Geospatial Technology Integration

A Commentary

KC Perley

Department of Education Technology, Western Oregon University

CSE – 618

Professor Elayne Kuletz

10 June 2021

Geospatial Technology Integration

Misinformation has always been a threat to various societies, nation-states, groups of people, and civilizations. And misinformation or “fake news” is not a new concept born out of the rise of the internet and online social media. For as long as there has been information, there has been misinformation. Despite the rapid expansion of digital technology in the past thirty years, producing an almost endless stream of data, misinformation is still prevalent. To some extent, the internet has democratized misinformation and made it more accessible to misalign information. This growing threat is spreading to education with the propagation of information and digital literacies. Like teaching future generations how to read, educators today need to teach the future generations how to discern what is fact and what is fiction, along with how to use digital technology appropriately and ethically.

One specific area that is, unfortunately, catching up to this conversation is geospatial technologies. These technologies process geographic data, including its collection, analysis, communication, and management (Kuletz, 2021). An example of geospatial technology would be Google Earth. This software processes geographic data and uses it to produce a three-dimensional Earth, available to anyone with a relatively strong WiFi signal. Unfortunately, this technology, like other digital technologies, is still susceptible to the threat of misinformation. One sobering example of this misinformation is deepfake geography - AI-generated geographic data, imagery, and cartography (Zhao, et al., 2021). Although an extreme example of misinformation, it still presents a problem: people lack the skills to identify misinformation in geospatial technologies. This is where educators come in: Two strategies that educators should utilize to combat misinformation in geospatial technologies effectively is through the integration of information and geospatial literacies, as well as prioritizing digital technology standards, such

as the International Society for Technology in Education (ISTE) standards, with the intent to increase geospatial technology utilization across subjects and curricula.

Literacy is commonly associated with the ability to read and write. Information literacy, along with digital literacy,[1] extends the longstanding tradition of teaching literacy: once students know how to read and write, they must learn how to engage information ethically. This presumption is derived from the definition of information literacy, provided by the Association of College and Research Libraries: "Information literacy is the set of integrated abilities encompassing the reflective discovery of information, the understanding of how information is produced and valued, and the use of information in creating new knowledge and participating ethically in communities of learning" (2016, p. 8). Taking this definition, strategies teachers can utilize to promote this literacy include inquiry and research projects, sourced writing activities, source evaluation activities, and source comparison. Fundamentally, any educational activity in which a student produces an analysis regarding a source or geospatially created map would promote information literacy and combat misinformation.

Moreover, as geospatial technologies become more prevalent, especially within education, a growing need for geospatial literacy, or the ability to read and write maps using geographic data, has arisen. Moorman frames this literacy perfectly:

> The need for relevant assessments, educational resources, professional development, and curricula to support effective geospatial literacy teaching and learning grows. Geospatial literacy is required to make meaningful products and extract meaningful information from geospatial data to inform and support our decisions. (2019, Abstract)

[1] Sometimes the two terms are used interchangeably due to the vast digital context of today.

Two years later, there is arguably still a lack of educational infrastructure to produce geospatial literacy. However, the need has not diminished. On the contrary, the rise of deepfake geography stresses the need for educators to incorporate components of geoliteracy throughout their curricula. Combined with information literacy, the ability to read, write, and analyze geographical data and projections will extensively allow future generations to combat misinformation.

The second and more critical strategy educators need to embrace is utilizing geospatial technologies across subjects and curricula. For example, most educators would assume that geospatial technologies would and should be reserved for the social studies department due to their increased use of geographic data and maps. Although a popular viewpoint, it is narrow. There needs to be more significant exposure to geospatial technologies in multiple contexts to counter any misinformation surrounding the technologies. For example, a student in Environmental Studies, or even Biology, could create an ArcGIS StoryMaps on ocean threats and protection.[2] In Health, a student could use Google Maps to map out where food desserts are in their community. Even in Mathematics, a student could extrapolate data from geospatial technologies for a case study data analysis. Finally, students in a Computer Science course could analyze geospatially produced maps to investigate for misinformation. All of these examples represent the combination of geospatial technology presenting the content matter. Students will learn the content in these scenarios and be exposed to learning a geospatial technology to deliver their gained information. This information, if ethically monitored by the teacher, would also be factual and not misleading. Teachers also have many other classroom strategies (e.g., group

[2] This topic is actually the 2021 ArcGIS StoryMaps Challenge.

work, inquiry, etc.) that would provide a more rich, authentic learning experience utilizing geospatial technology.

The learning experience just described is known as deep learning and not the machine learning flavor. Deep learning in education exposes students to authentic, complex, and real-world experiences and understandings beyond what they can search in a search engine (Seif, 2018). Integrating geospatial technologies across subjects and curricula promotes deep learning. This horizontal integration is the basis for this second strategy of exposing geospatial technologies across educational levels.

Unfortunately, standards do not exist for implementing geospatial technologies, or at least, at the present moment. Educators, however, do have access to the International Standards for Technology Education (ISTE). This organization provides specific frameworks for implementing technology into a classroom, including standards for students, educators, education leaders, and coaches. According to the ISTE, their standards "provide the competencies for learning, teaching, and leading in the digital age, providing a comprehensive roadmap for the effective use of technology in schools worldwide. Grounded in learning science research and based on practitioner experience, the ISTE Standards ensure that using technology for learning can create high-impact, sustainable, scalable and equitable learning experiences for all learners" (2021). Although these standards do not discuss the implementation of geospatial technologies specifically, this should not detract from their importance in helping educators implement geospatial technologies in the classroom to offset geospatial misinformation. The most critical strategy for educators in combatting geospatial misinformation is through the direct implementation of the technology in and across the classroom.

As mentioned at the outset of this essay, misinformation is becoming a growing problem in our increasingly digital society. Before the widespread integration of the internet, a teacher could focus primarily on sharing information and knowledge and providing strategies to build critical thinking. However, the knowledge and information we pass on to our students may not be accurate, which means teachers and educators of all levels need to pivot and reevaluate their strategies to help students learn. In the broader scheme of things, misinformation in the geospatial technologies field is still a novel flashpoint. The deepfake geography article brought up initially was not discussed on any significant news outlet because no one really understands the implications of deepfakes and the risks they pose. The novelty of these issues will quickly fade and soon grow in significance as the world continues to change rapidly. Climate change and climate-change-related disasters, along with a growing far-right, anti-democratic political movement worldwide, are going to affect the physical world radically. As a result, physical and political geography is going to change. Exposing misinformation in geospatial data will be crucial to challenge the false narratives being shared on global platforms. Unfortunately, as we have seen with social media and its use to spread misinformation, the same will happen to geospatial technology data. Educators need to push forward, innovate, and prepare in advance to offset the damages caused by geospatial misinformation.

References

The Association of College and Research Libraries. (2016). *Framework for Information Literacy for Higher Education.* http://www.ala.org/acrl/sites/ala.org.acrl/files/content/issues/infolit/framework1.pdf.

ISTE. (2021). *The ISTE Standards.* https://www.iste.org/iste-standards.

Kuletz, E. (2021). *1. What are Geospatial Technologies?* [Moodle Book]. Retrieved from https://moodle.wou.edu/mod/book/view.php?id=585745.

Seif, E. (2018, October 5). What is Deep Learning? Who are the Deep Learning Teachers? *ASCD Inservice.* https://inservice.ascd.org/what-is-deep-learning-who-are-the-deep-learning-teachers/.

Zhao, B. et al. (2021). Deep fake geography? When geospatial data encounter Artificial Intelligence. *Cartography and Geographic Information Science*, 48(4), 338-352. https://doi.org/10.1080/15230406.2021.1910075.