Profiling Students for Online Teaching and Learning Environments: A Case for the University of Namibia, Rundu Campus

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ABSTRACT

The purpose of the study, through a survey 1) established the devices that students have access to and the mode of internet connection, 2) described students' level of digital literacy, 3) established their preferred mode of learning, and 4) established their frequency of access to the devices. About 441 1st year students enrolled for Integrated Media and Technology Education 1 at the University of Namibia, Rundu Campus were targeted. About 63 students responded to the web-based questionnaire items via a WhatsApp group. The study found that students limitedly access their work via smartphones and laptops. Participants preferred to work in groups and were able to regulate their own learning. Therefore, educators need to use a variety of instructional materials in order to align to students learning styles during Coronavirus (COVID-19) pandemic when moving teaching and learning activities to online-learning environment as a strategy for remote learning.

Keywords: *Online learning, Online-learning environment, Student profiling, Digital literacy, Higher education, Preferred mode of learning, Frequency of access to devices, COVID19.*

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Highlights of this paper

This study contributes to the importance of profiling higher education students in order to understand their learning styles before desigining instructional materials during online teaching and learning times. Covid19 has come and technological devices are needed in the world that strives towards articficial intelligence in all sectors of knowledge.

1. BACKGROUND TO THE STUDY

The World Health Organisation (WHO) on March 11, 2020, declared Corona Virus Disease (COVID-19) a pandemic after over 118 000 cases were recorded in over 110 countries around the world (Ducharme, 2020). The declaration resulted to schools, colleges, universities and other institutions of higher learning around the world including the University of Namibia (UNAM) suspending traditional face-to-face (f2f) classes as a measure to contain the further spread of the virus. The findings in the UNESCO (2020) report, shows that the closure of schools have affected over 1.57 billion students in 191 countries (p.5). Therefore, most of educational institutions opted to move f2f lessons to online learning environment using various Learning Management Systems (LMSs) such as Moodle, Google Classroom, Edmodo, and Blackboard. For UNAM, Moodle was adopted to implement online learning and teaching.

Rashida (2018) defined LMS as "a tool that is used as a platform for implementing e-learning process" (p.15). Similarly, Rahman, Daud, and Ensimau (2019) defined LMS "as a software application for the administration, documentation, tracking, reporting, and delivery of educational courses" (p.1530). Core to the definitions is the view that an LMS is a learning environment made up of integrated systems. When used, LMS allows instructors to deliver learning contents and to facilitate lessons virtually. For the students, it allows them to interact with their educators as well as fellow students through asynchronous and synchronous communication modes. The use of the internet in the implementation of an LMS allows users to interact virtually at any place of their choice without being physically present at a school, college or university campus. Therefore, students have the opportunity and flexibility to engage in learning activities at anytime and anywhere. Özbek (2015) study revealed that technological skills and competencies such as the ability to use the internet, to submit assignments, follow announcement, post in discussion forum, and collaborative tools such as Google doc are inseparable part of online learning. Hence, this study profiled 1st year students enrolled for Integrated Media and Technology Education 1 (IMTE1) at the University of Namibia, Rundu Campus in order to establish their level of technological skills and competencies required for online learning environment.

2. LITERATURE REVIEW

2.1. Online Learning

During the pandemic, the move to online learning have generated diverse opinions. Craig (2020) in his opinion presented in an article available at EdSurge website argued that the current mode of teaching and learning that allows students to attend classes virtually at home cannot be qualified to online learning, but rather refer to it as remote learning. Manfuso (2020) defined online learning as an intentional approach to online education that involves significant amount of time in planning and designing that can take between six to nine months before implementation. Therefore, in this era of COVID-19, no room is available for educational institutions to properly plan for online learning environment as required. Hence, Ray (2020) defined remote learning as a form of instructional strategy that arises on needs in order to provide an opportunity for students and teachers to remain connected and engaged with content while working from home. This implies a temporal strategy that a school can adopt in response to disasters such as COVID-19 pandemic to continue with teaching and learning when f2f is not possible. However, Hodges, Moore, Lockee, Trust, and Bond (2020) termed such an approach to teaching and learning during pressing times like

COVID-19 pandemic as *"emergency remote teaching"* because it is adopted as a response to a situation that is not planned for. This diversity of opinion in describing teaching and learning during COVID-19 shows the need for further exploration of the concepts. Though the debate on the concepts is important, it is not the focus of this paper hence the concepts are used interchangeably to refer to learning and teaching that take place over the internet (Geith & Vignare, 2008).

2.2. Access to Technological Devices for Online Learning

From the reviewed literature, a number of technologies such as smartphones, tablets, laptops, and the internet are required to participate in an online learning course. Liebenberg, Chetty, and Prinsloo (2012) descriptive study revealed that 100% of their respondent indicated that they have regular access to laptops or netbook. With regard to the internet, 91% of the respondent indicated that they have access either at home or at work. A study by Mbukusa (2018) study finds that a mobile phone is one of the technologies that are widely used as a learning tool. A recent survey report on United Kingdom learners' digital experience shows that 82% of them owns a smartphone, 68% own a laptop and 35% own a tablet (Killen & Mark Langer-Crame, 2020). This shows that most students have access to some technologies such as smartphone and laptops that allows them to take part in online learning activities. Smartphones and laptops are portable mobile devices which students can carry around easily. However, this may not be the same for students at UNAM Rundu Campus who had to move to online learning after the institution suspended in-person teaching due to the outbreak of COVID-19 pandemic.

2.3 Students' Level of Digital Literacy

Liebenberg et al. (2012) argued in their study that access to learning technologies alone does not translate into effective usage. Therefore, it is important to consider digital literacy skills of users when moving learning to online environment. Digital literacy refers to all abilities that allows a student to work and interact effectively in a digital environment (Knight, 2011). Digital skills for online learning include but not limited to awareness of browser software and file format, ability to navigate between web pages, create files, and communicate effectively online. Liebenberg et al. (2012) further covered students' capabilities in using technology in their study which revealed that 93% of the respondents indicated that they are aware of internet browsers and 91 % of them are able to navigate between web pages. Furthermore, their study also revealed that 63% of the participants were able to use social media. In addition, Blayone, Mykhailenko, Kavtaradze, Kokhan, and Barber (2018) explored digital competencies of students and professors at Kyiv National Economic University, Ukraine, and found that students were able to interact effectively in an online learning environment. These studies findings show that some students at other Universities around the world have the required competencies for online environment. Therefore, the move to online learning during COVID-19 might not affect students' learning. However, this may not be the same for students in Namibia at UNAM Rundu Campus given the lack of literature on the subject that could be used to infer their digital context and readiness for online learning.

2.4. Students' Preferred Mode of Learning

Every student come to a learning environment with a unique learning style (Mupinga, Nora, & Yaw, 2006). Learning styles refers to an individual preferred mode of effective learning (Pashler, McDaniel, Rohrer, & Bjork, 2008). This simply means that it is a preferred way a student find useful in the process of constructing knowledge. Some students prefer learning in a group by actively interacting with one-another, others prefer reading independently from written materials and others by listening to spoken explanation from educators. Students'

learning styles has an influence on their learning. Therefore, it is important for instructional designers to consider students' diverse learning styles when designing instructional materials and selecting pedagogical approaches for online learning activities. A study by Cheng and Chau (2016) explored the relationship between students' learning styles and their participation in an online blended course and their study revealed that students' learning styles have a relationship to their online participation. This means that when students' learning styles is effectively embedded in the design of instructional materials for online learning environment, students are likely to meaningfully engage in learning activities.

2.5. Frequency in the Use of Devices

Smartphones, laptops, and tablets are some of the mobile devices that students use for online learning. Some students own these devices, while others borrow these devices from friends and families to access online learning. Hence, Liebenberg et al. (2012) study further revealed that 53% of respondents indicated to frequently accessed computers at home, 29% at Internet Café, and 12% at someone else's home. Similarly, another study by Killen and Mark Langer-Crame (2020) also revealed that 82% and 68% of their study respondents had access to smartphones and laptops. Though these studies paint a frequent access to devices by students, it varies from person-to-person. Therefore, these differences reported in the studies shows the need for educators to consider students' access to devices required for online learning before moving lessons to online platform and that can be achieve through students profiling. Park, Ji, and Lim (2015) defined profiling as processes of gathering data and developing knowledge about the learner's characteristics. Developing such knowledge through student profiling helps to promote student well-beings as well as their academic success (Blayone et al., 2018; Pan, Graham, & Luyegu, 2018). Furthermore, profiling students before they participate in an online-learning environment, help avoid some of the barriers associated with online learning such as accessibility issues and students preparedness for online learning environment (Aboagye, Yawson, & Appiah, 2021; Stone, 2019). Therefore profiling students is of great importance for a teacher to know the students' strength, needs and challenges. Hence, this paper reports on the profile survey of students enrolled for Integrated Media and Technology Education 1 (IMTE1) at UNAM Rundu Campus.

3. METHODOLOGY

The aim of the profiling survey is to describe IMTE 1 students' digital context. The study employed a descriptive survey design. The survey targeted all 441 undergraduate education students enrolled for IMTE 1. Of the Four hundred and forty-one (441) students, 63 completed the survey, resulting in 14, 29% response rate. This response rate supports (Nulty, 2008) view that online surveys are much less likely to achieve a response rate as high as that administered on paper. A Likert Scale questionnaire was used to collect data. A link to the online questionnaire developed with Google Form was shared with the participants via a WhatsApp group created for the module.

During data collection, respondents were encouraged to complete as many questionnaire items as possible, as long as they were able, but it turned out that respondents skipped some of the survey items. As a result, it caused a variation in the number of responses to some of the survey items as reflected in the result section. Fraenkel and Wallen (2010) allude this to happen sometimes when a respondent lacks an answer to an item or time to address the item. Data generated using the online questionnaire was analysed following a descriptive statistics.

4. RESULTS AND DISCUSSIONS

Understanding students' digital context does not only helps educators to accommodate their learning needs for effective teaching and learning in an online learning environment, but also mitigates some of the barriers associated

with online learning. Data collected was organised into four themes beginning with: 1) *type of devices* that students have access to and the *mode of internet connection* that they have, 2) *students' level of digital literacy*, 3) *preferred mode of learning*, and 4) *frequency of access to the devices* and presented using chart, bar Figure and tables. There are variation in the number of responses per questionnaire item in relation to the earlier indicated total number of the study participants. This was caused by the flexibility accommodated in the data collection process that allowed participants to skip items that they were not able to provide a response, either due to a lack of information or for personal reason.

4.1. Types of Devices and Mode of Internet Connectivity

Figure 1 shows the type of devices that participants reported to have access to. The percentages in the below graph includes for those who have access to multiple devices; hence, they do not correlate with the total number of the respondents. Some participants own the devices, while others accessed through friends and families.

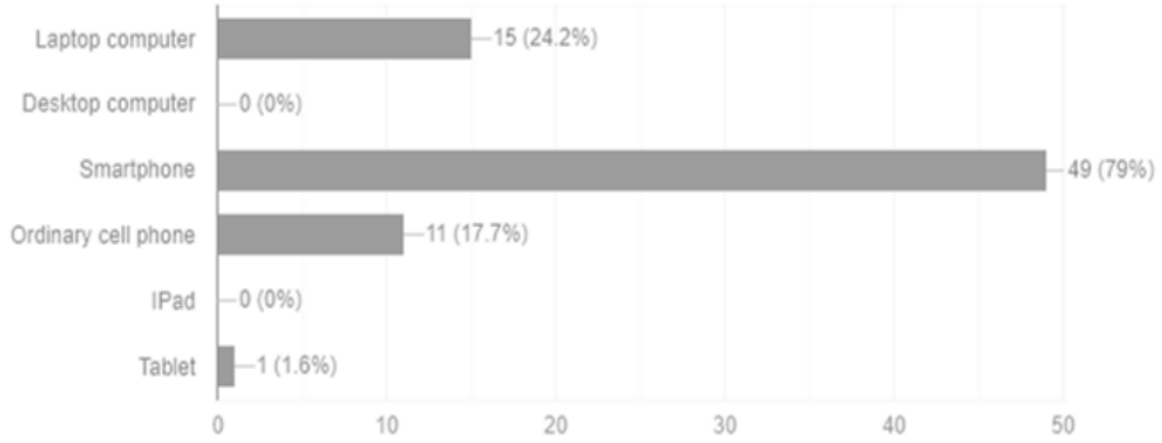

Figure 1. Type of devices.

The Figure shows that 79% of the respondents have access to smartphones while laptops is 24, 2%. Ordinary cell phones is represented by 17,7% and tablets by 1,6%. Ordinary cell phones lack the feature by design to connect to the internet network. The study reveals that most of the students have access to smartphones and laptops. These findings supports Liebenberg et al. (2012) and Aheto and Cronje (2018) studies that found that most students have access to smartphone and laptops. These are smart devices recommended for online learning (McGreal & Elliott, 2008). This shows that more students (79%) have access to the required devices for online course. The Campus decision to shift from face-to-face to online teaching and learning during COVID-19 pandemic does not pose a serious challenge to students' participation. However, the few students who responded to only have access to ordinary cell phones, need the support of the campus to enable them to attend online classes.

In addition, participants were asked to indicate the mode of connectivity they use to access the Internet. Again, this item provided respondents the flexibility to indicate all that is applicable to them. Therefore, the results include those who have multiple mode of internet access; hence, the percentages do not correlate with the total number of respondents. Figure 2 shows that 70% of them connect via mobile cellular network, 30% uses hotspots. Cellular network and hotspot both uses wireless network technologies. However, cellular network covers a wide geographical area whereas hotspot connectivity is limited to small Wireless Local Area Network (WLAN). Cellular network allows smartphone and other dial-up devices, such as pocket WI-FI to connect to the internet anywhere, on condition that there is network coverage. While majority (70%) of respondents can access the internet often, a key requirement for online learning, there is 30% of students who have limited internet connectivity. Therefore, when developing content

for online learning, the designer needs to ensure that the content is downloadable for offline use in order to cater for students with limited access to the Internet.

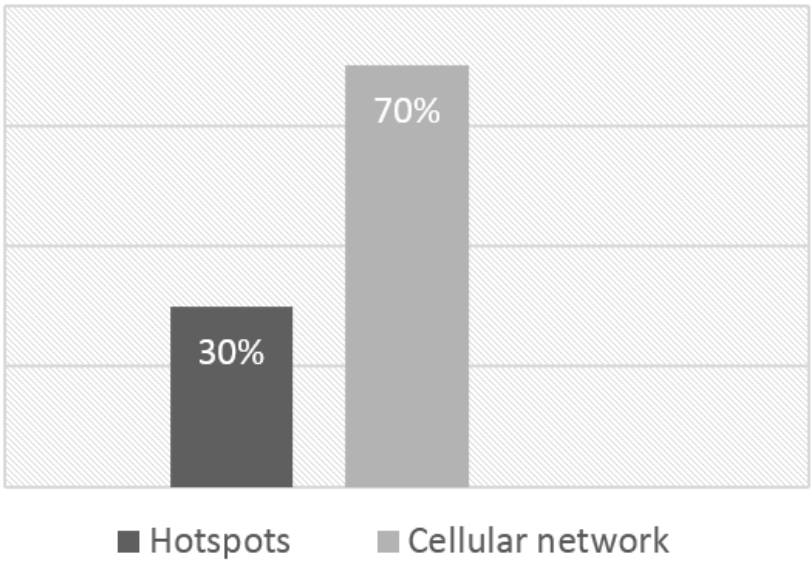

Figure 2. Mode of internet connectivity.

4.2. Frequency of Access to the Devices.

Frequency of use is another theme that was investigated in the study. The focus was on establishing the frequency of students' use of devices that they have access to. Knowledge of frequency of access to technological devices helps online facilitators to develop an understanding of the extent to which students may have access to the learning environment. Similarly, such knowledge helps instructional designers when making decisions on whether learning materials are to be limited to viewing online or to be downloadable for latter offline viewing. Table 1 show the items used to establish the frequency of students' access to devices. Participants were expected to indicate the extent to which they agree and disagree with the statements.

Table 1. Frequency of use.

Frequency of Access	Agree	Partly agree	Not sure	Disagree	Total
I use it anywhere	15 48.4%	8 25.8%	4 12.9%	4 12.9%	31
I used it anytime	5 21.7%	14 61.0%	1 4.3%	3 13.0%	23
I use it on limited time	27 65.9%	8 19.5%	3 7.3%	3 7.3%	41

The first item that was put to the participants was aimed at establishing whether the devices that students have access to is used anywhere without being limited to certain areas. Their responses shows that 74. 2% (23 out of 31) of them indicated that they can use the devices anywhere while 25. 8% (8 out of 31) cannot use it anywhere. This observation is reflected in Graph 1 that shows a high number of respondents who have access to smartphone and can access the internet via cellular network. Participants, who could not access a smartphone and laptop regularly and anywhere, are those who do not own the devices, but borrows from friends or family members. This could mean or imply that access to online learning environment is not applicable to everyone.

The second item in Table 1 focused on establishing whether those reported to have access are able to use the devices at any time. The results shows that 82. 7% (19 out of 23) uses the devices at any time while 17. 3% (4 out of

23) do not. This means that some participants do not use the devices at any time. As a result, they have limited time to use the devices to access the online learning environment. This shows diversity in ownership of technological devices such as smartphone and laptops among students.

The key issue emerging from Table 1 is that, some students have limited time to use smartphones. This reveals that some of the students taking online classes have access to technological devices at a limited time. Therefore, educators should take such limitation into consideration when setting dates for online activities. This would allow students to complete all online learning activities without missing any task.

4.3. Students' Level of Digital Literacy

Students' level of digital literacy is an important element in the delivery of online courses. Prior, Mazanov, Meacheam, Heaslip, and Hanson (2016) investigated the effect of attitude, digital literacy and self-efficacy on online learning. Their study revealed that digital literacy significantly contributed to students' self-efficacy. Therefore, it was important in this study to consider the level of literacy of the online learners focusing on their ability to navigate between web pages, the use of social media tools, communicate, and awareness of web browsers for displaying web pages, file format and the nature of online learning. Table 2 shows the results of the respondents in percentage base on Likert Scale.

The first item in the Table 2 assessed participants' awareness of different types of browsers which online learners can use to access and display web-based digital content. Their responses show that a combined 76. 2% (16 out of 21) of students are aware of different browsers that they can use while 14. 3% are not aware. This means that there are some students who do not have an idea of what a Web-browser is and its role in online learning. These students need additional support from the facilitators in order for them to develop knowledge of different web browsers. The second item looked at their skills to navigate between web pages, their responses shows that a combined 66. 7% (6 out of 9) of the respondents are able to navigate between web pages, while 11. 1% are not able.

Table 2. Students' digital literacy skills.

Awareness of different types of browsers	Agree	Partly agree	Not sure	Disagree	Total
I'm aware of different types of browsers	14 66.7%	2 9.5%	2 9.5%	3 14.3%	21
I can navigate between web pages	1 11.1%	5 55.6%	2 22.2%	1 11.1%	9
I can use social media tools	6 54.2%	2 15.4%	0 0.0%	5 38.5%	13
I can communicate ethically when using social media or other messaging systems	5 45.5%	2 18.2%	3 27.3%	1 9.1%	11
I'm aware of different file/document format	1 16.7%	3 50.0%	1 16.7%	1 16.7%	6
I'm aware of online learning	20 71.4%	5 17.9%	1 3.6%	2 7.1%	28

The third item in Table 2 looked at participants' ability to use social media tools and the results shows that a combined 54.2% (8 out of 13) students indicated to be able to use social media tools, while 38.5% (5 out of 13) are not able. The fourth item was a follow-up to the respondents' response to the third statement in Table 2, and focused at establishing whether participants use social media tools ethically when communicating with others or any other messaging system. Their responses shows that a combined 63.7% (7 out of 11) can use social media tools ethically when communicating while 36.4% are not. LMSs as platforms for delivering online education have built-in

communication system that uses social media principles and allows both synchronous and asynchronous mode of communication (Watts, 2016).

The fifth item focused at establishing their awareness of different file format. Online learning environment accommodate files that are in different format designed to accomplish various instructional objectives. It is important for the online learner to be aware of different file format in order to view the shared information. Their responses shows that, a combined 66.7% (4 out of 6) are aware of different file format while 33.4% (2 out of 6) are not. The sixth item which was the last on this section, focused at establishing whether the participants are aware of online learning. Their responses shows that 89.3% (25 out of 28) are aware while 10.7% (3 out of 28) are not. This means most of the participants are aware of the nature of online learning.

An analysis of Table 2 results revealed a difference in IMTE 1 students' level of digital skills. Most students are aware of different web-browsers –application required to access information on the World Wide Web and are able to navigate between Web pages. The results also reveals that students are able to use social media tools and they can use it ethically when communicate. Lastly, students are aware of different file format. These findings reveals that most of the students met the minimum requirements to take part in an online course, such as IMTE 1 which is offered via Moodle.

Similarly, the analysis reveals that 16.13% students do not the minimum digital literacy level required to participate in an online course. This means that the students are not able to participate in online learning, because they lacked the required skills and resources. Therefore, it is important for the campus to help students develop digital skills needed to engage in online learning. Moreover, students themselves should also make use of available opportunities availed to them to develop digital skills needed for learning. Digital skills help them thrive in learning in times when face-to-face tuition is replaced with online in times such as COVID-19.

4.4. Preferred Mode of Learning

Students' preferred mode of learning is another issue that the study aim to establish. Cheng and Chau (2016) study shows that students' learning style have a relationship with their participation in an online learning environment. For example, when the format of instructional content does not relate well with students' preferred learning style, their interaction with the content will be very low. Therefore, taking into account of students' learning styles when designing instructional materials does not only help to meet their learning needs but also motivates them to engage in learning activities. Table 3, shows participants' responses to Likert Scale items aimed at establishing their preferred learning style.

Table 3. Students' preferred learning style.

Students' preferred mode of learning	Agree	Partly agree	Not sure	Disagree	Total
I like working in a group	18 60.0%	7 23.3%	2 6.7%	3 10.0%	30
I can manage my own learning activities	7 43.7%	6 37.5%	2 12.5%	1 6.3%	16
I prefer listening to the lecturer than reading	14 58.3%	2 8.3%	5 20.8%	3 12.5%	24
I prefer viewing videos than reading	8 66.7%	0 0.0%	1 8.3%	3 25.0%	12

The first item focussed at establishing whether students preferred to work in a group or not. Their responses shows that 83. 3% (25 out of 30) prefer to work in a group while 16. 7% (5 out of 30) are not sure or cannot. This shows that most students are able to work in a group. The second item looked at participants' views on whether they

are able to manage their own learning activities or not. The result shows that 81.2% (13 out of 16) can manage their own learning activities while 18.8% (3 out 16) are not. Based on the results, it is evident that most students are able to manage their own learning. Online learning require learners to self-regulate and direct their own learning if they are to succeed. Therefore, students' development of self-regulated helps them ensure the effectiveness of online learning (Carter Jr, Rice, Yang, & Jackson, 2020).

The third item focused at establishing their views towards listening to lecture over reading on their own. Their responses shows that 66.6% (16 out of 24) indicated that they prefer listening to the lecturer over reading the notes. However, 33.4% (8 out of 24) of the respondents prefer reading the lecture notes over listening to the lecturer. This shows that more students prefer listening to the lecturer than reading the lecture notes on their own. Therefore, blending recorded audio-visual instructional materials such as lectures and live video conferencing sessions in the delivery of instructions would be appropriate for online learning. This observation is supported by Sadik (2015) study that found out that students' prefer screen casting lectures in a remote learning environment. The forth item focussed at establishing students' preference between viewing learning resources in video format over reading. Their responses shows that 66.7% (8 out of 12) prefer viewing videos over reading resources while 33.3% (4 out of 12) prefer reading over viewing videos. This result shows diverse views of students over the two format of learning resources, though a high number of them are likely to opt for videos.

An analysis of Table 3 data reveals that most students prefer to work in a group and they are able to manage their own learning. These are some of the skills learners should have if they are to succeed in online learning environment. Similarly, the surveyed students are found to prefer listening to lectures instead of reading. Overall, the results shows that most students would prefer interacting with instructional resources that are in audio-visual than those only in visual format. This finding is important as it inform educators that instructional materials to be used in an online learning environment should not require students to only read but should also listen. This means that educators need to spend time developing materials in a format that meet students' needs. However, despite students' preference of audio-visual resources, there is still a room for using visual instructional materials. Therefore, effort should be made to ensure that different instructional materials that are in different format are used in online learning environment.

5. CONCLUSIONS AND RECOMMENDATIONS

The study has revealed that smartphones and laptops are the devices that students have access to, compared to ordinary cell phones and tablets. Though smartphones are the devices which students have access to, students have limited time to use them. Students access the internet mostly via cellular network because of their availability anywhere in the country. Access to the internet is mostly via hotspots network that is geographically limited compared to cellular network. Most students are digitally literate, however, there are students who lack the required basic skills and knowledge that an online learner should demonstrate. Students are able to work in a group as well as managing their own learning. A high number of students prefer content in multiple formats such as audio-visual than text only. It is therefore strongly recommended that students are empowered with basic knowledge and skills that are required for online learning and teaching. Educators should use instructional media that are in different file format when teaching online in order to meet the needs of the diverse learners. Varied teaching and learning methods that are geared towards online platforms should be encouraged among lecturers so that all forms of learning is captured to engage all types of learners. Blending recorded audio-visual instructional materials such as lectures and live video conferencing sessions in the delivery of instructions would be appropriate for online learning. Educators need to use a variety of instructional materials in order to align to students learning styles. Educators should be made

to be aware of their students' learning needs and possible challenges that they are likely to continue experiencing during Coronavirus (COVID-19) pandemic when moving teaching and learning activities to online-learning environment as a strategy for remote learning.

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