Data Article

Data on students’ learning experiences in mathematics during the COVID-19 school closure

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\textbf{ABSTRACT}

Like in other education systems around the world, the COVID-19 school closure in Zambia necessitated a shift from physical classroom face-to-face interactions to remote learning. However, it was not clear whether all students’ remained engaged with the learning of mathematics during that time. The data described in this paper were collected to support the findings of a descriptive survey that aimed at finding out Zambian students’ experiences with mathematics remote learning. A semi-structured questionnaire was used to collect data from 367 secondary school students in Kitwe district. It was anticipated that the collected information could provide some valuable insights into remote learning experiences among secondary school students in times of a crisis such as the COVID-19 outbreak and beyond.

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Specifications Table

| Subject | Education |
|---------|-----------|
| Specific subject area | Mathematics Education |
| Type of data | Table |
| | Text |
| | Numeric |
| How data were acquired | Data were collected from 367 secondary school students via a semi-structured questionnaire. |
| Data format | Raw |
| Parameters for data collection | The aim of the research whose data are described here was to find out secondary school students’ remote learning experiences in mathematics during the COVID-19 school closure from 20 March 2020 to 14 September 2020. Respondents were 174 grade 10 and 193 grade 11 students, from six selected secondary schools within the Kitwe district of Zambia. Of the 367 respondents, 178 (48.5%) were male while 189 (51.5%) were female. The ages of the respondents ranged from 13 to 21 years old (M = 16.92, SD = 1.47). The dataset contains three files namely, semi-structured questionnaire, closed-ended questionnaire responses, and open-ended questionnaire responses. |
| Description of data collection | After the refinement of the questionnaire, the data collection permit was obtained from the District Education Office. This was followed by data collection from September 28, 2020 to October 23, 2020. This was soon after the re-opening of schools effective September 14, 2020. Both closed-ended and open-ended questions were included in the questionnaire which was self-administered. |
| Data source location | City/Town/Region: Kitwe, Copperbelt Province |
| | Country: Zambia |
| Data accessibility | The data described here are openly available in the supplementary files attached to this paper |
| Related research article | A. Mukuka, O. Shumba, H.M. Mulenga, Students’ Experiences with Remote Learning during the COVID-19 School Closure: Implications for Mathematics Education, *Heliyon* [1]. 10.1016/j.heliyon.2021.e07523 |

Value of the Data

- These data provide insights into the prevailing situation regarding Zambian students’ experiences with remote learning during the COVID-19 school closure.
- The data are useful not only for Zambia’s education system but also for other similar contexts worldwide. The data provide some insights into potentially effective mathematics teaching practices in times of a crisis such as the COVID-19 outbreak and other future emergencies.
- The data also provide a basis for further investigations regarding the evaluation and assessment of remote learning as one of the measures aimed at mitigating the impact of the COVID-19 outbreak on mathematics education.
- The data can serve as a basis for policy formulation regarding the provision of Information and Communications Technology (ICT) to support the teaching and learning of mathematics in Zambia and beyond.

1. Data Description

Following the declaration of COVID-19 as a pandemic on March 11, 2020, by the World Health Organisation, more than 186 countries worldwide decided to close learning institutions as one of the measures to prevent person-to-person transmission of the corona virus [2,3]. Zambia was not an exception as all the institutions of learning in the country closed on March 20, 2020, after the first two cases were recorded on March 18, 2020. Like many other education systems around the world, the Ministry of General Education (MOGE) in Zambia recommended remote learning
for the continued provision of education to all learners. This study was conducted to understand students’ remote learning experiences during the COVID-19 school closure in Zambia.

The data described here were obtained via a semi-structured questionnaire. The questionnaire items were formulated in line with the existing COVID-19 related literature [4,5], the Zambian government’s response to COVID-19 school closure, and the researcher-anticipated challenges associated with remote learning in the context of Zambia’s secondary education system. The questionnaire comprised three major sections namely, demographic information, accessible mathematics learning options, and the challenges associated with remote learning. Further details about the collected data and response types have been highlighted in Table 1.

After defining all the variables regarding closed-ended questionnaire responses, the data were entered into a Microsoft Excel Spreadsheet. These data have been stored in the supplementary files attached to this paper with the file name “Dataset_Closedended questionnaire responses”. Similarly, all the open-ended questionnaire responses for questions 4, 5(c), and 6 were extracted from each of the 367 completed questionnaires and have been stored under the file name, “Open-ended questionnaire responses”. The actual questionnaire items have also been stored under the file name “Questionnaire-Remote Learning Experiences”.

2. Experimental Design, Materials and Methods

A descriptive survey research design was employed to collect the data on students’ remote learning experiences in mathematics during the COVID-19 school closure [6]. Both the quantitative and qualitative data were collected as this was deemed necessary for providing an in-depth exploration of students’ learning experiences during the COVID-19 school closure.

Prior to the main data collection, a draft questionnaire was sent for validation to 18 experts via email. However, only 15 of these experts provided feedback giving a return rate of 83.3%.

**Table 1**

| Section | Question number | Collected information | Response type |
|---------|-----------------|-----------------------|---------------|
| Part I: Demographic Information | 1 | Respondent’s gender | Closed-ended |
| | 2 | Respondent’s grade level | Closed-ended |
| | 3 | Respondent’s age (in years) | Closed-ended |
| | 4(a) to 4(f) | Respondent’s choices regarding the accessible mathematics learning options during the COVID-19 school closure | Closed-ended |
| Part II: Mathematical Learning Experiences During COVID-19 School Closure | 5(a) | Respondent’s most preferred mathematics learning option among the ones listed in (4) | Closed-ended |
| | 5(b) | Respondent’s choice of whether to continue learning using the stated option in 5(a) or not | Closed-ended |
| | 5(c) | Respondent’s reason for the response given in 5(b) | Open-ended |
| Part III: Challenges associated with remote learning during the COVID-19 school closure | 6(a) to 6(j) | Respondent’s choices of the challenges associated with remote learning during the COVID-19 school closure | Closed-ended |
| | | Respondent’s overall feelings about the COVID-19 school closure and the teaching/learning of mathematics | Open-ended |
The experts who provided feedback comprised 2 Ph.D. students in mathematics education, 2 master’s students in mathematics education, 6 college/university lecturers in mathematics and science education, and 5 secondary school teachers of mathematics. These experts were selected because of their experience with mathematics education research, and/or their experience with the Zambian secondary school mathematics curriculum. Like the instrument validation procedures employed by [7], validators of this questionnaire were requested to comment on the quality of the included items in terms of sufficiency, relevance, clarity, and coherence. After getting feedback from these validators, their suggestions and comments were analyzed and the final questionnaire was developed.

After the questionnaire refinement, a request for a data collection permit was sought from the District Education Office on September 24, 2020, alongside the questionnaire for approval. The permit was granted on September 28, 2020 and data collection commenced thereafter. A cluster random sampling method was used to select 367 students from selected secondary schools within the district.

Based on the information obtained from the district education office, schools were clustered into two categories based on their geographical locations. Schools that were located within a 10-kilometer radius from the city center\(^1\) were categorized as urban. On the other hand, schools located outside the 10-kilometer radius of the city center were categorized as peri-urban. Fig. 1 gives a pictorial description of how the sample was obtained while Table 2 illustrates further characteristics of the sample. The ages of the sampled respondents ranged from 13 to 21 years old ($M = 16.92, SD = 1.47$).

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\(^1\) City centre, in this case refers to the commercial and business centre of Kitwe district.
Table 2
Sample characteristics.

| Variable   | Category   | Frequency | Percent |
|------------|------------|-----------|---------|
| School Type| Urban      | 176       | 48      |
|            | Peri-urban | 191       | 52      |
|            | Total      | 367       | 100     |
| Gender     | Male       | 178       | 48.5    |
|            | Female     | 189       | 51.5    |
|            | Total      | 367       | 100     |
| Grade Level| Grade 10   | 174       | 47.4    |
|            | Grade 11   | 193       | 52.6    |
|            | Total      | 367       | 100     |

Note. School type refers to the geographical location of the sampled school based on the above-prescribed classification.

Ethics Statement

The purpose of the study was explained to all the participants for informed consent from all of them before administering the questionnaire. Although ethics approval for this survey was not required, permission from the district education office was sought and granted.

Declaration of Competing Interest

The authors declare that they have no known competing financial interests or personal relationships which have or could be perceived to have influenced the work reported in this article.

CRediT Author Statement

Angel Mukuka: Conceptualization, Methodology, Data curation, Writing – original draft; Overson Shumba: Supervision, Validation, Writing – review & editing; Henry M. Mulenga: Supervision, Validation, Writing – review & editing.

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Supplementary Materials

Supplementary material associated with this article can be found in the online version at doi:10.1016/j.dib.2021.107537.

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