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Justice as fairness in preparing for emergency remote teaching: A case from Botswana

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Background. The COVID-19 pandemic necessitated drastic changes to undergraduate medical training at the University of Botswana (UB). To save the academic year when campus was locked down, the Department of Medical Education conducted a needs assessment to determine the readiness for emergency remote teaching (ERT) of the Faculty of Medicine, UB.
Objectives. To report on the findings of needs assessment surveys to assess learner and teaching staff preparedness for fair and just ERT, as defined by philosopher John Rawls.
Methods. Needs assessment surveys were conducted using Office 365 Forms distributed via WhatsApp, targeting medical students and teaching staff during the 5 undergraduate years. Data were analysed quantitatively and qualitatively.
Results. Ninety-two percent (266/289) of students and 73.5% (62/84) of teaching staff responded. Surveys revealed a high penetration of smartphones among students, but poor internet accessibility and affordability in homes. Some teaching staff also reported internet and device insufficiencies. Only WhatsApp was accessible to students and teaching staff.
Conclusions. For equitable access to ERT in the future, the surveys revealed infrastructural improvement needs, including wider, stronger, affordable WiFi coverage within Botswana and enhanced digital infrastructures in educational institutions, with increased support for students.

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National lockdown regulations under 2020 COVID-19 pandemic conditions necessitated drastic changes to medical education globally, including in Botswana. To ensure that the academic year could be completed when students were no longer allowed on campus, the Department of Medical Education (DME) conducted a needs assessment to determine readiness for emergency remote teaching (ERT) of the Faculty of Medicine (FoM), University of Botswana (UB). ERT has been used as the 'least-worst option' to school closure,[1] ensuring that student learning continues and the academic year is not entirely lost to the pandemic. ERT is a temporary alternative to face-to-face or blended teaching approaches, enabling institutions to continue educational programmes quickly during a crisis.[1] As the transition to ERT happens under extraordinary circumstances, it requires rapid, adaptive planning and implementation. This is contrary to formal online teaching that is characterised by rigorous planning, familiarity and reliability. Unlike established online learning programmes where students already understand the technology and learning necessities, during the COVID-19 pandemic students who were enrolled in traditional programmes suddenly found themselves in varying ERT situations, sometimes without appropriate tools to participate fully.[2-5]

Technical capacity and capability are critical factors in technology-driven programmes and projects.[6-8] Normally, universities have technological infrastructure[2,4] and libraries to ensure equal access and academic success for all students. As institutions migrate to ERT, these support structures become inaccessible, shifting the responsibility for access from the university to the learner.[2,3] In such situations, it is not uncommon for learning to be designed around publicly available, non-education-designed platforms such as YouTube, WhatsApp, Zoom and Google Meet.[4] Because of the shift towards learners providing their own 'access for learning', inequalities that are generally invisible become visible behind the availability of, and access to, university resources.[2,3] ERT can amplify existing inequalities, such as lack of access to appropriate technologies (digital divide),[9] lack of understanding of using appropriate technologies (digital use divide),[10] and inability to use technology to ensure optimal learning (lack of digital fluency).[2] These divides are exacerbated by inequalities in conditions for studying provided by students' homes.[2]

In the COVID-19 era, when a campus is closed, some students have limited or no options to participate in technology-driven ERT programmes; justice becomes a critical consideration for equitable education. According to John Rawls,[11] the notion of justice as fairness is centred around two principles. The first is that each 'person has an equal claim to a fully-adequate scheme of equal basic rights and liberties, which scheme is compatible with the same scheme for all'. Secondly, 'social and economic inequalities are to satisfy two conditions: first, they are to be attached to positions and offices open to all under conditions of fair equality of opportunity; and second, they are to be to the greatest benefit of the least advantaged members of society'.[11] Using Rawls' theory of justice as fairness, the first principle suggests that each student has an equal claim to a fully adequate strategy of learning, disadvantaging none. The second suggests that the inevitable inequalities in students' social and economic situations must be remedied by a structure of learning that ensures equal opportunity to the

most disadvantaged students, e.g. by providing technological infrastructure for equal accessibility. Thus, those with less who need more are catered for, to balance the claims of those who need less because they have more. This distribution will enable fair equality of opportunity, levelling the challenges of ERT for all students and ensuring, for Rawls, 'the greatest benefit of the least advantaged'.[11] These principles guided DME's design of strategies to ensure fairness and equality when planning ERT. In this article, we report on findings of needs assessment surveys conducted to assess learner and teaching staff preparedness for fair and just ERT at UB.

Methods

Study design

A needs assessment was conducted of student and teaching staff access to adequate, affordable WiFi, digital equipment and learning materials in their homes. Two surveys were developed – for students and teaching staff, respectively (Supplementary files: https://www.samedical.org/file/1803; https://www.samedical.org/file/1804).[12]

Study setting

Soon after UB's FoM was founded in 2009, it received a Medical Education Partnership Initiative (MEPI) grant that financed learning infrastructure.[13,14]

Most students are government sponsored and receive a laptop. Although Botswana has a high penetration of cellular phones,[15] internet access is relatively expensive and not commonly used, especially non-cellular high-speed internet.[9]

Study population and sampling

All 289 undergraduate medical students and the 84 medical teaching staff were included in the study.

Study instrument

To develop two needs assessment instruments, we drew from our professional experience, from an understanding of our context and from the literature. Instruments were not validated owing to emergency time constraints; however, we met regularly to develop and discuss instruments to ensure their face validity. The questionnaires included some open-ended questions that enabled us to collect qualitative information. The instruments asked participants about:

- availability of devices during lockdown
- internet access and availability
- internet speed and reliability
- software application and online platform usage ability
- regular use of university email
- availability of learning or teaching materials (electronic or hard copies)
- where they resided during the lockdown.

Additionally, students were asked regarding the cost of mobile data, and lecturers were asked about their ability to teach their disciplines online. The instruments used English, the language of instruction at UB.

Data collection

The deputy dean sent a Word document (Microsoft, USA) comprising the survey to all class representatives to distribute to students via WhatsApp. Each class representative collected and collated the responses into a single document and returned it to the researchers. The deputy dean sent teaching staff a link to an Office 365 Forms (Microsoft, USA) questionnaire. A reminder to staff was sent twice before the questionnaire was closed 2 weeks later. Responses from students and staff were then collated in Office 365 Forms.

Data analysis

Questionnaire response data were exported to Excel spreadsheets (Microsoft Corp., USA). A frequency analysis was performed on the quantitative data, yielding percentage distributions of responses for each item. Qualitative data were analysed using thematic analysis. The narrative responses to the questionnaires were read several times and grouped into categories and themes with supporting quotes as they emerged. The research team met to reach consensus regarding the themes.

Ethical approval

Ethical approval was granted by the Botswana Ministry of Health and Wellness Research Development Division (ref. no. HPDME 13/8/1). Participation was voluntary and data collection anonymous.

Results

Response rates were encouraging: students – 92.0% (n=266/289) and teaching staff – 73.5% (61/83). Students reported a variety of devices available at home, and several methods of internet access, predominantly mobile data access (Table 1). Many found home internet speed unsatisfactory. Students' reports of the skills and software required for ERT varied considerably.

Table 1. Students' devices, internet access and speed, Office 365 Forms use and ERT skills, n=266

Devices and internet	n (%)
Devices available	
Smartphone only	38 (14.3)
Laptop only	7 (2.6)
Both devices	221 (83.1)
Access to the internet	
Mobile data	191 (71.8)
Mobile internet	9 (3.4)
WiFi (with or without mobile data)	51 (19.2)
Cable	9 (3.4)
None stated	6 (2.3)
Evaluation of the speed of internet service at home	
Fast	19 (7.1)
Average	133 (50.0)
Poor	114 (42.9)
Comfort in using MS Office 365 Forms	
Never used	100 (37.6)
Somewhat comfortable	124 (46.6)
Very comfortable	42 (15.8)
Reported skills needed for ERT	
MS Word	195 (73.3)
MS PowerPoint	204 (76.7)
Transfer of files using Bluetooth	94 (35.3)
Moodle	48 (18.0)
Zoom/Skype	43 (16.2)

ERT = emergency remote teaching; MS = Microsoft.

Many had never used Office 365 and relatively few were comfortable with it. Students reported not checking university email (95%) or private email (44%) regularly, and most (64%) did not remember their university email password (Table 2). Most, but not all, students had study material at home, such as textbooks or study notes (Table 2).

With regard to teaching staff, 96.7% of respondents had reasonable home internet access, but unreliable in 16.4% of cases, while 96.7% had all or some of the material they needed for teaching available. All had at least one device needed for ERT, but confidence with using this technology varied considerably. Only 21.3% had all the material they needed for teaching available (Table 3).

Qualitative data further informed these findings. Four major themes were generated: digital access as gatekeeper to ERT; technological pedagogical knowledge; non-technological challenges to equity under ERT; and attitudes towards justice under ERT.

Digital access as gatekeeper to ERT

Teaching staff noted that equity of internet access is needed among staff and students to engage in ERT meaningfully:

> 'I think the key is having access to the internet for both the teachers and students … then teaching can take place.' (Fac51)

Students agreed that:

> '[a]dequate speed internet access' (MS130)

is the basic infrastructure that acts as gatekeeper to ERT, and specified the challenges impeding such equity.

Mobile data bundles allow students to circumvent expensive internet connectivity, but the bundles available to most students are limited to social media platforms:

> 'The data bundle that I subscribe to does not allow me to surf the net; hence the reason I cannot check my emails as I am only limited to social networks like WhatsApp.' (MS17)

Alternative mobile data bundles are not enough for activities that require significant data:

> 'The available mobile data bundle we subscribe for daily is … not enough for video streaming.' (MS210)

Data bundles depleted quickly:

> 'It is a challenge to access the internet since I rely on buying internet bundles which also do not last long.' (MS220)

Some students preferred more affordable 'time-bound' bundles and only had access at night:

> 'To access the internet I normally subscribe for night surfers to access internet between 11 pm and 5 am.' (MS219)

Technological pedagogical knowledge

Staff reported struggling to adapt problem-based learning sessions or plenary sessions for asynchronous online teaching. ERT was judged more appropriate for knowledge outcomes than for practical training:

> 'online teaching is an option … which will better work for knowledge-based outcome[s].' (Fac57)

Staff skill sets also showed mismatches with student skill sets, e.g.: staff

Table 2. Students' email use, textbook and study material availability

Variable description	Yes, *n* (%)	No, *n* (%)	Total, *n*
Regular use of university email	20 (7.5)	246 (92.5)	266
Remembering university email password	94 (35.9)	168 (64.1)	262
Regular use of private email	149 (56.0)	117 (44.0)	266
Textbooks available	217 (81.6)	49 (18.4)	266
Textbooks and/or study notes available	251 (94.4)	15 (5.6)	266

Table 3. Staff devices, internet access and speed, Office 365 Forms use and ERT skills, *n*=61

Devices and internet	*n* (%)
Devices available	
Smartphone	54 (88.5)
Tablet	17 (27.9)
Laptop	60 (98.4)
Desktop	1 (1.6)
Access to the internet	
Wireless/WiFi	40 (65.6)
ADSL through landline	15 (24.6)
Cellular/mobile data, e.g. 3G, 5G	3 (4.9)
Mobile internet, e.g. hotspot, internet dongle	3 (4.9)
UB network	3 (4.9)
Other	2 (3.3)
Evaluation of the speed of internet service at home	
Reliable	51 (83.6)
Unreliable	10 (16.4)
Confidence in using MS Office 365 Forms	
Never used	5 (8.2)
Somewhat confident	41 (67.2)
Very confident	15 (24.6)
Reported skills needed for ERT	
MS Word	55 (90.2)
MS PowerPoint	57 (93.4)
WhatsApp	59 (96.7)
PDF reader	38 (62.3)
Zoom	42 (68.9)
Skype	40 (65.6)
Transferring files using Bluetooth	22 (36.1)
Moodle	5 (8.2)
Availability of material needed for teaching	
All	13 (21.3)
Some	46 (75.4)
None	2 (3.3)
Use of email	
Office email checked regularly	50 (82.0)
Personal email checked regularly	57 (93.4)
Overall confidence in teaching with technology	
Very comfortable	5 (8.2)
Comfortable	39 (63.9)
Somewhat uncomfortable	16 (26.2)
Very uncomfortable	1 (1.6)

ERT = emergency remote teaching; ADSL = asymmetrical digital subscriber line; UB = University of Botswana; MS = Microsoft.

struggled to download documents from WhatsApp. Some admitted they preferred platforms such as Zoom or Teams because they were accustomed to face-to-face teaching.

Non-technological challenges to equity under ERT

Students detailed numerous learning challenges arising from their living at home during the lockdown:

> 'As you know, we require a lot of time to study. Here [at] home, there is other work I have to carry out because I am here, e.g. cleaning, cooking twice a day, etc. Therefore, it might not be easy to concentrate and focus very well.' (MS25)

Additionally:

> '[t]he home is not suitable since we share rooms and the house is not big enough to have some private space and quietness to study, so studying during lockdown is very difficult.' (MS143)

Lack of basic utilities was also highlighted:

> '[n]o electricity in [the] home, so I have difficulty in charging my smartphone – its battery lasts for about 4 hours and needs to be charged again.' (MS99)

Such challenges are unequally distributed across the student population and beyond the amelioration of teaching staff.

Attitudes towards justice under ERT

Students showed strong awareness that they require support to attain equitable access to the internet:

> '[I] am willing to comply if we are going to be given Wi-Fi allowance.' (MS140)

Overall, staff supported ERT as an appropriate response to the teaching and learning challenges caused by the pandemic, saying that:

> '[o]nline training should [be] the way forward' (Fac06) and '[w]e can encourage distant learning.' (Fac60)

Their comments highlight various inequities, however. Some staff used familiar face-to-face pedagogies via Zoom or Teams, tacitly abandoning the aim of equity. Others aimed to increase equity through adapted pedagogies and delivery methods:

> 'I think most students … will have access to social media (mostly WhatsApp) so we have to explore it more and make it work as it may be the most pragmatic way to get learning material and any other communication to students.' (Fac43)

Other teaching staff directly rejected ERT because of the accessibility gap:

> '[u]ntil I see the data I am concerned that a quarter or more of the students will not have the connectivity and/or financial wherewithal to meaningfully participate.' (Fac26)

Discussion

The digital divide is a global challenge, not only an issue for low- and middle-income nations. The COVID-19 pandemic exposes variations of WiFi access and affordability, digital equipment access and electronic information literacy in countries including Australia, the USA, those in the EU,[16-18] as well as in sub-Saharan Africa.[19-21] Although classed by the World Bank as an upper-middle-income country, Botswana has a Gini index of 60.5, the fourth highest in the world,[22] indicating an extreme gap between citizens with low and high incomes.

We sought to explore the readiness of the FoM to develop a fair and just ERT programme. The high response rate provided somewhat representative concrete data. In general, teaching staff had better, but not total access to devices and university facilities, which enabled their participation in ERT. Students had reasonable access to devices and study materials, but faced significant challenges with internet access and speed. The skills and software needed to facilitate this access when at home, where some students' environments were not conducive to learning, were also challenging.

Our findings suggest the conceptual power of Rawls' theory of justice as fairness in preparing for a fair and just ERT programme. From the beginning, Rawls' first principle – that of the right to equality in ERT – was accepted. The second principle was more challenging: designing a structure that would ensure that the opportunities for ERT would be equitably distributed, particularly benefiting students with the least access. Our findings also complicate the notion of a single digital divide, with challenges to learning ranging from inequitable internet access to a mismatch in digital skills across generations between staff and students.

The South African Association of Health Educationalists recommend that ERT programmes be simple, low technology, mobile friendly and asynchronous rather than synchronous.[6] These recommendations apply to low-income countries, but our study in an upper-middle-income country confirms that designing ERT according to the needs of students from resource-challenged homes, who are disadvantaged by the lack of access to devices, connectivity, and learning materials, is a prerequisite for justice as fairness.[2,5]

Our ERT needs assessment proposes ERT guided primarily by this disparity of means, and the need to find a structure that would ensure a fully adequate scheme of equal basic rights to the entire group, while distributing opportunities equally, and particularly benefiting the least advantaged members of the relevant group.[23] The study emphasises how constraints external to an ERT programme can be defining of its success and fairness; in our case the defining constraint was internet access. Many students reported that they could not afford data for several hours per day in the long term. The university did attempt negotiations with data providers and after many months obtained some limited financial support, but not before the return to campus. Without access to the internet through data or campus networks, equitable ERT is almost impossible.

The study findings and literature suggest that students and staff need university information technology (IT) support in moving to a new way of learning and teaching,[24-26] most notably training in using appropriate applications (apps).[27] Student skills were not sufficient to use synchronous platforms and they did not use email on a regular basis (Tables 1 and 2). These disadvantages, along with the high cost of reliable internet access, meant that the social messaging app, WhatsApp, would possibly be ideal because it would support the 'cheaper' mobile data bundles that most students use for internet access (Table 1). This situation has implications for pedagogy: study material must be 'data light', e.g. Word documents, as many students would be unable to access videos and large PDF documents (Table 2). Staff would also require training in using WhatsApp and adapting its functionality for teaching. Teaching practical skills remotely would be challenging while students are learning remotely.

Although justice as fairness can be the directing goal (no system achieves it perfectly),[23,25,28,29] we should not expect to achieve it perfectly in the current emergency situation. While it might be tempting to resort to a utilitarian approach, institutions should rather consider a justice as fairness approach as recommended by Rawls, to ensure equitable access to learning for all students.

Study strengths and limitations

Strengths of this needs assessment included the high response rate among students and staff. The up-to-date representative data from staff and students regarding their preparedness for ERT, enabled evidence-based practice. The implication of this work is that when ERT is designed, fairness and equity for the most disadvantaged students should be considered. Our needs assessment process for ERT could be a model for other universities, particularly those with poor infrastructure, during another pandemic-like situation.

Limitations of the study include the absence of formal piloting and validation of the tool due to the emergency state during which this needs assessment was conducted, and the exclusion of support staff in the process. Future research could consider studying what steps the university should take to remedy the deficiencies found in this research, and the students and staff satisfaction with ERT that resulted from the needs assessment.

Conclusions

Fair and just medical education was critically important during the uncertain time of the 2020 COVID-19 global pandemic. Rawls' principle of justice as fairness provides a possible theoretical grounding for deciding whether particular technical and educational solutions would be acceptable. The 2020 pandemic will not be the last emergency faced by Botswana and other countries with similar economic structures. Therefore, the data gathered in Botswana provide a useful snapshot that can influence educators and governmental authorities locally and across the continent to press for wider, stronger and more affordable WiFi coverage in the country, as well as improved digital infrastructures in educational institutions, with increased support for students.

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