COVID-19 Pandemic and Adoption of Digital Technology in Learning and Teaching

Samuel Adeyinka-Ojo[1], Abayomi Oluwaseyi Ikumoro[2]

Abstract— **Introduction**: The aim of this paper is to share the first author's online teaching experiences during COVID-19 pandemic. This paper was written in the first person – that is, the first author as he positioned himself within the case studies. I was engaged with students' cohorts using the software – Blackboard Collaborate Ultra live during semester 1, 2020 for (UG) and Trimester 2, 2020 for (PG) at the offshore campus of an Australia University in Malaysia. This paper is a reflective account of the (first author and students) in four undergraduate (UG) and one postgraduate (PG) teaching units during pandemic era**. Methods**: This reflective work on digital learning and teaching adopted a combination of extant literature, online resources, and personal experiences to demonstrate and reflect on engagement with UG and PG students to achieve specific learning outcomes. For this study five teaching units were involved and subsequently categorised into case studies to provide commentary and shared experiences on learning and teaching during COVID-19 pandemic era. **Results:** This paper presents a context, reflection, and case studies on the possible impact of adoption of digital learning and teaching platform. Active learning is found to be good teaching practice in an online learning environment. Based on the current COVID-19 pandemic unabated in major international higher education hubs; it appears online delivery of lectures, tutorials, seminars, and assessment will continue to be administered. **Implications:** This paper provides insights into the need to adopt and accelerate digital technology tools in learning and teaching environment. From the case studies, students' attendance and participation increased during COVID-19 pandemic compared to face-to-face classroom session due to convenience and accessibility to internet and digital devices. Importantly, 100 per cent student pass rate was achieved in all the five teaching units. **Originality/value:** The reflective account presented in this paper indicates resilient in engaging digital technology in learning and teaching, increased student engagement and participation in achieving learning outcomes during COVID-19 global pandemic era with specific reference to the five teaching units sampled in this paper. In the 'new normal' generation, it is envisaged that digital learning and teaching platform will continue to be adopted in global educational institutions in post COVID-19.

Keywords: COVID-19, Digital Technology, Reflection, Learning and Teaching

Samuel Adeyinka-Ojo
Curtin University
Malaysia

Abayomi Oluwaseyi Ikumoro
Limkokwing University of Creative Technology
Malaysia

I. Introduction

First of all, it is important to make it clear to the wider audience that this paper was written in the first person – that is, the first author as he positioned himself within the case scenario being studied [1]. The outbreak of COVID-19 pandemic led to the imposition of movement control order (MCO) or lockdown and most schools across the globe were shut down. Subsequently my affiliated university moved from face-to-face lectures, workshop, tutorials and seminars to online learning and teaching platforms. I was motivated to develop strategies to increase student engagement in achieving specific learning outcomes for all my teaching units

A. Online Learning and Teaching

There are several definitions of online learning(digital or virtual learning) from the extant literature. Online learning is described as access to learning experiences via the use of web-based technologies [2]. Prior to COVID-19 pandemic, and 'as technology advances many higher educational institutions are exploring online learning and teaching platform due to increase in student enrolment' [3]. For example, online learning environment was developed and facilitated at my affiliated university to support teaching and learning in both blended and fully online learning settings. These environments reside within the Blackboard Learning Management System (LMS) and may involve other enterprise technologies [4]. In order to engage students productively and achieve the stated learning outcomes or objectives, active learning framework is indispensable.
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B. Active Learning in a digital Teaching Environment

Active learning is a good teaching practice in an online learning and teaching environment. Seven principles of effective teaching that could be applied to improve learning were developed by [3]; and they [Chickering and Gamson] concluded that student success is related to effective teaching practices. A framework for evaluating online teaching was developed by [5]. This framework followed the work of Chickering and Gamson. These seven principles include [a] student–faculty contact, [b] cooperation among students, [c] **active learning**, [d] prompt feedback, [e] time on task, [f] high expectations, and [g] respect for diverse talents and ways of learning.

Active learning is a method of learning in which students are actively or experientially involved in the learning process and where there are different levels of active learning, depending on student involvement [6], and students participate [in active learning] when they are doing something besides passively listening. It has been suggested learners work collaboratively, discuss materials while role-playing, debate, engage in case study, take part in cooperative learning, or produce short written exercises, and online presentation [6].

Active learning is based on constructivism theory which encourage learners to develop their existing knowledge and understanding to achieve deeper levels of understanding. This means that learners are more able to analyse, evaluate and synthesise ideas (thus achieving the higher order skills of Bloom's Taxonomy – analyzing, evaluating, and creating). The use of multimedia and technology tools helps enhance the atmosphere of the classroom, thus enhancing the active learning experience. In this way, each student actively engages in the learning process. Active learning techniques cause students to engage with the subjects rather than passively take in information. Examples of active learning activities include brainstorming, discussing, teaching, journaling, group work, focused listening, formulating questions, notetaking, annotating, and role play. Principles of active learning include purposive, reflective, negotiated, critical, complex, situation-driven and engaged. Engaging students in active learning assists disseminator or facilitator of knowledge and skills to reflect on different teaching practices employed in a digital learning and teaching environment [7].

C. *Reflective Practice and Reflection*

Reflective practice is where the practitioner makes meaning from a given situation so that he/she can better understand the art of his/her professional practice [8]. Reflective process supports the development of professional knowledge and the improvement of teaching practice [9]. Reflective practice has been considered to hold a significant position in the professional development of pre-service teachers [8], current and future practitioners. Reflective practice is 'learning through and from experience towards gaining new insights of self and practice' [10]. Reflection is a systematic reviewing process for all teachers which allows you to make links from one experience to the next, making sure your students make maximum progress. Online learning and teaching reflections are pedagogical practice that should be encouraged among the faculty members to increase student engagement and achieve learning outcomes. For example, with effect from 25 April 2011, The Office of Learning and Teaching at Curtin University in Australia provides road map regarding student engagement in blended learning environments guidelines (including online learning) [4].

D. *Student Engagement*

Student engagement has been defined as comprising "active and collaborative learning, participation in challenging academic activities, formative communication with academic staff, involvement in enriching educational experiences, and feeling legitimated and supported by university learning communities" [11]. Based on this

definition, the process has been conceptually mapped and aligned with five elements that characterise effective teaching and learning environments namely: learning resources, learning activities, communication and collaboration, student support, assessment, and feedback.

E. *Challenges of Online Learning and Teaching*

There are several online and teaching challenges. These include, time management, suitability of online teaching technology platforms – (BB Collaborate, Cisco Webex, MS Teams, Face Book, Google Meet, Google Classroom, Zoom, GoToMeeting etc.). Others are the issue of conducive environment, self-motivation, virtual communication, and consultation, learning resources and activities – lecture, tutorial, and assessment materials. Moreover, internet connection – (high bandwidth or the strong internet connection), IT skills and digital literacy, functional computer, laptop, tablets, smartphone and digital devices, and adaptability - (switching from traditional F2F classroom to virtual classroom)

II. Methods

This reflective work on digital learning and teaching adopted a combination of extant literature as in Table 1 [4], online resources, and personal experiences to demonstrate and reflect on engagement with UG and PG students to achieve specific learning outcomes. For this study five teaching units were involved and subsequently categorised into case studies to provide commentary and shared experiences on learning and teaching during COVID-19 pandemic era. These five collective case studies, as [12] explains, are generalisable to theoretical propositions and not to populations because the main purpose is to expand and generalise theories instead of counting the number of occurrences or frequencies. This is consistent with previous study on reflective practitioner using digital storytelling [13] and adopted case study framework as research methodology [12] presented in Tables 2, 3 and 4.

TABLE 1. CONTEXT: ONLINE ENVIRONMENTS

Context	Activities and Engagement
A	(1). Students refer to the Blackboard unit to gain unit information and download lecture and tutorial materials. (2). Online learning space provides the student with access to learning resources, assessment guidelines, and basic communication tools.
B	(1). Students refer to the Blackboard unit for personal learning needs and as scheduled for collaborative learning activities. (2). Online learning space provides the student with collaborative learning tasks, formative assessments, various communication tools and complex learning activities.
C	(1). Students engage with the teaching staff and student community via appropriate collaboration tools and in a variety of authentic online learning activities. (2). Online learning space allows the student to be an 'active' learner who creates and interacts with the resources of the unit.

Source: Adapted from [4]

TABLE 2. CASE STUDIES FROM TEACHING UNITS: LECTURE AND TUTORIAL

Strategies & tools (lecture, seminar, tutorial & consultation)	Case 1 UG Unit - HE (Semester 1)	Case 2 UG Unit - PTHE (Semester 1)	Case 3 UG Unit - MTD (Semester 1)	Case 1 UG Unit - BC (Semester 1)	Case 1 PG Unit - PPM (Trimester 2)
Planning, link & reminder	BB Coll, email, & WhatsApp	BB Coll, email, & WhatsApp	BB Coll, email, & WhatsApp	BB Coll, email, & WhatsApp	BB Coll, email, & WhatsApp
Test run and preparation	BB Collaborate	BB Collaborate	BB Collaborate	BB Collaborate	BB Collaborate
Virtual platform: lecture, seminar, & tutorial	BB Collaborate	BB Collaborate	BB Collaborate	BB Collaborate	BB Collaborate
Virtual platform: consultation	Cisco Webex	Cisco Webex	Cisco Webex	Cisco Webex	Cisco Webex
Kahoot application	Formative assessment	N/A	N/A	N/A	N/A
Outside classroom engagement	FB & WhatsApp	FB & WhatsApp	FB & WhatsApp	FB & WhatsApp	FB & WhatsApp
Class activities	BB/Discussion board	BB/Discussion board	BB/Discussion board	BB/Discussion board	Live discussion

Source: Developed for this study

TABLE 3. CASE STUDIES: ASSESSMENT TASKS AND STUDENT ENGAGEMENT

Strategies &Tools (Assessment Tasks)	Case 1 UG Unit - HE (Semester 1)	Case 2 UG Unit - PTHE (Semester 1)	Case 3 UG Unit - MTD (Semester 1)	Case 1 UG Unit - BC (Semester 1)	Case 1 PG Unit - PPM (Trimester 2)
Engagement explanation, Q&A (keep informed)	Reminder-WhatsApp & email	Reminder-WhatsApp & email	Reminder-WhatsApp & email	Reminder-WhatsApp & email	Reminder-WhatsApp & email
Individual presentation				XX	
Group presentation	XX	XX	XX		
Take-home test	XX				
Weekly e-Test				XX	
Weekly Business simulation				XX	
Preparation task/ Peer review				XX	
Individual report (1), essay & VBCR	XX	XX	XX	XX	XX
Reflective learning				XX	
Group report & essay	XX				
Final exam. & assessment		XX	XX		
Final assessment – online MCQs					XX
Individual report (2)					XX

Source: Developed for this study

TABLE 4. CASE STUDIES: GRADING, MODERATION AND FEEDBACK)

Strategies &Tools (Assessment Tasks)	Case 1 UG Unit - HE (Semester 1)	Case 2 UG Unit - PTHE (Semester 1)	Case 3 UG Unit - MTD (Semester 1)	Case 1 UG Unit - BC (Semester 1)	Case 1 PG Unit - PPM (Trimester 2)
Marking rubrics	Applied	Applied	Applied	Applied	Applied
Grading & marks	M/Rubrics	M/Rubrics	M/Rubrics	Online rubrics	Online rubrics
Moderation - UC (marked papers)	6 samples	6 samples	6 samples	6 samples	10% or min. of 10 papers
Feedback to -individual student	Grade centre	Grade centre	Grade centre	Grade centre	Grade centre
Feedback to all the students (general)	During class	During class	During class	Email -CBS During class	During class
Consultation & student engagement	WhatsApp Email Discussion board	WhatsApp Email Discussion board	WhatsApp Email Discussion board	WhatsApp Email During class	WhatsApp Email

Source: Developed for this study

III. Results and Discussion

This section presents findings on the achievement of learning outcomes or objectives for the four undergraduate and one post graduate teaching units during the COVID-19 pandemic. Findings also indicate that adoption of digital technology in learning and teaching has uncovered the importance of time and return on investment (ROI) on education as valuable resources. Feedback from students through teaching evaluates report (TER) and their online learning experiences are consistent with the expected learning outcomes. In particular, pass rate for the five teaching units published by the university authority is presented in Table 5.

TABLE 5. EXCERPTS FROM TEACHING EVALUATE REPORT (TER) AND UNITS PASS RATE

Teaching Units	Unit Pass Rate (%)	Excerpts from TER
		Commendations
Case 1: HE -UG	100	"Dr. Samuel is a very well-educated lecturer with lots of knowledge and interacts in a very friendly way with his students. This makes students more comfortable to talk to him".
Case 2: PTHE - UG	100	"I can feel his enthusiastic and engagement in his teaching especially during this 'online' semester that might confront with several issues".
Case 3: MTD - UG	100	"He's very enthusiastic and whenever we text him, he replies"
Case 4: BC - UG	100	"The lecturer is very engaging with the students despite not having a face-face consultation, he responds to student's inquiries very fast via email or WhatsApp".
Case 5: PPM - PG	100	"Knowledgeable and friendly lecturer"
		Recommendations
		"Get enough rest Dr Samuel, sometimes can see you online at 3.00 in the morning"
		"Provide break time during seminar because three hours is too long!"

Source: Developed for this study.

IV. Implications and Conclusion

COVID-19 Pandemic has changed the current and future learning and teaching practices in all the educational institutions all over the world. For example, University of Cambridge in United Kingdom was the first university to announce that online classes would continue until the end of year 2021. Excerpts from my current affiliated university recently announced in the following statement.

"… regarding learning and teaching arrangements in Semester 2, 2020 …., and aligned to the Ministry of Higher Education guidelines, we will continue with online delivery of learning and teaching for all undergraduate and foundation programs (including lectures, tutorials and seminars) throughout Semester 2. Assessments will also be continued to be administered online in Semester 2, 2020. This means that new enrolments for undergraduate and foundations programs in Semester 2 will also be enrolled for online learning until such time face-to-face teaching is resumed in the 2021 academic session. Advance notice will be given to all students of any impending switch when the time comes." [14].

The use of digital technology has many benefits to instructors [13], and students during and post pandemic. In conclusion, educational institutions especially the university sector and higher training institutes must invest heavily in digital technology to support online learning and teaching delivery in a 'new normal' era.

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About Authors

Dr Samuel Adeyinka-Ojo holds a PhD in Hospitality and Tourism from Taylor's University Malaysia. Currently, he is a Senior Lecturer, Department of Marketing at the Faculty of Business, Curtin University Malaysia. He was formerly the head of department of marketing (2017-2019). He teaches hospitality, marketing, tourism and business capstone courses at the undergraduate programmes, and two modules in the Master of Science degree in project management. Samuel researches in tourism destination branding, hospitality marketing, employability skills, food and cultural festivals, digital technology innovation, social media marketing in hospitality and tourism, health tourism and sustainable practices in rural and ecotourism destinations. He has published his works in refereed academic journals, book chapters and presented papers in several international academic conferences across the world.

Abayomi Oluwaseyi Ikumoro is rounding up his PhD in Management at the Limkokwing University of Creative Technology, Malaysia. His research interests include understanding the barriers and enablers of using emerging technologies namely robotics and artificial intelligence in small and medium enterprises, educational institutions, tourism, hospitality and events industry. He has presented papers at international conferences and published in refereed journals.