

Enhancing Undergraduate Students Subject's Understanding through Fieldwork

Elie F. Itoba - Tombo^{1,2}, Bonita Kleyn-Magolie¹, Andrew Rand¹, Vincent Zungu¹ and John Baptist Mudumbi^{1,2}

Abstract—Fieldwork is known as a practical/physical way of teaching and learning. Thus, fieldwork is a complementary learning opportunity for students to participate in order to augment their theoretical learning. This research investigated the effectiveness of fieldwork as a tool to enhance the understanding of the Environmental Geology subject for the first year students in the Extended Curriculum Programme (ECP) at Cape Peninsula University of Technology in 2018. There were (n=39) students in the first year class. During the first semester, the students were exposed to theoretical learning only while, during the second semester, practical learning (fieldwork) was included to support theoretical learning. The results revealed a failure rate of 53% in the first semester. However, during the second semester the students' performance improved after exposure to fieldwork, which culminated in a pass rate of 76.7%. Therefore, the study concluded that fieldwork was critical in enhancing the students understanding, knowledge as well as skills and contributed enormously in improving the subject's pass rate.

Keywords— Environmental Science, Environmental Geology, Effectiveness teaching, Fieldwork, Theoretical teaching.

I. INTRODUCTION

Many tertiary institutions around the world and in South Africa in particular receive a high number of first year students yearly that are willing to become scientists after completing their studies. Sometimes these aspiring scientists experience challenges such as adapting to a new university environment, the style of teaching and learning etc., which might affect the student's understanding of the subject's or course curriculum, contributing to the high failure and drop out rates. Thus, to avoid such issues, fieldwork can be envisaged as a way to enhance the students understanding of the subject knowledge. Many scientists (i.e. Geographers, Geologists, Psychologists, Environmental scientists) etc., emphasized a positive role of fieldwork in students learning [1]. [1] believes that fieldwork offers students many pedagogical benefits. Thus, fieldwork is paramount for the training of students as it requires them to use and develop or strengthen their cognitive and affective skills [2]. Its enable students to make personal observations, inquiries, interpretations, re-interpretations based on the theory, lab-work and natural aspects on the field [3]-[5]. It helps to demonstrate the validity of the theory. A subject such as

Environmental Geology for example, require students to not only grasp the theoretical teaching of aspects, processes etc., but also to be able to touch, identify, observe, interpret/explain the occurrence of those aspects, processes (or events) in the natural environment. As suggested by [6]-[10]. Therefore, fieldwork becomes indispensable for these students to physically see, observe, analyze, interpret/explain the practicality of the theory, to which they were subjected to during the teaching and learning process.

Previously, students from higher education institutions have used fieldwork application and/or practical for subjects such as Geographical Information Systems (GIS), Geography, Geohydrology, etc., coupled with mobile devices [1], [11], [12]. However, to our knowledge there is little scientific evidence on the importance of fieldwork for a subject such as Environmental geology

Thus, it is necessary that such a study be undertaken to add to the existing scientific literature and demonstrates the importance of fieldwork in improving students' understanding of the subject.

II. MATERIAL AND METHODS

In this 2018 study, a class of (n=39) first year students in the Extended Curriculum Programme (ECP) at the Cape Peninsula University of Technology were used to assess the effectiveness of fieldwork as a tool to enhance the understanding of the subject, Environmental Geology. An academic year consists of two semesters. During the first semester, the students were exposed to theoretical learning only whereas, during the second semester, practical learning (fieldwork) work was implemented as an additional teaching and learning method to supplement the theoretical teaching.

The objective of the study was to assess the students' understanding of the concepts/processes taught in class. Thus, the students were taken to the field and were exposed to concepts such as weathering, erosion, stratification, etc. The students were given a brief talk about each process followed by a practical identification of the processes (i.e. weathering, erosion) in the field. The students observed, touched, analyzed and identified the types of weathering, erosion etc., their characteristics, effects on the geological material (rocks), field and the environment. The students were also able to observe the stratification (layering/bedding) process of geological material. The duration of the outing was 3-4hrs, and the students were asked to draft a field report as part of an assessment.

1. Department of Environmental and Occupational Studies, Cape Peninsula University of Technology, P.O. Box 652, Cape Town, 8000, South Africa,

2. Bioresource Engineering Research Group (BioERG), Department of Biotechnology, Cape Peninsula University of Technology, P.O. Box 652, Cape Town 8000, South Africa;

III. RESULTS

A. Results Analysis

A comparison of the two semesters results, shows that during the first semester the students struggled to comprehend most of the concepts and aspects taught in class. Thus, during the first semester out (n=39) total registered students, n=21 passed their assessments (53%), n=13 failed and n=2 dropped out (refer Figure 1). Whereas, after the introduction of fieldwork during the second semester, the student's marks drastically improved. Thus, n=30 out of n=39 the equivalent of (76.9%) passed the subjects, n=4 failed and n=2 dropped out. Fieldwork provided the students with a great opportunity to strengthen their understanding and knowledge of Environmental Geology. The results of this study confirm those of previous studies by [1]-[7]; [9] and [10].

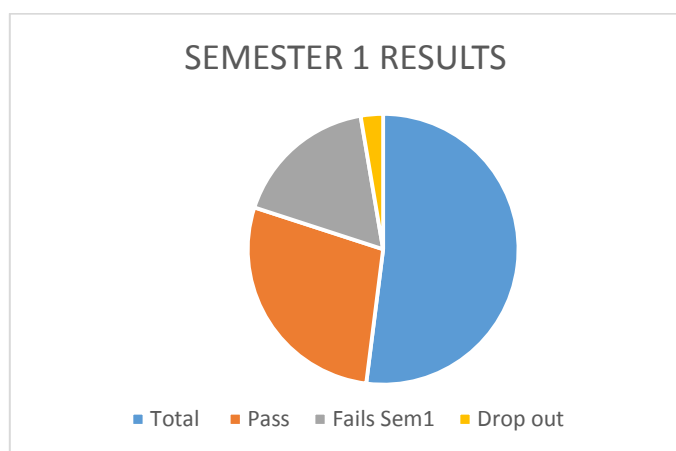


Fig. 1. Semester 1 results

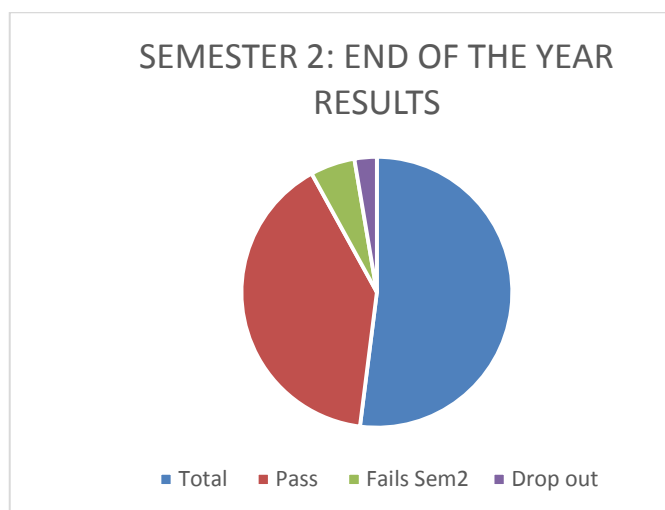


Fig. 2. Semester 2 results

Fieldwork creates a feeling of enjoyment for the students, as they are taken out of the classroom to experience nature physically. A Fieldwork creates a positive learning environment that help to deepen the students learning. Previous studies demonstrated that fieldwork creates enjoyable moments that will yield deep learning [1], [7], [9], [10].

B. Students opinions of the fieldwork

The students were asked to complete a fieldtrip feedback form. Below are a few of the students' responses,

- "It was a very educational outing where we can see and touch material, aspects taught in the classrooms."
- "This excursion has answered many of the questions we had as Environmental Geology students."
- "It made the module/course more interesting, because we got to deal with real world aspects that we normally discuss in class."
- "I can say, that it was a practical experience of the theory we were taught in the classroom."

IV. CONCLUSION

In conclusion, fieldwork was paramount in improving the first year students understanding, practical skills and theoretical knowledge of Environmental Geology and contributed immensely in enhancing the subject's pass rate.

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Elie F. Itoba-Tombo
PhD-Environmental Studies
(Environmental Health)- Cape
Peninsula University of Technology-
RSA
-Master’s (MTech) Environmental
Management-2010.Cape Peninsula
University of Technology RSA
BSc Honours- Earth Environmental
Sciences- 2004- University of the
Western Cape-, RSA
Bachelor (BSc) Option: Physical
Geography- 1996 - University of Brazzaville
(Marien Ngouabi)- Republic of Congo

Currently working as a lecturer of Ecology, Environmental Geology, Environmental Management IV and Environmental Economics V) in the Department of Environmental and Occupational Studies- Environmental Management Programme; from 2007 to Present

Publications:

Books chapters:

- Elie Fereche Itoba-Tombo**, Abraham Thomas, Stam M. Ed. 2019. Spatial and temporal distribution of pollutants from different land-use/land-cover types of the Bottellary River catchment. In *New Horizons in Wastewater Management: Emerging Monitoring and Remediation Strategies*. Prof. Dr. Elvis Fosso-Kankeu (Ed.). Nova Science Publishers, Inc. (NOVA), ISBN: 978-1-53615-659-1
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