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Grasping the global with Digital Earth

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Grasping the global with Digital Earth

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Abstract. This study examined the extent to which adopting a more subject-led approach to teaching with the interactive geospatial tool, the Climate HotMap, can enhance geographical knowledge and understanding of climate change. Findings showed the significance of teachers paying more attention to geography's central concepts of place, space, interconnection and environment in understanding the impact of climate change on local places but also on the relations between places in the bigger global climate change picture.

1. Introduction

In school geography education, even the simplest of geospatial tools can bring to life teaching about a vast array of human, physical and inter-related geographical phenomena across our planet [1]. Indeed, several of geography's fundamental phenomena and processes, can only truly be understood conceptually at a planetary level. Geography as a school subject is also unique in having the conceptual tools to draw together and make sense of this wide range of the earth's complexities [2]. It can therefore be argued that the global should be taught more explicitly through geography because it is one of the only disciplines that has the potential to address conceptually grasping global head on [3]. Subject knowledge can be powerful in this way when it enables young people to think in ways beyond their direct experience and where it gives them access to exercise their intellectual capacities in ways that fulfill their true human potential [4]. Using geospatial tools in tandem with geography's central concepts can provide this kind of access in geography education to enable them to explain, analyse and generalise about the complex and abstract global phenomena such as climate change.

2. Digital Earth and powerful geography

Digital Earth in the guise of GIS (geographical information systems), virtual globes and other location-based geospatial technologies can provide a unique perspective on the global. These tools have moved us beyond the more traditionally exclusive expert systems of geographical information systems (GISs), spatial data infrastructures (SDIs) and remote sensing applications to a point where geo-spatial technologies are within reach of the non-specialist user [5]. With regards to powerful geography and Digital Earth, Maude's typology of powerful geography knowledge [6] was critically considered because it focuses specifically how geography can be powerful if it provides new ways of thinking about the world; analyzing explaining and understanding the world; provides young people with some power over their own knowledge; enables young people to follow and participate in debates on significant local, national and global issues; provides knowledge of the world. In identifying these key elements of the nature of powerful geographical knowledge, consideration of the specific ways in



which a Digital Earth tool can be used in subject-led ways by geography teachers to construct knowledge about global climate change was then considered.

3. Constructing powerful geography knowledge about the global

To explore the connections between grasping the global, powerful knowledge and Digital Earth a detailed exemplar of using the Climate HotMap application [7] to teach about climate change was critically considered using Maude's typology of powerful geography knowledge as an analytical framework [6]. The analysis reveals that using such a geospatial application more specifically in conjunction with geography's meta-concepts can enable a deeper grasp of the impacts of global warming with regards to:

- Thinking about climate change through geography's concepts of space and place (type 1 powerful knowledge).
- Analysing climate change impacts and solutions through geography's concepts of space, place and interconnection (type 2 powerful geographical knowledge).
- Using generalisations to explain climate change (type 2 powerful geographical knowledge).
- Following and engaging in debate on climate change (type 4 powerful knowledge).
- Taking students beyond their own experience in learning about the world (type 5 powerful knowledge).

Combining a geography subject-led approach with the use of a geospatial application, can help students explore places in more depth and breadth, observing specific variables of climate change and comparing places similar in one characteristic but different in others. By comparing areas with similar issues e.g. drought in the Sahel, the Mediterranean and the U.S. Southwest can establish links between global warming and raised evapotranspiration in these already fragile areas. In considering anomalies, reasons why some areas are losing ice more quickly than others, e.g. Greenland, extraordinary rises in Arctic temperatures and their impacts can be visualised and explored [8].

4. Conclusion

The educated geographer can comprehend the earth in its entirety, understand the interconnections between the human and physical and place and place and extrapolate to reach informed conclusions about the causes and consequences of the many processes occurring at the global level and the cross-scale interactions between the global and the local. Enabling young people to step back and use virtual globes to formulate and develop a truly global geographical perspective involves subject specialist teachers more proactively in curriculum making to combine the potential of such tools more overtly through a subject-led approach.

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