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*Short Communication: Geographic Insight in Brief*

# GeoTAITO: A Framework for Students' Geomedia Skills and Proficiency Levels

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**Abstract:** Young people encounter geographically framed information through maps, GIS, geospatial data, images, statistics, and location-based services while navigating misinformation. GeoTAITO (Geo + Finnish taito, 'skill' or 'know-how') is a conceptual framework that structures ten geomedia skill areas and three proficiency levels across primary, lower secondary, and upper secondary education. It focuses on geomedia skills as one dimension of broader geomedia competence, alongside critical geomedia literacy. Based on conceptual synthesis and teacher-informed empirical refinement, the model supports curriculum interpretation, instructional planning, and assessment while highlighting students' higher-order analytical and critical geomedia skills.

**Keywords:** Critical geomedia literacy; Curriculum interpretation; Geography education; Geomedia; Geomedia skills; Geomedia skill framework

**Highlights:**

- GeoTAITO model clarifies what geomedia skills mean at different school levels
- GeoTAITO specifies 10 geomedia skill areas and three proficiency levels
- The model includes analysis, evaluation, and participation as core higher-order geomedia skills

## 1. Introduction

Young people grow up in an increasingly dense and fast-moving information environment in which places, events, and risks are communicated instantly across multiple media. In everyday life, they continuously encounter diverse forms of geomedia conveying geographically framed information (Muukkonen et al., 2022; Muukkonen, 2026). As the availability of geospatial data and mobile applications expands, and as misleading or false information circulates alongside reliable sources, education needs to support students in developing robust geomedia skills to access, interpret, analyse, and critically evaluate geographically referenced information (Ash et al., 2018; Puttick, 2020; Muukkonen et al., 2022; Pellikka et al., 2024).

In geography education, the concept of *geomedia* has been used to describe media through which geographical information can be collected, stored, processed, and visualised, including information that is tied to place or location (Vogler & Hennig, 2013; Jekel et al., 2014; Muukkonen et al., 2022; Hynynen et al., 2023). In this study, we conceptualise geomedia competence as an overarching construct that includes both concrete geomedia skills and broader forms of geomedia literacy. Following Hynynen et al. (2022; 2023), skills refer to operational abilities such as interpreting, analysing, and producing geomedia, whereas geomedia literacy emphasises the capacity to critically engage with geographically mediated information. The GeoTAITO model focuses specifically on the structuring and progression of these geomedia skills as one core dimension of geomedia competence. In this framework, geomedia competence is understood as a composite construct in which concrete geomedia skills and critical geomedia literacy form complementary, partly

overlapping dimensions. Geomedia can also be approached more broadly as media that communicate geographical and regional phenomena, even when an explicit georeference is not foregrounded (Hilander, 2017; 2024). For example, a news photograph of coastal flooding, a social media post about an urban heatwave, or a documentary image of land-use change can function as geomedia when interpreted in relation to geographical processes, even if coordinates or map-based references are not explicitly provided. In this broader sense, geomedia includes, for example, maps and digital map services, statistics and diagrams, geospatial datasets, photographs, news, oral presentations, and social media posts that convey geographical information (Fast et al., 2017; Hilander, 2017, 2024; Lapenta, 2011; Muukkonen et al., 2022; Vogler & Hennig, 2013). While GIS and other geospatial technologies form an important subset of geomedia, the concept of geomedia is analytically broader as it also encompasses non-technical and multimodal representations of geographically referenced information and should therefore not be equated directly with GIS competence or geospatial literacy, although both are important related domains.

Geomedia is also a central element of contemporary geography curricula. For example, in the Finnish National Core Curriculum for Basic Education, students are expected to practise "map-use and other geomedia skills" in primary school and to develop everyday geomedia skills as well as to read, interpret, and produce maps and other models of geographical phenomena in lower secondary school (Finnish National Agency for Education, 2014, pp. 241 and 385). In upper secondary education, the goals are described in more detail and include skills to use geomedia in versatile ways for information acquisition, evaluation, and communication (Finnish National Agency for Education, 2019, p. 244). However, curriculum texts do not specify sufficiently what kinds of geomedia skills are expected at different school levels or what constitutes adequate proficiency, which teachers have found confusing (Hynynen et al., 2022; Pellikka et al., 2024). Recently, the goals have been clarified in assessment criteria for basic education (Finnish National Agency for Education, 2020) and later also for Grade 6 environmental studies (Finnish National Agency for Education, 2023). From the perspective of learning goals, it is therefore important to define systematically what skills and what kinds of proficiency are actually expected at different grade levels. To respond to this need, Lammi et al. (2026) developed the GeoTAITO model. This short communication presents the GeoTAITO model, originally published in Finnish. This short communication presents the model for an international readership.

The name *GeoTAITO* combines *Geo* (geography or geospatial) with the Finnish word *taito*, meaning 'skill' or 'know-how'. The noun *taito* is derived from the verb *taitaa* ('to know how to; to be able to; to master'). For English-speaking readers, *GeoTAITO* can be pronounced approximately as "GEO-tie-toh" (Finnish stress on the first syllable of each part). In the International Phonetic Alphabet (IPA), a close approximation is /ˈge.o ˈtɑi̯.to/.

## 2. How we developed the GeoTAITO model

GeoTAITO is a literature-informed framework, refined through teacher input, for structuring geomedia skills. As described by Lammi et al. (2026), the model was constructed as a conceptual synthesis of (1) the GI Learner framework and its progression of geomedia-related competences, used here as one basis for specifying concrete geomedia skills (Zwartjes et al., 2017), (2) the main phases of geomedia work (collecting/producing or adopting data, processing, analysing, and presenting) discussed in geography education research (Hynynen et al., 2023; see also National Research Council, 2006), (3) curriculum expectations for geomedia use in Finnish primary, lower secondary, and upper secondary education (Finnish National Agency for Education, 2014, 2019), and (4) the revised Bloom's taxonomy as a lens for describing cognitive progression (Anderson & Krathwohl, 2001). Following this synthesis, the GeoTAITO model was empirically refined through the teacher interview dataset reported in Lammi et al. (2026), in which geography teachers (n = 20) evaluated the relevance, completeness, and expected proficiency levels of the proposed geomedia skills; the resulting teacher feedback and interpretations were used to refine the final model and its three proficiency levels (elementary, intermediate, advanced). An overview of the GeoTAITO model is provided in Figure 1, and the proficiency-level descriptors for each skill are summarised in Table 1.

The empirical component of the model development draws on a qualitative interview dataset with Finnish geography teachers that has been analysed in detail in previous studies (Hynynen et al., 2022; Pellikka et al., 2024; Lammi et al., 2026). The data consist of semi-structured interviews with teachers from primary, lower secondary, and upper secondary education, conducted using a thematic interview protocol focusing on geomedia, geomedia teaching, and students' geomedia-related skills and broader competence. Participants were recruited through professional networks and open invitations, and the data collection continued until thematic saturation was reached. The interviews were con-

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ducted remotely and transcribed for analysis. The analysis followed qualitative thematic and content-analytical approaches, in which teachers' evaluations of the proposed skill areas and proficiency levels were used to assess the relevance, completeness, and internal coherence of the model. The analysis combined theory-informed and inductive coding: the initial coding was guided by geomedia skill areas and curriculum-related themes, while additional categories were refined from teachers' accounts. Interpretations were discussed among the author team, and further methodological details are reported in Lammi et al. (2026). The teachers were asked to evaluate both the overall structure of the model and specific skill areas and proficiency-level descriptions. Teacher agreement with the descriptors is therefore treated as evidence of pedagogical relevance and coherence, not as evidence that the levels empirically describe students' actual developmental trajectories.

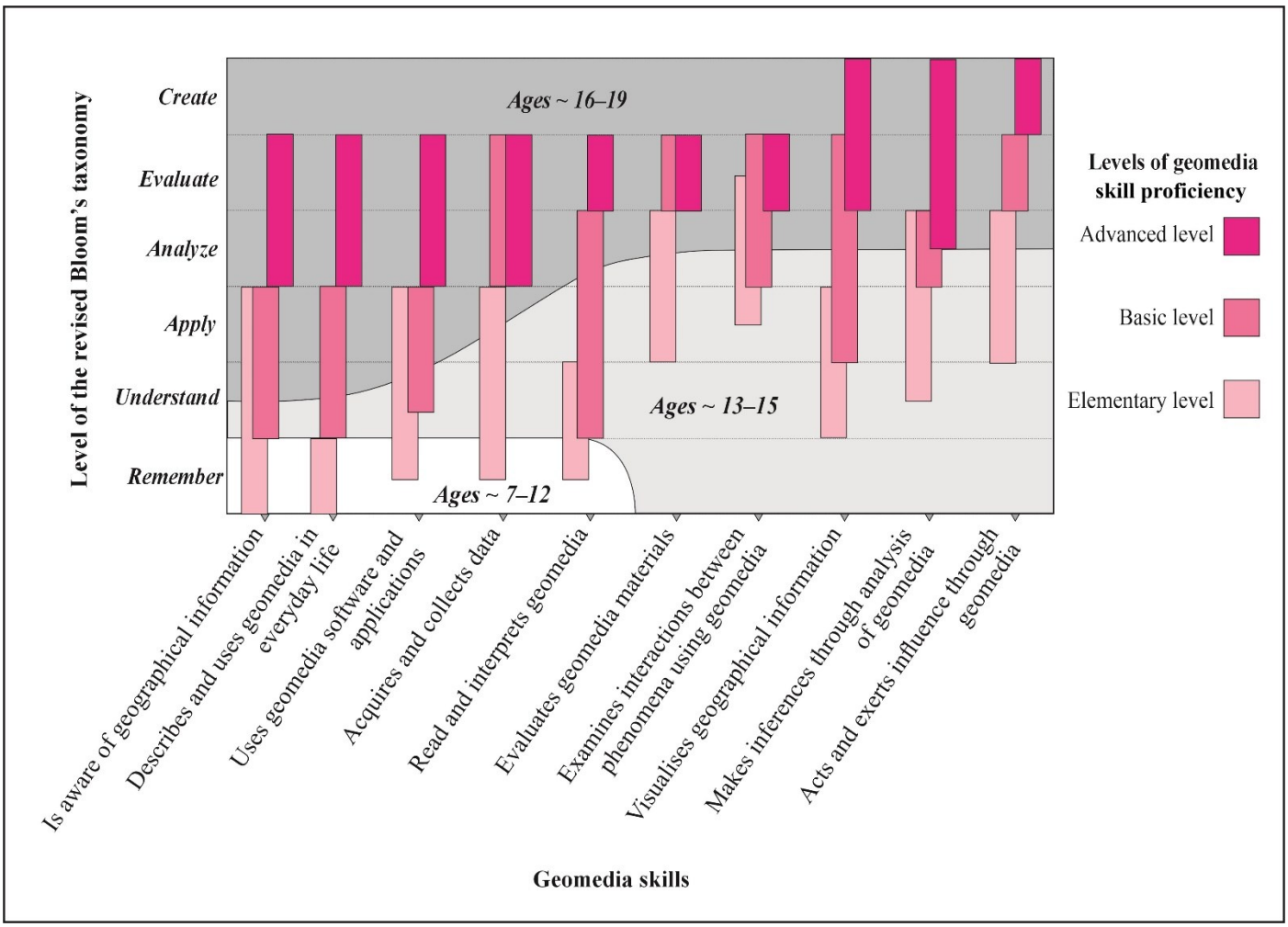


**Figure 1.** The GeoTAITO model: a conceptual model of the progressive development and deepening of young people's geomedia skills across primary, lower secondary, and upper secondary education. The vertical bars represent proficiency levels (elementary, intermediate, advanced) for each skill. The x-axis lists geomedia skills together with geographical content knowledge and geographical thinking; the y-axis depicts conceptual deepening of skills, with the revised Bloom's taxonomy used as a heuristic reference (Anderson & Krathwohl, 2001). Adapted from Lammi et al. (2026, Figure 1).

The revised Bloom's taxonomy (Anderson & Krathwohl, 2001) is used here as a heuristic for describing increasing cognitive complexity, not as a rigid or linear developmental sequence. In practice, students may produce geomedia before they can critically evaluate it, or create a simple digital map before they can assess the reliability of the underlying data. Figure 1 should therefore be read as a conceptual overview of possible deepening across skill areas, while Table 1 provides more concrete descriptors that can support curriculum interpretation, instructional planning, and formative

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**Table 1.** Descriptions of the elementary, intermediate, and advanced proficiency levels for the geomedia skills included in the GeoTAITO model (Lammi et al., 2026, Table 1). The progressive development of these geomedia skills across educational levels is illustrated in Figure 1 using the same level-specific colours.

| Geomedia skill | Elementary level | Intermediate level | Advanced level |
|---|---|---|---|
| **Is aware of geographical information** | Identifies geographical information and distinguishes it from non-geographical information. | Can use and apply geographical information. | Recognises that geographical information can be represented in different ways and can critically evaluate their suitability for different purposes. |
| **Describes and uses geomedia in everyday life** | Knows a few common forms of geomedia used in everyday life. | Can use geomedia in everyday situations. | Can evaluate how geomedia can be used in different functions of society. |
| **Uses geomedia software and applications** | Can carry out simple tasks using geomedia software and applications. | Can use multiple forms of geomedia in different geomedia software environments. | Can solve problems by using diverse geomedia software and applications. |
| **Acquires and collects data** | Can acquire and collect simple geomedia data from the field or from ready-made sources, such as statistics. | Can choose a suitable dataset, data type, and data collection method. | Can solve challenges related to data acquisition/collection or combine missing data from alternative sources. |
| **Reads and interprets geomedia** | Can read conventional maps and a few other common visualisations. | Can interpret diverse types of geomedia. | Can interpret various geomedia materials in depth and draw conclusions from them. |
| **Evaluates geomedia materials** | Is aware that data are produced in different ways and that quality varies. | Understands and can demonstrate that datasets vary in quality. | Can critically evaluate data quality, reliability, and suitability for different uses. |
| **Examines interactions between phenomena using geomedia** | Is aware that things and phenomena can be related and influence each other. | Can identify and demonstrate interactions between (geographical) phenomena using geomedia. | Can evaluate and reflect on causal and interaction relationships (and their strength) between (geographical) phenomena using geomedia. |
| **Visualises geographical information** | Recognises geomedia visualisation methods and presents simple geographical information. | Can visualise geomedia in multiple ways and choose an appropriate mode of presentation. | Can critically evaluate their own visualisations and the information they convey. |
| **Makes inferences through analysis of geomedia** | Understands the results of geomedia-based analysis. | Can combine and structure analysis results. | Finds new connections in analysis results, can evaluate analytical reliability, and can contextualise results within broader wholes. |
| **Acts and participates using geomedia** | Knows and recognises a few ways of influencing through geomedia. | Can compare different ways of influencing through geomedia and their effectiveness. | Can plan and implement influence/participation actions using geomedia. |

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assessment. As an illustrative reading of Figure 1, a younger student may first recognise everyday geographical information and read simple maps, while later instruction may support the use of multiple geomedia sources, comparison of data quality, and eventually more independent analysis, evaluation, and participation. This example should be read as an illustration of increasing complexity rather than as a fixed pathway that all students follow in the same order.

For example, in the skill area 'Makes inferences through analysis of geomedia', elementary proficiency may involve understanding the result of a teacher-provided map or diagram, intermediate proficiency may involve combining results from two geomedia sources, and advanced proficiency may involve identifying new spatial relationships, evaluating the reliability of the analysis, and contextualising conclusions within a broader geographical issue. Such descriptors help translate broad curriculum goals into teachable and assessable expectations.

## 3. Geography teachers' impressions of the GeoTAITO model

Teachers' perspectives derived from the interview analyses reported in Lammi et al. (2026) underline both the usefulness of the GeoTAITO structure and the main pedagogical bottlenecks it helps to make visible. First, teachers emphasised that students' ability to *read and interpret* diverse geomedia materials (especially maps and diagrams) is among the most central outcomes of geography education, and they also highlighted a need to strengthen *image interpretation* because students encounter abundant visual geomedia in news and social media (Hilander, 2017, 2024; Lammi et al., 2026). Second, while teachers viewed deeper *analysis*, *critical evaluation*, and source-critical judgement as key goals, they noted that these higher-order skills typically develop slowly and remain superficial for many students even by the end of upper secondary education, meaning that only a minority of students often reach the advanced proficiency levels in the GeoTAITO model (Lammi et al., 2026). Third, teachers described geomedia skill development as cumulative across the school pathway, yet strongly differentiated between learners: the gap between students who remain at elementary proficiency and those who progress toward advanced proficiency tends to widen as schooling progresses (Lammi et al., 2026). These teacher observations align with the progression and level descriptors illustrated in Figure 1 and detailed in Table 1.

## 4. Conclusion

Taken together, teachers' impressions and the conceptual structure of GeoTAITO suggest that the model offers a concise framework for making geomedia skill expectations more explicit across educational levels. However, it should be understood as a conceptual and teacher-informed framework rather than as a fully validated learning progression model. Its empirical basis is limited to teacher interviews in the Finnish curriculum context, and its use in other educational systems requires contextual adaptation. Broad skill areas, such as interpreting, evaluating, analysing, visualising, and using geomedia for participation, are likely to be transferable across geography education contexts, whereas age-related expectations, curriculum terminology, access to GIS and digital geomedia tools, and assessment practices may require local adaptation. Future research should examine how the model functions in classroom practice, how students' geomedia skills develop over time, and how the level descriptors can support assessment across different national and curriculum settings.

**Secondary Publication Statement:** This Short Communication is a secondary publication of a model originally reported in Finnish. It is presented in accordance with recognised international guidance on secondary and translated publication (including the ICMJE Recommendations on Overlapping Publications; COPE guidance on translations), to make the model accessible to an international readership that does not read Finnish. The primary publication is: Lammi, P., Hirvensalo, V., Nylén, T., Hynynen, L., Pellikka, A., & Muukkonen, P. (2026). GeoTAITO-malli: Nuorten geomediataidot ja osaamisen tasot. Ainedidaktiikka, 10(2), 81–112. https://doi.org/10.23988/800ejp61. This communication faithfully reflects the data and interpretations of the primary publication and reports no new primary data.

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**Ethics Statement:** According to Finnish national guidelines and the relevant institutional practice, formal ethical review was not required for this interview study. Participation was voluntary, and informed consent was obtained from all participants.

**Data Availability Statement:** The original GeoTAITO model for young people's geomedia skills and proficiency levels is openly available in the primary publication by Lammi et al. (2026). The teacher-interview data used in the empirical refinement are not publicly available because the transcripts contain potentially identifiable qualitative information and participant consent did not cover public data sharing.

**Use of AI:** Microsoft Copilot was used to improve the English, grammar and idiomatic expressions in the text.

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