

Map skills as a basis for building digital competencies in geography education under the Czech national curriculum

Jiří Šmída^{a,*}

^a *Technical university of Liberec, Czech Republic – jiri.smida@tul.cz*

* Corresponding author

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Abstract:

Map skills are well described professionally as the critical elements of spatial thinking necessary for the active use of spatial concepts in personal life and many professions. However, geographers often address the didactic aspects of map skills, classification, and development based only on traditional, paper-based maps and atlases (Hanus, 2019). At the same time, web maps represent different types of sub-knowledge and skills compared to paper maps, which are necessary for the effective use of digital maps—both paper and digital media aid in developing and improving spatial thinking skill acquisition among students. To build map skills comprehensively, it is essential that educators understand the differences between paper and digital maps and put the target knowledge and skills first and the medium used (i.e. paper or digital map) second when planning teaching methods and instruction. Meanwhile, studies addressing digital map skills are less common (e.g., Collins, 2018; Rautenbach, 2017). Usually, authors point to the inseparability of map work and geographic information system (Hamerlinck, 2015, Jadallah, 2017) and argue for the appropriateness of implementing GIS in geography education from primary school onwards (Kerski, 2013, Lee, 2009).

As part of a revision of the national curriculum of the Czech Republic, a new cross-cutting competence - digital competence - was added. Its role is above all educational areas, whose "new" task is to implement digital technologies, methods and knowledge. The European Digital Competence Framework 2.0, also known as DigComp 2.0, became the basis for the concept of building digital competencies across the curriculum. The framework document identifies the digital skills needed to effectively, safely and ethically navigate the digital environment (Vuorikari, 2016).

In the three-year project "Supporting the development of digital literacy" (abbreviated as Digigram, 2018-2020), which focused on subject-specific digital competencies, we defined the relationship between digital and subject-specific competencies and defined principles for the implementation in geography education. In order to build students' digital competencies in each school subject, it is necessary to identify specific digital competencies. We identified geographic data and maps as the core topic of digital literacy in geography. By analysing the DigComp 2.0, we concluded that digital competencies could be focused on creating digital geographic data, its management, analysis, and visualization in maps in geography education.

We have adapted the scope of mapping skills for the digital environment. By developing specific methodological materials for teachers, we pointed out, in line with the professional literature, that to fully build mapping skills, it is necessary to integrate geotechnologies and geomedias. We identified the target quality of integration as natural, meaning digital maps and methods will be used interchangeably with analogue maps and atlases; it is not desirable that the different media compete with each other, but neither is it a state where they are absent from teaching. The involvement of digital methods should be in shorter, more frequent and thematically varied tasks aimed at geographic education. The developed sample cases of methodological tasks showed the possibilities of using widespread and easily accessible map portals such as Google Maps and Czech Mapy.cz and the ArcGIS StoryMaps tool. The tasks cover all parts of map skills, i.e. map reading, analysis, interpretation and map production.

The presentation will illustrate the methodological conclusions reached by the project Digigram. It will describe the relationship between subject and digital literacy and the role of digital map skills in overall geographic literacy. The author will present the barriers that currently prevent the widespread use of web maps as an educational tool in Czech schools. These have been identified through the evaluation process of the developed methodologies.

References

Collins, L., 2018. The Impact of Paper versus Digital Map Technology on Students' Spatial Thinking Skill Acquisition. *Journal of Geography*. Routledge, 117(4), 137-152. ISSN 0022-1341.

- Hamerlinck, J. D., 2015. Whither goes the “maps” course? Maintaining map-use concepts, skills, and appreciation in GIS&T curricula. *Cartography and Geographic Information Science*. Taylor & Francis, 42(sup1), 11-17. ISSN 1523-0406.
- Hanus, M. and Havelková, L., 2019. Teachers’ Concepts of Map-Skill Development. *Journal of Geography*. Routledge, 118(3), 101-116. ISSN 0022-1341.
- Jadallah, M., Hund, A. M., Thayn, J., Studebaker, J. G., Roman, Z. J. and Kirby, E., 2017. Integrating Geospatial Technologies in Fifth-Grade Curriculum: Impact on Spatial Ability and Map-Analysis Skills. *Journal of Geography*, 116(4), 139-151. <https://doi.org/10.1080/00221341.2017.1285339>
- Kerski, J. J., Demirci, A. and Milson, A. J., 2013. The Global Landscape of GIS in Secondary Education. *Journal of Geography*, 112(6), 232-247.
- Lee, J. and Bednarz, R., 2009. Effect of GIS Learning on Spatial Thinking. *Journal of Geography in Higher Education*, 33(2), 183-198.
- Rautenbach, V., Coetzee, S. and Çöltekin, A., 2017. Development and evaluation of a specialized task taxonomy for spatial planning – A map literacy experiment with topographic maps. *ISPRS Journal of Photogrammetry and Remote Sensing*, 127, 16-26.
- Vuorikari, R., Punie, Y., Carretero, S. and Van den Brande, L., 2016. DigComp 2.0: The Digital Competence Framework for Citizens: Update Phase 1 (1st ed.). Publications Office of the European Union.