging for students to interpret, especially the most abstract ones. Therefore, it is suggested that one reason why students might not pay much attention to geography textbook visuals is their abstract nature. Instead, visuals should be easily accessible, helpful, and useful for students [11] (p. 175). This is opposite to Janko's and Knecht's [22] (p. 106) suggestion, as they write that "geography textbooks should include more abstract types of visuals".

According to Yasar and Seremet [21] (p. 183), the primary purpose of photographs and drawings in geography textbooks has been to explain and complement the textual elements. In their research on Turkish geography textbooks, there were only a few photographs and drawings "which would enable students to express their own feelings and thoughts" and improve their skills in problem solving [21] (p. 183). To some extent, this applies to the Finnish matriculation examination, as well, because there have only been a few geography assignments that utilize students' personal experiences, viewpoints, and value bases [49]—even though they are stressed in the Finnish National Core Curriculum for General Upper Secondary Education [8]. The question is: do abstract textbook visuals give space for students to express their own feelings and thoughts and utilize their experiences, viewpoints, and value bases?

In the investigated Finnish geography textbooks, there were a few visuals that can be related to Kellert's concept of direct experience of nature; that is, snapshots depicting people in action and snapshots of geographical hazards. Therefore, it is suggested that (1) the role of snapshot visuals in geography education is discussed and (2) considered whether the role of snapshots visuals in geography education should be strengthened. This does not, however, mean that textbook visuals should be purely decorative [11] (p. 175). Instead, the role of snapshot visuals could be strengthened by, for instance, using alternative visual catalogues, such as images in children's literature [50] or photographs taken by the teachers and students themselves, in geography education. For instance, in research conducted by

Elina Särkelä [51], Finnish students were asked to photograph their everyday lives in the Global North and write about their assumptions about young people's lives in the Global South. In the task, students were to reflect on their assumptions concerning the Global South using the photographs they had taken, as well as to assess whether the photographs supported their assumptions. To some extent, these sorts of alternative visual catalogues could motivate students to pay attention to textbook visuals, as well. In addition, it is good practice to discuss the textbook visuals together with the students; for instance, what sorts of first impressions do students obtain from the images and what sorts of thoughts do the images evoke in them? According to Gillian Rose [52] (p. 287), the questions asked should always aim at broadening the discussion into a debate about the geographical meanings of the visuals.

As stated in Section 2, photographs can also evoke emotions. This is in line with Kellert's concept of direct experience of nature. However, it was also the most difficult category to operationalize in the context of textbook visuals. That is, how does one define visuals that evoke emotions and give space for students' thoughts? At the same time, this category is seen of importance in this study because snapshot visuals can draw students' attention and allow teachers to start from students' thoughts and experiences, rather than relying on high theory from the very beginning [53] (p. 280). In addition, snapshot visuals can take on multiple interpretations. Consequently, when students are arguing for their own interpretations, their skills in visual literacy and geographical thinking are improved.

The visual content analysis presented in this article can appear simple compared to the categorizations by Yasar and Seremet [21] and Janko and Knecht [22]—or, for instance, to Daibao Guo, Katherine Wright, and Erin McTigue [54], who have used nine major types and 54 subtypes of textbook visuals in their content analysis. However, the simplicity can also be taken as a strength of the method; that is, the three categories introduced in this article are a workable and manageable rubric for the analysis of a large number of images [50] (pp. 120–121). With this method, one can relatively easily obtain an overview of how approachable textbook visuals are. This can help, for instance, geography educators in assessing the extent of instruction needed in order for the students to take advantage of the textbook visuals in the best possible manner.

The three categories are somewhat distinctive, as well, which helps to encode the textbook visuals; it was more challenging to determine what to consider an independent image, as the textbooks were very rich in terms of visuality. Having said that, the difference between snapshot visuals and landscape visuals was not always that easy to observe when it comes to photographs depicting people; that is, what sort of action or extent of spontaneity is enough for a visual to be classified as a snapshot? Thus, it can be considered whether the attributes for snapshot visuals should be refined in future work. In addition, visuals depicting people in a portrait-like manner could be renamed other than landscape visuals, as was performed in this article. From an ethical point of view, one could also question the authors' decision to include stereotypical photographs (headshots) depicting people from different cultures in the textbooks. Furthermore, the use of subtypes could make the typology more sophisticated. However, the objective of this research was not to find out how many, for instance, maps there are in the textbooks, but to compare the total number of abstract visuals (including maps) to other types of visuals defined as landscape visuals and snapshot visuals in this particular study. As an environment–human discipline, geography needs a textbook typology that accounts for a range of visual stimuli that exist in people–place interactions.

One of the weaknesses of visual content analysis, according to Rose [2] (p. 88), is that it focusses almost exclusively on the composition of the images and does not show interest in the audiences, in this case, the geography students. In order to better understand the role of snapshot visuals in geography education, research in which students can take part and evaluate textbook visuals would be welcome. Future research could, for instance, utilize qualitative research methods, such as photo-elicited interviews, during which the students could express their thoughts about the approachability of textbook visuals.

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