

Design Courses and the ‘New Normal’: ePortfolios as a Pedagogic Innovation in Advancing University Education

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Abstract

Portfolios are crucial for practitioners in the creative industry. Practitioners in the field of art and design use portfolios as a means to show their skills to prospective clients or audiences. Portfolios may either be created in the form of physical artifacts or digital versions depending on the artist/designer’s specialised area and preferred medium. Portfolios cannot be taken out of art and design disciplines. A portfolio is the evidence of the designer’s work and skills. In most design schools every course requires the creation of a portfolio, which sometimes becomes challenging to manage for design educators and even students at the end of the term. The study aimed at exploring the use of emerging technologies in higher education institutions (HEIs) – specifically in a University of Technology (UoT) – as part of design education to facilitate the creation of ePortfolios. Participants were level 300 Advertising and Media (AD&M) option students who take a core course in photography. Flipped classroom, pedagogical approach and design methods were used to introduce students to the course. In a sandpit session, they were introduced to Google sites and Edmodo to create their ePortfolios and conversations between students and educators respectively. Results showed that Google sites had an affordance that facilitated the creation of ePortfolios and Edmodo was a useful tool for collaboration, communication, discussion and appraisal of students’ work in a virtual classroom. It is anticipated that ePortfolios will be beneficial for future virtual exhibitions, reflective learning, sharing, assessment, collaborations, monitoring and evaluation that can make learners work. Suggestions are that other HEIs could reflect on the ePortfolios pedagogies and integrate it as part of learning activities in the era of the COVID-19 global pandemic – which arguably, is the ‘new normal’.

Keywords: *Afrika; Conventional Framework (CF); Bloom’s Digital Taxonomy (BDT); COVID-19; Design Education; ePortfolio; Emerging Technologies; Flipped Classroom; Inclusive Education; Higher Education Institution (HEIs); Resilience*

INTRODUCTION

Communication Design practices continue to evolve due to the emergence of technology. The advent of technology necessitated a call for action in design schools to improve instructional approaches that can accommodate trends of the 21st century practitioners and learners. In the 21st century, communication design students in higher education institutions are exposed to one or more types of emerging technologies and social media tools. These are made up of online media tools for peer-to-peer communication and learning. Some of the commonest social media tools include *Facebook, WhatsApp, Viber, Instagram* and the likes (Rahimi *et al.*, 2015:235-237).

These social media tools provide students and educators with a wide range of opportunities to engage in conversations in real time for collaboration and communication.

However, the use of these tools to facilitate teaching and learning in the process of conversation with emerging technology have not been fully explored in most educational settings within the research context. Educators usually focus on teaching technology as opposed to teaching with technology. For instance, in design departments within the study context, most art and design educators usually focus on teaching students how to use technology to complete their design projects. Occasionally learners are encouraged to use social media for communication among peers and submission of exercises. The focus has not been on how we can teach with emerging technologies (e.g. Web 2.0 or social media) to support teaching and learning. This gap in design education provides an opportunity to explore pedagogical approaches that can accommodate emerging technologies in design programmes to facilitate active teaching and learning. In specialised disciplines within the Communication Design domain, such as graphic design, and photography, designing software enables designers to come up with the needed artifact to satisfy or meet the needs of an identified audience. As such students are familiar with using technology for their studio-based exercises. Therefore, it is feasible to transform the learning environment using emerging technologies, which is adaptable by students to promote affective learning.

This paper is based on a pilot study where we explored the process of teaching with technology within the Communication Design programme in a UoT in Afrika¹. The design experimentation was undertaken with students in the *Advertising and Media* (AD&M) option of the Communication Design programme, but focusing on the photography course. Communication Design courses are most often practice oriented. The output of the design exercises in the programme is usually submitted as creative portfolios, which complement written essays that form part of the learners' collective assessment process. The concept of teaching with technology was piloted with the photography course. Participants were tasked to create their ePortfolios as part of student reflective learning and assessment.

Due to the integration of digital technology in the design courses, there is a need to explore how to digitise portfolios and integrate it into the broader Communication Design programme. The enquiry sought to answer the following questions. *What are the emerging technologies that can aid communication design students to create ePortfolios? What are the relevant technologies that can assist educators to create virtual classroom environments to facilitate teaching and learning? What are the pedagogical approaches and technology that can enable design students achieve High Order Thinking Skills?* In this case, we describe the processes involved in the study, design activity in creating ePortfolios and reflections on teaching with emerging technologies. Advantages of ePortfolios as opposed to paper-based portfolios and other case examples are discussed. Findings of the study are discussed reflecting upon Diana Laurillard *Conversational Framework* (CF) and Bloom's *Digital Taxonomy* (BDT), which acknowledge that teaching occurs as a conversation. Focusing on High Order Thinking skills (HOTs) of BDT, technology served as an enabler in the process of teaching and learning in the research case.

¹ Afrika: an epistemological stance seeking to co-create an authentic narrative of the continent from its own unique context, perspective and aspirations.

Background

Emerging technologies in design education

In design schools where the focus is on creative arts, courses such as photography, typography, illustrations, sound design, and graphic design are usually offered in these institutions, which require the creation of a portfolio for assessment (Powell, 2013:86). The emergence of technology has offered designers with limitless possibilities on realising some of the creative ideas they have conceptualised and bringing them into reality in design schools (Rowley *et al.*, 2014:39). However, technology in this case is an enabler to augment design pedagogical approaches in making it easy to ideate and easily design solutions to emerging problems.

The introduction to social media in education has moved teaching and learning solely from directive learning (teacher centred-pedagogy) to learner-centred (andragogy) and self-directed/motivated learning (heutagogy) (Cochrane & Antonczak, 2014:359-360). Technology has increased collaboration and communication in academic circles and among professionals in the industry due to the emergence of Web 2.0 for social media activities (Cochrane & Antonczak, 2014:359-360). The popularity of Web 2.0 tools and the services have provided students with “just in time” and “at your fingertips” learning opportunities that can support a wide range of teaching and learning activities (Rahimi *et al.*, 2015:235).

Communication Design (graphic design) and other related design disciplines have transformed incrementally due to the emergence of technologies. Communication Design discipline has migrated from paper-based designing, through desktop computer based courses, into engagement with the rise of mobile computing and design formats that foster interactivity (Cochrane *et al.*, 2014:34). In the educational setting, programmes such as *Adobe Creative Suite, Indesign, Flash, Maya, Cinema 4D, Edius Pro* and so on, have affordances that enable designers to bring their imaginary concepts into reality. These professional tools and the familiarity with ICTs give designers the ability to work with social media and other cloud based tools for learning. These tools can also help designers create their portfolios. The effectiveness of working with technology will be possible, provided the learning environment is designed to accommodate student learning through active participation using available technologies (Cochrane *et al.*, 2014:36).

Emerging technologies offer a wide range of tools that can support pedagogical approaches to promote active teaching and learning. Some of the pedagogies include flipped classroom, blended learning, rhizomatic learning, and so on. Although these benefits are enormous, in some UoTs in developing world context, these technologies have not been fully explored in design disciplines for course outcomes such as ePortfolios. The goal of this study is to explore ePortfolios as a pedagogic innovation where students will use their artifacts as documentary evidence of their learning as a way of promoting active teaching and learning (Rowley & Bennett, 2016:1-2). In view of the many benefits of ePortfolios in design education, the study was purposed to *firstly identify relevant emerging technologies that can enable design students create ePortfolios. Secondly, to identify relevant technologies that can assist educators create virtual classroom environments for communication, collaboration and appraise student ePortfolios. Thirdly, to explore available pedagogical approaches and technology that can enable design students achieve High Order Thinking Skills (HOTs).*

Portfolio Design

Portfolios are a collection of students', teachers' or people's work that demonstrates one's skills or performance over time and serves as an evidence of their learning or skills (Ng *et al.* 2013:355-356). Portfolios present more detailed information than a standard resume (Shaidullina *et al.*, 2015:375). Portfolios have been kept by artists for hundreds of years but today it has become part of modern education since the 1980s (Davis, 2015:1). Portfolios are not only applied in design courses but students in other disciplines such as engineering, architecture, nursing and many more, to encourage reflective learning (Green *et al.*, 2014:4-5). Portfolios may be organised in two major ways that may either adopt a positivist, and / or a constructivist approach (Davis, 2015:1-2).

The process may either be combined to achieve learning outcomes as desired by educators in a particular course and to understand media literacies (Perk & Galantino, 2013:39). It is necessary for educators to determine what type of portfolio it is that one is building. Educators need to decide whether the portfolios for *showcasing* or a *process* portfolio that ought to consider how students will store their portfolios during and after the course (Bryant & Chittum, 2013:189-190). Portfolios may be designed to meet particular audiences for employment or for educational purposes. However, when considering portfolios for educational purposes it may be developed using the *positivist* or the *constructivist* approach.

Portfolio for learning (positivist approach)

It is usually done over a short-term period. It is typically assessed summative at the end of the term; that is typically a showcase portfolio. In this process students will submit their portfolios at the end of the term for assessment (Davis, 2015:1-2).

Portfolios as learning (constructivist approach)

In this case, it is usually a process portfolio. In this format, the use of portfolios as learning, typically has an extended time frame and can be done overtime (*ibid*). It aims for formative assessment and students will reflect on their learning which gives them ownership of the process. It mirrors the construction of student learning overtime in their studies (O'Toole, 2013:6; Davis, 2015:1-2).

Traditional Portfolios versus ePortfolios

Portfolios come in two major formats, the traditional (paper or sample of physical artifact) and the electronic (digital versions of artifacts) formats also known as ePortfolios (Newhouse, 2014:475-476). The paper portfolios could be perceived as two-dimensional and the e-versions will be 3-dimensional (Fox *et al.*, 2009:7). In some situations the two formats could be combined. In such situations, the electronic versions are stored on a DVD or on a pen drive and presented together as one piece of work which is applicable, especially in the field of designing (Lorenzo & Ittelson, 2005:1-5).

Components of a Traditional Portfolio

These may be made up of only tangible physical evidence of the creator's works, such as artworks in print media formats, hardcopy paper CVs, publications, pictures and any other related works which might be presented in a file or in a physical artist portfolio (Fox *et al.*, 2009:3). Traditional portfolios include the reflections and learning activities of the creator, both at school and co-curricular activities. In design schools these portfolios help educators and learners assess outcomes of their learning. These portfolios are later extended to the industry after school, as a tool to showcase the artist's work for employment.

Components of Electronic Portfolio (ePortfolios)

This version is an electronic portfolio which is mainly in digital formats and might be presented usually in the form of a website format (Buente *et al.*, 2015:170). A typical ePortfolio will be an electronic evidence of the owner that will be made up of blogs, text, images, audio recordings (podcasts), video recordings (vodcasts), multimedia, links to other websites (webcasts) in the form of hyperlinks and other digital forms (Green *et al.*, 2014:4-5). ePortfolios have now become a movement that is being explored in many universities in other parts of the world to promote active teaching and learning (Eynon *et al.*, 2014:95-96).

Advantages of ePortfolios

ePortfolios have several benefits for educators, students and the general public. Studies on ePortfolio implementation in academic circles such as the creative arts have proven to be successful in enhancing students' learning (Rowley *et al.*, 2014:36-37). ePortfolios have been used successfully as an alternative tool to collect, reflect and select student learning in diverse academic disciplines and co-curricular activities on campuses (Kehoe & Goudzwaard, 2015:343). ePortfolios potentially can expand student learning in various forms of media, enhance media literacies and encourage reliable intellectual work (O'Keeffe & Donnelly, 2013: 2-3). It allows students to link different parts of their learning, both in class (formal) and other co-curricular activities (informal). ePortfolios enable active learning rather than passive learning since students continuously engage with their learning (Bryant & Chittum, 2013:189).

Also, ePortfolios provide a system for schools to assess and organise student learning (Buyarski & Landis, 2014:49). ePortfolios make it possible to connect with other students and educators in other universities (Latta & Vaughan, 2015:16-17). Students and educators alike are able to share pedagogical and learning styles in their various fields of discipline and it has been proven to enhance assessment and feedback (O'Keeffe & Donnelly, 2013:2). In a word, the use of ePortfolios is not about technology only but rather a set of principles about pedagogy where the technology serves as an enabler to these set of principles (Barrett, 2009:para 6).

Cases of ePortfolio integration

Cases: University of Hawai'i at Mānoa Francis

The University of Hawai'i at Mānoa Francis integrated ePortfolios into their communication BA curriculum for assessment. ePortfolios were integrated into their curriculum incrementally starting from 2010 and assessment was done in 2013. They noted that integrating ePortfolios in capstone courses can facilitate relational connections with their major courses. ePortfolios can provide more consistent learning experiences that integrate real life work and experiences in the classroom (Buente *et al.*, 2015:169-176).

Case 2: Efolio Minnesota

In Minnesota, ePortfolios have been extended to the public domain. The idea was practicalised through local, federal government and higher education. It was dubbed eFolio Minnesota which was a statewide ePortfolio system. The system provided every resident of the community an opportunity for a free storage capacity (3Mb) of a lifetime ePortfolio (<http://www.efoliominnesota.com/>). eFolio Minnesota was being used by educators, students and workers (Lorenzo & Ittelson, 2005:7).

Case 3: University of Cape Town- eMarketing Course

In a case study conducted at the University of Cape Town, South Africa, postgraduate students in an eMarketing course used ePortfolios as a way of marketing themselves as a *brand* in the course. Students indicated that it was a useful tool to share with potential employees and create an online presence and spaces for interactions. The authors in this case, noted that ePortfolios have multiple aspects that learners need to be aware of. ePortfolios goes beyond online space, personal brand and assessment regime in the eMarketing course. ePortfolios can foster relationships and as such it not only serves as a means to deploy technology, it also makes pedagogy and students visible (Pallit & Houslay, 2014:4-13).

Additionally, in a report by *New Media Consortium* (NMC) 2015, ePortfolios were introduced in some schools among first year students in Ireland. Researchers from this study reported that the integration of ePortfolios in schools improved student learning (Johnson *et al.*, 2015:7). It is evident from these case examples that ePortfolios have great potential and could be integrated in different educational settings. ePortfolios can promote reflective learning that can meet career goals among students and practitioners across many disciplines.

Research Gap in a Design Programme

Students and lecturers in art and design schools often use portfolios as the main source of reflecting on students' performance at the end of the term. At the end of each design cycle in a typical studio based course, students produce portfolios for evaluation and for their professional practice (Buente *et al.*, 2015, 172-173). A typical portfolio of a communication design student is a collection of their works that may range from print media to electronic media (Newhouse, 2014:476-477). These works are created by students that are often exhibited at mid-term and end-of-term and it forms part of their continuous assessment. Sometimes creating these artifacts are expensive for students to manage since printing is costly and not very sustainable (Ng *et al.*, 2013:360).

After exhibiting some of these works, it becomes problematic for students and lecturers to store them within the university environment for future studies. At the moment there is no instant digital feedback session, avenue for digital exhibition, or virtual storage system in place within most of these practical oriented courses in the selected UoT. Thus, in this investigation, we explored teaching with emerging technologies that could facilitate development and conversations around ePortfolios as a reflective (active) teaching and learning activity.

Educational context- ePortfolios in an Advertising and media course

The context of this research is situated within the Communication Design programme in the selected UoT. The Communication programme in the selected UoT has three major options: AD&M, Film and Video, Animation and Visual Communication. The study is being piloted, at this stage. Hence, we focused on AD&M students with a focus on the course, photography. In our observation as educators in our contexts, it is evident that designers cannot do without portfolios. Students and educators create portfolios which might be physical artifacts or digital formats which are usually stored on pen drives, hard drives, CD/ DVDs, to show to potential audiences or for assessment. Presentation of these portfolios has been in more traditional formats as opposed to electronic portfolios. Physical (paper-based) portfolios have been quite cumbersome for educators and students alike to manage hence the need for this investigation. Although the study is in its early stages, it is perceived as an opportunity to integrate ePortfolios into Communication Design programmes in future.

METHODOLOGY

The methodological approach for the inquiry was based on qualitative research procedures that draw on Action Design Research (ADR) methods. Design Research (DR) process involves research through the design process (Glanville, 2015:13-16). ADR methods are a combination of DR and AR procedures ($DR + AD = ADR$). Since the study was conducted based on our real context as design educators and practitioners, we adopted some aspects of Action Design Research approach (ADR) for the study because ADR is problem driven and generates knowledge through an iterative design process (Reuver *et al.*, 2015:1-2). Our practice as design educators informed the data collection process in an iterative manner, as applied in design research to test the concept of integrating technology in a real educational context (Kennedy *et al.*, 2017). However, concepts in the CF were integrated as part of the teaching process using design methods to meet HOTS as part of learning outcomes in AD&M courses. A summary of the teaching process is illustrated in an emerging conceptual framework as Figure 1. Figure 1 is a combination of selected concepts in the CF, BDT and the Double Diamond (DD) design process situated in the ADR approach.

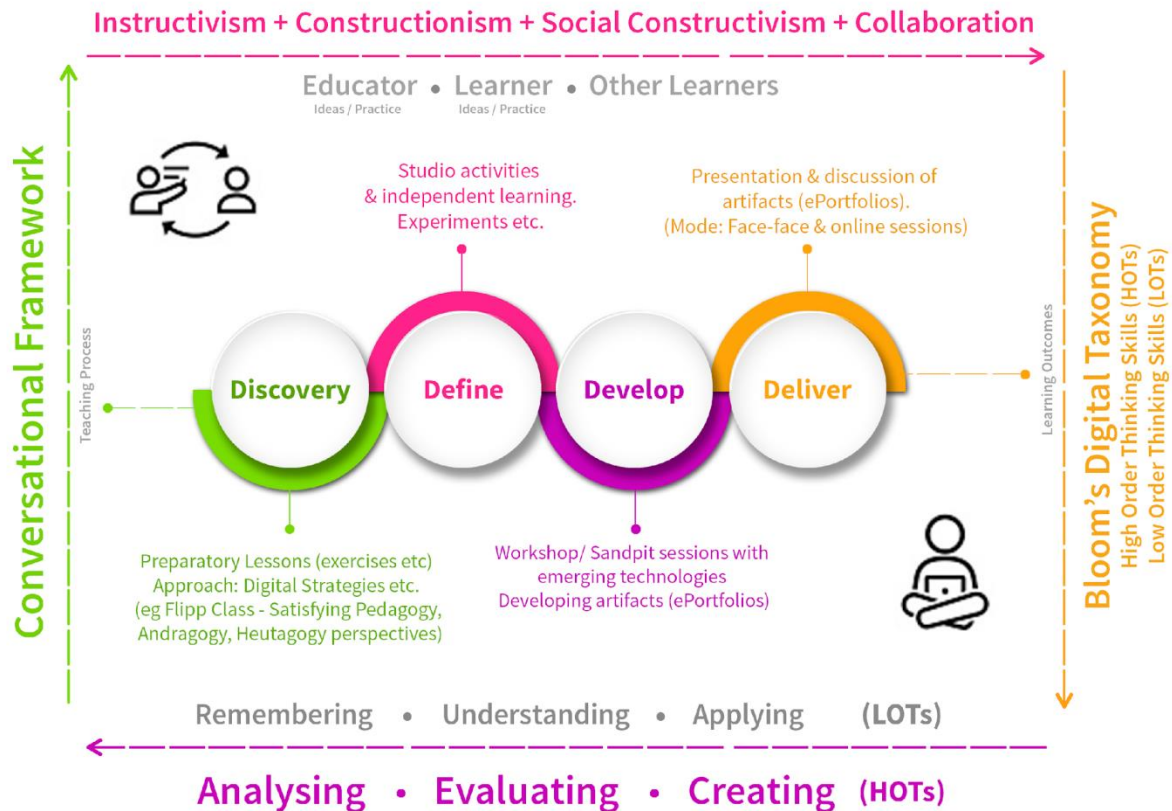


Figure 1: Framing ePortfolio integration in the design process (source: 1st author's construct)

Participants and ePortfolio activities

Design students were purposively selected to participate in this inquiry in order to meet the stipulated milestones of the research (Wahyuni, 2012:73; Creswell, 2014:239). The participants were mainly from level 300 of the AD&M option. Since the study is being piloted at this stage it was not extended to cover all students in the Communication Design programme due the large class sizes. AD&M design classes have the smallest number of design students, which was manageable for the research case. Most of the design students are familiar with designing with technology using software such as *Adobe Creative Suite*, *Dreamweaver*, *Flash*, and other related design software due to the nature of the design programme. They all own laptops, mobile devices and are familiar with social media tools. Hence the *Bring Your Own Device (BYOD)* concept was used and students brought their own devices to the course. Their familiarity with these tools made it easier for them to create ePortfolios as part of their reflective learning process.

Design ethics

The inquiry was conducted with design ethos that informed the research process. It was conducted in a collaborative process with participants and lecturers (facilitator) both in face-to-face and virtual classroom environments. Participants signed consent forms and they were not forced to participate in the study, as it was actually part of their AD&M course activities for the term and therefore they willingly participated. Participants were assured that information will be

managed with confidentiality and reporting of data will be done with anonymity except in cases where they gave permission for their names to be used (Collins, 2010:86-87). However, participants' works have been shown in this paper, because they all gave permission for their works to be used as such.

Design Action with Emerging Technologies

Designers normally use some form of technology to design and develop their artifacts. In the photography course the goal for the term was for the students to develop an ePortfolio as part of their assessment for the term. This process required the use of technologies that students were familiar with but, in a different way. On the design action, the study began by briefing students on the outline for the term and highlighting the essence of developing an ePortfolio for assessment, learning and professional practice. Expected outcomes for the term were made known to students that included creating virtual exhibitions as part of their assessment for the term. The flipped classroom pedagogical approach was applied to the photography course (see Figure 1 & 2). Students were then given the necessary learning materials in order to personalise their learning and meet the set objectives for the term (Abeysekera & Dawson, 2015:1-3).



Figure 2: Participants at work in a face-to-face/ sandpit sessions

Integrating emerging technologies in AD & M Course

Integrating technologies into a course requires that educators select appropriate technologies that have the affordances to meet the specific outcomes in the AD&M course. *Google* sites and *Edmodo* were selected for the exercise, since it had the affordances that could facilitate the development of ePortfolios. Workshops were organised in the form of “*Sandpit sessions*” for *technology integration*. Sandpit sessions are considered as playful learning environments that foster creativity. It can be organised either in the classroom or outside the classroom (Jarrett *et al.*, 2010:221-222). In this context, *Edmodo* (Figure 2a) was suitable to create a virtual classroom space for collaboration and communication. *Google* sites were deemed suitable for participants to create ePortfolios (see Figure 2b). These tools provided students with new spaces to showcase themselves and their artworks in new ways (Brown, 2015:335). Participants using these tools for creative works could develop higher metacognitive abilities through creating ePortfolios in the selected design course.



Figure 3a & b: Logos of selected emerging technology tools (source: Google images)

RESULTS AND DISCUSSION

Results

Creating ePortfolios with design students generated interesting feedback. Data obtained were both visual and textual. These were based on responses obtained from students, on the exercises in *Edmodo* and during face-to-face sessions that were valuable sources of data. Information obtained was categorised based on the emerging themes from participants. Reflections were based on learning experiences as participants were observed while they work on their ePortfolios. The findings evolved through the process of organising, and analysing participants’ feedback; appraisal of ePortfolios and finally making sense and comparisons out of the entire process. Students’ ePortfolios served as the basis for reflections and appraisal of their works. The data was grouped through the process of higher order concepts to a more abstract level in order to find interrelated themes in their ePortfolio design (Collins, 2010:150). Findings from the process showed that the students understood the concept of ePortfolios and perceived it as creative artifacts. As beginners, they created authentic ePortfolios that had basic aesthetic appeal expected in a creative piece of artifact. Participants enjoyed using the selected technologies to facilitate their learning in a more reflective process. Samples of the ePortfolios created by AD&M students are presented as Figures 4 and 5. Additional ePortfolios from other members in the class have been documented in the form of hyperlinks accessible online by simply double clicking the links to sample ePortfolios of ADM students such as the ones provided below:

Class page – link to design student ePortfolios:

- <https://sites.google.com/view/isaacopoku/home>
- <https://sites.google.com/view/danielkofiaboagye/home>

- <https://sites.google.com/view/davidedusah/home>

Group page – link to Edmodo virtual classroom:

- <https://www.edmodo.com/home#/>

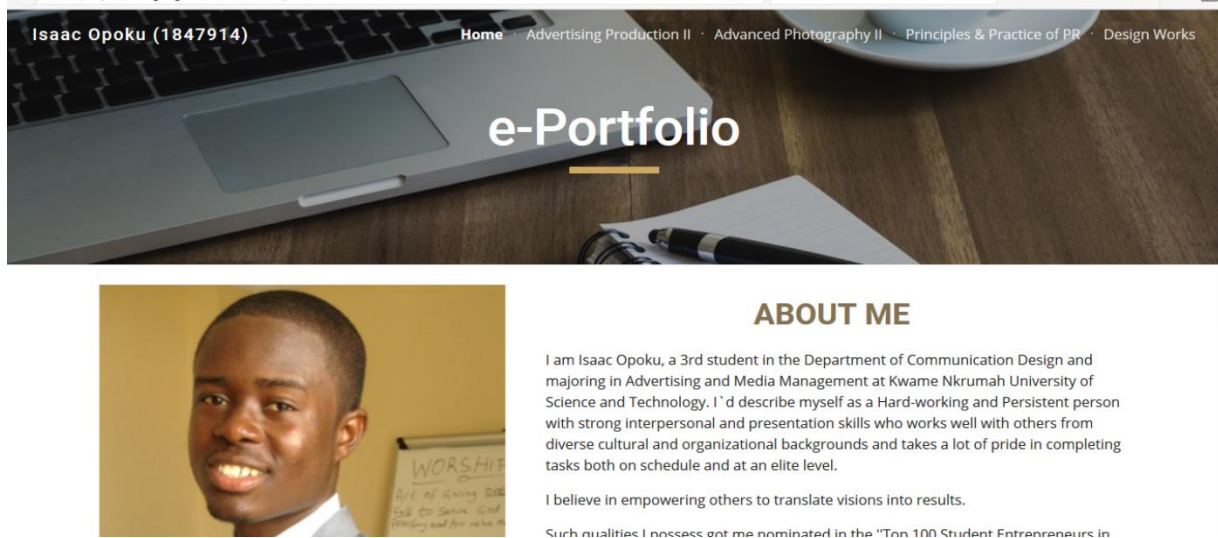


Figure 4: Sample A - ePortfolio of AD&M student

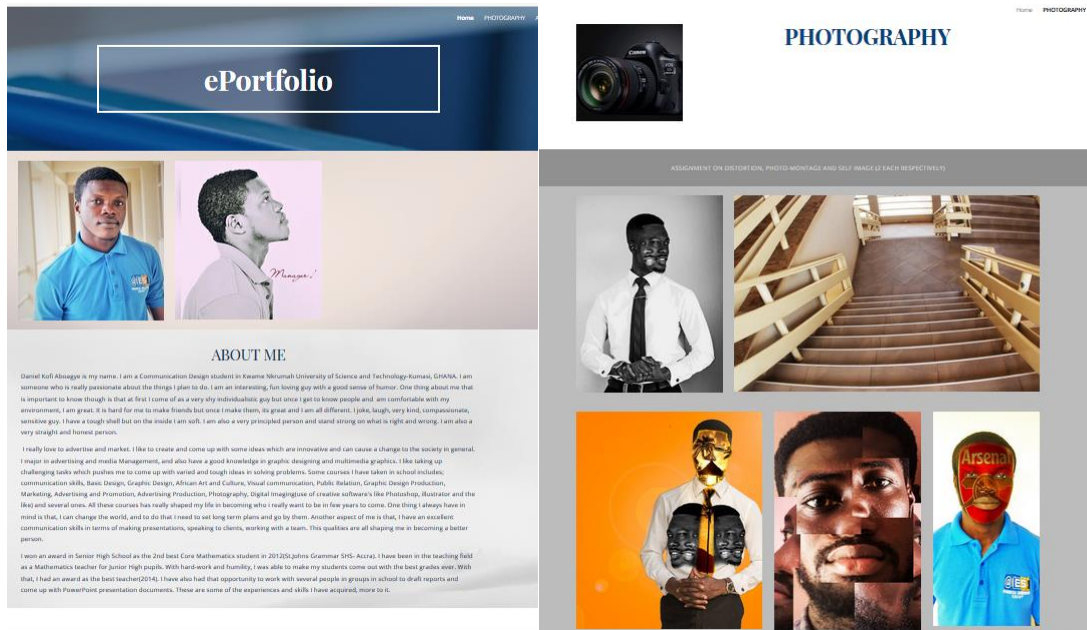


Figure 5: Sample B -ePortfolio of AD&M student

Participants' Reflections their ePortfolios

Students showed enthusiasm in the use of these emerging technologies as observed during the sandpit sessions. They indicated that it was a very smart way of creating their ePortfolios and storing their works in virtual environments for collaborations and communications. Some indicated that they had lost a lot of work in the past due to the absence of a system to compile their works and store in the clouds. Also, participants indicated that they were very excited that they could actually create paperless portfolios in a more organised way. They acknowledged that using *Google* sites was quite easy. A few of the comments obtained from the participants are presented as extracts in subsequent lines:

“Using Google sites today is really cool, it seems to be a smart tool and If I had known how to use this in my early years in school, I would have saved most of my works in the clouds by creating my ePortfolio” – Designer A.

“Using an ePortfolio as a means of documenting our works is very good. Because we are in an era where almost everything is done online; job application, interviews and many other things too. Integrating ePortfolio as part of our learning, gives us the chance to upload our works online for people to view and make comments concerning our works. We pick up these pieces of ideas and make sure to incorporate them in our next work. We tend to see other peoples work as well and derive some inspiration from them. ePortfolios are a good way to reflect on our learning and practice as designers. We are able to get online exposure without suffering to look for someone to aid you. When you have an ePortfolio online, not only those who are familiar with your works will comment, unknown experts or people with good and appreciable knowledge of what we do can also pass comments which will help you enhance your knowledge for professional practice” – Designer B.

“ePortfolios [are] fun! It is exciting to know I have a personal website that I can manage. With ePortfolios, I have control to design and manage the content of my website, and also it is an easier means to share my work” – Designer C.

“Wow, wow, wow, this is one of the best education initiatives so far, students can interact anytime, anywhere and on any day. At least we do not have to carry loads of assignments to class whereas it can simply be compiled as ePortfolios and presented on this virtual classroom platform. As an advertiser, a platform like this is best for idea sharing both internationally and locally. God bless the creator ☺ I'm excited already to be part of this experience” – Designer D.

The extracts presented above based on participants' opinion is a good indication that ePortfolios has a potential in design courses. ePortfolios can be integrated into the communication design programme to promote active teaching and learning.

Discussion

Teaching in general and in design transpires through the process of conversation to co-construct knowledge in various forms for different purposes. Conversation for the purpose of teaching/learning occurred between the design educator, AD&M learners and other design students (Figure 6). Here in a conversation, ideas were exchanged from educators, learners that were later extended to other learners. Based on these concepts, the AD&M courses were taught in the process of conversation through an iterative design process to integrate ePortfolios. Integrating ePortfolios as part of the AD&M course was entirely a new concept and as such was done incrementally.

Learners were introduced to the ideas and theories around ePortfolios using flipped classroom pedagogies. They were then provided with learning materials such as videos (vodcast) and PowerPoint presentations to argument their learning process that formed the basis of creating their ePortfolios. Since teaching and learning happens as a conversation, two frameworks that aligned to the concepts of the investigation were selected. These are the Diana Laurillard CF and BDT. They were adopted as an adjustable lens to discuss the outcome of the study. CF is focused on the process of teaching between teachers, learners and other learners (peers). The framework as Laurillard describes it has four main basic components: *i) students concepts and ii) students specific actions; iii) teachers concepts; and iv) teachers constructed learning environment* (Schneider & Mgaved, 2007:1). On the other hand, BDT highlights the cognitive abilities of the learners. BDT is classified into two major parts: Low Order Thinking skills (LOTs) that involves *remembering, understanding and applying*; and High Order Thinking Skills (HOTs), which involves *analysing, evaluating and creating* (Tarling & Ng’ambi, 2016:559-560).

However, in this research case the inquiry revolved around HOTs. Thus, participants were expected to come up with ePortfolios as an outcome of their learning out of the teaching process of conversation. In reflecting upon the investigation using the CF, participants were given information in the form of theories and ideas (*teachers’ ideas*). Participating design students then processed these theories/ideas (*learners ideas*) to understand what ideas have been put forward by their lecturer. Learners processed these concepts/ ideas as obtained from their lecturer. Next, the lecturer sends feedback to learners in the process of conversation, which occurs in an iterative manner between lecturer, learner and other learners (Figure 6).

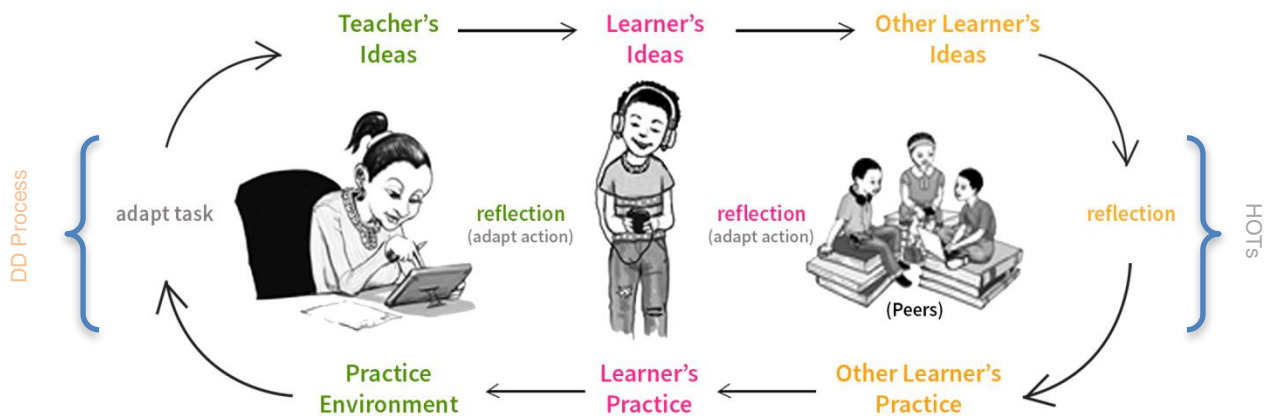


Figure 6: Metaphor of the CF (source: 1st author’s construct)

(Metaphor framework was informed by Diana Laurillard CF, BDT& DD)

After students had come up with tangible results in the form of ePortfolios, feedback was then given to the lecturer that formed part of the teacher’s constructed environment (*Learners/ other learners practice*). The students’ works were reflected upon by the lecturer, providing constant feedback to participants that informed the next process of instruction (See Figure 1& 6). Students extended these ideas on ePortfolios to their peers both in class and outside the classroom that encouraged rhizomatic learning through social media (Cochrane *et al.*, 2014:39). Rhizomatic

learning is the process where independent and peer-to-peer learning occurs through active experimentation with technology (Mackness & Bell, 2015:31).

Emerging technologies such as Edmodo were used for active communication and collaboration with lecturers, learners and other peers in the virtual AD&M classroom environment. On the other hand, *Google* site was a useful tool in creating ePortfolios that served as a tangible product for their learning process. Propositions are that HOTS of the BDT have been met to an appreciable level through the creation of ePortfolios. The results of the study have proven that ePortfolios can add value to design courses. ePortfolios can be integrated as a viable tool that can promote reflective teaching and learning in UoT offering Art and Design programmes in Afrika.

Lessons Learned from ePortfolio Integration

The introduction of ePortfolio concepts using technology was adaptable because the 'Bring Your Own Device' (BYOD) strategy was employed. BYOD encouraged students to easily participate since they had their own devices that adds flexibility and context to their learning (Cochrane *et al.*, 2014:39). Also, participants were familiar with their devices, social media, which facilitated the introduction of *Google* sites that are easily adaptable to ePortfolios design and *Edmodo* for communication and collaboration. Finally there were challenges with accessing constant connectivity and electricity. However, this challenge was overcome at a point since most students already charged their mobile devices and had some data for connectivity. However, for an effective teaching and learning to take place using emerging technologies, there should be constant power supply and interconnectivity for educators and students in the context of the study.

CONCLUSION

Design as a discipline will continue to require the use of portfolios as an outcome of the design process. The integration of ePortfolios in communication design courses can potentially provide learning experiences with technology since outcomes for course assessment are usually designed artifacts. Creating ePortfolios with design principles will add aesthetic value to the designers' creative abilities and can help them gain employment. The study focused on level 300 AD&M students in the Communication Design programme. It is proposed that future research is required to integrate the ePortfolio concept as part of the annual students' industrial attachment programme as learning and for assessment. Future research could focus on virtual supervision of industrial attachment programmes and other learning activities using tools such as *Zoom*, *Microsoft Teams*, *Skype*, *Adobe Connect*, *Google Hangout*, *Google Meet*, *Facebook* and other emerging technologies with the relevant affordances for the exercise. Also, further research needs to be conducted into how ePortfolios can inform assessment; how active learning and teaching can be achieved using ePortfolios; what emerging technologies will be suitable to transform learning spaces in design education for communication and collaboration; *How technologies such as Quick Response (QR) codes could be explored to integrate paper based artifacts into ePortfolios; and what best practices are available using QR codes in ePortfolio design?*

In summation, it is proposed that the selected UoT could explore the concept of ePortfolios as part of the pedagogical approach to encourage reflective learning in all courses. The use of these approaches can potentially bring visibility to the university. It can also create networks with students and educators in other universities. Future projections are that ePortfolios can be further extended to include students, lecturers and administrative staff in the selected UoT for both storage, learning and communicative purposes. A holistic, integrated approach is required to digitise artifacts in order to operate a sustainable ePortfolios system at all levels in higher education institutions. The efficacy of such ePortfolio systems is arguably prescient given the highly disruptive nature of the COVID-19 global pandemic and its implications on the future of design pedagogy in Afrika and beyond.

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