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Publication date:

2020-10-09

Permanent link:

<https://doi.org/10.3929/ethz-b-000475695>

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Originally published in:

Abstracts of the ICA 2, <https://doi.org/10.5194/ica-abs-2-28-2020>

Augmenting Printed School Atlases with Thematic 3D Maps

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Keywords: augmented reality, atlases, 3D cartography, thematic maps, education, usability

Abstract:

Digitalization in schools requires a rethinking of teaching materials and methods in all subjects. This upheaval also concerns traditional print media, like school atlases used in geography classes. In this work, we examine the cartographic technological feasibility of extending a printed school atlas with digital content by augmented reality (AR). While previous research rather focused on topographic three-dimensional (3D) maps, our prototypical application for Android tablets complements map sheets of the Swiss World Atlas with thematically related data. We follow a natural marker approach using the AR engine Vuforia and the game engine Unity. We compare two workflows to insert geo-data, being correctly aligned with the map images, into the game engine. Next, the imported data are transformed into partly animated 3D visualizations, such as a dot distribution map, curved lines, pie chart billboards, stacked cuboids, extruded bars, and polygons. Additionally, we implemented legends, elements for temporal and thematic navigation, a screen capture function, and a touch-based feature query for the user interface. We evaluated our prototype in a usability experiment, which showed that secondary school students are as effective, interested, and sustainable with printed as with augmented maps when solving geographic tasks.

Details and results of our work are published in this article: <https://doi.org/10.3390/mti4020023>¹. In this presentation, we will give an overview about the key findings and lessons learnt from the research project.

¹ Schnürer, R., Dind, C., Schalcher, S., Tschudi, P., and Hurni, L.: Augmenting Printed School Atlases with Thematic 3D Maps, *Multimodal Technologies Interact.*, 2020, 4, 23