

From 2D to 3D: Teachers' perspectives on 3D printed models in geography education

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Abstract:

Over the past decade, 3D printing has expanded beyond its initial industrial and professional sectors and entered educational settings as an emerging technology. In geography education, however, the instructional use of 3D printed models remains largely underexplored. While previous research has explored the potential of 3D terrain models to support topographic map interpretation, it has largely overlooked the broader range of geographic concepts that such models could meaningfully support. Addressing this gap also requires attention to teachers' perspectives, as they play a decisive role in determining whether 3D printed models are actually adopted and used in geography lessons.

This poster presents findings from a questionnaire survey of lower- and upper-secondary geography teachers that examined perceived benefits, barriers, and concept-specific opportunities of 3D-printed models in geography teaching. Instead of viewing 3D printing mainly as a maker-oriented activity, the study emphasizes its role as instructional media within subject-specific geography lessons. Teachers strongly associated 3D printed models with aiding spatial thinking and transitioning between 2D and 3D representations, while barriers were mainly related to time and skill requirements.

The central contribution of the poster is a structured overview of geography-specific concepts that teachers consider suitable for integrating 3D printed models. Beyond the well-established domain of topography and contour line interpretation, teachers identified a wide spectrum of physical and human geographical concepts that would benefit from tangible, model-based instruction. This concept map, grounded in empirical evidence from classroom practitioners, offers a practical framework for identifying priorities in the design and development of 3D printed teaching aids.

The poster will illustrate selected model representations corresponding to the identified concepts, bridging the gap between 2D and 3D. By combining conventional methods, such as topographic maps with corresponding 3D printed elements, the poster aims to demonstrate the instructional possibilities that tangible models offer in geography teaching. This visual pairing will illustrate how 3D printed models can bring selected geographic concepts to life in the classroom and where the greatest potential for their meaningful use in everyday geography teaching may lie.

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