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Online learning during COVID-19 emergency – a descriptive study of university students' experience in Mozambique

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Abstract

Initially described as pneumonia of unknown etiology, COVID-19 emerged in China in late 2019 and quickly spread around the world. Its impact has resulted in the closure of schools in several countries, including Mozambique, and at that time, the teaching and learning process shifted to digital platforms. In this context, this research was developed with the aim of describing students' experience with the teaching and learning process using digital platforms during the state of emergency. We surveyed 6,542 students from 43 public and private higher education institutions, of whom 3,226 (52%) were male and the average age was 24 years. The survey was answered using the Google Forms platform between 4th and 12th of May 2020. Descriptive statistics were used for data analysis, and the results are presented in simple tables. 98.5% of the students were at the undergraduate level, about 1% pursued a Master's degree and only 0.3% were attending a doctoral course. The most used platforms were WhatsApp, email and Google Classroom, and about 64% reported an unsatisfactory level of competence and just over three quarters had some kind of difficulty. The most used device to access the platforms was the cellphone (59.4%), however only 45.5% had the device available full time. Only 27% of the students were able to follow all classes, and difficulty of comprehending some topics and the poor quality of the internet were the main barriers. Furthermore, only 34% of them stated that they continued to have all classes initially planned and about 78% rated the performance of their teachers as poor or reasonable. About 65% believed that the quality of the teaching and learning process had decreased, and 80% had an unsatisfactory experience in their adaptation to the process and almost the same proportion (79%) would not continue with this teaching modality. During the suspension of classes, students used a variety of digital platforms and faced constraints regarding access to the internet, as well as difficulties in adapting to the process.

Introduction

The coronavirus disease (COVID-19), initially described as pneumonia of unknown etiology, is an infectious disease caused by the new coronavirus (SARS-CoV-2) that was first detected in the city of Wuhan, Hubei province, in the People's Republic of China in December 2019 (Lu et al., 2020; Cruz et al., 2020). Due to its rapid spread, the World Health Organization declared the disease an international public health emergency on 30 January 2020, thus alerting the international community to take measures to control the disease (World Health Organization [WHO], 2020a). The continuous disseminations of COVID-19 led to its declaration as a pandemic in less than two weeks after the disease was classified as public health emergency (WHO, 2020b).

In the first months of 2020, the disease had already a systemic impact on a global scale, not only in morbidity and mortality but also in socioeconomic life (Sohrabi et al., 2020). In this process, the closure of schools was one of the measures implemented in several countries (Huang et al., 2020). This measure, which has its scientific support from the experience of some countries with the 2009 influenza epidemic, aimed to reduce contact between people as a way of containing the spread of the disease (Viner et al., 2020).

Estimates from the United Nations Educational, Scientific and Cultural Organization (UNESCO, 2020) indicate that by 20 April 2020, around 191 countries had decreed the closure of schools, affecting more than 1,579,634,000 students. In Mozambique, the suspension of face-to-face classes was decreed on March 20, with effect from 23rd of the same month, for a period of 30 days, with the teaching and learning process being done using digital platforms, especially in higher education (Ministry of Science, Technology and Higher Education [MCTESTP], 2020). Subsequently, the government decreed a 30-day State of Emergency with effect from April 1st (Boletim da República, 2020), thus extending the suspension of face-to-face classes until April 30, 2020.

In order to guarantee the continuation of classes, the Ministry of Science, Technology and Higher Education issued an official letter instructing all public and private Higher Education Institutions to design activity plans for the 30-day period and to use the Information and Communication Technologies (ICT) such as email, WhatsApp, Skype, Google Classroom and other digital platforms to deliver lessons (MCTESTP, 2020).

According to Salimo and Gouveia (2017), in a higher education classroom in Mozambique, between 40 and 60% of students have portable computers and between 90 and 100% have cell phones with internet access. However, this does not necessarily imply that these students are prepared to migrate to a teaching and learning process based on digital platforms. In addition, considering the challenges that still exist in the use of ICT by teachers and students both in face-to-face and distance learning (Lobo & Maia, 2015), as well as the weaknesses in the provision of internet access (Krönke, 2020) and the move from onsite to online classes without proper preparation, we deemed it opportune to describe students' experience in learning using digital platforms in order to evidence challenges and opportunities of the teaching and learning process in a context of emergency caused by COVID-19 in Mozambique.

Literature review

The study by Butler-Henderson et al. (2020) shows that there have been numerous publications on how students and institutions responded to the demands caused by the outbreak of COVID-19 during the first half of 2021, when rapid adjusments were needed to keep the teaching and learning process in place.

While there is a consensus that the outbreak of COVID-19 has disrupted education systems worldwide, the evidence suggests that the impact and response varied between and within countries (Bonk et al., 2020; Crawford et al., 2020). Although the developed countries have made a smoother transition to online classes, at least from the infrastructure point of view, still students experienced some diffculties to adapt, with their mental health and well-being affected by concerns about their academic situation and future professional life (Aucejo et al., 2020; Crawford et al., 2020; Hasan & Bao, 2020; Hawley et al., 2021). On the other side, the developing countries faced more challenges to support the transition from traditional to online learning models (Crawford et al., 2020; Nyerere, 2020).

In Africa, studies prior to the COVID-19 pandemic have shown that online education is affected by resource constraints. A study held in Kenya by Nyerere et al. (2012) revealed that the delivery of online learning faces infrastructural issues as one of the main handicaps, with students reporting low levels of satisfaction with the resource centres, programme organization and delivery. Likewise, in Zimbabwe, Mpofu et al. (2012) found that distance learning was threatened by a lack of properly trained teaching staff. These scenarios still prevail in many other African countries, where the level of digital literacy or preparedness to use electronic devices and the internet coverage and access are yet to improve (Krönke, 2020; Nyerere, 2020).

From the available literature, it is evident that the COVID-19 pandemic forced significant changes upon the teaching and learning processes. To the best of our knowledge, this is the first study to examine students' learning experiences during the early stage of the COVID-19 outbreak in Mozambique, thus contribuing to document a singular event from which many lessons can be learned so as to rethink and improve the education system.

Methodology

A descriptive study with a quantitative approach was carried out through an online survey using Google Form. The objective was to describe the students' experience of the teaching and learning process using digital platforms during the state of emergency. The survey was open between the 4th and 12th of May 2020 and was disseminated through social media (WhatsApp) and also by email. Respondents were able to share the link with their network of contacts,

thus allowing the survey to reach more eligible people. The study population consisted of undergraduate and graduate students from public and private institutions in Mozambique. The data collection instrument was developed based on the literature review and contributions from the research team, covering aspects about the platforms used during the suspension of face-to-face classes, the effectiveness and quality of teaching as well as satisfaction with the process. In all, the survey had 29 closed-ended questions.

All students were informed about the research objective and participation was voluntary. The information was displayed in the opening of the survey link and students were asked to confirm their willingness to participate in the study, and only after this procedure, the study questions were displayed. No identifying information was collected, thus ensuring an anonymous and confidential participation of students.

Results and discussion

Students' general characteristics

We obtained 6,542 responses and after cleaning incoherent data and duplications, 6,224 responses were considered valid, with 3,226 (52%) male, 2802 (45%) female and 196 (3%) who chose not to identify their gender. The mean age was 24 years (SD = 6.16 years), ranging from 16 to 64 years. Altogether, the survey reached students from 43 higher education institutions. Approximately 59% of the students attended public universities. Regarding the training cycle, 98.5% were at the undergraduate level, about 1% were attending at Master's level and only 0.3% attended a doctoral course. Although it would be expected that the number of students decreases at higher educational levels, the gap between undergraduate students compared to those pursuing Master and doctoral degrees is steep. There were fewer students entering the fifth and sixth years, a fact that is explained by the small number of courses with training programs going beyond four years. Close to three quarters (74.2%) were daytime students, with the majority of them in the field of Applied Sciences and Engineering (31.8%) followed by Economic/Financial Sciences (28.8%) and Social Sciences (16%) and to a lesser extent, students of Arts and Culture (1.6%) and Sports Sciences (0.5%). Table 1 summarizes the characteristics of the study participants.

Table 1: Students' general characteristics

		n	%
Type of institution	Public	3665	58.9
	Private	2559	41.1
Training Cycle	Undergraduate	6130	98.5
	Master	78	1.3
	Doctorate	16	0.3
Studying year (for undergraduates only)	1st year	1688	27.5
	2nd year	1600	26.1
	3rd year	1320	21.5
	4th year	1387	22.6
	5th year	120	2.0
	6th year	14	0.2
Period	Daytime	4549	74.2
	Night time	1580	25.8
Major	Arts and culture	87	1.4
	Economic / Financial Sciences	1795	28.8
	Education sciences	181	2.9
	Social Sciences	995	16.0
	Health Sciences	803	12.9
	Applied Sciences and Engineering	1980	31.8
	Sports Science	34	0.5
	Linguistics	316	5.1
	Not indicated	33	0.5

Digital platforms used by students in the teaching and learning process during the suspension of face-to-face classes

Just over half of the students (51.3%) stated that they had never used any digital platform to attend classes before the suspension of on-site classes. In the period of suspension of face-to-face classes, the predominance of a combination of different platforms in the teaching and learning process was notorious, where a combination of WhatsApp, email and Google Classroom was the most used (18.9%), followed by email (12.1%) and the combination of WhatsApp and email (10.4%). The least used were Zoom and YouTube with 0.9 and 0.1%, respectively. Only about 10% of students reported using a specific platform of their institution for the continuity of classes (Table 2).

We noted that the platforms used were predominantly asynchronous, with the information provided by the facilitator accessible anytime by the students and there often not being any real-time interaction (Basilaia & Kvavadze, 2020; Ruiz et al., 2006), though they may also be real-time interaction in cases where classes take place at a previously agreed schedule. Another salient aspect is the weak use of video platforms such as Zoom and YouTube, which can be due to costs and quality of the internet (Baticulon et al., 2020; Krönke, 2020). The small proportion of students who report using the institution's specific platforms reflects the unavailability of these platforms or the impossibility of making them operational to cover the entire academic community during the emergency period. Considering the advantages that the institution's specific platforms offer, such as ease of monitoring of the teaching process, producing academic statistics, recording activity and storing information, it is unquestionable that higher education institutions should pledge to put these tools in place. According to research by Cacheiro-Gonzalez et al. (2019) the specific learning platforms promote more autonomy in learning, facilitate access to bibliographic materials and the

interaction between teachers and students. However, studies that compare the effectiveness of learning using institution-specific platforms and tools used by students during the emergency may be more illuminating on the subject.

Table 2: Use of platforms during higher education and during the suspension of face-to-face classes

		n	%
Use of digital platforms throughout the training	No	3190	51.3
	Yes	3034	48.7
Digital platforms used in the teaching and learning process during the suspension of classes	WhatsApp, email, and Google Classroom	1176	18.9
	Email	753	12.1
	WhatsApp and email	647	10.4
	WhatsApp, Google Classroom and other	535	8.6
	WhatsApp and institution-specific platform	483	7.8
	Email and other	473	7.6
	WhatsApp, email, Google Classroom and other	437	7.0
	WhatsApp and Google Classroom	364	5.8
	WhatsApp, email and other	348	5.6
	WhatsApp, email and Zoom	255	4.1
	Institution-specific platform	146	2.3
	Google Classroom	137	2.2
	Other	108	1.7
	Email and other	95	1.5
	Google Classroom and other	83	1.3
	WhatsApp	69	1.1
	WhatsApp, email, Zoom and other	59	0.9
	Zoom	50	0.8
	YouTube	5	0.1

One important aspect for effective use of digital platforms is the level of competence that users have when using those platforms. In this regard, we found that about 64% considered their level of competence as poor or reasonable and only 4.4% said it was very good or excellent, while 19% did not know how safe they were in using those platforms. About 76% of the students faced some kind of difficulty in using the platforms, most of whom obtained support from colleagues (26.4%), and others from a family member/friend or neighbour (7.9%). However, it should be noted that about 30% of students who had difficulties did not get any support (Table 3).

The high proportion of students who reported having a poor or reasonable level of competence and difficulties in using the platforms can be seen as a consequence of the sudden transition that took place from classroom classes to the use of digital platforms, without training them in its use. Incompetence in using digital teaching platforms can compromise the quality of the teaching process and students' performance, as evidenced by Bhuasiri et al. (2012). According to data from 34 African countries, including Mozambique, only 20% of the adult population is able to make use of digital platforms for learning or to support a family member in this process (Krönke, 2020).

Table 3: Level of competence in the use of platforms and support received

		n	%
Competence level in using digital platforms during the teaching and learning process	Poor	1457	23.4
	Reasonable	2496	40.1
	Good	806	12.9
	Very good	137	2.2
	Excellent	135	2.2
	I can't say	1193	19.2
Support received to overcome difficulties in using digital platforms	Did not face any difficulty	1524	24.5
	Did not have support	1899	30.5
	Colleague	1643	26.4
	Family member/ friend/ Neighbour	493	7.9
	Information available on the institution's website	275	4.4
	Institution technician	211	3.4
	Colleague and Family / Friend / Neighbour	68	1.1
	Colleague and institution technician	41	0.7
	Colleague and Information made available on the institution's website	40	0.6
	Colleague, institution technician and information available on the institution's website	22	0.4
	Institution technician and Information available on the institution's website	8	0.1

Electronic devices used and places from where classes were assisted

Electronic devices are essential elements when it comes to using digital platforms. In this regard, the cellphone alone was the most used (59.4%) followed by a combination of cellphone and laptop (23.3%). As with platforms, we also found a combination of various types of devices. Looking at the availability of these devices, less than half had them full-time (45.45%), almost 17% had the devices available many times, while the rest (38%) had more access restrictions. Bearing in mind that one of the objectives of suspending face-to-face classes was to limit the movements of students as a prevention strategy for COVID-19, we probe the location from which students followed classes. In this, we found that more than three quarters (77.8%) did it from home, while the rest had to move for several reasons, including the demand for internet and devices for accessing the platforms. The quality of the internet network was another element analyzed, where we found that around 87% considered it as

poor or reasonable. Approximately 10% rated it as good and close to 2% of the students rated the quality of the signal as very good or excellent (Table 4).

As mentioned, the cellphone was the most used device, however it is worth noting that most students had difficulties following the classes due to the limited availability of the devices. Indeed, in an assessment carried out in 34 African countries, it was found that only 46% of households have a cellphone or computer or both (Krönke, 2020). The quality and stability of the internet are still a challenge in developing countries and the crisis imposed by COVID-19 may have aggravated this scenario, as several other activities moved to an online environment, generating greater demand in this period. In a survey conducted in Ghana involving pre-university and university students, only 36.4% said they had access to the internet to attend classes (Owusu-Fordjour et al., 2020). Adnan & Anwar (2020) identified that about 52% of students in Pakistan indicated the quality of the internet as one of the main obstacles to the use of platforms.

Table 4: Electronic devices used and location of students

		n	%
Used electronic devices	Cell phone	3942	59.4
	Cell phone and laptop	1548	23.3
	Cell phone and desktop	229	3.4
	Laptop	139	2.1
	Cell phone, laptop and desktop	92	1.4
	Cell phone, tablet and laptop	70	1.1
	Tablet	55	0.8
	Cell phone and tablet	47	0.7
	Desktop	35	0.5
	All	30	0.5
	Tablet and laptop	16	0.2
	Cell phone, tablet and desktop	11	0.2
	Tablet and desktop	6	0.1
	Laptop and desktop	4	0.1
Availability of used electronic devices	Always	2828	45.4
	Oftentimes	1049	16.9
	Few times	2347	37.7
Place from where the teaching and learning process was followed	Home	4827	77.8
	Home and elsewhere	756	12.2
	Elsewhere to access the internet	289	4.7
	Elsewhere for another reasons	238	3.8
	Elsewhere to access electronic devices	59	1.0
	Elsewhere to ask for technical support	36	0.6
Internet quality	Poor	2198	35.3
	Reasonable	3245	52.1
	Good	598	9.6
	Very Good	66	1.1
	Excellent	62	1.0
	No access	54	0.9

Barriers to online classes

Considering the limited time that higher education institutions had to migrate from face-to-face to distance learning, we explored possible barriers that may have existed in the teaching and learning process, especially if students were able to attend all the classes. We found that only 27% were able to do so. Among those who were unable to follow all classes, the biggest barrier was the difficulty in comprehending the content (58.3%), followed by the poor quality of the internet (24.6%) and also the costs associated with access (10.3%) (Table 5).

Difficulty in comprehending the contents may be due to students' lack of preparation for remote learning, associated with the fact that it has to take place in an environment that was eventually not usual. A similar scenario was identified in Ghana by Owusu-Fordjour et al. (2020) where only 19% of students said they experienced effective learning from home after face-to-face classes were suspended due to COVID-19. In addition, regular students regard online teaching negatively and believe that face-to-face interaction is necessary for learning (Adnan & Anwar, 2020).

Table 5: Barriers to attending online classes

		n	%
Attendance of all virtual classes	No	4526	72.9
	Yes	1682	27.1
Barriers among students who could not attend all classes	Difficulties in comprehending the classes	2631	58.3
	Restrictions in using the internet due to signal quality	1111	24.6
	Restrictions in using the internet due to financial reasons	463	10.3
	Reduced interaction with teacher	64	1.4
	Other	57	1.3
	Difficulties in using digital platforms	52	1.2
	Unavailability of electronic devices to access digital platforms	46	1.0
	No proper schedule of classes / activities	19	0.4
	Absence of regular interaction with teacher	18	0.4
	Lack of clarity in the given instructions	16	0.4
	Weak mastery of the subject by teachers	12	0.3
	Teachers not following a logical approach	8	0.2
	Teachers with difficulties in using digital platforms	7	0.2
	Non-compliance with the agreement between the teacher and the class	6	0.1

Disciplines taught and teachers' performance

Only 34% of the students stated that all disciplines planned at the beginning of the semester continued to be taught after the suspension of face-to-face classes, while 27% stated that most were being taught via digital platforms and about 3% reported that no discipline was being taught. Digital platforms allow implementing a variety of teaching strategies that can enhance student learning. In this sense, we probe the strategies deemed useful by the students, where the most pointed were classes for discussing reading materials and assignment (37.4%), classes for clarifying doubts (20.7%) and the combination of test, individual and group tasks (11.5%). Just over 78% of students rated their teachers' performance as poor or reasonable, approximately 17% as good and only 4.6% as very good or excellent (Table 6).

Table 6: Number of disciplines taught and teachers' performance

		n	%
Disciplines that continued to be offered during the suspension of face-to-face classes	All	2321	37.4
	Most of them	1673	27.0
	Less than half	1182	19.1
	Half	845	13.6
	None	182	2.9
Strategy that best helped to understand the contents taught	Online classes by appointment and classes to discuss reading materials	2226	37.4
	Classes to clarify doubts	1228	20.7
	Test, individual and group task	683	11.5
	Online classes by appointment	463	7.8
	Classes for discussion of reading materials and other strategies	222	3.7
	Individual task	197	3.3
	Exercise resolution classes	167	2.8
	Group work	112	1.9
	Teacher's Feedback on tasks	71	1.2
	Other	578	9.7
Students' evaluation of teachers' performance during online classes	Poor	1358	22.1
	Reasonable	3464	56.4
	Good	1041	16.9
	Very good	165	2.7
	Excellent	115	1.9

The two preferred forms of learning, where interaction with the teacher is necessary, show that students are more adapted to a model where the teacher is a present element in the teaching and learning process. The study by Dietrich et al. (2020) also shows that students have little affinity with models where the teacher is an absent figure. The appreciation of the teachers' performance can be seen from two perspectives. On the one hand, it may reflect the impartial appreciation that students have of their teachers. But on the other hand, it may be that the difficulties with, and negative perceptions of, the digital platforms by the students influenced them to negatively evaluate their teachers. However, it is possible that teachers had difficulties in implementing or adapting an appropriate teaching methodology to the context. Baticulon et al. (2020) identified poor communication and lack of instructions on teachers' side as one of the main barriers pointed out by students in online education. In addition, body language and facial expressions are two important teaching instruments that teachers cannot use in online learning, particularly in a situation where they were not prepared to compensate for these limitations (Bao, 2020).

Students' satisfaction with the use of digital platforms as a support of the teaching and learning process

We sought to explore some variables that could reflect student satisfaction with the teaching and learning process via digital platforms. The majority's perception is that quality has decreased (64.7%); to about 30%, the quality was not affected, while almost 6% said it had increased. Approximately 80% of students considered their adaptation to the teaching and learning process via digital platforms as poor or reasonable, whilst it was good for close to 12% and very good or excellent for 3.3%. The whole process was seen as poor or reasonable by 90.9% of students, good for about 8% and very good or excellent for less than 2%. Finally, about 79% would not choose to continue this teaching format (Table 7).

Data from Krönke (2020) shows that the level of readiness for online education in Mozambique, assessed by digital literacy, is around 36%. In addition, student-teacher interaction, teacher's performance and teaching and learning evaluation are important factors for student satisfaction when it comes to distance learning (Ali & Ahmad, 2011), factors that have been greatly affected by the pandemic and which may have led to a perception of reduced quality of education.

The perception of reduced quality of education cannot be dissociated from the difficulty of adaptation revealed by the majority of students, a fact identified in a research by Baticulon et al. (2020), where only 41% of students in the Philippines felt able to adapt to online teaching, which has turned out to be been one of the main barriers to remote learning.

Although this reduction in the quality of education is plausible, one must consider the negative impact that the pandemic had on students' well-being, as some studies reveal feelings of anxiety, despair and stress among students (Bao, 2020; Baticulon et al., 2020; Cao et al., 2020; Hasan & Bao, 2020) that certainly interfere with learning, and may lead to their evaluation the process in a negative way. In addition, the lack of interaction with colleagues was also identified as a negative aspect affecting learning in this period (Baticulon et al., 2020). Moreover, there were demands from social

life that led students to become involved in household or income-generating tasks that limited the time available for studies (Baticulon et al., 2020).

The high proportion of students who would not choose to continue the learning process via digital platforms is consistent with their evaluation of their adaptation and the process itself. However, this result should not be interpreted as a rejection of digital platforms or distance learning, taking into account the context in which the process took place, where neither students nor teachers had the necessary preparation. In addition, the data presented here must be interpreted with caution, particularly because it describes the situation in the initial phase of the higher education institutions' transition and adaptation process, which may have changed over the six-month suspension of face-to-face classes.

Table 7: Student satisfaction with the teaching and learning process via digital platforms

		n	%
Students appreciation on teaching and learning process quality	Reduced	4027	64.7
	Unchanged	1840	29.6
	Increased	357	5.7
Self-assessment of the adaptation to the teaching and learning process	Poor	2058	33.1
	Reasonable	2935	47.2
	Good	739	11.9
	Very good	129	2.1
	Excellent	76	1.2
	I can't say	287	4.6
Assessment of the process as a whole	Poor	2763	44.4
	Reasonable	2897	46.5
	Good	475	7.6
	Very good	61	1.0
	Excellent	28	0.4
Would continue with this learning modality	No	4898	78.7
	Yes	1326	21.3

Conclusion

In this study, we show that teaching and learning processes were highly heterogeneous, given the diverse profile of students from public as well as private institutions in Mozambique. A notable aspect was the multiplicity of platforms used to guarantee the continuity of the teaching and learning process and the weak use of specific online teaching platforms that could allow students to access teaching content in a standardized manner. Internet access also represented a considerable constraint during this period. But despite these obstacles, we believe that higher education institutions in Mozambique should capitalize on the teaching experience based on digital platforms, which can be useful in enhancing the teaching and learning process, increasing students' autonomy and creativity in learning.

Not least important is the need for the government in general and the higher education instititions themselves to find a mechanism to facilitate access to digital devices such as cell phones and laptops by students and to adopt or consolidate specific teaching platforms in view of the numerous advantages for the teaching process when compared to the common platforms widely used in this period. Given the high proportion of students who stated that there has been a reduction in the quality of teaching, it would be elucidative to assess the extent to which the basic skills for each level were achieved.

Finally, the objective of this research was to provide an overview of the teaching and learning process in Mozambique after approximately a month of teaching via digital platforms. There are certainly differences between courses that should be explored in future research and that can reveal peculiarities of certain areas of teaching, facilitating an innovative approach to distance learning or via digital platforms. We think that this research constitutes an opportunity for reflection on the importance of using available technologies and digital platforms, as well as the need to prepare and train teachers and students for their application and use in different learning contexts.

Availability of data and materials

The data that support the findings of this study are available from Hélio Martins but restrictions apply to the availability of these data, which are not publicly available.

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