A Cross-Modal Analysis of Learning Experience from a Learner's Perspective

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Abstract: Learning experience has been one of the most debated aspects of *Massive Open Online Courses (MOOCs)*. Various perceptions on learning experience offered by MOOCs have led to many claims about the quality of these courses and their potential impact on higher education in both developed and developing countries. This paper discusses, from a learner's perspective, learning experience across four modes of learning: face-to-face, self-guided/radio, online and MOOCs. My own educational experience expanded across the first three mode of learning. To gain similar first-hand experience in MOOCs, I enrolled in one cMOOC and twelve xMOOCs and studied these courses alongside other engaged learners. I conducted a cross-case analysis of the four modes of learning and identified strengths and limitations of each mode. Then I organised recurring patterns across the four learning modes into five themes: openness, availability, diversity, flexibility and interactivity. I found that each of these learning modes can help learners achieve a significant milestone in learning, and accomplishment in one mode can bridge across to a different learning mode. I argue that a combination of learning modes, where applicable, can lead to better learning experience than an exclusive use of a single mode. I also argue that each of these modes can contribute enormously to learners' educational, socio-economic, and cross-cultural migration as well as to their geographical mobility. Each of these modes can also contribute to bridging an educational divide if stakeholders in education capitalize on the target learners' strengths, on existing access to media and on openness in terms of content, assessment and accreditation. This paper is likely to benefit educational stakeholders who want to open up access to education and to reach learners in underprivileged settings, and those who are interested in cross-cultural education development.

Keywords: learning experience, face-to-face learning, self-guided/radio learning, online learning, learning from MOOCs, cross-cultural education

1. Introduction

Massive Open Online Courses (MOOCs) have recently dominated the debate in education. The popularity of these courses has catalyzed dispute about, for example, the learning experience they offer, their quality, their reach and their completion rates. On the one hand, MOOCs are hailed for their fit within a knowledge society (Levy and Schrire n.d.). According to Koller (2012) MOOCs provide learners with opportunities to personalise their learning. At Stanford University, students preferred taking *Artificial Intelligence* as a MOOC rather than face-to-face (Thrun 2012). The potential of MOOCs and the MOOC model to open access to education for learners in developing countries has also been noted (Koller 2012, Thrun 2012, Nkuyubwatsi 2013). The World Bank has linked up with Coursera to develop MOOCs for learners in developing countries (World Bank 2013). On the other hand, MOOCs are criticised for their assessment methods that lack constructive feedback (Daniel 2012, Armstrong 2012) and for being difficult to understand (Mazoue 2013, Edmundson 2012). The lack of critical, creative and original thinking in MOOCs (Bates 2012) and their students' low completion rates (Daniel 2012) have also been noted. Equally, the potential of MOOCs to improve quality of, and open up access to higher education in developing countries is doubted (Bates 2012 and Daniel 2012, Young 2013; Sharma 2013). Liyanagunawarderna et al. (2013) argue that the high resolution videos in xMOOCs provide positive learning experiences to students with high quality connectivity but this contribute to excluding students with poor connectivity because the higher the resolution is, the more difficult to download with low bandwidth. These different views on MOOCs and their potential reflect a diversity of learning settings that needs to be considered.

The acronym MOOC (Massive Open Online Course) was created in 2007 by Dave Cormier and Bryan Alexander to define *Connectivism and Connective Knowledge*, the open online course developed at the University of Manitoba by George Siemens and Stephen Downes (Daniel 2012). Anderson (2013) explores the four aspects of the acronym: massiveness, openness, the online nature and course features. He notes that MOOCs' massiveness refers more to their scalability than to a specific number of students. He acknowledges the massiveness in terms of numbers of students, but recommends a careful use of students' numbers at the registration, course start, first assignment/quiz completion and course completion phases in the discussion of MOOCs' completion rates. Anderson (2013) also identifies six types of openness:

- expansion of education beyond geographical barriers,
- freedom of speech,
- removal of restrictions on the learning content,
- enrolment without prerequisite,
- the freedom to determine the learning pace,
- the provision of a course free of charge.

Concerning the online aspect, he points out that MOOCs are not necessarily entirely online since some students in the same geographical location can meet face-to-face for mutual support and 'meet-ups' are encouraged in some courses. Face-to-face meetings are often required for formal students who want to get credit for studying a MOOC (Blom et al. 2013). As for the course aspect, he highlights that MOOCs run for a specific time (p.3). Based on Anderson's (2013) work, MOOCs have been defined as "online, non-selective and tuition-free courses that are usually addressed to a global audience of students" (Nkuyubwatsi 2013, P. 341).
MOOCs have been broadly classified into two categories: *Connectivist MOOCs (cMOOCs)* and *Extension MOOCs (xMOOCs)*. Connectivist MOOCs are based on many, if not all, of Siemens' (2005) connectivist learning principles:

- Learning and knowledge rests in diversity of opinions.
- Learning is a process of connecting specialized nodes or information sources.
- Learning may reside in non-human appliances.
- Capacity to know more is more critical than what is currently known
- Nurturing and maintaining connections is needed to facilitate continual learning.
- Ability to see connections between fields, ideas, and concepts is a core skill.
- Currency (accurate, up-to-date knowledge) is the intent of all connectivist learning activities.
- Decision-making is itself a learning process. Choosing what to learn and the meaning of incoming information is seen through the lens of a shifting reality.

As for extension MOOCs, they are essentially based on a didactic pedagogy. They are characterised by high student-multimedia content and student-student interactions, but student-teacher interaction is very low. As the name perhaps suggests, the goal of these MOOCs is to expand higher education beyond universities' physical campuses. Many universities involved in the xMOOC movement hope to attract students to their fee-bearing courses through MOOCs. For this reason, xMOOCs resemble, in many respects, university courses offered for various qualifications. A statement of accomplishment is awarded to students who successfully complete many xMOOCs. These MOOCs are criticised for relying on either cognitive-behaviourism (Rodriguez 2012) or behaviourism (Daniel 2012, Bates 2012). As Conole (2013) argues, however, these criticisms do not reflect the diversity in these MOOCs and how students engage with them. Therefore, the cMOOCs/ xMOOCs categorization does not necessarily means that MOOCs in the same category look the same.

The popularity of MOOCs grew enormously from 2011 onward; when the first three xMOOCs were offered at Stanford University. *Artificial Intelligence, Machine Learning* and *Introduction to Databases* ran concurrently (Rodriguez 2012). The *Artificial Intelligence* MOOC enrolled more students than the other two MOOCs, and became more famous, because of its instructor's post-course reaction. After co-tutoring the course with Peter Norvig and graduating 20,000 students from 160,000 enrollees, Professor Sebastian Thrun resigned from Stanford. In January 2012, he launched Udacity (https://www.udacity.com/), a private MOOC provider. This move triggered a response from his colleagues, Daphne Koller and Andrew Ng, who co-founded Coursera (https://www.coursera.org/) in April 2012. Unlike Udacity, Coursera focused on working in partnership with prestigious universities. This enabled Coursera to become one of the biggest MOOC platforms in terms of number of students, number of courses, partner institutions, diversity of fields of study and languages of learning. By the end of 2013, Coursera had already enrolled over 5,856,000 students. Its website listed 557 courses and 107 partners. Courses were available in 25 fields of study and 12 languages: English, Chinese, French, Russian, Spanish, Portuguese, Turkish, Arabic, German, Ukrainian, Italian, and Japanese. A few weeks after Coursera started, Harvard and MIT co-financed the MITx platform, which changed its name to edX (https://www.edx.org/). Competition in the MOOCs industry was already intense.

The United States of America monopolized the xMOOC market for only a few months before reactions appeared in other countries. In December 2012, a partnership of British institutions to provide MOOCs via the FutureLearn platform (http://futurelearn.com/about/) was revealed. In December 2013, 26 higher education institutions, mostly British universities, the British Library, the British Council and the British Museum were partners in FutureLearn. Non-British partner universities included the University of Auckland (New Zealand) and Monash University (Australia). In March 2013, Open2Study (https://www.open2study.com/), an Australia MOOC platform was launched. This platform was quickly followed by the OpenUpEd (http://www.openuped.eu/), a pan-European MOOC initiative launched in April 2013. OpenUpEd is unique in being committed to open licensing of the MOOC content, with Creative Common Attribution (CC-BY) and Creative Common Attribution Share Alike (CC-BY-SA) as the most desirable licences (OpenUpED 2013). This open licensing of MOOC materials will enable cultural translation, a sound practice that is often hindered by prohibitive licences (Nkuyubwatsi upcoming). Other MOOC platforms include, but are not limited to, NovoEd (http://novoed.com/) based at Stanford University, Iversity (https://iversity.org/) which is a German MOOC platform, Veduca (http://www.veduca.com.br/) based in Brazil and eWant (http://www.ewant.org/MOOC/Home/Default.aspx) based in China. The number of MOOC platforms has expanded quickly across the globe in the last two years.

2. The controversy around MOOCs

The debate on MOOCs was polarized after the surge of xMOOCs. The founders of xMOOC platforms claim that MOOCs are high quality courses provided free to learners all over the world (Koller 2012, Shaw 2012, Thrun 2012, FutureLearn 2013,). Equally, Ripley (2012) commends opportunities opened by xMOOCs to learners who are unable to attend higher education in existing systems. Although the quality of xMOOCs' content is controversial, some universities have made agreements with Coursera to use its courses for their accredited programmes (Kolowich 2012). Moreover, the recent partnership between Coursera and the World Bank mentioned earlier (World Bank 2013) indicates that xMOOCs have gained some trust. However, xMOOCs are criticized for relying on a traditional learning approach (Daniel 2012) and cMOOCs do not enable meaningful connectedness and interactivity (Mackness et al. 2010 p. 272). In their survey on *Connectivism and Connective Knowledge*, Mackness et al. (2010) found both positive and negative reactions from participants (p. 267). They also noted that the number of participants was so overwhelming that it hindered meaningful connectedness and interactivity.

It is important to recognize that both MOOC advocacy and criticism are coupled with the promotion of learning perspectives, many of which do not make sense universally. Some perspectives, for instance, tend to overemphasize the teacher's presence and seem to underestimate the role of the learner's investment and learning that occurs in settings where there is a shortage of teachers. A different approach that recognizes multiple perspectives of learning and the merits as well as limitations of a diversity of modes of learning is needed. As Kandiko (2013) argues, there is no universal student experience because of enormous diversity (p.4) and there is no universal way of learning. Having a diverse mindset vis-à-vis perspectives on learning and various modes of learning would help educational stakeholders understand better learning across settings.

MOOCs are also criticized for their low completion rates (Daniel 2012). However, Anderson (2013) argues against basing these rates on figures that include enrollees who are not interested in completing the course. Likewise, Fini (2009) contends that using the conventional concepts of attrition and drop out for such students is inappropriate. Moreover, the MOOC completion rate looks low when the viewer is interested in percentage. However, when attention shifts to the course reach, MOOCs' superiority stands out. For instance, the Stanford University A*rtificial Intelligence* MOOC that had a low completion percentage (about 12.5 percent) graduated 20,000 students. Courses whose professors pride themselves for 100 percent of completion have not accomplished a 20, 000 graduation in a single cohort. It would indeed take more than a professor's life period to graduate 20,000 students with 100 percent of completion rate in the non-MOOC system. To reach 100 percent of completion, traditional universities exercise selective filters, and this ends up excluding a lot of learners. The consequence of using such selective filters on non selected individuals is the self-perception as being not good enough for higher education, which is a tipping point of social disempowerment (Lane 2009, p. 9 and Lane and Van Dorp 2011). Such feeling inhibit disempowered individuals' efforts because they think they cannot upgrade their competences to the level required for higher education. Hence, the cost of prioritising percentages in calculations of completion rates is the disempowering selection which inhibits effort and development of potential talents of people who are not included.

Another source of dispute about MOOCs is their potential to improve access to higher education in developing countries. While Thrun (2012) and Koller (2012) are optimistic about this contribution, Bates (2012) and Daniel (2012) see such optimism as unjustified: they argue that widening participation in developing countries depends on both the provision of free courses and the accreditation of the learning achieved. The need to link learning, certification and accreditation also emerged in the First International Conference of the African Virtual University held in Nairobi in November 2013. According to the African Development Bank (2013), the conference delegates agreed that certification as evidence of learning achievement is important in all countries and especially in Africa. In a different direction, Ostrow (2013) argues that MOOCs are beneficial to students who are rich and those who already have degrees. This is similar to Liyanagunawarderna et al.'s (2013) and Sharma's (2013) contentions that the current MOOC model is not compatible with many learning settings in the developing countries. MOOCs still need to be adjusted to suit learning in underprivileged settings.

A good way to position MOOC learning experience vis-à-vis learning experience through other modes of delivery is by exploring in each the possible types of interactions that enable meaningful learning. Moore (1989) identified three types of interaction: student-teacher, student-student and student-content. The fourth type of interaction, learner-interface interaction in which the student interact with a computer, was added by Hillman et al. (1994). In his interactivity theorem, Anderson (2003, p. 4) argues that as long as at least one of Moore's three types of interaction is maximised, deep and meaningful learning occurs. In this paper, I describe and discuss a cross-modal learning experience that enabled my migration across the four types of interaction. This experience occurred through face-to-face, self-guided/radio, online and MOOC modes of learning.

3. Methodology

The research was designed as a case study that analyses and discusses learning experience across four cases: face-to-face learning, self-guided/radio learning, online learning and learning from MOOCs. Face-to-face learning covers my education at both the National University of Rwanda (NUR) and Eastern Michigan University (EMU). The programme at NUR was at undergraduate level and the one at EMU was at postgraduate level. My self-guided and radio learning experience was enabled by reading various resources, mostly hand-written, and by listening to the British Broadcasting Corporation (BBC) and the Voice of America (VOA). This learning enabled me to prepare for my national examinations, which I had to take to compete for a place and student loan for public higher education, and to prepare for my undergraduate education afterwards. In my learning from radio, I listened regularly to various English language courses, debates, and other broadcasts. Radio courses included, but were not limited to, *Leçon d' Anglais par Radio* which was offered by "BBC Afrique", as well as *New Dynamic English* and *Functioning in Business* which were broadcast by the VOA Special English. Debates included the BBC's *Have your Say* and the VOA's *Straight Talk Africa*. As for other broadcasts, they included news from both radios as well as programmes of the VOA Special English, mainly *Exploration*, *Science in the News*, *Agriculture Report*, *Education Report*, *Economics Report*, etc. The third case, online learning experience, consisted of learning with both the UK Open University (OU) and the e-Academy, an eLearning platform run by the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ). The UKOU programme was at MA level and focused on theories, research and practices in online and distance education. It had several modules whose sizes varied between 300 and 600 hours: 30 and 60 credits respectively in the British credit system. As for the e-Academy programme, it focused more on the development of hands-on skills in planning, implementing, managing and tutoring eLearning courses. It consisted of six modules of roughly 30 to 40 hours of workload. This programme was implemented by the University of The Philippines Open University (UPOU). As for my MOOCs learning experience, it consisted of learning from one cMOOC and 12 xMOOCs. The cMOOC was *Open Content Licensing for Educator (OCL4Ed)* which was offered by the Open Educational Resources Foundation (OERF) in partnership with the Commonwealth of Learning (COL) chair in OER at Otago Polytechnic, the UNESCO-COL chair in OER at Athabasca University and the Creative Commons Aotearoa New Zealand. As for the xMOOCs, I took them from Coursera between January and December 2013. These MOOCs were offered by Universities in three Countries: USA, UK and Germany (see Table 3.1).

In the first three cases, I was simply a learner, but my role in the MOOCs was mainly as a researcher. My enrollment in these MOOCs was informed by my interest in the courses: most students choose courses because they are interested in the content and this helps them to engage with their learning. In each MOOC, my goal was to complete all learning activities that were required and add a manageable number of optional

activities. In this way, I was a participant observer. Yin (2009) defines participant-observation as a mode in which the observer assumes various roles in the case study situation and actively participates in the phenomenon that is being studied (p. 111). He argues that such participation helps the researchers to see the reality from the point of view of someone who is inside the case study rather than external to it (p. 112). Hence, participating in MOOCs and engaging in learning activities as other MOOC students gave me a broad and deep understanding of these courses from a learner's perspective. It also enabled me to engage with learning from these MOOCs, just as I was engaged in the other courses that make up the three other cases analysed in this study.

Given that this study is a multiple-case study, I conducted a cross-case comparison of learning experience. Firstly, I identified strengths and limitations of each case and recurring patterns across learning enablers offered by the four cases. Secondly, I organised those patterns into five themes: openness, availability, diversity, flexibility and interactivity. Then, I established a chain of evidence related to the five themes across the four cases. In discussing findings, I linked pieces of evidence to the related literature and the following research questions:

- What were the strengths in each of the four learning modes?
- What were the limitations in each of the four learning modes?

Table 1: Coursera xMOOCs used in this study

xMOOC	University	Period
Artificial Intelligence Planning (AIP)	University of Edinburgh	28 January-03 March 2013
Internet History, Technology and Security (IHTS)	University of Michigan	1 March-28 May 2013
Leading Strategic Innovations in Organisations (LSIO)	Vanderbilt University	5 March-06 May 2013
Inspiring Leadership through Emotional Intelligence (ILTEI)	Case Western Reserve University	1 May-12 June 2013
Developing Innovative Ideas for New Companies: The 1st Step in Entrepreneurship (DIINC)	University of Maryland	20 May-1 July 2013
Competitive Strategy (CS)	Ludwig-Maximilians-Universität München	1 July-11 August 2013
New Model of Business in Society (NMBS)	University of Virginia	2 September-7 October 2013
Creativity, Innovation, and Change (CIC)	Pennsylvania State University	1 September-27 October 2013
Online Games: Literature, New Media, and Narrative (OGLNMN)	Vanderbilt University	9 September-21 October 2013
Law and the Entrepreneur (LE)	North Western University	23 October-4 December 2013
E-learning and Digital Cultures (EDC)	University of Edinburgh	4 November-9 December 2013
Design Thinking for Business Innovation (DTBI)	University of Virginia	4 November-9 December 2013

4. Results

This section presents learning experience that revolves around openness, availability, diversity, flexibility and interactivity in each of the four cases.

4.1 Learning experience in the face-to-face mode

Face-to-face programmes I attended at both NUR and EMU were not open in terms of removal of restriction on learning content and freedom to determine the learning pace. Entry to both programmes was highly selective and the learners' freedom to choose their field of study was limited at NUR. In terms of availability, the NUR programme was marked by two major access challenges: the difficulty to access adequate learning resources and the shortage of competent teachers. To borrow books from the library, students had to make a list of the books they wanted and pass the list to a librarian who went to the shelves to find the books. In many cases, the librarian came back without the books, because the few copies the library had were on loan. Consequently, a significant amount of time was wasted trying to access reading resources. This difficulty made reliance on teachers' notes high, but teachers were hard to meet on a regular basis. Many times, we went to

classrooms and waited for a teacher for about an hour, and then the class ended up being cancelled because the teacher could arrive. These irregularities were mainly caused by sharing the few available teachers between institutions, the unreliable transportation system and an inadequate communication system and infrastructure. By contrast, my face-to-face experience at EMU was marked by over-abundance in terms of access to learning resources and teachers and communication systems. I had access to the library 24 hours a day, seven days a week. In addition to plenty of print materials, I could access online resources anytime and from anywhere. Professors had office hours in which they expected students to visit them and discuss their progress.

Diversity in terms of content and participants was limited at NUR. However, this programme was diverse in terms of settings from which the required learning content came. As for the programme at EMU, it was diverse in terms of the content that was accessible to students and participants. However, the required resources in some classes were limited to research and practices in North America. In terms of interactivity, student-content, student-teacher and student-student types of interactions were limited at NUR. While student-content and student-teacher types of interaction were hindered by inadequate access to resources and shortage of teachers, the student-student interaction was limited by the learning culture which was dominated by individual learning. The three types of interaction were more enabled at EMU by access to plenty of resources, a learning culture that valued discussion and the small size of the classes.

4.2 Learning experience in the self-guided/radio mode

The self-guided learning mode, especially the one based on written materials, was not open. Finding relevant resources was difficult since open licensing was not yet adopted. Radio learning was based on open course and other broadcasts were open in terms of expansion beyond geographical barriers, freedom of speech, no requirement to enroll and access free of charge. I had to take notes as I was listening. Although listeners did not necessarily have freedom of speech, this freedom was reflected in BBC and VOA debates that apparently offered an equal chance of expression to all contenders. However, the availability of the programmes was limited, and the scheduling was not flexible at all. I had to be tuned in at the specific times the programmes were broadcast. Otherwise, I missed them because I had no means to neither download nor record them. In terms of diversity, these programmes covered topics from a diversity of settings. Most of the broadcasts were addressed to audiences beyond the UK and USA respectively. The hosts covered stories, practices and cases from a diversity of settings. Self-guided learning lacked interactivity. However, engaging with this mode of learning was a must for me to secure a place and funds for formal undergraduate education.

4.3 Learning experience in the tutored online mode

When I started my online learning experience, my computer literacy was rudimental and my English language proficiency was still far below the level of native speakers. Equally importantly, the British education system was unfamiliar. Aware of these disadvantages, I was not intimidated. I had already gained access to formal higher education through the self-guided learning mode and my strategy was to build on self-discipline, self-management and resilience that I had already developed. My only worry was that the programme might be inaccessible to me, but I was able to leverage both online and offline learning successfully. Everything was perfect with the first module thanks to my regular access to the Internet. There were a few interruptions caused by connectivity failure and electricity outages, but I was able to cope. With the second module, however, the Internet at my workplace collapsed. I had to take a three-hour weekend bus trip to access the Internet. Each weekend, I downloaded and copied and pasted all the materials for the coming week, contributed to the forum discussion and watched or listened to video or audio materials that were only available through the Internet. Fortunately, most of the materials were articles, and book chapters that could be used offline. During work days, I read the materials and completed all activities that could be done offline. The Internet failure certainly affected the level of success I wanted to achieve, but I could maintain my performance above the course requirements thanks to this strategy. I further addressed the issue by seeking a full time scholarship in a setting where I could have access to consistent connectivity. That is how I ended up at EMU. After completing the programme at the UKOU, I took the e-Academy's eLearning courses. This professional programme, consisted of six short courses. Similar to the UKOU programme, learning was mainly based on reading material that could be downloaded and read offline. Access to the Internet was mandatory only for participating in and facilitating discussion in the forum and chat sessions. Both the UKOU and e-Academy programmes required some prerequisites and were not free of charge. The course contents were also not openly licensed. Tutorial support was availability and all queries received responses within 48 hours.

The learning contents were diverse in that they covered research, practices and cases from a diversity of settings, not just one country. Participants were also from a diversity of settings. The three types of interaction were all available and the frequency was high for participants who were interested in taking the best from these programmes.

4.4 Learning experience in the MOOCs mode

I started my MOOC learning experience with OCL4Ed in June 2012. However, after noticing that the amount of time required to engage in meaningful learning was far beyond what was announced in the course information, I dropped out. I re-enrolled in this cMOOC in the following offering of December 2012. Aware of the amount of time needed to learn from this course, I had planned enough time for the December 2012 offering. Learning was based on a few reading materials and micro-blogging that was conducted using WENotes on WikiEducator, identi.ca or Twitter. I had to follow the flow of micro-blogs to feel I had taken the best from the course. Overall, I found this cMOOC more beneficial to highly educated people interested in sharing than to inexperienced learners who wanted to learn new concepts.

Unlike OCL4Ed which was loosely structured, most xMOOCs are structured to facilitate the learning for different levels as long as learners engage seriously with the course. These MOOCs vary enormously in terms of depth, rigour, mode of assessment and course structure. Some of them such as NMBS and CIC are at the introductory level while others such as LSIO and ILTEI are more advanced. NMBS and CS are simply based on lecture videos, optional forum discussion and quizzes while EDC is more structured like cMOOCs. However, EDC offered more readings, including academic publications, than OCL4Ed. EDC also relied heavily on social learning that takes place in the discussion forum, or via Facebook and Twitter. The course had no quizzes and certificates were awarded based on a digital artifact submitted for peer grading at the end of the course. Participation in the forum discussion was required in LSIO, ILTEI and DTBI while it was optional in other xMOOCs.

With regards to openness, availability, diversity, flexibility and interactivity, MOOCs share some similarities but they differ in many aspects as well. All the MOOCs I took had no entry requirement other than access to the Internet. They were provided free of charge and learners had a say in the learning pace. However, they were not openly licensed except OCL4Ed. Most of xMOOCs were mainly based on lecture videos, and accessing them required good connectivity. Similar to other online courses, MOOCs were available 24 hours, seven days a week, during their run period. All the MOOCs attracted participants from a diversity of background. However, diversity in terms of content varied from MOOC to MOOC. While some MOOCs' content covered practices and research from various settings, others were restricted to research and practices in North America. Diversity in terms of learning and assessment activities also varied. While some MOOCs such as NMBS and CS were based on lecture videos, forum discussion and weekly quizzes, other MOOCs such as LSIO and ILTEI additionally had reading materials, reflection activities, team project or practical activities that required working with people. As for interactivity, student-teacher interaction was minimal in MOOCs. However, student-student interaction occurred in the discussion forum and/or socio-media for those students who were interested. Student-content interaction can also be maximized in MOOCs that provide plenty of high quality content. The type of interaction that is unique to Coursera MOOCs is student-interface interaction: the platform offers tools for students to personalize their learning. Students can stop videos any time, repeat them as much as they like, slow down the speech rate and add sub-titles.

5. Discussion

The four modes of learning share a precondition for learning: access to the learning opportunity and learning content. Whenever this precondition was met, it has been possible for learners to capitalize on resources they have access to. The learner's strengths, the media the learner has access to, and open assessment and accreditation can all make a difference to the learner's educational accomplishment. Each of the four learning modes has its own strengths and limitations, which are discussed below:

5.1 What were the strengths in each of the four learning modes?

Face-to-face learning's strengths relied on the shared knowledge and understanding of the learning setting. In the face-to-face programmes at both NUR and EMU, opportunities and challenges were, to some extent, shared by students and teachers. As Edmundson (2012) argues, the face-to-face mode enables the teacher to understand where learners are as people and start from there. Another advantage of the face-to-face mode of

learning was the presence of a tutor/teacher who could answer students' queries on the spot. This mode of learning is critical for learners who are inexperienced and those who have not yet reached sufficient maturity to manage their own learning. In places where there are enough teachers, the face-to-face mode can provide an enjoyable learning experience to mature students as well as novices. The face-to-face mode also offers students better opportunities to build social relationship beyond the academic life.

Self-guided learning, based on written materials or radio broadicasts, is more powerful in terms of geographical reach. This mode enabled my learning from an isolated setting, without electricity or Internet connectivity. My achievement from this mode of learning enabled me to move to formal higher education, this time, in a setting with access to electricity and limited access to Internet. Considering the current statistics on Internet penetration globally (Miniwatts Marketing Group 2012), self-guided and radio learning seem to be the most scalable modes of learning. This mode has the potential to provide the most inclusive education if Bates' (2012), Daniel's (2012) and African Development Bank's (2013) argument on linking learning and accreditation is considered.

Online learning is unique in its flexibility coupled with tutorial support. Students can access the content anytime and anywhere. This flexibility makes it possible for individual learners to learn at their own pace and convenient times: this invalidates claims that "Online education is a one-size-fits-all endeavor" (Edmundson 2012 paragraph 11). Through this learning mode, I developed multiple skills that are needed in the digital age such as communication in a digital environment, self-management, etc. Online learning requires high motivation to learn as Edmundson (2012) argues. However, high motivation is a desirable attribute for good students. Briefly, the online learning mode is strong in terms of flexibility and opportunity for multiple skill development for students who engage with their learning. As with tutored online learning, MOOCs are flexible and accessible anytime and anywhere there is Internet connectivity, and they provide opportunity for multiple skills development. Skills that can be learned from MOOCs include, but are not limited to, cross-cultural communication which can be learned from both cMOOCs and xMOOCs, providing peer-feedback, and being receptive to critical feedback learned from xMOOCs. These skills were additional to what I learned from the MOOCs content parse. Unlike any other mode of learning, the Coursera platform offered tools to personalise learning (Koller 2012). These tools enabled students to stop lecture video anytime, repeat them as much as they want, slow down the speech rate and add subtitles.

To sum up, each of the four modes of learning makes a unique contribution to learning experience. Face-to-face learning is crucial for inexperienced learners and enables the departure from the learners' setting. Self-directed learning, based on radio or written materials, helps learners in remote settings. Online learning is unique in offering flexibility, with the possibility to learn anytime and anywhere, and opportunity to develop multiple skills, advantages that are coupled with tutorial support. As for MOOCs, they offer students tools to personalise their learning in addition to most of the advantages offered by online learning.

5.2 What were the limitations of each mode of learning?

The drawbacks of face-to-face learning include, but are not limited to, cost in terms of time and money, socio-disempowerment and lack of flexibility. Face-to-face learning requires expensive infrastructure. In settings where there is a shortage of teachers and difficulty to access learning resources, face-to-face learning incurs the waste of time that could be invested in learning. This is especially the case when teachers' availability is quite difficult to predict. As earlier discussed, students at NUR wasted significant amounts of time when they went to classes that were eventually cancelled and when they waited in a queue to get library resources. Equally, most face-to-face programmes are selective, which cause excluded individuals to see themselves as not being good enough, an indicator of social disempowerment (Lane 2009, Lan and Van-Dorp 2011). In terms of flexibility, face-to-face courses require all students to attend classes or lectures at a specific time, regardless of inconvenience to them as participants. It is probably this lack of flexibility that led to most of Stanford University's *Artificial Intelligence* students' preference of the MOOC mode rather than the face-to-face one (Thrun 2012). Although some face-to-face sessions are fruitful when students discuss the course-related topic or materials, such discussion can also occur online. Briefly, the face-to-face mode is not the right choice for expanding access to education with limited resources.

Self-directed learning is weak in its lack of support to the learner. Although I achieved my goal through this mode, I could not get support I needed. The self-guided mode enabled by radio is probably the least flexible

mode of learning. I had to be tuned in at the time of broadcasts or miss the sessions. Equally, it was challenging to listen to the radio and take notes at the same time. Bates' (2012) and Daniel's (2012) criticism of learning based on transmission of knowledge applies particularly to radio learning. Self-directed learning is also the least interactive mode when it comes to Anderson's (2003) interactivity theorem. In this mode, learners suffer isolation, and they have to be exceptionally committed to carry on. Hence, self-directed and radio learning modes are probably to be used only as the last resort. Online learners can also feel isolated to a certain extent, although this feeling can be alleviated by participation in the forum discussions. In my case, this feeling was exacerbated by the Internet difficulties, especially when I thought I was lagging behind. The flexibility of online education comes with a high level of responsibility. Successful online learners are self-disciplined and good at self-management. In addition, a high level of motivation is required for successful online learning (Edmundson 2012). Another disadvantage of online education is that its reach is limited. With less than 50 percent of people having access to the Internet globally (Miniwatts Marketing Group 2012), online learning still cannot help reach many people, perhaps the majority. Briefly, online learning can be a negative experience and its reach is limited.

MOOCs share most of the drawbacks of online learning. In addition, the loose structure in cMOOCs makes learning complicated for inexperienced learners. Like Mackness et al. (2010), I found it difficult to keep up with the flow of conversation in cMOOCs. As for xMOOCs, most of these courses are based on videos that require high bandwidth. As Liyanagunawarderna et al. (2013) and Sharma (2013) argue, this prohibits access for many learners in developing country settings. Another disadvantage of MOOCs is the lack of accreditation of the student's accomplishment (Bates 2012, Daniel 2012 and African Development Bank 2013). This may be why they have so far been beneficial to learners who already have degrees (Ostrow 2013). The current nature of MOOCs needs revision and the model to accredit successful learning needs to be developed for these courses to have much impact among poor learners.

Despite the weaknesses of these four learning modes, each of them brought a unique contribution to my educational, socio-economic and geographical migration. Self guided and radio learning enabled me to migrate from non-formal learning to formal higher education. Thanks to this mode, I was able to secure a place (and a student loan) in public higher education. The independence and high motivation that I had developed through self-guided learning was transferred to face-to-face undergraduate education, and this enabled me to complete this level with results that gained me an academic position. This marked my most significant socio-economic migration: crossing the poverty line to the upper position. Coupled with my previous learning accomplishments, working in academia was critical for gaining a place at the UKOU, which enabled me to migrate into an online and collaborative learning experience. Working in higher education also led to my winning a place and funding for the EMU graduate programme and migration to the USA. More important than this physical movement, I have been able to learn through institutions in Rwanda, UK, USA, Germany, the Philippines and New Zealand. This learning experience, expanding to the five continents, was enabled by all the four modes of learning, each one building on accomplishments enabled by its predecessor(s).

The complex migration discussed above indicates that by capitalizing on specific learners' strengths, existing access to media and open assessment and accreditation practices, it is possible to build an inclusive education system that can make a difference in learners' lives and help them migrate across learning modes. This is an important message to pioneers who want to use MOOCs to open up access to higher education in developing countries. If related initiatives do not capitalize on existing access to media, local learners' strengths and openness in terms of content, assessment and accreditation, they will end up creating an exclusive education for the local rich. It has already been discussed that the current MOOCs model is beneficial to rich learners (Ostrow 2013). The failure to consider local learners' needs and access to media risks deepening the existing socio-economic and educational divides rather than bridging them.

It is also worth noting that learning experience is unique and varies from student to student, and a combination of learning modes might lead to a better learning experience. As Kandiko (2013) highlighted, there is no universal learning experience because of the diversity of learners and learning settings. In my own learning experience, the high level of engagement and investment in these four modes of learning shaped my gain and therefore contributed to my positive learning experience. Learning through multiple modes is likely to lead to a more positive learning experience since strengths of those modes can be leveraged. It is normal for learners to prefer some mode of learning over others (I personally prefer online and MOOC modes). However,

other modes contribute enormously to learning and skill development as well. Therefore, each of the four modes can help engaged learners accomplish a great deal in their learning.

6. Conclusion

In this paper, I have attempted to compare and contrast face-to-face, self-guided/radio, online and MOOC learning experience. Face-to-face learning provides a shared understanding of the learners' setting and is critical for inexperienced learners but it is expensive and becomes socially disempowering when it is selective. Self-directed learning, by radio or otherwise, helps reach learners in remote places but it leads to isolation and is quite difficult if the learners are not highly motivated. Online learning is flexible and helps develop multiple skills for the digital age, but its reach is limited by the digital divide. As for learning from MOOCs, especially those on the Coursera platform, they enable personalised learning, are flexible and enable multiple skill development. However, they lack accreditation and are only beneficial to learners with high quality connectivity. MOOCs, especially xMOOCs, were found to be diverse in nature: the xMOOC categorization does not mean that they are all similar. Despite the limitations, each of these learning modes can lead to remarkable learning achievement that can transfer to other modes of learning and bridge the educational, digital and socio-economic divides. Learning through a combination of learning modes, where possible, can lead to better learning experiences than an exclusive use of one mode. The findings in this study, especially the ones on learning experience, should not be generalized. Learning experience is unique and depends on multiple factors including the number of options available to the learners, the learner's investment and the learning goal. This study can help stakeholders in education who are interested in expanding education to disadvantaged settings to capitalize on learners' strengths, available access to media and open practices. Doing so can help provide an inclusive education for learners' development, education that impacts positively on learners' lives.

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