ZIBELINE INTERNATIONAL™ PUBLISHING

ISSN: 2521-0890 (Print)
ISSN: 2521-0491 (Online)
CODEN: GBEEB6

Geological Behavior (GBR)

DOI: http://doi.org/10.26480/gbr.01.2021.01.03

REVIEW ARTICLE

IMPACTS OF COVID-19 ON GEOMORPHOLOGICAL FIELDWORK: EXPLORATION OF NEW INITIATIVES AND DIMENSIONS

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ARTICLE DETAILS

Article History:

Received 18 October 2020
Accepted 20 November 2020
Available online 04 December 2020

ABSTRACT

The novel coronavirus disease (COVID-19) has already changed the world in many respects, and its impact cuts across many fields of human endeavours. An area of temporary setbacks in geomorphological research posed by the pandemic is in the restriction placed on fieldwork exercise. Apart from bringing a lot of constraints to fieldwork, the need to meet the learning outcomes ensured that the already in-use technologies were easily adapted to simulate the necessary fieldwork in evaluating dynamics in geomorphological environment and the natural world. Despite the success, however, the fieldwork remains 'signature pedagogy' for geography, geomorphology and any other Earth Science disciplines. The dynamic nature of landforms, the serendipity of on-site field training and exercises, the ability to have a first-hand experience of field phenomenon, etc. are some of the expected rewards that could not be simulated remotely. Hence, when COVID-19 pandemic is over, the aspects of fieldwork should not be jettisoned for the simulated alternatives embraced in the pandemic. The two should work hand-in-hand for the diverse fields of geomorphological research.

KEYWORDS

Geomorphic process, field sciences, fieldwork, Remote Sensing, Digital video technology, COVID-19;

1. INTRODUCTION

Fieldwork is widely regarded as essential in geomorphological and physical geography studies, whether for undergraduate or graduate studies (Kent et al., 1997; Dunphy and Spellman, 2009). It does not only provide a platform for teaching and learning to both students and academic staff, but it also provides an opportunity for exploration of various methods and modes of course delivery, principally integrating the theoretical and practical concepts; gaining numerous transferable skills (Gold et al., 1991; Kent et al., 1997; Dunphy and Spellman 2009).

The sudden and rapid global spread of the novel coronavirus disease (COVID-19) since the beginning of the year 2020, has not only changed the socio-economic landscape of the world, it has affected every fabric of human and environmental society in many dimensions (WHO 2020; MacKenzie 2020; AWWA 2020; Fine et al. 2020; CCSA 2020; Wuyts et al. 2020; Klemeš et al. 2020; Nzediegwu and Chang 2020; Oyedotun and Moonsammy 2020). One of the areas where the impacts of COVID-19 are most pronounced is in the world's education and research (Harper et al. 2020; Park 2020). In the bid to stem the rise of the disease, countries around the world adopted strict non-pharmacological interventions (NPIs) including but not limited to closure of border, quarantine, travel restrictions, social and physical distancing, curfew, cities lock-down. Face-to-face (F2F) classes and fieldwork have been severely affected by these non-pharmacological interventions (Corlett et al. 2020; Gummer et al. 2020; Sastry et al. 2020). As a result of these interventions and restrictions, which also affect the higher education all over the world, F2F and other forms of fieldwork or outside data collection have been halted or postponed to an unforeseeable time in the future.

With the first positive case and death of COVID-19 reported in Guyana on March 13, 2020, the University of Guyana and other public schools in Guyana got closed to F2F learning, suspended every form of fieldwork, discouraged every form of physical gathering and moved its teachings and numerous activities online (Boodie 2020; Jamaica 2020; News Room 2020; WHO 2020; Oyedotun and Moonsammy 2020). As a result of the University of Guyana Management's directives, every fieldwork component of physical geography and other related courses became suspended until further notice, thereby leaving both the students and staff to explore other options to address the fieldwork components of the courses' curricula. This paper discusses how the COVID-19 has affected the planned and ongoing geomorphological fieldwork efforts in Guyana, summarily illustrates the exploratory ideas considered as a safe replacement for fieldwork during this ongoing pandemic, and highlights the challenges, issues and new initiatives faced.

2. IMPACT OF COVID-19 ON GEOMORPHOLOGICAL FIELDWORK

2.1 Grappling with the definitions and nature

With the definition of 'the field' as any place "where supervised learning

Quick Response Code	Access this article online	
	Website: www.geologicalbehavior.com	DOI: 10.26480/gbr.01.2021.01.03

Cite the Article: Temitope D. Timothy Oyedotun (2021). Impacts Of Covid-19 On Geomorphological Fieldwork: Exploration Of New Initiatives And Dimensions. *Geological Behavior, 5(1): 01-03.*

can take place via the first-hand experience, outside constraints of the four- walls classroom setting", the restrictions imposed as a result of COVID-19 pandemic put a challenge to what should be considered as "the field" and the "first-hand experience" the students of higher learning are expected to have in physical geography courses in general and geomorphology in particular (Longergan and Andresen 1988). For the planned fieldwork for the semester, these were cancelled, and various forms of simulations were considered as a substitute for the fieldwork component. The debates and struggles the lecturers first had to grapple with is a bit to equate the definition of fieldwork with the new realities imposed by COVID-19.

2.2 Blending with the trend

Geomorphology, the basic and applied science that studies the origin and development of landforms, in the early century was largely a descriptive science that depended greatly on qualitative evidence and fieldwork. However, for over the years, with the early works, quantification of geomorphic processes and observations from the fieldwork became engrained in the field of geomorphology (Gilbert, 1917; Strahler, 1952; Dune and Leopold, 1978). These early forms of geomorphological investigations, (that is, observing earth phenomenon on the field; describing or quantifying the observations and the processes that contributed to the development of such landforms, or the processes still shaping the landforms) are parts of the components of the fieldwork for geomorphological study in the Department of Geography, University of Guyana. This is before the spread of COVID-19 to the country which disrupted the usual traditional means of geomorphological reasonings. With the restrictions placed on fieldwork as a result of COVID-19, both students and staff explored the existing and recent means of geomorphological investigations.

The availability of high-resolution topographic data with the capability of being linked to new data analysing techniques means that the possibility of having a comprehensive understanding and studying of the landscape are limitless (Keller et al. 2020). Since the disruption of fieldwork activities by COVID-19 pandemic, both students and staff are now embracing the ever-increasing high technological data and methods that are already available but sparsely used before COVID-19. Our studying of geomorphic landscapes and geomorphic processes are daily embracing the very high-resolution topographic data, remotely sensed data, photogrammetry data, and so on; which are being linked and investigated in Geographic Information Systems (GIS). These are already being used extensively in other parts of the world, but COVID-19 is making them be the 'now' methods of geomorphological investigations to replace fieldwork temporarily. This is especially true for geomorphic modelling, mapping, and quantifying Earth surface landforms and processes (Keller and Pinter 2002; Hofle and Rutzinger 2011; Van Western 2013; Keller et al. 2020).

2.3 Digital video technology

The introduction of digital video technology through the streaming of simulations of sedimentary and geomorphologic processes was incorporated in the undergraduate classes during the semester disrupted by COVID-19 pandemic. Experimental simulations of these processes were used to introduce students to what would have been expected in standard field sampling procedure for the acquisition of data that can be used in the formulation of hypothesis or understanding of sedimentary and geomorphological processes. Although this pedagogic (digital video technology) is not new in other physical geography environments, it became a form of replacement for fieldwork that engaged students in narrating and quantifying geomorphological and sedimentary processes (France and Wakefield 2011; Fuller and France 2014). The documented use of podcasts in learning and engagements were also considered during the transition to online mode. Students studied their local geomorphological and sedimentary environments and made video productions of such that was considered for assessments (Jarvis and Dickie, 2010; Kemp et al., 2012; Fuller and France, 2014). The video productions presented by students were awarded marks based on contents, clarity, explanation and overall quality of the presentation (France and Wakefield, 2011; Fuller and France, 2014). In a succinct, COVID-19 pandemic caused the intense integration of digital video technology as a replacement for fieldwork in a bid to protect students and staff during this pandemic. This is one of the impacts of the pandemic on our pedagogy.

3. Benefits of The New Explorations

Some of the benefits of exploration of alternative means of fieldwork during this pandemic could be summarily stated as:

- the elimination or total reduction of fieldwork costs, both to the university and the students. One of the major concerns that have been raised on fieldwork in geomorphological field study and physical geography is the associated costs to the institutions and the students (Fuller et al. 2003);
- the saving of time and efforts that are usually expended on the preparation and administration of fieldwork exercises (Fuller et al. 2003);
- prevention of potential health and safety risks that are mostly associated with fieldwork (Nash 2000)
- the utilisation of digital video technology by both students and staff in a range of simulated fieldwork exercises opened the opportunity of new and transferrable skills that can be used in a wider appreciation of sedimentary processes and geomorphological methods. These skills helped students in the appreciation of the geomorphic processes, and could be well integrated into the traditional fieldwork when the pandemic is over.

4. Limitations and Cautions

Despite the ability, and the relative success, of utilising various means of replacement for fieldwork components of geomorphology curriculum, few students were not comfortable with the alternatives, preferring the traditional forms of engagement. Of concerns also is the mature students who are new to the technologies. If not properly taken care off, they may be neglected by the sudden embrace of the new initiatives. As advised, adequate time is being allowed for those students experiments with the new technology to be able to learn and familiarise with the initiatives brought by the pandemic (Fuller and France, 2014; Hovorka and Wolf, 2009).

5. Conclusion

It is indeed too early to evaluate the overall impacts of COVID-19 on fieldwork in geomorphology and other related sedimentary environments, but some preliminary observations and conclusion are possible. As at present, the already in-use technologies could be easily adapted to simulate geomorphic processes in evaluating dynamics in sedimentary environment and the natural world, however, the fieldwork will remain the 'signature pedagogy' of geomorphological studies as it enables the opportunities to acquire the relevant facts and data from the real world that can be used in understanding geomorphic patterns and processes. The new dimensions considered as alternatives for fieldwork by the COVID-10 pandemic, should not be discarded when the pandemic is over, as these can work hand-in-hand as we consider the world as our laboratory. Although the focus of this short communication is on fieldwork disruption as a result of the pandemic, however, this pandemic is first and foremost a deadly tragedy challenging human's existence in all fronts. Therefore, the priorities must be on safeguarding human health and the containment of the pandemic. When the pandemic is over, the proper and traditional fieldwork in geomorphological studies must not be made to be over. It still has, and will always have, its additional benefits including but not limited to enhancement of teaching practices, strengthening our understanding of geomorphic forms and processes, and even aid in our bid to challenge any long-held theories that may be based on casual observations.

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