International Journal of Mobile and Blended Learning
Volume 14 • Issue 3

Digital Literacy Needs for Online Learning Among Peri-Urban, Marginalised Youth in South Africa

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ABSTRACT

As online learning modes become more common, this can exacerbate educational inequalities for learners who do not have the ability to utilise these modes effectively. This has been seen in the COVID-19 crisis where there has been a shift to remote and distance learning modalities despite the limited ability for all learners to benefit equitably. In particular, digital literacy remains a fundamental barrier to benefitting from online and blended learning. This paper reports on a study that investigated the digital literacy needs and preferences of peri-urban, marginalised youth when utilising online and blended learning in South Africa and how online education platforms can be designed to better suit such groups. It is argued that for online courses to truly support marginalised groups, it needs to be ensured that these learners are digitally equipped and digitally literate in terms of accessing, utilising, and benefitting equitably from online learning.

KEYWORDS

Access, Benefit Equitably, Blended Learning, COVID-19, Critical Digital Literacy, Digital Divide, Internet Literacy, Mobile, Online Course, Peer Support, Self-Directed Learning, South Africa, Use

INTRODUCTION

As online learning modes become more common, this can exacerbate educational inequalities for learners who do not have the ability to utilise these modes effectively. This has been seen in the COVID-19 crisis where there has been a shift to remote and distance learning modalities despite the limited ability for all learners to benefit equitably. In particular, digital literacy remains a fundamental barrier to benefitting from online learning.

This research is situated in the South African context, where colonialism and apartheid, followed by insufficient attempts at reform, have resulted in one of the most unequal countries in the world, with a Gini coefficient of 0.6 (World Bank, 2019). Educational inequalities have been exacerbated by neoliberal policies in education such that 'the post-2000 higher education system has perhaps become even more elitist than it was prior to 1994, with social class now acting as a major "stalling" force on the revolution in African enrolments.' (Cooper, 2015, p. 248).

This paper reports on a study which investigated the digital literacy needs of peri-urban[1], marginalised[2] youth[3] when utilising online and blended learning in South Africa and how online education platforms can be designed to better suit such groups. It responds to the research question:

DOI: 10.4018/IJMBL.310940 *Corresponding Author

What are the needs and preferences of peri-urban, marginalised South African youth regarding digital literacy for online learning?

The study was conducted as part of larger doctoral research which envisioned justice-oriented online education models for marginalised groups. This was done through investigating the extent to which Massive Open Online Courses (MOOCs), produced both internationally and locally, support (or could support) the needs, preferences, and aspirations of marginalised South African youth and address the material, cultural-epistemic, political, and geopolitical injustices they face (Adam, 2020).

The study involved facilitating one-day online courses in-person with 250 predominantly non-university, marginalised youth across five different peri-urban, under-resourced contexts. The author developed this regional online course along with colleagues from Khwela, a social venture that the author co-founded, which aims to provide marginalised groups in South Africa with access to online courses to educate and empower them, and moreover to assist them in finding employment. Similarly, the author was able to access computer centres in peri-urban areas through Siyafunda (isiZulu for 'we learn'), an organisation she had previously worked with, which provides community centres that have computers and internet access in under-resourced areas in order to promote learning and develop essential digital skills.

This chapter presents findings from three sources. Firstly, observations and reflections running and facilitating the online course. Secondly, pre-course surveys investigating participants' technological access, usage, and online learning preferences. Lastly, a post-course feedback survey sharing participants' reflections on the online learning experience.

This paper argues that for online courses to support marginalised groups truly, it needs to be ensured that these learners are digitally equipped and digitally literate in terms of *accessing, utilizing,* and *benefitting equitably* from online learning. This means considering their *access* to technological devices and educational platforms and their ability to *use* these devices for learning, which includes acknowledging their preferences in online learning and their perceptions of online learning. Importantly, barriers to *benefitting equitably* need to be addressed which means acknowledging factors such as gender, age, employment, educational background, neighbourhood, and household income within the design (Rohs & Ganz, 2015).

CONCEPTUAL FRAMEWORK

This study draws on digital divide theories to illustrate the inequalities in digital literacy. In 'Rethinking the Digital Divide', Warschauer (2003, p. 6) argues:

'Meaningful access to ICT comprises far more than merely providing computers and internet connections. Access to ICT is embedded in a complex array of factors encompassing physical, digital, human and social resources and relationships. Content and language, literacy and education, and community and institutional structures must all be taken into account.'

Thus, when exploring digital literacies for online learning in this paper, a key aspect is understanding it within the social, cultural, economic, and political contexts.

This study draws on the work of Rohs and Ganz (2015) as a conceptual framework. Rohs and Ganz (2015) use Knowledge Gap Theory, which argues that information is absorbed differently by recipients depending on their socio-economic status (Tichenor et al., 1970). This is due to the privileges that those with higher socio-economic status have, and how these factors interrelate and reinforce each other.

Rohs and Ganz (2015) identify three aspects in relation to the Digital Divide: the Access Gap, Usage Gap, and Reception Gap. These are unpacked here in relation to digital literacies and the contexts they evolve in. The Access Gap refers to inequalities in access. As of 2020, only 39.3% of Africans have internet access compared to 87.7% of Europe and 95% of North Americans.[4] This disparity is

mainly attributed to a lack of resources and infrastructure. Where facilities exist, there are inequalities in bandwidth distribution, price and internet speed, which are further shaped by socio-economic factors of gender, age, employment, educational background, neighbourhood, rurality, and household income (Rohs & Ganz, 2015). Furthermore, the intersection of these factors reinforces inequality. For example, in high-income countries, the gender gap for access to connectivity is marginal at 2.3%, but in low- and middle-income countries that gap is 7.6%, and in both cases men have more access than women (ITU, 2016).

The Usage Gap refers to how those with access make use of digital technology. This usage depends on, and is limited by, the individual's basic computer literacy skills, educational level and languages spoken, among other factors (Rohs & Ganz, 2015). For example, one's typing speed or familiarity with a graphical user interface will impact one's experience of learning through digital devices. The Reception Gap deals with an individual's ability to interpret information, in comparison to others with the same information, based on their socio-economic background. For example, a high level of information literacy is needed in searching and sorting through the flood of information available online to determine what is useful, factual, and relevant (Liyanagunawardena et al., 2013). Those with higher socio-economic status are able to extract this information better due to broader knowledge bases, better formal education, more social contacts and networks, better ability to select, sort and interpret information, and more opportunities to connect and act on information received (Rohs & Ganz, 2015). Those with higher socio-economic status thus obtain greater educational benefits. Drawing on this framework, this chapter analyses digital literacy for online learning in terms *of accessibility, utilization,* and ability to *benefit equitably*.

BACKGROUND AND RESEARCH METHODS

Fieldwork Sites and Sample

As the aim of the study was to understand digital literacy needs and preferences of marginalised youth, fieldwork sites where one could access such marginalised youth were chosen. Due to the legacy of the Group Areas Act which segregated South Africans according to their race, historically-black areas are still the poorest and most under-resourced in terms of infrastructure and amenities. Five fieldwork sites – Cosmo City, Inanda, Ivory Park, Mankweng and Umgababa – were thus chosen in these marginalised historically black areas.

To illustrate the differences between historically black and historically white regions, Cosmo City, which has a 97% black population, can be compared to its neighbouring region, North Riding, which has a 53% white population. Cosmo City has a population density of 4476.06 per km^2 whereas North Riding has a population density of 236.50 per km^2 (Frith, 2011). This is just one indicator of the differences in living conditions, let alone differences in infrastructure, services, and amenities.

The sample group correlated with the population demographics of the fieldwork sites and was deemed a representative sample of the population in terms of race, languages spoken and socio-economic status (Adam, 2020). In the case of gender, however, 79% of participants were female, which differed from the population demographics where the number of females and males were approximately equal. In the study design, gender was not an aspect that was controlled for in the selection process and so the dominance of female participants happened organically. Due to there being approximately four times more female participants than male participants, meaningful comparisons cannot be made along the line of gender. However, the dominance of female participants may indicate that females are more aspirational in wanting to attend the course and/or have a greater likelihood of being unemployed and thus have the time to attend the course on a weekday. Regarding the absence of males, participants were asked why there were so few men and three answers were given: 1.) many men are involved in drugs; 2.) the men are not interested in attending such a course; 3.) the men are working and cannot attend the course. The lack of involvement from males needs further research but is beyond the scope of this study.

Finding a computer centre in peri-urban regions is rare but due to the author's prior work with Siyafunda, she was able to gain access to such centres. Siyafunda has over 80 Computer Technology Centres (CTCs) in marginalised communities. The author requested and was graciously partnered with five centres that were 1.) in peri-urban regions; 2.) in a variety of provinces; 3.) had 20 – 30 computers; and 4.) had or could have access to the internet.

The One-Day Regional Online Course

The regional online course, developed in conjunction with Khwela, was conducted in the five fieldwork sites as a one-day course. This was done in batches of 20 – 30 students per day on days that the course was advertised as being conducted at a particular site. An example of the Khwela posters used to advertise the course is given in Figure 1. This poster was sent to the Siyafunda CTC staff, who, advertised the courses in the community through WhatsApp and word of mouth.

Figure 1. Poster used to advertise the course. Source: Author's own

The course was designed simply on the WordPress Learning Management System (LMS) called LearnDash. LearnDash scales to be usable on computers, tablets, and mobile phones, which proved more useful than imagined. The platform had some drawbacks for use in this context, such as the inability to work offline, but was deemed acceptable overall.

Prior to the course design, Khwela held a human-centred design workshop with marginalised youth to ensure the experiences of marginalised youth were incorporated into the course design from inception. Details will not be expanded on here out of a need for brevity. As the course was designed with under-resourced contexts in mind, content was predominantly in the form of text and pictures, with a few short, optional videos. isiZulu voice-overs were added to the videos before going to the Kwa-Zulu Natal province to test whether participants would appreciate this. The course was free to access[5] online but was not advertised beyond the scope of the research as the intention was to build a proper platform from the findings of the study.

The study consisted of a full-day course with participants. The beta online course was called 'Basic Career Development'. The schedule comprised of 1) participant registration; 2) verbal introduction to the course and the day's schedule by the facilitator; 3) completion of online pre-course surveys, completion of a baseline test; 4) undertaking the course online; 5) completion of an endline test; 6) and lastly, completion of the online feedback survey at the end. The course was designed to be blended

in that the participants would complete the online course on their own but also have facilitated group discussions at various points in the day. The role of the facilitator was to provide technical support and facilitate group discussions; no formal teaching was done by the facilitator. The CTC staff informed the participants beforehand that the course was a study, reiterating this at the beginning of each full-day course when consent was obtained.

The study did not aim to analyse the content of the course, but rather participants' experiences of doing the course. However, the course content does intertwine with the overall research and is referred to when necessary.

Surveys

The surveys were done digitally through Google forms which were embedded into the online course. This eased the data collection process, but there were some shortfalls. Data was lost if the internet or power was cut,[6] and participants who struggled with typing and English may have given shorter or unclear answers.

Selected findings from the pre-course 'Technology Survey', 'Education and Employment Survey', and the post-course 'Feedback Survey' are presented in the findings of this paper. Information from the 'Background Survey' is highlighted in the following section. The surveys aimed to ascertain participants' *understandings*, and thus perceptions as opposed to facts are presented. A summary of the survey themes can be found in Figure 2.

Figure 2. Summary of themes in surveys. Source: Author's own

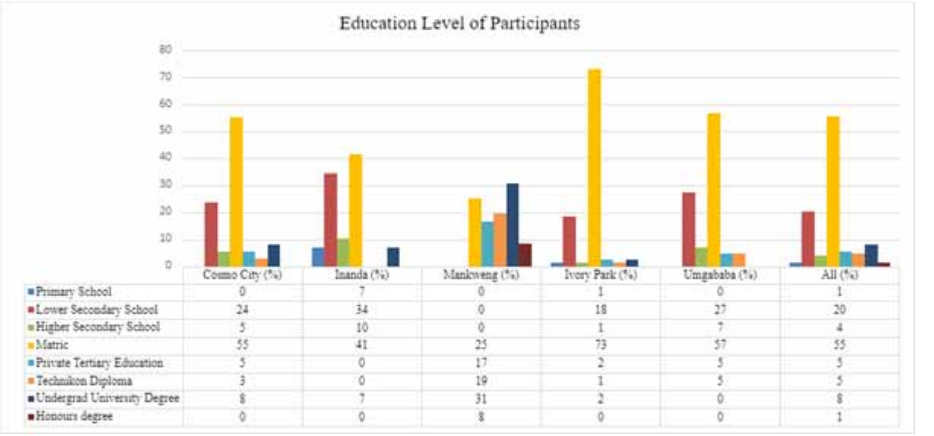
Participant Demographics

As the study was being conducted in historically black peri-urban areas, it was likely that the participants would be from low socio-economic backgrounds, have low education levels and

experienced other intersectional disadvantages that would contribute to their marginalisation. These factors were verified in the surveys to ensure that the 250 participants fit this description.

Figure 3 shows the educational levels that participants are pursuing or have achieved. Nineteen per cent of participants have continued with further education after high school. This percentage is higher than normal due to the Mankweng site having more university students in the sample group due to the CTC venue being based at a university.

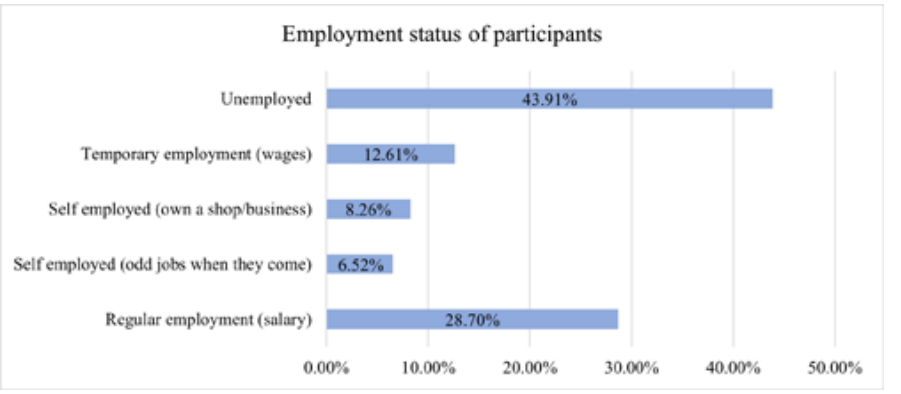
Figure 3. Education level of participants. Source: Author's own



	Cosmo City (%)	Inanda (%)	Mankweng (%)	Ivory Park (%)	Umgababa (%)	All (%)
Primary School	0	7	0	1	0	1
Lower Secondary School	24	34	0	18	27	20
Higher Secondary School	5	10	0	1	7	4
Matric	55	41	25	73	57	55
Private Tertiary Education	5	0	17	2	5	5
Technikon Diploma	3	0	19	1	5	5
Undergrad University Degree	8	7	31	2	0	8
Honours degree	0	0	8	0	0	1

Figure 4 shows the employment status of the participants. The 44% unemployment rate of participants is slightly higher than the youth (15—34) unemployment rate of 40% of the country (Statistics South Africa, 2019). This may be due to the course content targeting those seeking job opportunities.

Figure 4. Employment status of participants. Source: Author's own



As a further indicator of intersectional difficulties, it was found that 43% of the participants were raised by single mothers. This loosely correlates with national statistics of 43% (Caxton Central, 2019). It was also found that 41% of the participants were now single parents themselves.

The descriptive data of the sample of peri-urban, marginalised, youth illustrates the difficult conditions these groups face in terms of low formal education levels, low levels of employment and being raised by a single parent and then being single parents themselves.

FINDINGS AND ANALYSIS

Findings are presented from three sources: observations, pre-course survey findings and post-course survey findings.

Source 1: Observations

The observations from the study are crucial to understanding the participants, the context and the socio-technological context that framed the study. The observations reflect on incidents that happened during running the in-person, online course programmes as they relate to digital literacy. As the observations qualitatively reflect on what was seen and experienced in real time at the one-day courses, they are not measured and quantified. Thus, terms likely 'many' and 'some' are used to illustrate what was observed.

Concerning Access

Lack of Email Addresses and Privacy Issues

Although the advertisement asked for participants to have working email addresses set up, at least half of the participants across locations did not have an email address. For those that did, some forgot the password. Gmail accounts were set up for these participants. However, this was not an easy task and caused delays. Accounts needed to be verified through a phone number and not all participants had their phones or knew their phone numbers. Some participants would forget their passwords during the day and need to create new ones. The lack of email addresses illustrates the first barrier to accessing many 'free online content' sites. Furthermore, by encouraging participants to sign up to Gmail, the author was incorporating those who have thus far managed to have a low digital footprint into the digital world where their data is tracked.

Infrequent Internet Usage and Erratic Internet Connection

To protect all the Google form surveys from spam, the author added a Google reCAPTCHA feature where the user ticks the 'I'm not a robot' checkbox. Due to the lab computers having infrequent internet connection and multiple users, reCAPTCHA had a problem identifying the users as humans. It thus presented a series of image identification tests that wasted time and frustrated participants. Although this feature was annoying, it was kept as it ensured an internet connection before a user submitted; if the 'I'm not a robot' button could not be checked, it meant the internet was down and needed to be reconnected. Creating features/tools that can hold offline information – and synchronise later when there is connectivity – is thus crucial in internet-erratic places.

Concerning Utilisation

Varying Computer Literacy Levels

Despite basic computer literacy being a specification in the advertisement, participants with completely varying levels of computer skills attended. On the one hand, some participants, who were students at the CTCs, helped with difficult networking issues setting up the venue. On the other hand, the author had to teach some participants how to hold and move a mouse. While many participants knew how to use a smartphone, and thus were familiar with touchscreen user interfaces, the keyboard was a difficult interface to grapple with for many. For example, holding the 'shift' button to type '@' was a difficult lesson. Tasks like identifying buttons, blue underlined text indicating a hyperlink, or

drop-down arrows for more selections, were not common knowledge and needed to be explained. However, once participants were taught these basic skills and user interface features, they proceeded independently, albeit slowly.

Internet and Critical Digital Literacy

While computer literacy was relatively easy to pick up, internet literacy and critical digital literacy proved far more difficult. Some of the difficulties included dealing with pop-ups, software updates, anti-viruses notifications and default browser questions. Many of these were due to the computers not being connected to the internet regularly. Participants, understandably, struggled to tell what was part of the course, and what was a random pop-up or link that was unrelated and should not be clicked. As one becomes familiar with the internet, one can filter out adverts and other distractions, but many participants were not able to do this yet. Multiple tabs were also hard to manage as participants would panic thinking they had lost all their information if a blank tab had opened. Navigating through the online course buttons was also not intuitive, which is something for user interface designers to consider. More explicit signposting was needed such as, 'Click the green NEXT button below to proceed'.

Concerning Benefitting Equitably

Blended Learning Did Not Work as Planned

The course was intended to be run in a blended learning style, with time allocated for individual learning online, discussion with peers, and class reflections at various points in the day. Given the varying levels of computer literacy and English fluency, this was not possible as some students would race ahead if they could type fast and speak English fluently, whereas others required more time to think and type. Older participants tended to be far less digitally savvy in comparison to younger participants, although there were still many younger participants who also struggled. Whilst peer-to-peer learning did not happen in the organised way that the author had planned, participants continuously chatted and helped each other throughout the day, asking each other for help before asking the author. After being taught how to Google a word if they did not understand it, the author observed participants doing this on countless occasions instead of asking others what it meant. This allowed them independence and self-directedness in their learning, which they chose over asking for help.

Source 2: Pre-Course Surveys

Selected findings from the technology survey and education survey are presented.

Concerning Access

Access to Computers and the Internet

Figure 5 outlines where participants access computers and the internet. The most common answer for computer access was 'at an internet café' (153, 65%), followed by 'at a library' (119, 51%). A similar pattern was seen in terms of internet access. Fifty-seven participants (24%) indicated they owned a computer. 'At work' was the least likely place to access a computer (22, 9%) or the internet (19, 8%) indicating either that participants are unemployed or do not do jobs that involve computers.

Ownership of Phones

Participants' ownership of mobile phones or smartphones is presented in Figure 6 and Figure 7. Two hundred and two participants (86%) had access to a mobile phone, while 176 (75%) had access to a smartphone. A further 13 (6%) had mobile phone access through a friend or family, and another 34 (14%) had smartphone access through a friend or family. This correlates with findings from the Pew Research centre, which reports 75% mobile penetration for groups who have secondary education and above (Silver & Johnson, 2018).

Figure 5. Access and ownership to computers and the internet. Source: Author's own

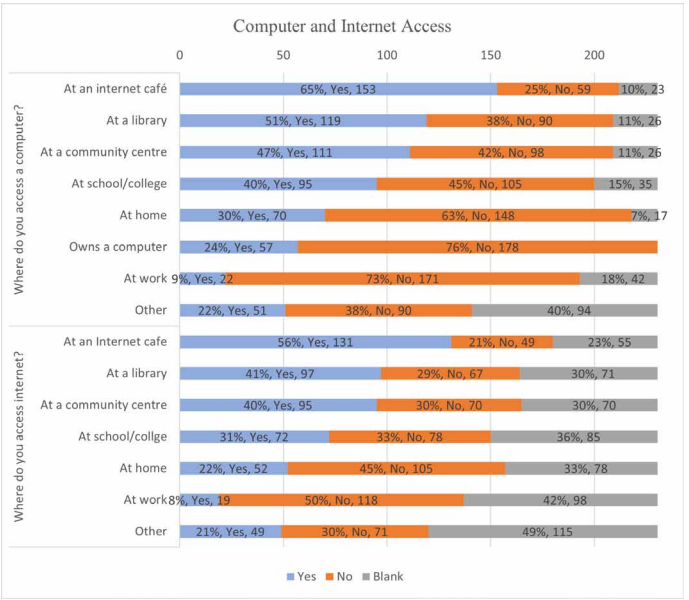


Figure 6. Responses to 'Do you have mobile phone?' Source: Author's own

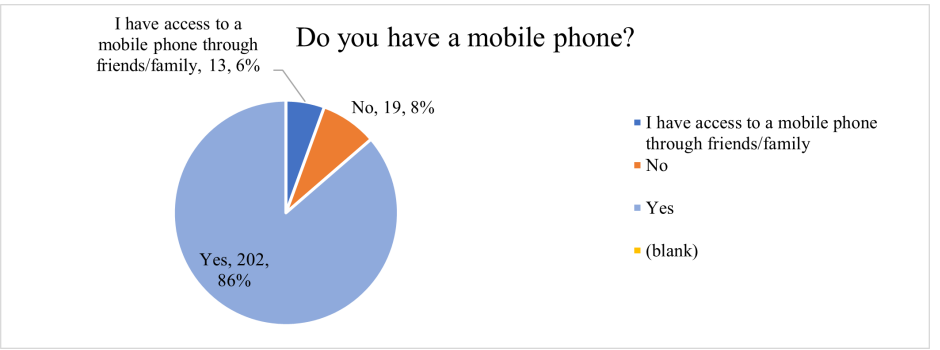
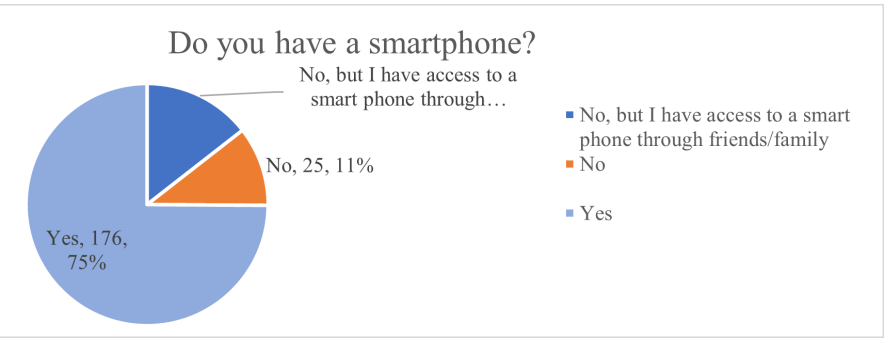


Figure 7. Responses to 'Do you have a smartphone?' Source: Author's own



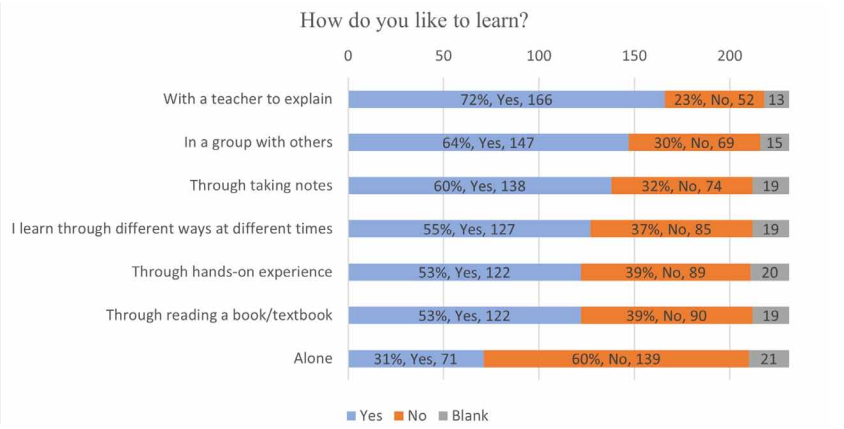
These findings tell us that mobile phones are a better option than computers to support this marginalised group in accessing digital and online learning opportunities. To reach the largest portion of this marginalised group, it is also important to design for access through non-smartphones i.e. through mobile Wireless Application Protocol (WAP). Furthermore, since not everyone owns a device, the ability to access one's user account on different devices (e.g. at an internet café or library) is essential.

Concerning Utilisation

General Learning Preferences

Figure 8 shows ways in which participants like to learn, unrelated to technology. The two highest preferences were learning with a teacher to explain (166, 72%) and learning in a group (147, 64%). By contrast, only 31% of learners liked learning alone.

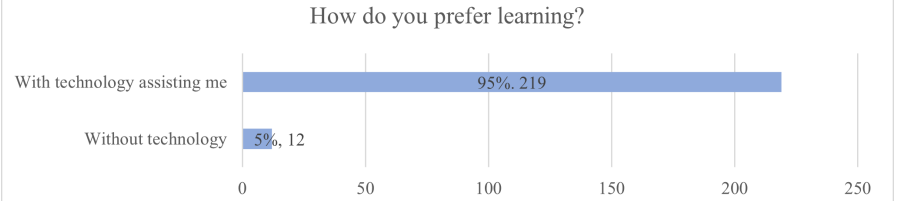
Figure 8. Responses to 'How do you like to learn?' Source: Author's own



Digital Learning Preferences

Before the online course was undertaken, participants were asked about their digital learning preferences. Figure 9 shows that 219 (95%) participants preferred learning *with* technology assisting them as opposed to without it.

Figure 9. Responses to 'How do you prefer learning?' Source: Author's own



These findings show that while there is less aversion to using technology in learning, the individualised human-lacking element of online learning is not preferable. The preference for learning with support from a teacher or peers indicates that online learning might best be supported by in-person peer learning groups.

Concerning Benefiting Equitably

Learning through Online Courses

Participants were asked whether they would be open to learning through online courses. As can be seen in Figure 10, 65 participants (52%) were open to online learning, 42 (33%) thought it depended on the subject matter, and 19 (15%) were not open to it at all.

Figure 10. Responses to 'Would you be open to learning through an online course?' Source: Author's own

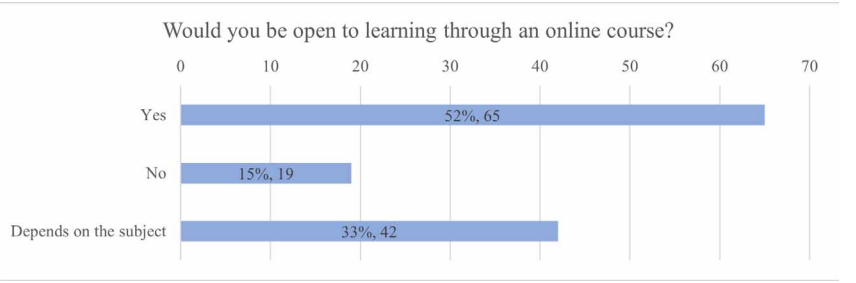


Table 1 gives a breakdown of various reasons regarding participants' openness to learning through an online course. Although participants differed in their willingness to take online courses, similar reasoning sometimes overlapped across all three opinions (i.e. yes, no, or depends). Thus the reasons are mapped to the responses in Figure 10 and are presented together in Table 1.

Participants who were less inclined[7] to online courses stated that they preferred a teacher to engage with and ask questions (11 depends, 5 no), preferred group learning in a classroom environment (1 depends, 4 no), preferred practical, hands-on learning (2 depends, 3 no), and were concerned that they might be scammed (3 no). The concern about being scammed correlates with the observations raised under Source 1 about the need for internet literacy, beyond computer literacy.

Answers more inclined[8] towards pursuing online learning indicated that it would bring flexibility (14 yes, 1 depends), ease and efficiency (14 yes), quick access to knowledge (3 yes),[9] opportunity to learn more through online (3 yes), save money (2 yes),[10] and improve job prospects (2 yes) among other reasons. Those that had confidence in their ability to learn independently (5 yes), had undertaken distance learning (2 yes), or liked experimenting (3 yes), were more open to online learning.

Some participants mentioned reasons that were similar although they differed in their willingness to learn through an online course,[11] for instance, in terms of needing more information about online learning (2 yes, 3 depends, 2 no) and fearing not understanding the course (1 yes, 1 depends, 1 no). Technological concerns such as lack of hardware (1 yes, 3 depends, 1 no), connectivity (1 yes, 3 depends, 1 no), and computer literacy (1 yes, 3 depends) were raised. However, they were not ranked as highly as the aforementioned pedagogical and convenience factors. In fact, two participants looked at online courses as an opportunity to improve their computer literacy.

Pedagogical concerns about online learning were more dominant than issues of access or digital literacy. Those who have experience in self-directed or distance learning benefit more from online learning opportunities such as flexibility, saving money, saving time, and unlocking further opportunities. Those who require in-person support during learning and lack critical digital literacy are less likely to pursue online learning. This shows that to benefit from online learning opportunities fully, digital learning methods and critical digital literacy need to be acquired, beyond digital literacy. This was also reflected in the requests for more information about what online learning is and how to use it.

Table 1. Reason for wanting/not wanting to learn through online courses. Source: Author's own

Why would you, or would you not, be open to learning through an online course?	Description	Example	Would you be open to learning through an online course?			Total
			Yes	Depends	No	
Teacher	Needs a teacher and needs to ask questions	"I want a teacher in front of me so that i will be able to understand more" (P134P26FZU)	0	11	5	16
Flexibility	Saves time, can work and study, reduces travel time	"I can work and learn through online" (P242U00FZU)	14	1	0	15
Easier	Perceived as easier/more efficient	"Online make life easy" (P230U33FZU)	14	0	0	14
Information needed	Require more information about online courses	"because now i dont have information about learning on line" (P165P30FVE)	2	3	2	7
Depends	Depends on the subject and guidance needed	"some subject are very hard need guidance" (P211U22MZU)	0	6	0	6
Classroom environment	Prefer group learning/classroom environment	"I like learning in a class for incase ,I need some help during my course" (P132P36FTW)	0	1	4	5
Connectivity	Concerns of network connectivity & data costs	"Because of data and the network sometimes doesn't work well" (P245U19MZU)	1	3	1	5
Need practical	Prefers hands-on, practical learning	"I prefer hand on learning" (P177P23FXH)	0	2	3	5
No hardware	No computer or smartphone	"it because idont have smart phones or laptop" (P260)	1	3	1	5
Self-directed learner	Already a self-motivated, independent learner	"I'm a fast learner so I don't mind learning online" (P237U32FZU)	5	0	0	5
Not tech-savvy	Not computer literate enough	"am not perfect on using computer" (P184P32FNS)	1	3	0	4
Quick access to knowledge	Instant access to world of knowledge	"Because it easy access information it saves a lot" (P215U30FZU)	3	0	0	3
Experimental	Likes to try to things	"because i like to try many thing in my life" (P200P28FZU)	3	0	0	3
Learn more online	Learn more online than in textbooks	"Becouis u learn more infonmetion than book" (P199P22FZU)	3	0	0	3
Scam	Concerned they might be scammed	"I would not know that its a scam or not" (P179P22FTO)	0	0	3	3
Won't understand	Concerned they cannot understand alone	"because i wont understand some of the things" (P190P22FSW)	1	1	1	3
Cheaper	It will be cheaper	"Because it saves interms of spendings" (P205U32FZU)	2	0	0	2
Experience with distance learning	Prior experience with distance education	"because i'm used to self driving as i also did my degree through distant learning" (P159P41FXH)	2	0	0	2
Improve job prospects	Will improve job prospects	"I would love to gave extra skills while I am looking for a job" (P140P24FZU)	2	0	0	2
Full time	Prefer to learn full time in a class	"i want full time course to know more information" (P130P24FNS)	0	1	1	2
Opportunity to increase computer literacy	Opportunity to increase computer literacy	"It will gave me a chance to learner how to studying a computer" (P225U26FZU)	2	0	0	2
Teach others	wants to learn to teach others	"I would, just to teach others" (P207U26FZU)	1	1	0	2
Difficult	Concerns of difficulty	"Its can be difficult" (P248U20MZU)	0	1	0	1
Digital age	Embracing the digital age and digitalising learning	"because at the age of this its asimply way to do it" (P180P27FTO)	1	0	0	1
English	Concerns of language barriers	"Because of my English" (P243U00FZU)	0	1	0	1
Helpful	Perceived as helpful	"it is going to help me" (P126P26FTO)	1	0	0	1
Not online	Subject knowledge not online	"Because most of my subject are writhing in papers" (P220U29FZU)	0	1	0	1
Notes	Prefers note taking	"some you have to take notes" (P150P24FTO)	0	1	0	1
Privacy	Concerned about privacy	"private matters" (P158P23FTO)	0	1	0	1
Smartphone access	Has smartphone access	"Because i do have a smartphone" (P170P31FSO)	1	0	0	1

Source 3: Post-Course Surveys

After the course, a feedback survey was completed by participants, asking for reflections and suggestions.

Suggested Improvements

In response to the question of how one would improve the course, participants shared both general and pedagogical suggestions. A thematic summary of the suggested improvements can be seen in Table 2.

Table 2. Suggested improvements. Source: Author's own

Suggested Improvements	Code	Frequency
Prefer shorter course	Length & Level	18
Nothing needs to be changed	Nothing	15
More time to complete course	Length & Level	13
More videos	Content format	9
More classroom, oral and non-digital interaction	Interactivity	7
More small group tasks	Interactivity	6
Shorter and fewer questions	Length & Level	6
Computer skills needed first	Barriers	4
Simpler language and instructions	Barriers	4
Fix and improve video-playing	Content format	3
Ensure the course reaches others	Barriers	3
More one-on-one personal support	Guidance	3
More graphics and visual aids	Content format	3
Provide more content	Length & Level	3
Control class rowdiness	Guidance	2
Provide more examples	Length & Level	2
Provide more facilitators to assist	Guidance	2
Include more quizzes and feedback	Interactivity	2
Include other language options	Barriers	2
Limit screen time for those with eye difficulties	Barriers	1
Include harder questions	Length & Level	1
Improve the quality of the images	Content format	1
Make it less mentally exhausting	Length & Level	1
Include more articles	Length & Level	1
Include more audio	Content format	1
Have more rests and breaks	Length & Level	1
Provide more computers	Barriers	1
Provide more instructions and guidance	Guidance	1
Have more class lessons and teaching	Interactivity	1
Remove videos	Content format	1
Include more summaries	Length & Level	1
Make use of class instruction and projector more	Interactivity	1

Source: Author's own

Length and Difficulty of Course

The comments on shortening the course (18), having more time (13), and shortening questions (6) were very apt. Due to time-consuming technical activities such as setting up email addresses or fixing the internet connection, there was reduced time for participants to work. There were, however, a few suggestions to have *more* content, lessons, examples and articles, which indicated that some participants wanted to increase their depth of understanding. These contradictory suggestions highlight different education and self-directed learning levels of participants. Personalised adaptive learning paths in online courses can assist in catering to different learning levels and speeds.

Guidance

Some participants wanted more one-on-one support (3), more control of the class (2), more facilitators (2), and more instructions and guidance (1). One of the parts of the course that was enjoyed the most was *'[w]hen the instructor was presenting'* (P095M25MNS). This was normally done when the author explained something practically using the projector, whilst engaging the class. This style was appreciated by P102M25FNS, who suggested interaction *'[b]y operation via a projector for everyone to understand and work as a team'*. Other participants would have preferred facilitators to *'[m]onitor each and every student of the course'* (P113M21MBL). Also required of a facilitator was to control the class: *'The students musts have order to make it easy to learn it was a bit loud'* (P023C20FNS). These types of requests suggest that andragogic approaches, as described by Crosslin (2016), do not suit the participants despite them being adult learners. They prefer considerable educator support and guidance.

Classroom Interaction

Participants desired more classroom interaction (7) and more group work (6). These suggestions alluded to the need for more human interaction and mentorship, as opposed to self-directed, autonomous learning. P116M30MNS enjoyed *'having group discussion'*. P001C24FZU suggested including non-digital learning: *'not to make everything computer based. its tiring sitting in front of the computer for a long time'*. Similarly, P221U42MZU suggested that *'[s]ometimes we can do oral exercise so we can not forget'*. P138P26FZU suggested *'being more engaging than just having to answer the questions online'*. The participants were not used to spending a day in front of a computer, and this can be exhausting, as highlighted by P108M33FNS, *'my mind is tired reading the notes'*. Limitations to utilising online courses were mentioned, such as lack of computer skills (4), language (6), and difficulty for people with disabilities (1). P099M24FNS stated, *'[I] think the course is great but not for people with eye defects that cannot stand computer screen for too long'*.

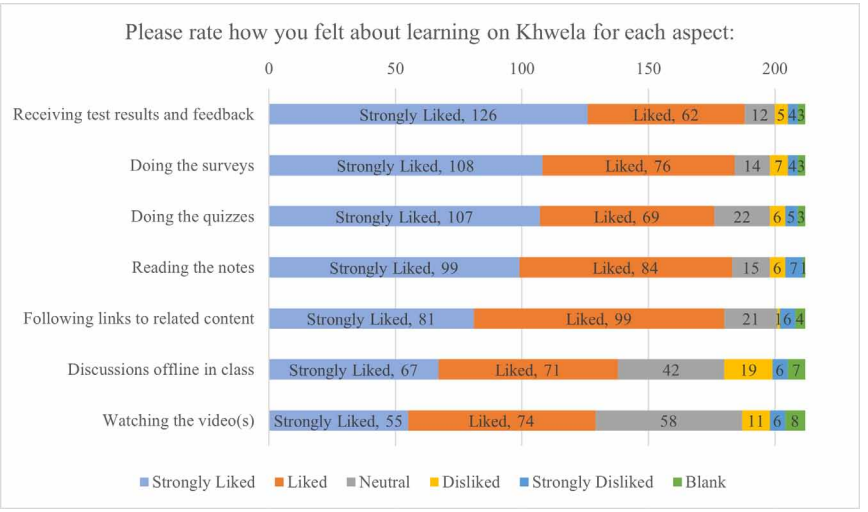
While participants requested more interaction, it is worth mentioning that the original blended-learning approach did include these aspects, but these fell away due to different levels of computer literacy and education in the classes. Also, given the amount of basic technical support that was needed in the class, there was little time for deeper one-on-one engagement or prompting critical thinking. As such, technical difficulties took time away from learning which is not uncommon in tech-enabled learning environments.

Learning Preferences

In rating the different learning methods offered in the course in (Figure 11), participants found receiving their test results the most beneficial. This may be because participants have seldom recieved feedback from their overworked teachers and poor-quality education. There was much more excitement and liveliness when participants got to the quizzes, multiple-choice questions and endline tests that gave feedback, as opposed to the self-evaluative and planning exercises. This indicates that gamified learning would further incentivise participants as they enjoy immediate feedback. Participants, however, began to by-heart the correct answers if they needed to resubmit, rather than truly understanding the rationale behind the task. Thus, while quizzes can be stimulating and motivating, more complex tasks are needed to ensure learning gains.

Watching videos was ranked relatively low compared to other learning methods because the video-watching experience was poor. Videos were less than 4 minutes in length as it was expected that the research sites would have poor connectivity.[12] One unforeseen problem was that YouTube was blocked at Mankweng due to the regulations of the University of Limpopo, where the course was run. Thus, Mankweng participants could not watch the videos at all. As P088M00FNS suggested in relation to this, *'The way to view videos should have many options other than you-tube'*. In other cases, desktops at venues didn't have headsets and if participants didn't have their own headphones with them, they could not listen to the audio. This shaped the suggestion that *'videos must play without*

Figure 11. Please rate how you felt about each learning aspect on Khwela. Source: Author's own

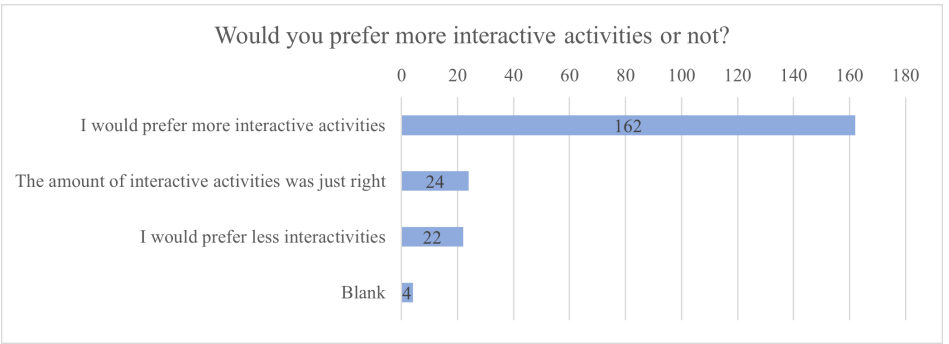


inserting headset' (P094M31FSO). This resulted in various conflicting opinions on the suggested improvements such as *'remove or reduce videos'* (P093M30FNS) and *'making use of more videos'* (P052I31FZU). While the experience of using videos in this course was not always enjoyed, 163 participants (76.9%) stated they would prefer more videos in the future.

Interaction Preferences

As the course required participants to help and support each other, interactivity was an important element. Figure 12 shows responses to the question of whether they would prefer more interactive activities or not. One hundred and sixty-two participants (76%) stated they would prefer more interactive activities, which correlates to the suggestions for improvements in the course. Twenty-two (10%) preferred fewer interactive activities, which indicates that accommodation should be made for the more pensive or introverted learner.

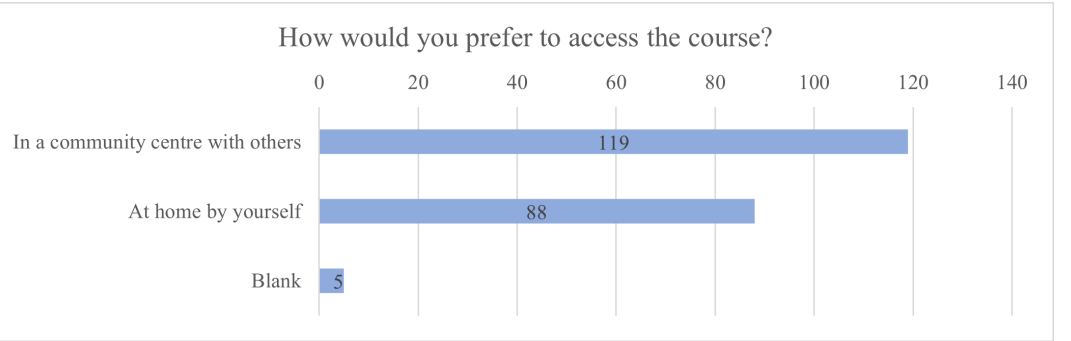
Figure 12. Responses to 'Would you prefer more interactive activities or not'? Source: Author's own



When asked to choose between accessing the course alone, or in a community centre with others, as in Figure 13, 119 (56%) preferred 'with others,' and 88 (42%) preferred 'at home,' which shows a

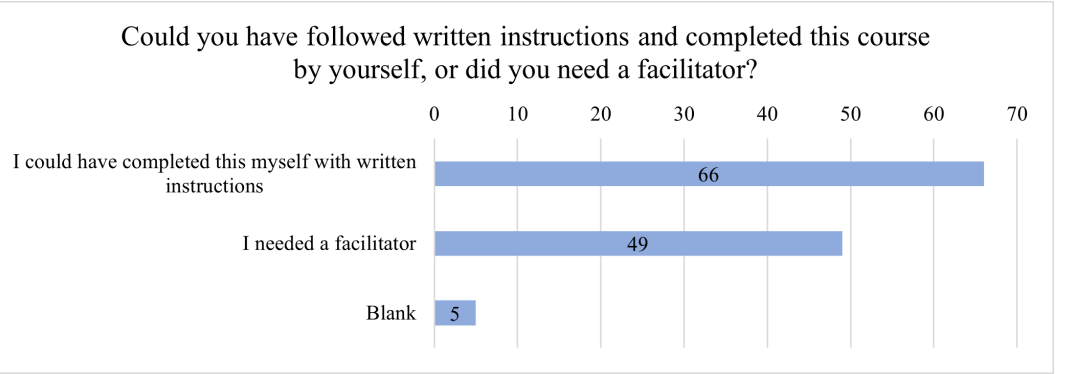
fairly divided opinion on this. Factors that could contribute to wanting to be in a community centre are access to resources and the internet as well as peer-to-peer support.

Figure 13. Responses to 'How would you prefer to access the course?' Source: Author's own



A final question asked whether participants needed a facilitator. Figure 14 shows that 66 participants (55%) thought they could have completed the course by themselves, whereas 49 (41%) thought they needed a facilitator. From the author's observations, more than 41% needed a facilitator. Almost every single person in the class needed assistance at some point, even if just for validation.

Figure 14. Responses to 'Could you have followed written instructions and completed this course by yourself, or did you need a facilitator?' Source: Author's own



When participants were asked if they would now do a Khwela course on their own, 175 (83%) responded positively, indicating that after getting information about online learning and experiencing learning digitally, they felt more confident in their digital learning abilities. Interaction was identified as an important element of learning for the participants as well as learning in community groups. Thus, online courses could be supplemented, either formally or informally, by in-person peer learning groups to support learners.

CONCLUSION

This study investigated the digital literacy needs for online and blended learning to support peri-urban, marginalised groups in five regions in South Africa. The study involved 250 participants attending facilitated, one-day in-person online courses. Observations, pre-course surveys and post-course surveys were analysed through three levels identified as necessary to unpack digital literacy needs for online courses to support marginalised learners: *access, utilization,* and *the ability to benefit equitably*. At each level, barriers, and recommendations to overcome such barriers, are highlighted.

Regarding *access*, findings illustrate that we need to look beyond access to devices when considering the barriers to accessing online education. For example, many marginalised learners do not have email addresses and therefore lack access to education platforms that require email registration, even if they are free. Similarly, we need to look beyond lack of data for internet access; poor internet infrastructure that leads to intermittent and erratic connectivity makes it more difficult for learners with low digital literacy to learn online. Furthermore, infrequent internet users must deal with more authentication tests (e.g. reCAPTCHA), popups and update requests that distract and confuse novice internet users. Such technical difficulties take time away from learning. To overcome some of these barriers, education platforms can address digital literacy needs by limiting advertising, being low-data, mobile-friendly, and accessible on non-smartphones. They should have offline modes that can be synced when there is connectivity.

Regarding *utilisation*, we need to look beyond basic digital literacy as participants seemed to pick this up reasonably fast. Instead, internet literacy and critical digital literacy are required as learners need to gain skills to safely navigate online spaces and develop a critical lens for dealing with information received online. Regarding using online education platforms, participants were less wary of the technological aspects and more concerned with the pedagogical aspects such as lack of human and in-person support from teachers and peers. To address the lack of interaction in online courses, in-person, peer-learning groups can provide human interaction, technical support and peer-to-peer learning.

Regarding the *ability to benefit equitably* from the online education provided, it was evident that learning experiences differed according to computer literacy levels, internet literacy levels, and critical digital literacy levels, English fluency, age and self-directed learning abilities. Learners who have these abilities (which often correlate with higher socio-economic status), stand to benefit more from the provisions. Participants who were less inclined to pursue online education cited lack of a teacher, classroom environment and guidance as their main concerns. For those who were more positively inclined, ease, flexibility in time, and lower costs were major factors. Those who were inclined seemed to be comfortable with their own digital literacy such that they could pursue self-directed and distance learning. To equitably respond to learners' digital literacy needs and preferences, online platforms and courses need to be designed to provide as much learner support and guidance along the way as possible, such that they guide learners in developing self-directed learning abilities. To cater for the varied levels and speeds of learners, adaptive learning paths could be beneficial, although this should be approached with caution so as not to increase inequalities between differently skilled learners.

In under-resourced contexts, it is particularly pertinent to ensure that social, cultural, economic and political factors do not further disadvantage learners who have differing digital literacy needs and preferences. As such, online courses need to be designed with intentionality to overcome the digital literacy barriers that can prevent learners from benefitting equitably. Likewise, initiatives that aim to develop learners' digital literacy need to go beyond basic computer literacy to develop internet literacy, critical digital literacy and the ability to guide one's own learning through complex digital spaces.

Conflicts of Interest

We wish to confirm that there are no known conflicts of interest associated with this publication and there has been no significant financial support for this work that could have influenced its outcome.

Funding Statement

No funding was received for this work.

Process Dates:

Received: September 23, 2021, Revision: December 5, 2021, Accepted: May 9, 2022

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ENDNOTES

1. 'Peri-urban' in South Africa refers to the informal settlements on the outskirts of major cities as a result of massive migrations from the countryside.
2. 'Marginalised' in this study refers to groups from historically black areas that are still the most socio-economically disadvantaged and who experience intersectional disadvantages (Adam, 2020).
3. 'Youth' in this study refers to those under 35, however, 27 of 250 (11%) participants were older than 35. These participants were included as it was practically difficult to turn them away from the one-day online course that they had travelled to attend.
4. These statistics were obtained from https://www.internetworldstats.com/stats2.htm
5. The author would not term it open as it needed a user account to access it.
6. Power or internet cuts happened numerous times at all the venues. This frustrated many participants and contributed to large amounts of data being lost. The choice to collect survey information online was probably the biggest shortfall of the methodology.

[7] The 'less inclined' grouping comprises reasons where participants responded with 'depends' and 'no'.
[8] The 'more inclined' grouping comprises reasons where participants responded with 'depends' and 'yes'.
[9] It would also free up time as one would not need to travel and could study flexibly.
[10] This is because the courses would not only save money for fees, but also for transport to the education institute.
[11] These reasons were weighted in the centre, where 'depends' was the most frequent response.
[12] Videos were summaries and thus were not essential if missed out.

Taskeen Adam is an Associate Manager with Open Development & Education and a Research Associate at the University of Johannesburg. She completed her PhD on 'Addressing Injustices Through MOOCs: A Study Among Peri-Urban, Marginalised South African Youth' at the University of Cambridge. Her research highlighted that historical injustices, cultural imposition, and economic dependence continue to play a pivotal role in education. Her MPhil thesis focused on the 'Sustainable Implementation of the One Laptop per Child project in Rwanda'. Alongside her academic pursuits, she pioneered Khwela (a regional online course platform) and Solar Powered Learning in South Africa as well as Mobile Education for Smart Technology in India. Prior to her career shift to EdTech, she worked as an electrical engineer, specialising in measurement and control.