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Geojournalism: An Emerging Discipline and its Application at University of The Bahamas

Mark Stephens 0000-0002-3400-7687
University of The Bahamas

Tarik E. Yildirim 0000-0002-5155-3823
Wenzhou-Kean University, China

Abstract

Geojournalism is a growing field within environmental journalism at the intersection of both eco- and data-journalism. It is a new way to combine maps and data with traditional reporting in online platforms to provide scientific evidence for stories and narrative context for data. However, given its novelty, there appears to be little formal recognition of geojournalism in educational and academic contexts. In this paper, we review tools, techniques, and platforms that can be applied by educators and learners to investigate and report on geographic and environmental issues. We also describe examples of geojournalism (blog, radio show, infographic, photostory, and virtual field trip) resulting from collaboration between Geography and Journalism faculty and students at University of The Bahamas. We propose that geojournalism include geography researchers, educators, students, and citizen scientists sharing their knowledge and data with journalists and as well as being trained in journalism themselves. This study furthers the recognition and formalization of geojournalism in environmental communication and higher education.

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Introduction

It is widely accepted that Carson's (1962) *Silent Spring* marked the rise of the modern environmental movement and the beginning of modern environmental journalism in the West (Kroll, 2001; Parks, 2017; Sachsman & Valenti, 2020). Since then, many different approaches and practices have been developed in reporting environment-related news to the public at the local to global scale, such as environmental communication, nature writing, science journalism, advocacy journalism, activist journalism, data journalism, and citizen journalism (Sachsman & Valenti, 2020). As the demand to inform others at a variety of social strata about often complex human-environmental interactions increases, journalists need to employ a wider variety of reporting methods, and geojournalism is one such approach (see https://geojournalism.org/).

Geojournalism can play an important role in the Bahamian education system, for a variety of reasons. First, as a small island developing state, The Bahamas is particularly dependent upon its immediate geo-ecological environment. Further, technology in education was highlighted as a necessary intervention in the most recent national review of Sustainable Development Goals

(Government of The Bahamas, 2018). This is part of an ongoing trend to enhance the educational experience of Bahamian students by making classroom-based technological equipment readily available to educators (Jean-Pierre, 2021). Storr (2016) notes that educational institutions should play a pivotal role with journalism educators having to rethink how they teach their craft to equip students, journalists, and citizens with the right skills and mindsets for an evolving media landscape in the Caribbean and worldwide.

The Earth Journalism Network (https://earthjournalism.net/) was established in 2004 by Internews to provide more research tools and information for journalists. In 2013, a multinational group of environmental journalists established the eponymous Geojournalism.org to assist journalists reporting environmental issues (Table 1; Faleiros, 2020). At the Global Landscapes Forum held in December 2015, the meeting agenda described geojournalism as:

> A growing movement of data journalists … building platforms that combine interactive maps with visualized environmental data and traditional reporting to communicate the essential stories of climate change… a branch of data journalism that combines these approaches to create online platforms that provide scientific evidence for stories and narrative context for data. (Global Landscapes Forum, 2015, para. 3)

However, given its novelty, there appears to be little formal recognition of geojournalism in educational/academic contexts until very recently (Szews, 2018; Delgado-Peña & Subires-Mancera, 2019; Faleiros, 2020; Macleod, 2020; Sachsman & Valenti, 2020; Stephens & Yildirim, 2021). Day concurs, noting that

> because this research addresses issues not heavily researched or discussed in the academic scholarship: journalism and geographic information systems (GIS), the relationship between reporters and geographers and how GIS in news affects readers, the term "Geo-Journalism" has been created to help classify and describe this research (2018, p. 3).

Geojournalism as a Sub-Discipline of Environmental Journalism

Environmental journalism broadly means "researching, verifying, writing, producing and broadcasting of news about the environment to the public sphere, traditionally by trained professionals" (Pezzullo & Cox, 2017, p. 92). It intersects politics, economics, business, science, nature, and culture, in between the individual and society and in between local, regional, and global levels (Sachsman et al., 2010; Bødker & Neverla, 2012; Hansen & Cox, 2015). According to Rademakers (2004), environmental journalism

> can be considered an advocate's beat, journalism with a purpose, or simply journalism about the environment ... media coverage of the environment may be classified as risk reporting or science journalism, or as part of a more general field called environmental communication. (pp. 14-15)

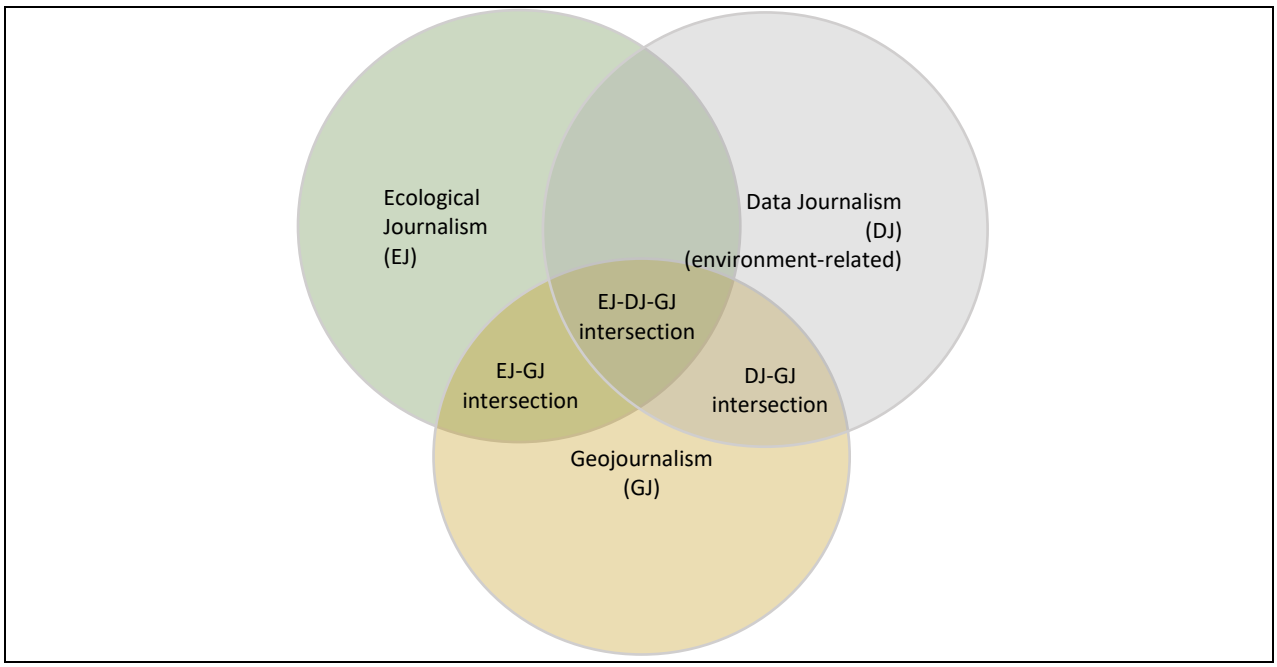
It has also been more narrowly described as being "based on covering environmental disasters or catastrophes, as is the case of landslides or extreme events [death of species, tsunamis etc.]" (Camana & Almeida, 2015, p. 7).

Table 1 *Geojournalism Online Platforms*

Geojournalism Website	**Description**
Earth Journalism Network	A global community of journalists, featuring news, reporter resources and opportunities to apply for grants, fellowships, and training opportunities
Infoamazonia	Geojournalism site focused on the nine-country Amazon region
Geojournalism.org	Online resources and training for journalists, designers and developers to dive into the world of data visualization using geographic data. Contains numerous tutorials on using data, maps, and stories
OpenEarth	Global platform featuring thousands of stories from regional geojournalism sites on climate change and related issues from the Earth Journalism network
InfoCongo	Reveals the impacts of environmental change on human lives and ecosystems in Central Africa and the Congo Basin through interactive mapping and data visualizations
Oxpeckers	Uses data, geo-mapping, and traditional reporting to expose eco-offenses and track those looting Africa of its natural wealth
The Third Pole	News and geojournalism site focused on nature, climate and water issues in the Himalayan region and downstream countries
Earth Journalism Network: InfoNile	Maps and data on water issues in the Nile River basin with links to traditional journalism stories to promote transboundary peace
Earth Journalism Network: Pasifika Environews	Produces stories on major environmental crises in the Pacific to help local communities adapt and explore ways to deal with environmental change
Earth Journalism Network: Mekong Eye	Curates regional news and data and provides original content that examines and gives context to the Mekong region's environmental and social challenges
Ekuatorial	News and geojournalism site focused on Indonesia
Earth Journalism Network: Mongabay EnviroNews Philippines	Environment news and features website that focuses on reporting high-quality, in-depth stories from nature's frontlines in the Philippines
Caves and Blue Holes of The Bahamas : A Geojournalism Blog	Geojournalism site for educational purposes created by Geography and Journalism faculty and students at University of The Bahamas focused on environmental issues of caves and blue holes

Figure 1 illustrates the intersection of geojournalism with other branches of environmental journalism for modern-day geographers, ecologists, citizen scientists, educators and environmental journalists. The terms *environmental* and *ecological* are often not differentiated in journalism (Sachsman & Valenti, 2020; Simpson, 2020; Alaqad, 2021) and seemingly used as equal/interchangeable terms (Pezzullo & Cox, 2017). We propose a differentiation of environmental journalism and ecological journalism (eco-journalism) by including eco-journalism under environmental journalism. This hierarchy will improve clarity, just as in the natural sciences where ecology is a branch of environmental science (Botkin & Keller, 2014). Data journalism analyses or filters large data sets for the purpose of creating or elevating a news story (Rogers, 2014).

Figure 1 *Intersection of Geojournalism with Ecological and Data Journalism, within the Realm of Environmental Journalism*



Tools and Techniques Used to Obtain (Geo)Scientific Evidence

Geographical field-based enquiry is critical for providing first-hand evidence through the recording of geographical features, natural and cultural landscapes and processes (Frew, 1998; Jones et al., 1999; Lenon & Cleves, 2001). This is accomplished through field notetaking, in-situ writing (Stephens, 2018), audio-visual recording, scientific sampling and measurement, laboratory, and statistical analysis (as appropriate) with subsequent documentation in reports, articles, and weblogs. It is also useful to report findings with volunteered geographic information, observations of environment change online (ISeeChange https://www.iseechange.org/), and citizen science applications Citizen Science & Sensors Global (https://earthjournalism.net/projects/citizen-science-sensors).

Table 2 lists a selection of resources for obtaining geographical data freely online. Google Earth, Google Earth Engine and United States Geological Service's Earth Explorer allow the visualization and spatial analysis of satellite imagery, and opportunity for virtual fieldwork in geographical and environmental hotspots worldwide. The historical imagery and time-lapse features of Google Earth and Google Earth Engine, respectively, allow investigation of environmental impacts and are increasingly being reported in the media (Murray & Tong, 2009; Sui & Goodchild, 2011). EarthCam allows for virtual field observations through a network of live streaming webcams found in different locations from natural to urban environments around the world. A useful mapmaking tool for schoolteachers and students is MapMaker Interactive, created by National Geographic.

Table 2 *Selection of Tools/Techniques to Obtain Virtual Geographical Data*

Tool/technique	**Function(s)**
ClimaTracker	Interactive maps from southern Africa showing how temperature and primary productivity (farming) have changed and are likely to change in the future. Includes a food basket calculator
EarthCam	Live virtual field investigations from selected locations worldwide
U.S. Geological Service EarthExplorer	A tool to search, and order satellite images, aerial photographs, and cartographic products from several sources. Includes Landsat, MODIS, NASA ASTER, and a variety of other data providers
U.S. Geological Service Earthquake Hazards Program	Information about real-time earthquakes, online catalog search of archives, seismicity maps and statistics. Includes monitoring, station, other various seismic data, and an earthquake notification service
Google Earth	Virtual field investigations of the natural-human environment; view satellite imagery, maps, terrain, 3D buildings. Tools include elevation profile to study geomorphology, and historical imagery to inspect landscape change over time
Google Earth Engine	A tool for analyzing geospatial information e.g., land use change, including a timelapse feature. Includes Landsat, MODIS, and Sentinel Collections
National Geographic MapMaker	Interactive mapmaking tool for teachers and students
U.S. Tsunami Warning System	Provides access to water-level data, and information on historical and recent tsunamis. Message subscriptions available for tsunami forecasting/alerts
Open Geography Portal	Provides geographic products, web applications, story maps, services, and APIs for United Kingdom

One can explore earthquake and tsunami hazards in real-time in many parts of the world, including the Caribbean, by using the United States Geological Service's Earthquake Hazards Program and the NOAA/National Weather Service U.S. Tsunami Warning System. Both include historical and present mapping of the hazard locations and notification/alerts of active events. ClimaTracker also uses maps and focuses on southern Africa to forecast impacts of climate change in this ecologically sensitive region. Other countries also have open-access statistical information and maps such as the Open Geography Portal, created by the United Kingdom Office for National Statistics.

Geojournalism Platforms Used at University of The Bahamas

Members of the public need to receive clear communication about the proper utilisation of and care for environmental resources (e.g., Macadam & Lacković, 2010; Stephens, 2018, 2020). Accordingly, journalism education programs seek to train future journalists to present complex scientific information in a simplified and appealing manner for all audiences (Hansen & Cox, 2015; Sachsman & Valenti, 2020). Contemporary approaches include the use of infographics, radio programs of different formats, social media and blogging, and investigative virtual field trips (Petersen et al., 2020; Table 2). We have used these as instructional tools at University of The Bahamas (UB) from 2018 until the present (Tables 3 and 4).

Table 3 *Selection of Software and Social Media used in Geojournalism Education*

Platform/Software	**Function(s)**
Adobe Express (formerly Spark)	Blog/photostory
WordPress	Blog/photostory
Wix	Blog/photostory
Facebook	Blog/photostory/podcasting
Soundcloud	Podcasting
YouTube	Podcasting
Adobe Audition	Radio production
Adobe Illustrator/ Photoshop	Infographics
MS Word/PowerPoint	News scriptwriting, drama scenario production, information panels
Google Earth	Investigative virtual field trip

An example of a geojournalism genre that we have used effectively in media journalism classes at UB is the infographic. With its precursors tracing back perhaps to Alexander von Humboldt, infographics have become increasingly popular in recent years (De Haan et al., 2018; Huang, 2019; Dick, 2020). In a nutshell, infographics present complex or technical information for a general audience. Infographics come in many forms, including print posters, animations, animated video, or interactive web pages, often with lengthy information presented in the form of appealing visuals accompanying the text. A narrated topic or process is sequenced and divided into sections that show the phases, development, and result, and at varying levels of complexity (Godoy, 2015). An infographic was used in a Multimedia Layout and Design course (MJRN415) to create a poster about hurricanes in the Caribbean (Figure 2), and infographics were used in many photographic posters in a Digital Photojournalism course (MJRN120 Table 4).

Table 4 *Examples of Geojournalism Projects at University of The Bahamas, 2018-2023*

Output	**Purpose**	**Website**
Radio show	Environmental show	Environmental Show with Krystalanne Thompson, Keval Williams and Danille Dean Final project Chris Anyze and Shane Revised Mixdown
Infographic	Geographical news story / information	Hurricane Facts Infographic (Figure 2)
Photostory	Geographical news story	Photojournalism at UB CCA
Blog	Journal on geographical phenomena	Blue Holes of The Bahamas Geo-Journalism Trip: The Primeval Forest of The Bahamas
Virtual field trip	Investigate sites of geographical interest	New Providence Sustainable Features

Radio is another effective medium when reaching audiences, combining audio storytelling with facts (Fahys, 2020), and has been used in geojournalism news reporting and geography education. A Sound Production course (MJRN100) used Adobe Audition for public service announcement and radio program production assignments, and SoundCloud for a portfolio. All assignments focused on the local environment in The Bahamas (Table 4). For journalism students in the Introduction to Radio Production course (MJRN200), assignments were designed to produce radio shows with environmental or geography-focused content (Table 4). This included news, educational programming, quiz shows and radio dramas. In the Advanced Radio Production course (MJRN300), we used SoundCloud, YouTube and Facebook Business platforms for podcasting the programs and for wider audience reach (Table 4). Geography students (education majors) at UB in a Geography and the Environment course (GEOG320) produced radio dramas and received basic script

writing and sound acting training. Students in these courses produced educational and entertainment (edutainment) scripts aimed at high school audiences, with titles such as *Nassau School of Fish* (on local aquatic pollution), *Invasive Species by Jack the Octopus*, and *Story of the Naughty Hurricane* (Table 4).

Geography students (education majors) at UB also underwent journalism training in blogging. As part of the Landscapes and Soils course (GEOG222), geography students received two training sessions on geojournalism blogging to complete a term paper on local landforms (Table 4). During the first session, students learned the basics of journalistic writing, how to prepare a photostory, how to write photo captions and how to simplify a nature science story when reporting for a general audience. In the second session they received basic training on webpage design for blogging, including WordPress and Adobe Express (Tables 3 and 4). Adobe Express was the favoured blogging tool given the variety of text/image presentational modes (including Glideshow), although WordPress includes tabs which are suitable for larger group blogs. Students' progress was monitored whilst preparing their blog and were supported technically when needed (Table 4).

Students in a Geography and the Environment course (GEOG320) also produced virtual field trips for a fieldwork and research term paper using Google Earth to investigate the range of sustainability features that occur in Nassau (Table 4). Their presentations were subsequently communicated in a seminar with students from Wenzhou-Kean University in China (Stephens et al., 2023). The same course used Microsoft PowerPoint to create an information panel on geoconservation of caves in The Bahamas.

Figure 2 *Hurricane Facts Infographic Poster*

Note: Prepared by students in a Multimedia Layout & Design course (MJRN415) course at University of The Bahamas (2018-09-15).

A journalistic narration of what geography researchers do provides an opportunity to make a simplified description of who they are, what they do, in which time span they do their work, in which environment they do their research, why they do and finally how they do. This is, in effect, a list of the basic tenets of journalistic inquiry that says a newsarticle should give the reader answers related to the questions who, what, when, where, why, and how: the 5Ws and 1H principle in journalism. This process helps the researcher reach a local and global audience with varying levels of prior geographical knowledge.

The geojournalism blogs produced with this approach are student projects or research projects that aim to inform the public on aspects of the local landscape as well as creating a teaching resource for educators. Another objective is to populate the internet with reliable information for researchers and amateur/citizen scientists (Allan & Ewart, 2015). Here the crucial point is rather than train the geography student for all mass media (as happens with media journalism majors), we provide training only for the platform the student is expected to use and according to the depth the science story needs in order to be presented thoroughly for the target audience. This gives journalism a dynamic, fluid edge of practice, although the lack of knowledge of the audience and public perception could be a limitation to this approach.

In addition, students from both disciplines working side-by-side created geojournalism blogs. Journalism students observed and documented the activities of geography students/researchers in the field, including interviews and explanation of findings with simplification of terms made for the common newsreader. Such an approach was used to create the geojournalism blog *Caves and Blue Holes of the Bahamas* (Table 1).

We analysed available grades obtained by UB students taking assignments with a strong geojournalism component and found mean grades per course of at least 70% (B- or 2.75 grade point average, GPA, and above on the UB grade scale) from 201 assignments submitted between 2018-2023. Given this good performance of students along with the opportunity for stimulating collaboration between disciplines, and populating the internet with healthy scientific information, we encourage higher education in The Bahamas and elsewhere to integrate geojournalism into curricula.

Conclusion

Geojournalism is a relatively new interdisciplinary field. It has been identified as a branch of environmental journalism as it is at the intersection of eco- and data journalism (Figure 1). This paper is the first detailed discussion of the concept applied in an educational context. It combines digital technology to create online platforms that provide scientific evidence for stories and narrative context for data. These approaches and outputs are emphasized here through a unique collaboration between Geography and Journalism faculty and students at University of The Bahamas.

In addition to other definitions, we argue that geojournalism also includes geography researchers, educators and students sharing their knowledge and data with journalists and being trained in journalism themselves. A further extension of the definition is to include citizen scientists making a journalistic storytelling about their local landscape. We hope that this study further assists in the recognition and formalization of geojournalism as a component of science communication, environmental journalism, and educational curricula.

Geojournalism has the potential to form a niche that reports on environmental issues at all spatio-temporal scales, in a less politically motivated, and a more observation-oriented way, and as opposed to the dominant mentality of sensationalised, fast-moving news coverage. Often the locations environmental journalists report from are under dispute or experiencing civil unrest and therefore the line between journalist and activist may be blurred, sometimes with fatal consequences (Committee to Protect Journalists, n.d.). In a recent paper on the education needs of future environmental journalists, Motta states that:

> To prepare a new batch of top-notch environmental reporters for such a complex and dangerous future, we need to rethink the way we teach journalism, especially in the bureaucratic halls of academia, more and more dominated by corporate money and the technocratic view of many educators. Rethinking the way we teach journalism is a complex and dangerous task, but many educators and journalists have been tackling it in different ways. Their work provides a view of what the future of environmental journalism education could become." (2020, p. 115)

Motta (2020) also foresees

> … technology specialists help the students learn how to build databases, to create data visualizations, to produce and edit 3D stories, and to transform the narrative to fit in different platforms (mobile, print, online, broadcast, etc.) … (and) not all of it happens in the same physical space or at the same time (p. 115)

It is in this regard that we see geojournalism within the evolution of environmental journalism and as part of a future-oriented, eco-centric approach to education.

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Declaration of interests

The authors declare that they have no known competing financial interests or personal relationships that could have appeared to influence the work reported in this paper

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