OPENING UP HIGHER EDUCATION IN RWANDA: THE POTENTIAL CONTRIBUTION OF EXTENTION MASSIVE OPEN ONLINE COURSES (xMOOCS), OPEN EDUCATIONAL RESOURCES (OER) UNITS IN THE MIT OPEN COURSEWARE AND DIFFERENT STAKEHOLDERS

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Bernard Nkuyubwatsi

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Opening up higher education in Rwanda: The potential contribution of extension Massive Open Online Courses (xMOOCs), Open Educational Resources (OER) units in the MIT Open Courseware and different stakeholders

Bernard Nkuyubwatsi

ABSTRACT

This study focused on the potential contribution of xMOOCs, OER units and different stakeholders to opening up higher education. The main research questions were: "Which MOOCs can potentially be adapted for use in opening up Rwandan higher education?" (1) "Which OER units can potentially be adapted for use in opening up Rwandan higher education?" (2) and "What is the potential contribution of different stakeholders in Rwandan higher education to opening up this level of education?" (3).

The study had a transformative mixed method design and consisted of two major components: The *Research component* and the *Parallel development component*. Research was conducted on ten xMOOCs, ten OER units, 105 learners, 85 academics, one institutional leader and four policy documents.

Results showed that two xMOOCs and one OER unit can be adapted for direct use in opening up higher education in Rwanda if open educational services and enabling policies are available. Learners were willing to engage in different self-determined open learning practices and academics were willing to contribute to opening up education in different ways. No evidence of institutional leaders/policy makers' intention to recognise academics' engagement in open educational practices and support assessment of accomplishment from open learning for credit could be identified.

The main contributions of the study to knowledge include a framework for collaborative investment in opening up education; an in-depth understanding of *non-rivalrous resources* that may be used in opening up education; a deeper understanding of

the concept of heutagogy and proof of its transformative outcomes and a comprehensive evaluation of xMOOCs and OER units and how they may contribute to opening up education. Conclusions may be beneficial to transformative researchers, learners, academics and institutions interested in opening up education.

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CHAPTER 1 INTRODUCTION

The development of the open access and open education movements has made learning materials and opportunities increasingly available to the public. Open Educational Resources (OER) and Massive Open Online Courses (MOOCs) are released free of charge. Open access and open education have been developing hand in glove with advances in Information and Communication Technology (ICT). Information related to OER and MOOCs is easily shared using social media, and these media have been used to create learning communities. With OER and MOOCs, a great deal of learning can take place in learning communities mediated by social media without the need to go to physical campuses or schools.

OER have been stored in institutional repositories. As the OER movement developed, open access journals that publish full text articles under open licences multiplied and their number continues to grow. Anyone who has access to Internet connectivity can legally access a diversity of OER materials, redistribute them via social networks, make copies, and even print them to redistribute the printed copies in a non-electronic format. These practices enabled by open licences under which OER materials are released may help to reach learners who do not have access to computers and the Internet yet.

Since 2008, the OER movement development fed into MOOCs which became popular on a global scale since 2011. These courses are open to any learner who has access to the Internet to enroll and use the course content and different learning communities hosted on MOOC platforms for their personal learning, free of charge.

These recent developments need to be investigated to determine different opportunities they offer and how those opportunities may contribute to accommodation of learners who are not yet included in the higher education system. Similarly, challenges that come with OER and MOOC developments need to be researched. It is in this perspective that the current study was conducted. The focus on MOOCs and OER in this study was

motivated by the free availability of these resources and courses. This free availability may contribute to including learners who cannot afford the current cost of higher education in their respective settings. The study also investigated different stakeholders' role in addressing barriers that still stand in OER and MOOCs. The researcher moved further to influence actions that may contribute to removing those barriers.

Chapter 1 of this thesis introduces the study and presents the rationale and motivation behind it. It consists of nine sections: statement of the problem (1.1), the topic and purpose of the study (1.2), background (1.3), justification of the context choice (1.4), research questions (1.5), the study scope (1.6), expected outcomes (1.7), significance of the study (1.8), and the study outline (1.9).

1.1 Statement of the problem

Article 26.1 of the United Nations (UN)'s universal declaration of human rights claims that "everyone has the right to education" (United Nations, 1948). More specific to higher education, the same article emphasises equal access on a merit basis. While it has been challenging to establish and protect this right at the tertiary education level, the situation is likely to worsen in the future. Commonwealth of Learning & UNESCO (2011) predicted the global higher education enrollment to grow from 165 million in 2011 to 263 million in 2025. That is an increase of more than 59 per cent in a period of 15 years. In his interview with Alan Mandell and Nan Travers, Sir John Daniel observes that to accommodate all these learners in higher education, three or four universities of 30,000 student capacity needed to be built on a weekly basis between 2011 and 2025 (Mandell & Travers, 2012). There is no evidence that these universities have been built.

Access to higher education tends to be more challenging in under-resourced settings. In those settings, funds for student loans and grants for higher education are often in shortage. In Rwanda, for instance, an overwhelming number of secondary education

graduates qualify and wish to attend higher education, but they are inhibited by the lack of financial support. This is especially the case for learners from low income families including top performers in the national exams. In 2015, more than 42 per cent of top performers who were admitted in the public higher education on merit basis could not register and attend higher education because they were underprivileged (Igihe, 2015; Nkuyubwatsi et al., 2015). These learners were denied student loans and their families could not afford the cost of higher education.

The Ministry of Finance and Economic Planning in Rwanda (MINECOFIN) (2002, cited in Ministry of Education, 2006, p. 3) noted the inequality in terms of higher education enrollment between the rich and the poor in Rwanda. While 6.1 per cent of adults in the highest income quintile attended tertiary education in 2000, only 0.2 per cent from the two lowest quintiles did. In other words, people from the richest quintile attended tertiary education 30.5 times more than those from the two lowest quintiles. Hence, higher education tends to be an exclusive privilege for very few learners from rich families.

With the recent extension of basic education from six to twelve years in Rwanda, the demand for higher education increased beyond available resources. According to the Ministry of Education (2012, p. 17), the secondary education enrollment expanded from 266,518 students in 2007 to 486,437 students in 2011; an increase of 82.5 per cent in only four years. While the demand for higher education increased exponentially, financial resources needed to respond to this demand through conventional education have been depleting. Around 2010, Government funds to public higher education institutions have dramatically decreased. This was followed by the decrease of funds for Government sponsorship and student loans. In an attempt to manage this financial difficulty, the Government of Rwanda decided to merge all public higher education institutions into one university: the University of Rwanda that was established in September 2013.

The financial difficulty and the associated attempt to exclude many secondary education graduates from student loans and Government sponsorship started many years

before. In 2001, teacher-trainees and other graduates from secondary education fields that were referred to as *professional fields* were denied student loans and Government sponsorship. The original claim advanced to support this exclusion was that these graduates were prepared for jobs, not for attending higher education. Awarding them student loans and Government sponsorship would be wasting limited funds because these graduates would allegedly fail academic courses due to their lack of preparation. After complaints, the tactic has been to raise the cut-off point for such graduates and award student loans and Government sponsorship to very few of them since 2002. The issue culminated in 2013 when all fields of secondary education were concerned.

The attempt to massively cut down the number of student loans and Government sponsorship beneficiaries led to unjustified student arrests in 2013. A number of students were arrested after submitting a letter to the Prime Minister, calling for the review of the cancellation of student loans. The UN Special Rapporteur on the rights to freedom of peaceful assembly and association reported that at least 20 students were arrested and most of them were released without charge (Kiai, 2014, p. 8). Four of them were charged with holding an illegal demonstration and detained. They were taken to court which, one week later, found them innocent to order their release.

Open, distance education and eLearning innovations that are responsive to the prevailing challenges may offer a solution without arresting underprivileged learners who are willing to learn and making up allegations against them. Through innovative open, distance education and eLearning, different stakeholders may be engaged to mobilise limited resources they have access to and collectively build equitable higher education. The use of innovations is mentioned in different policy documents, but the awareness of these documents in academia is still minimal. In other words, there is a communication gap between different categories of stakeholders and there seems to be no contextual collaborative problem solving approach.

This study intends to investigate a responsive use of open education opportunities in an effort to make higher education more accessible to people in Rwanda, a context that is discussed in details under Section 1.3. Responsive use of open education opportunities may prioritise engaging the people who live with this contextual problem and its consequences and rely on media and technologies those people have access to and/or can afford. Such responsiveness may help learners move across socioeconomic and educational levels through learning. The starting point for this move to occur would be the use of limited resources and technologies people have access to and create opportunities for their progressive self-transformation.

1.2 The topic and purpose of the study

The current study was conducted under the topic "Opening up higher education in Rwanda: The potential contribution of extension Massive Open Online Courses (xMOOCs), Open Educational Resources (OER) in the MIT Open Courseware and different stakeholders". OER are teaching or research resources that have been released under an open licence through which permission to access and use for free has been provided. A MOOC is course that is open to anyone who has access to the Internet to enroll and learn for free. MOOCs, OER and other key concepts in this study are explained in details in Chapter 2. As for stakeholders in Rwandan higher education, they include, but are not necessarily limited to learners, academics, institutional leaders and policy makers.

The study intended to identify opportunities that may be offered by OER units in the MIT Open Courseware and MOOCs. It moved further to investigate the willingness of stakeholders in Rwanda to use these opportunities in effort to make higher education more accessible to people who are not included in the existing system. Based on the findings of the study, a set of recommendations to different stakeholders were made in effort to inform collective/collaborative action.

1.3 Background

1.3.1 The context of the study

a. Socioeconomic situation

Rwanda is one of the least developed countries (UNCTAD, 2012). According to the National Institute of Statistics of Rwanda (2012), 44.9 per cent of Rwandans lived under the poverty line in 2011. The overwhelming majority of poor people lived in rural areas: Ministry of Finance and Economic Planning (2007, p. 12) estimated that more than 90 per cent of poor people in Rwanda lived in rural areas. The main challenge to the country's development is the rapid population growth and high fertility rate. According to the Central Intelligence Agency (2012), the population growth in Rwanda was 2.751 per cent in 2012, one of the fastest rates on the globe.

The rapid population growth in Rwanda led to the depletion of resources as reflected on the labour market in the country. The majority of Rwandans are victims of unemployment, underemployment and underpayment. African Development Bank Group (2008) estimated unemployment rate in Rwanda at 15.5 per cent (p. 12). However, Ministry of Finance and Economic Planning (2007, p. 17) recognised that the proportion of underemployed farm workers who only work between three and five hours per day is even higher. According to African Development Bank Group (2008, p. 20) about 90 per cent of the population worked in agriculture and contributed only 42 per cent of the national GDP. The low agricultural produce is also noticeable on the food market across the country where prices are quite difficult to handle as are other basic needs such as accommodation, water and electricity. The difficulty to pay food commodities and other basic needs is not only an indicator of food shortage, but also a marker of underpayment.

b. Access to electricity in Rwanda

There has been extensive effort to expand electricity in Rwandan households in the last five years. According to the National Institute of Statistics of Rwanda (2014, p. 87),

about 18 per cent of households in Rwanda had access to electricity in 2012. Based on this proportion, there is positive progress in electricity penetration when compared to earlier statistics. Rwanda Development Board (2012, p. 1) and Ministry in Charge of ICT in the Office of the President (no date) had estimated access to electricity in Rwanda at 11 and 13 per cent respectively. Despite this progress, however, the electricity access is still very low. Moreover, the supply is intermittent for those who are privileged to access electricity, and the cost is exorbitant. The shortage, irregularity and high cost of electricity constitute a daunting challenge that would affect the dissemination of technology-enhanced education. More importantly, access to modern technologies is much lower than access to electricity as discussed below.

c. Access to Information and Communication Technologies (ICTs)

In 2012, radio was still the most widely accessible technology in Rwanda at the rate of 64 per cent followed by mobile phones at the rate of 54 per cent (National Institute of Statistics of Rwanda, 2014, p. 97). Access to television was 8 per cent while access to computers was only 2 per cent (National Institute of Statistics of Rwanda, ibid, p. 99). Interestingly, access to the Internet was 7 per cent (National Institute of Statistics of Rwanda, ibid, p. 100). A higher access to the Internet than access to computers in Rwandan households has justification. Significant proportions of Rwandans who were privileged to have access to the Internet used cyber cafés (16 per cent, according to the National Institute of Statistics of Rwanda, 2014, p. 103), office computers and mobile phones, rather than their own computers.

d. Openness in Rwandan education

Rwanda has been using national exams to select students at different levels of education. Since its establishment in 1998, the National Examination Council (NEC) introduced many changes in the administration of national exams for secondary education

certificate. These exams were anonymously graded (1). The exams became the only pathway for secondary education certificate in Rwanda (2). The exams were open to both formal and non-formal learners (3). The results in the national exams were based on to award Government sponsorship and student loans for undergraduate education, mostly in public institutions (4). The results in these exams, the cut-off point for government sponsorship and student loans as well as the winners of the sponsorship and loans were publically released (5).

Through these practices, the NEC introduced a transparent system for assessment and recognition of accomplishment from self-determined learning undertaken by non-formal learners. This system is roughly comparable to the recognition of prior learning (RPA) systems used in different countries (Nkuyubwatsi, 2015a; Witthaus et al., 2015). In this system, non-formal learners and formal students were treated equally based on their performance in the national exams.

Although this openness may be criticised for its violation of privacy principles, it introduced transparency and trust in the award of secondary education certificates. High performers were awarded the same qualifications and the same privileges such as student loans, regardless of their socioeconomic background. This triggered self-determined learning practices among non-formal learners. Equally, many students from underprivileged families and in rural areas gained more access to higher education than previously. Since all results in the national exams were released publically, it was not easy to replace an underprivileged high performer by a privileged low performer. In other words, replacement of underprivileged top performers by privileged lower performers was prone to exposure.

This malpractice had allegedly underpinned discriminations in the previous systems in which higher education was provided free of charge, but to only about 3000 students nationally. At the time, no private higher education institutions existed. With this limited

number of places in higher education, privileged families were tempted to secure their *lion share* at the expense of underprivileged learners.

Since around 2000, private higher education institutions have multiplied but their tuition fees are too high to afford for an overwhelming majority of underprivileged people. The decrease of funds for public higher education has led public higher education institutions in Rwanda to charge higher tuition fees than most private institutions. While tuition fee in public higher education institutions is currently Rwfr 600,000 per year, many private institutions charge around Rwfr450000 per year. With default in student loan repayment, coupled with the increasing demand for higher education, it has increasingly become difficult to sustain student loan provision. This has turned higher education back to an exclusive right for the privileged while underprivileged learners are mostly excluded.

It is worth noting that assessment of prior learning earlier discussed was also used at various higher education institutions for making decision based on test takers' foreign language abilities. These institutions had foreign language teaching programmes that intended to equip new students with foreign language abilities mandatory for undergraduate education in their respective fields of study. Prior to joining the foreign language programmes, a foreign language test was administered and those who demonstrated a high level of language abilities were exempted from studying the foreign language programmes.

Unlike the open assessment at NEC that led to the same qualification and benefit for both formal students and non-formal learners, the open assessment in higher education institutions led to exemption from studying foreign language programmes prior to their courses. This exemption saved successful test takers in some institutions up to 1 year in their educational period prior to the award of a bachelor degree. Expansion of open assessment in the mainstream higher education with an agenda to evaluate accomplishment from open learning for credit may enable sustainable open higher education. The

willingness to use open assessment for this purpose was one of the foci of attention in the current study.

1.3.2 My role in/knowledge of the context of the study

The choice of Rwanda as the context of the study has been informed by my extensive educational, professional and volunteering experience in the setting. The shortage of basic resources such as electricity, financial resources and educational materials, and limited educational opportunities in Rwanda affected my learning and professional experience.

a. Learning experience in Rwanda

My learning experience in Rwanda expanded from primary to postgraduate and professional education. It also expanded across different learning modes: formal face-to-face learning, non-formal self-guided learning based on reading material, non-formal learning via radio as well as online and distance learning (Nkuyubwatsi, 2014a). While my comprehensive learning experience in Rwanda is not covered in this study, it is worth discussing my migration from non-formal learning to formal undergraduate education, not least because the learning and socioeconomic conditions I emerged from were, and are still, shared by the majority of Rwandan learners.

I have my roots in an underprivileged rural family, in a district that had no access to electricity at all. It is in this remote setting that I started my career as a teacher with a *francophone* teacher-training background: in primary education, I learned French as a Foreign Language rather than English as a Foreign Language (EFL) and in my secondary education, French, rather than English, was the language of instruction. EFL was introduced in the second year of my secondary education and was officially limited to only

two hours per week during the last five years of my secondary education. Due to the shortage of EFL teachers at the time, there were no EFL classes in many semesters.

However, subsequent educational reforms led to my self-determined learning development. One year after my secondary education completion, the NEC, earlier discussed, introduced English national examination for all students and non-formal learners who wanted to have secondary education completion certificates. As discussed earlier, the national exams were made open to non-formal learners. More importantly, the open and public release of the results introduced transparency in awarding student loans and Government sponsorship for undergraduate education in public institutions in the country. It is this openness and transparency that catalysed my investment in self-determined learning, the learning I undertook in the remote area where I was teaching full time. With a monthly salary of about £27, I could not afford higher education without student loan. To get student loan, I had to learn on my own, take national exams within the newly established transparent system and score above the cut-off point.

Despite limited access to EFL learning resources and teachers during my secondary education, self-determined non-formal learning via reading materials and radio made a transformative difference. I had a few EFL books and a dictionary that I had purchased on approximately £3, and I used these limited resources to learn EFL on my own. A radio, a technological device I had bought at the cost of about £3.50, complemented the limited print materials to enable my transformative migration through learning. I listened regularly to the British Broadcasting Corporation (BBC) and eventually the Voice of America (VOA) which were broadcasting on Frequency Modulation (FM). I took open EFL courses that were offered by the two radio broadcasting organisations, and I took this radio learning opportunity seriously. I had to schedule my daily activities to ensure I do not miss any broadcast session of the open EFL radio courses and this self-discipline was maintained on a regular basis.

My engagement in non-formal self-determined learning was not limited to learning EFL; I also revised, on my own, all courses I had to take national exams in. I used hand-written notes, a few books I could access and borrowed hand-written notes from secondary education graduates from other schools. This enabled me to check if there were no points we had not covered at my former secondary education school.

I took national exams as a non-formal learner (known as *private candidate* or *candidat libre* in Rwanda) in the field of teacher-training in late 2000. I had previously attempted application through other pathways twice without success. I was convinced that once I score above the cut-off point, I would get student loan because of transparency that had been established by public release of results in the national exams, the cut-off points for student loans and Government sponsorship as well as the list of beneficiaries.

My results were made public in early 2001 and my performance was above the cut-off point for student loans and Government sponsorship offered to teacher-trainees during the two previous years. More interestingly, EFL which I had formally learned least, but in which I had invested most in my self-determined learning was the course in which I scored the highest in the national exams: a solid A. Despite dedication, perseverance, effort and time invest in self-determined learning and good results in the national exams, all teacher-trainee graduates were denied student loans and Government sponsorship in 2001 as highlighted earlier.

The fallacy advanced to exclude teacher-trainees from benefiting from student loans was criticised and nailed down because it was not backed by any example of a teacher-trainee or other marginalised graduates who had previously been awarded the loan and sponsorship and had failed. This led to a new decision: good performers among teacher-trainees and other marginalised graduates would be awarded student loans and Government sponsorship after two years in job. I had already worked for three years. I sought my employment certificate from my employer and took it to the Ministry of Education where all decisions were made. From the Ministry of Education, I was requested to take my

application documents to Kigali Institute of Education (KIE), which is currently the University of Rwanda's College of Education, but my request for a written referral from the Ministry of Education was rejected. The response from KIE's admission official was that two years I had worked before taking national exams as a non-formal learner (*private candidate* or *candidat libre*) were not valid. I had to wait another year to complete two years of teaching experience after taking the national exams in which I had obtained a grade that would contribute to my eligibility for student loan and Government sponsorship.

The National University of Rwanda (NUR) admitted teacher-trainees in 2002 after the cut-off point was raised. Fortunately, my grade was still above the higher cut-off point. After being admitted at the NUR and awarded student loan and Government sponsorship, I was exonerated from taking a year-long EFL programme. This exoneration resulted from my performance in EFL proficiency exam administered by the university as earlier mentioned. This enabled me to save one year in my learning with NUR: I completed my undergraduate education within four years from the initial admission at the university rather than five years that would be required if I had not passed the EFL proficiency test.

b. Professional experience in Rwanda

My professional experience in Rwanda extended across teaching at primary, secondary and tertiary levels of education as well as training adult learners. I started my career as a secondary education teacher (from 1998 to 2001), although I was, myself, a secondary education graduate who had been trained to teach at primary education level. Then, I moved to primary education teaching in September 2001, one year before the start of my undergraduate education. In the last two years of my undergraduate education, I was also teaching at secondary education level. Then, I moved into higher education teaching after the completion of my undergraduate education. I worked for Kigali Health Institute as an EFL teacher and member of the institution's admission board since January 2007 to September 2012. At the same time, I was an EFL teacher to adult learners, including local leaders and other adult learners who worked for different non-governmental organisations.

Finally, I was an Education Technical Trainer at USA Peace Corps Rwanda in 2011, where I introduced USA Peace Corps trainees/prospective volunteers to education system in Rwanda.

c. Volunteering experience in Rwanda

My volunteer experience in Rwanda was triggered by the difficulties I had myself experienced in accessing higher education, the apparent Government of Rwanda's agenda of transformation towards a knowledge-based economy as well as my expertise and training in the field of online and distance education. After completing the MA in Online and Distance Education programme with the Open University, I read a report of the Commonwealth of Learning Contact Person in Rwanda. This official was a secretary general in Rwanda's Ministry of Education. In the report, he had highlighted that Open, Distance Education and eLearning (ODeL) has the potential to make education more accessible, but there were no people trained in Rwanda to design and implement related projects. I wrote him a letter to inform him that I had completed an MA in Online and Distance Education and that I was willing to contribute to any initiative related to opening up higher education in Rwanda.

An appointment was made to meet a different secretary general in the Ministry of Education. This official referred me to the Department of ICT in Education, Open, Distance and e-Learning at Rwanda Education Board (REB). I volunteered at this department from then on till I started my PhD study. More specifically, I drafted a concept paper that led to the appointment of a Task Force on the University of Rwanda College of Open and Distance Learning (CODL). I was a member of this Task Force and a subsequent Working Group on this college. Starting with about 1180 students, this college was expected to gradually grow to reach more than 36,000 students in a period of eight years (Mukama et al., 2013, p. 28). In other words, it was supposed to have grown beyond the current Rwandan public higher education combined. This growth will, however, depend on how the project is implemented, and its current stage of development is lagging behind initial expectations.

In a nutshell, my experience in the research context is varied and enough to empathise with people who live the difficulties that prevail in this setting. As a learner, I was affected by the shortage of resources, and I could not afford to pay my undergraduate education without student loan and Government sponsorship. I had to take national exams as a non-formal learner to meet the requirements for the highly competitive student loans in Rwanda. Despite my performance which was above the cut-off point, I was denied student loan and Government sponsorship in 2001. After criticism of this denial of student loan, a few teacher-trainees were awarded student loans in 2002, and I was one of them. As educator and a member of admission board in a higher education institution, I noted the need for using open, distance education and eLearning strategies to make higher education more accessible. This is what led to my offer to volunteer on a related project, not least because I had completed my MA in Online and Distance Education with a leading university in the field.

1.4 Justification of the context choice

Rwanda has achieved the Millennium Development Goals (MDG) of education for all and gender parity at primary education level (Ministry of Education, 2012, African Development Bank Group, 2008, African Development Bank & African Development Fund, 2010). Gender parity was also achieved at the lower level of secondary education (Ministry of Education, 2012) and efforts have been deployed to increase the enrolment in secondary education. In this regard, the Ministry of Education established a nine year basic education programme which intended to provide education from primary to the lower level of secondary education to as many Rwandans as possible. This programme eventually fed into the twelve year basic education programme which recently inflated the demand for higher education in Rwanda far beyond the global rate.

As access to primary and secondary education was increasing, however, the socioeconomic barriers I experienced in accessing my undergraduate education were exacerbating. As discussed earlier, the 2001 denial of student loans and government

sponsorship to teacher-trainees and other graduates in the so-called professional fields marked the start of the depletion of funds that were already in shortage. Nowadays, the issue expanded to affect graduates from all field of secondary education.

This difficulty challenges the agenda to transform the society from subsistence farming to a middle income knowledge-based economy championed by the Government of Rwanda (Ministry of Finance and Economic Planning, 2000). The aspired transformation will not occur if the majority of Rwandan secondary education graduates cannot afford higher education and are not awarded student loans or any other financial support. Using open and distance learning strategies within the open access agenda (Weller, 2011; Nkuyubwatsi, 2016) may help create opportunities for willing learners to develop competences at their fullest potentials.

The current study is conducted in Rwanda to respond to the rising demand for higher education that is parallel to the depletion of financial resources. As discussed earlier, I personally experienced this issue when I was denied student loan in 2001, the decision that was reverted after the initially advanced justification was nailed down. Keeping in mind the challenges surveyed earlier and my hands-on development within those challenges, Rwanda is a perfect setting for studying the potential contribution of MOOCs, OER and different stakeholders to opening up higher education.

As highlighted earlier, thousands of secondary education graduates were admitted at the University of Rwanda on merit basis but have been denied student loans and were consequently unable to attend university education. In addition, the majority of secondary education graduates who qualify and are willing to attend higher education are not included because they come from underprivileged families and there are not enough funds for student loans and Government sponsorship. If different stakeholders engage in collective action, within a collaborative framework, limited resources available can be used for creating opportunities for learners who are not yet included.

As a Rwandan who lived the experience they are living, and was able to advance starting from limited resources that I had access to, I felt this study was very important. I was interested in researching the collective and collaborative use of the limited resources available to open up higher education to learners who wish to attend higher education regardless of their socioeconomic backgrounds. In addition to the potential contribution of OER and MOOCs, this study intends to investigate different stakeholders' willingness to engage in a collective and collaborative action to open up higher education with available resources. Moreover, I moved beyond research in effort to trigger related actions.

1.5 Research questions

Considering socioeconomic and infrastructural challenges discussed in Section 1.3, copying MOOCs, OER units and related practices from well-resourced societies and pasting them in Rwanda would not work. Instead, adaptation of the MOOC and OER unit content and related practices in a way that is responsive and sensitive to the socioeconomic and infrastructural realities that prevail in Rwanda is essential. It is in this perspective that the current study was conducted in the light of these three research questions: *Which MOOCs can potentially be adapted for use in opening up Rwandan higher education?* (1), *Which OER units can potentially be adapted for use in opening up Rwandan higher education?* (2), and *What is the potential contribution of different stakeholders in Rwandan higher education to opening up this level of education?* (3).

Research questions 3 had three subsidiary research questions: "To what extent are learners willing to engage in self-determined open learning?" (1), "To what extent are academics at the University of Rwanda willing to contribute to OER and open courses, and adopt open education roles?" (2) and "To what extent are the University of Rwanda's leaders and policy makers willing to develop an institutional open education policy and strategy that recognises academics' open educational practices/roles and credibly certify competencies developed via self-determined open learning?" (3).

1.6 The study scope

Unlike most of the research studies in the field that tended to focus on MOOCs and OER as ends in themselves, the current study positions opening up higher education as the key agenda above MOOCs and OER. MOOCs and OER are not considered as ends in themselves, but means to an end: the ultimate agenda to open up higher education to people in need. Different perspectives, technologies, theories on learning, learning philosophies and academic practices that can be used together or in isolation to address the issue of access to higher education in Rwanda are valued. Discussions of MOOC participants in the forum are out of the scope of this study. Interest on MOOCs is only on the content uploaded by instructors in the course environment or learners in the resource environment. In addition to the content side, the current study brings forth the authentic voice of learners, academics and other stakeholders from an under-resourced educational setting that is of interest. These target stakeholders are not well represented in the discourse that takes place in MOOC discussion forums.

1.7 Expected outcomes

By the end of the study, the potential contributions of MOOCs, OER and different stakeholders to opening up higher education in Rwanda were expected to have been identified. Equally, the niche for collaborative investment between different stakeholders for opening up higher education in a way that benefit all was expected to have been identified. The study was expected to inform open education policies and practices that underpin the use of OER and MOOCs/open courses for opening up higher education. The study was also expected to catalyse a collective/collaborative action that builds on open content, open courses and open learning assessment for credit to ensure socioeconomic inclusion in Rwandan higher education.

1.8 Significance of the study

This study is critical and timely not least because higher education in Rwanda has increasingly faced financial challenges while the demand for this level of education has been increasing. The inability to accommodate many learners who performed well in the national examinations may have raised awareness that open and distance learning strategies constitute an alternative option to address the issue among senior officials and academia in Rwanda. However, most of them do not have any training nor experience in open, distance and eLearning, neither as learners nor practitioners. In this study, I was not only interested in investigation, but also contribution to this awareness raising.

The study was expected to be beneficial to the Ministry of Education, the University of Rwanda, academics, potential open learners and other stakeholders who are interested in opening up education, especially in under-resourced settings. More specifically, the study was expected to provide insights that could contribute to the implementation of the *Seven Years Government Plan* (Government of Rwanda, no date) and its implementation in a way that benefits all these categories of stakeholders. According to this plan, 50 per cent of higher education should be provided via open and distance learning by 2017. At the moment, no evidence indicates that anything significant has been done in this regard. Communication gap between this policy makers and implementers (academics and learners) still exists. This study intended to contribute to bridging this gap by raising awareness of the barriers that inhibit the participation of all concerned and by investigating the potential contribution of each category of stakeholders to removing those barriers.

1.9 The study outline

This thesis consists of eight chapters. Chapter 1, "*Introduction*", states the problem (1), presents the topic and purpose of the study (2), and discusses the background context (3), justification of the study in the context (4), research questions (5), expected outcomes (6), significance of the study (7) as well the scope of the current study (8). Chapter two,

"*Literature review*", explores key concepts and critically surveys the relevant literature. It is organised in two major sections: definition and explanation of terms and concepts (1) and the conceptual framework (2). The third chapter, "*Research methods*", presents the design, and discusses ethics and access as well as best practices in the current study. In the fourth chapter, "*Phase 1 results*", findings on MOOCs and OER units are presented and analysed. Similarly, Chapter 5, "*Phase 2 results*", presents and analyses findings on the potential contribution of different stakeholders to opening up higher education in Rwanda. In Chapter 6, "*The outcomes of the parallel development component"*, I present the outcomes of my participation beyond research. In Chapter 7, "*Discussion*", I discuss the findings on MOOCs, OER units and different stakeholders in Rwandan higher education as well as the outcomes of my participation beyond research. The final chapter "*Conclusions*" discusses how academics may activate and nurture self/determined learning/heutagogy (1), contributions of my study to knowledge, practices and policies (2) and presents conclusions (3), limitations (4), recommendations for policies and practices (5) and suggestions for future studies (6).

Chapter summary

This PhD study seeks to contribute to addressing a real challenge: the disproportionality between the depleting capability to finance public higher education and provide student loans in Rwanda and the growing demand for this level of education in this country. The main focus in this study is on the potential contribution of xMOOCs, OER units in the MIT Open Courseware and different stakeholders to opening up Rwandan higher education to more people in need. The problem that the study intends to contribute to addressing is linked to financial difficulty as well as socioeconomic and infrastructural limitations that prevail in Rwanda.

I was personally affected by the issue in that, in 2001, I was denied student loan under an unsupported claim that teacher-trainees and other secondary education graduates from professional fields would fail undergraduate education. This decision was later on revoked to provide student loans to a few high performers from those fields in 2002. Although exclusion from student loans based on fields of study was abolished, it turned into student loan crisis that led to increasing inaccessibility of higher education for underprivileged learners (the majority in Rwanda).

With good intentions to transform Rwanda from subsistence farming to knowledge-based economy expressed in various official documents, this study was worth undertaking. Outcomes of this study were hoped to be the identification of opportunities offered by xMOOCs, OER units and a niche for different stakeholders to collaborate on using these courses and resources to open up higher education within limited resources available in Rwanda. The current study responds to under-representation of Rwanda and other least developed settings in studies related to opening up education. It also responded to the global scarcity of studies on MOOCs at the beginning of this study. This thesis consists of eight chapters: Introduction, literature review, research methods, two chapters on research results, one chapter on outcomes of my participation beyond research, discussion and conclusion.

CHAPTER 2 LITERATURE REVIEW

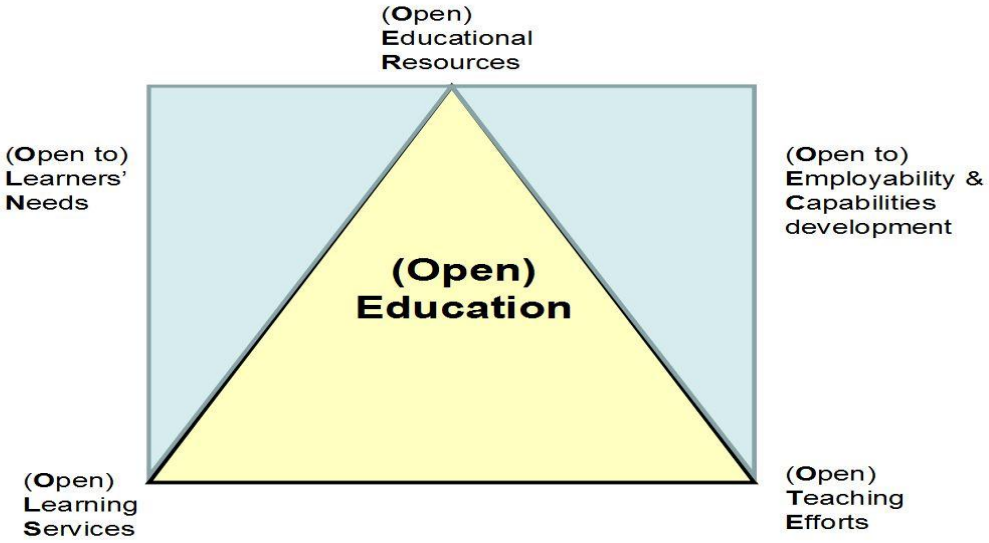
Chapter 2 critically explores the literature in the fields of open education, MOOCs, OER and Open Educational Practices (OEP). The chapter is divided into two major sections: *Definition and explanation of key concepts* and the *Conceptual framework*. In the first section, four major concepts are defined and briefly explored: open education, OER, MOOCs and OEP. The conceptual framework is discussed in 17 subsections in which the literature on openness/open education, OER, open licences, relevant declarations, open access publishing, OEP and MOOCs is discussed. Pedagogies that are relevant to MOOCs, OER and open education as well as andragogy and heutagogy/self-determined learning follow. Consensus and controversies, trends in OER, MOOCs and open education research as well as my position as a researcher are also discussed. Then, a framework for collaborative investment in MOOCs and opening up education is provided, and the application of this framework to my access to formal higher education (covered in Chapter 1) is discussed. The chapter wraps up with a look at the relation between the existing literature, research questions/findings and the current study.

2.1 Definition and explanation of the concepts

2.1.1 Open education

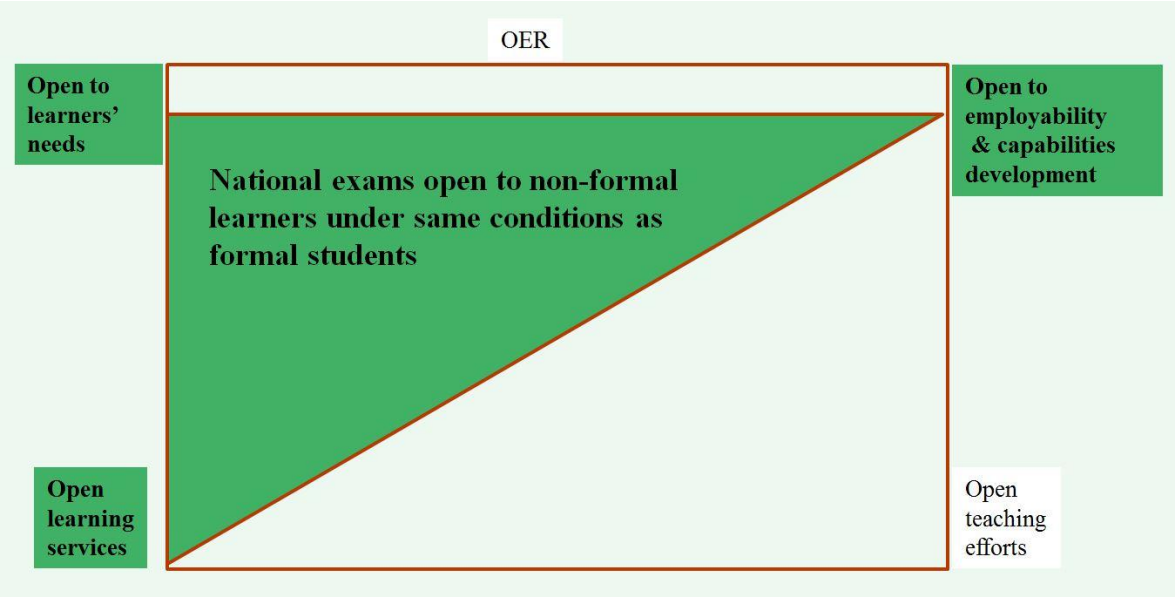
According to Mulder & Jansen (2015), open education emerged in the nineteenth century but it widely developed in the second half of the twentieth century with the start of open universities. Open education is defined differently across settings depending on agendas behind the use of the concept of *openness*. Mulder & Jansen (ibid) argue that this concept has been interpreted in a diversity of justified and questionable ways. Mulder (2015) developed a framework of five components of open education (5COE Model) that consists of OER (1), openness to learners' needs (2), open learning services (3), open teaching efforts (4) and openness to employability and capabilities development (5). Figure 2.1 illustrates the five components for open (opening up) education.

Figure 2.1 Five components of open education: 5COE Model (Mulder, 2015)



The National Examination Council (NEC)'s practice of opening national exams to non-formal learners in Rwanda discussed in Chapter 1 can be mapped on Mulder's (2015) 5COE Model. As Figure 2.2 indicates, the NEC's practices overlapped between three components: openness to learners' need, open learning/educational services and openness to employability and capabilities development. Resources self-determined learners engaged with when they were preparing for national exams were not OER and open teaching efforts were not directly available: Learners engaged with notes, sometimes borrowed from colleagues, in their preparation for national exams and they did not have access to tutorial support. However, the NEC administered the national exams to non-formal learners along with formal students and those exams were graded in same conditions for both formal students and non-formal learners. This practice constitutes open learning services to non-formal learners; one of the components in the 5COE Model. The national examination takers who scored above cut-off points were awarded same certificates and student loans regardless of whether the beneficiary was a formal student or a non-formal learner. This benefit aligns with two components in Mulder's (2015) 5COE Model: openness to learners' needs (1) and openness to employability and capabilities development (2).

Figure 2.2 NEC's administration of national exams to both formal and non-formal learners within the 5COE Model



Weller (2011, p. 96) discussed two main agendas associated with the concept of open education: the *open access* agenda and the *lifelong learning* agenda. According to Weller (ibid), the open education interest in western societies shifted from the *open access* agenda to the *lifelong learning* agenda as the higher education enrollment increased in those society. He highlighted that this agenda is still relevant in developing countries where access to higher education is still low. In the current study, the concept of open education will be used for an education system that focuses on either the *open access* agenda (opening up education) or the *lifelong learning* agenda or both.

2.1.2 Open Educational Resources

The concept of Open Educational Resources (OER) emerged in the 2002 UNESCO meeting that took place at the organisation's headquarters. The OER definition has been changing over time. In this study, the concept of OER is used to refer to any material that

aligns with the definition in the 2012 Paris OER declaration. In this declaration, OER are defined as

> Teaching, learning and research materials in any medium, digital or otherwise, that reside in the public domain or have been released under an open license that permits no-cost access, use, adaptation and redistribution by others with no or limited restrictions.
>
> UNESCO (2012, p. 1)

2.1.3 Open Educational Practice

The concept of Open Educational Practices (OEP) emerged around 2007 with advocacy from Open eLearning Content Observatory Service (Geser, 2007). The interest in OEP seems to have been triggered by the slow pace in adoption of OER in higher education and adult education, despite the availability of resources in large quantity (Andrade et al., 2011, Conole, 2012). The International Council for Open and Distance Education (no date) defines Open Educational Practices as:

> practices which support the production, use and reuse of high quality open educational resources (OER) through institutional policies, which promote innovative pedagogical models, and respect and empower learners as co-producers on their lifelong learning path. OEP address the whole OER governance community: policy makers, managers and administrators of organizations, educational professionals and learners.

2.1.4 Massive Open Online Courses (MOOCs)

MOOCs emerged in 2008 with *Connectivism and Connective Knowledge*, the first MOOC offered at the University of Manitoba by George Siemens and Stephen Downes

(Daniel, 2012, p. 3). Anderson (2013, pp. 1-3) explores the massive, open, online and course aspects of the acronym. He highlights that massiveness refers to scalability rather than a specific number of students. Anderson (ibid) identifies six types of MOOC openness which are the expansion of education beyond geographical barriers (1), freedom and free speech (2), removal of restrictions on the learning content (3), enrollment without prerequisite (4), the freedom to determine the pace of the course (5) and the gratuity/provision of a course free of charge (6). Concerning the online aspect, he highlights that MOOCs are not necessarily strictly online since some students can meet face-to-face for mutual support and meet-ups are encouraged in some MOOCs. As for the course aspect, he highlights that MOOCs have specific start and completion dates.

Based on the above description, I proposed this definition of MOOCs: "online, non-selective and tuition-free courses that are usually addressed to a global audience of students" (Nkuyubwatsi, 2013, p. 341). This was one of the earliest definitions of MOOCs that followed the 2011/2012 explosive dissemination of these courses. This definition is similar in many aspects to the Elearning Communication Open-Data (ECO)'s definition that emerged several months later on:

> an online course designed for large number of participants that can be accessed by almost anyone anywhere as long as they have an internet connection, is open to everyone without entry qualifications and offers a full/complete course experience online for free.
>
> ECO (2014, p. 7).

In the current study, the concept of MOOCs is used to refer to courses that meet the conditions in the above definitions. However, recommendations focus more on openness rather that the ubiquitous Internet access. An overemphasis on the ubiquity of Internet connectivity is more likely to lead to exclusion of learners who have limited access. With openness and a thoughtful use of available technologies and resources, such learners may

be accommodated and supported along their migration towards more advanced technologies and ubiquitous Internet access.

2.2 Conceptual framework

2.2.1 The broader notion of openness and open education

Openness and open education may broadly cover all initiatives that are undertaken within the *open access* and the *lifelong learning* agendas. According to Weller (2011, p. 96), the UK Open University original conception of *openness* referred to "*open to people, places, methods and idea*". He highlighted that the UK higher education enrollment for young people aged between 18 and 22 was 5 per cent at the time. Weller (ibid, p. 97) maps the expansion of the concept of *openness* to seven outlets: *open sources* (1) which focuses on the development and deployment of open source software, *OER* (2), *open courses* (3), *open research* (4) which include open crowdsourcing, open online conferences and open proposals, *open data* (5), *open Application Programming Interfaces (APIs)* (6) and *open access publishing* (7). Openness may also include other components such as open educational services (Ouwehand, 2012) also referred to as open learning services (Mulder & Janssen, 2013, p. 36). These services may include, but not be limited to, assessment of accomplishment from open learning for credit (Nkuyubwatsi, 2014c; Nkuyubwatsi, 2016; Mulder & Jansen, 2015). Briefly, the concept of openness has been taking its shape along the development of the open access and open education movements and related initiatives.

2.2.2 The emergence of OER

a. The dawn of the OER movement

Prior to the emergence of OER, *learning objects* was an important theme for open education discussion. Rehak & Mason (2003, p. 21) defined a *learning object* as "a digital entity which can be used, reused or referenced during a technology supported learning".

Duncan (2003, p. 13 and 16) argued that the shareability and reusability of the learning objects is facilitated by a granular production of units that would be rebuilt into different resources. The discussion of learning objects was catalysed by the need to increase access to education in many countries, both developed and developing ones (Littlejohn, 2003, p. 1). The idea behind learning objects was that sharing and reusing learning resources would help expand access to education cost-effectively.

However, practices around learning objects did not lead to expected results. Weller (2014, pp. 69-72) discusses three reasons that led to the failure of the *learning objects* movement. Firstly, the reusability of learning objects was quite complicated because the materials produced in one context were difficult to use in other contexts. This issue was referred to as *reusability paradox* (Wiley, 2004). Secondly, the learning objects were scattered in various learning management systems, which led to the development of various standards for their discoverability. However, these standards became complex, the phenomenon Weller (2014, p. 71) refers to as *over-specification*. This complexity of the standards inhibited many academics from adopting learning objects. Finally, the contribution to learning object repositories was not valued as publishing research findings in articles was. This discouraged many academics from engage in related practices in order to have the necessary critical mass. Without this critical mass, the *learning objects* initiative was not sustainable.

Due to these three barriers, the *learning objects* movement evolved into the *OER* movement and most of barriers associated with learning objects were removed. The reusability paradox was addressed by different open licences under which OER content is released. Through many of those open licences, permission to adapt the content and disseminate the derivative work across settings is provided, which addresses the issue of cross-cultural relevance of the content (Nkuyubwatsi, 2014b). The dispersion of resources and the over-specification issues may have been addressed by the creation of consortiums in which OER resources are shared. The Open Education Consortium (former Open Courseware Consortium) which consists of hundreds of higher education institutions may

be a typical example of this move. As for the low ranking of contribution to learning object repositories when compared to publishing journal articles, this issue has been addressed by the publication of journal articles under an open licence in open access journals.

b. The OER movement

The origin of OER is traced at MIT back in late 1990s. According to Vest (2006), a committee that consisted of students, faculties and administrators was set up at MIT to investigate how the institution would use educational technology and distance learning. At the same time, many other institutions were looking into for-profit distance learning or selling learning materials. Instead of selling educational materials, the MIT committee recommended giving some materials on the web for free. Subsequent to this recommendation, the first institutional OER repository, the MIT OpenCourseWare, was created.

This CourseWare model was presented in the 2002 UNESCO meeting that defined the concept of Open Educational Resources (D'Antoni, 2009). Thanks to the global participation in the meeting, the idea of provision of educational materials for free propagated. Participants at the meeting were enthusiastic about this endeavor as reflected in the final declaration of the meeting:

> …the participants express their satisfaction and their wish to develop together a universal educational resource available for the whole of humanity, to be referred to henceforth as Open Educational Resources (UNESCO, 2002, p. 28).

Hence, the 2002 UNESCO meeting coined the phrase of "Open Educational Resources (OER)" and catalysed the global dissemination of the concept. The ideal of production, reuse and sharing of educational resources which had marked the *learning objects* movement was transferred to the OER movement.

c. The OER community

In 2005, UNESCO supported the launch of the OER community which it continued to support afterward (D'Antoni, 2009 p. 7). The community consists of practitioners, teachers, learners, researchers, decision makers and independent consultants. Members of the community discuss issues around the production, use and reuse of OER. Discussions are held both online and in face-to-face workshops. According to UNESCO (2010), more than 600 community members participated in various online forums between 2005 and 2007.

After this two year discussion, the members felt the need to take the movement forward (D'Antoni, 2009, p. 7). They ranked 14 OER priorities they had already identified. The top five priorities were awareness raising and promotion (1), communities and networking (2), capacity development (3), sustainability (4) and quality assurance (5) (D'Antoni, 2009, p. 7, D'antoni, 2008). Four paramount stakeholders were also identified and assigned responsibilities. Higher education institutions (1) and academics (2), were tasked with research, supporting learning, raising awareness and capacity building. On their parts, international organisations (3) were assigned to deal with copyright issues, providing funds, developing standards and raising awareness. As for governments, they were assigned to develop policies, ensure accessibility, address copyright issues and provide financial support.

d. Funding and supporting OER initiatives

OER initiatives and the related community have been sustained by funds from various sources. Funding bodies, governments and intergovernmental organisations contributed financial support.

i. *Funding bodies*

The William and Flora Hewlett Foundation is one of the most important OER funders. According to D'Antoni (2009), this foundation has been funding OER initiatives since the creation of the MIT OpenCourseWare in 2001. This foundation provided grant for OER initiatives at various institutions, including the Open University's OpenLearn (Jacobi, 2012), Rice University's Open CourseWare (Glennie, Harley & Butcher, 2012) and Utah State University Open CourseWare (Hoosen & Butcher, 2012). In Africa, the foundation funded OER Africa (Glennie et al., 2012) and sponsored the pilot of a collaborative project between Kwame Nkrumah University of Science and Technology (KNUST), University of Ghana, University of Cape Town, University of the Western Cape, University of Michigan and OER Africa that developed health OER (Omollo et al., 2012). In addition to sponsoring OER initiatives, the William and Flora Hewlett Foundation has been sponsoring face-to-face discussion and online forums. In 2010, this foundation partnered with the UK Wellcome Trust to organise a workshop that attracted seventeen institutions that agreed on a collaboration to make more research data open to the public (Levey, 2012).

The William and Flora Hewlett Foundation was not the only funder of OER initiatives and communities. The Bill and Milinda Gates Foundation, the Twenty Million Minds Foundation and the Maxfield Foundation also financed Rice University's Open CourseWare (Glennie, Harley & Butcher, 2012). Other funders include the Andrew W. Mellon Foundation and the Shuttleworth Foundation (Hoosen & Butcher, 2012) to name a few.

ii. *Intergovernmental organisations*

OER initiatives and the related community have also been funded and supported by intergovernmental organisations namely UNESCO, the Commonwealth of Learning (COL) and the European Commission. UNESCO and COL made OER an important component in their work and took a leadership role in making countries aware of the potentials of OER (Glennie, Harley & Butcher, 2012, p. 3). Both organisations have been active supporters of

discussion and workshops within the OER community. In their *Taking OER Beyond the OER Community: Policy and Capacity* agenda, they co-sponsored various online forums and advocacy and capacity-strengthening workshops in 2010 (Wyk, 2012). In 2011, they co-authored the guidelines for OER in higher education. More recently, UNESCO supported the launch of the Global OER Graduate Network (GO-GN). This network also received funds from the European Commission and the William and Flora Hewlett Foundation discussed earlier. The European commission funded many other OER projects including *Policies on OER Uptake (POERUP)*.

iii. *Governments*

Governments' contributions to OER development varied from financial support to OER policy development. According to Mulder (2012, p. 73), the Indian Government was the first to support the use of OER at the national level. Many other countries followed the Indian example, including the Netherlands that set up the National Wikiwijs in 2009 (Mulder, ibid). This initiative was jointly coordinated by the Open University of the Netherlands and a Dutch public education organisation called Kennisnet.

In the USA, the Obama administration had been represented in OER related meetings (Valkenburg, 2012, p. 79), which led to a two billion USD investment in support of OER initiatives in this country (Mulder, ibid; Valkenburg, ibid). On 22 February 2013, the White House's Office of Science and Technology Policy (OSTP) signed a memorandum to increase access to the results of federally funded scientific research (OSTP, 2013). The American Government support of OER is still going on. In the 11th Annual Open Education Conference, the Director of Educational Technology in the USA Department of Education announced funds for OER development for K12 and made a call for contributions.

Brazil, China, Japan, Indonesia, Korea, Poland, South Africa, Turkey, Vietnam and the United Kingdom also support OER initiatives (Mulder, ibid). Government sponsorship

to OER initiatives may continue to rise. However, this may require evidence on the impact of OER initiative to addressing specific educational challenges in different countries. At the moment, OER impact evidence seems to be not compelling enough.

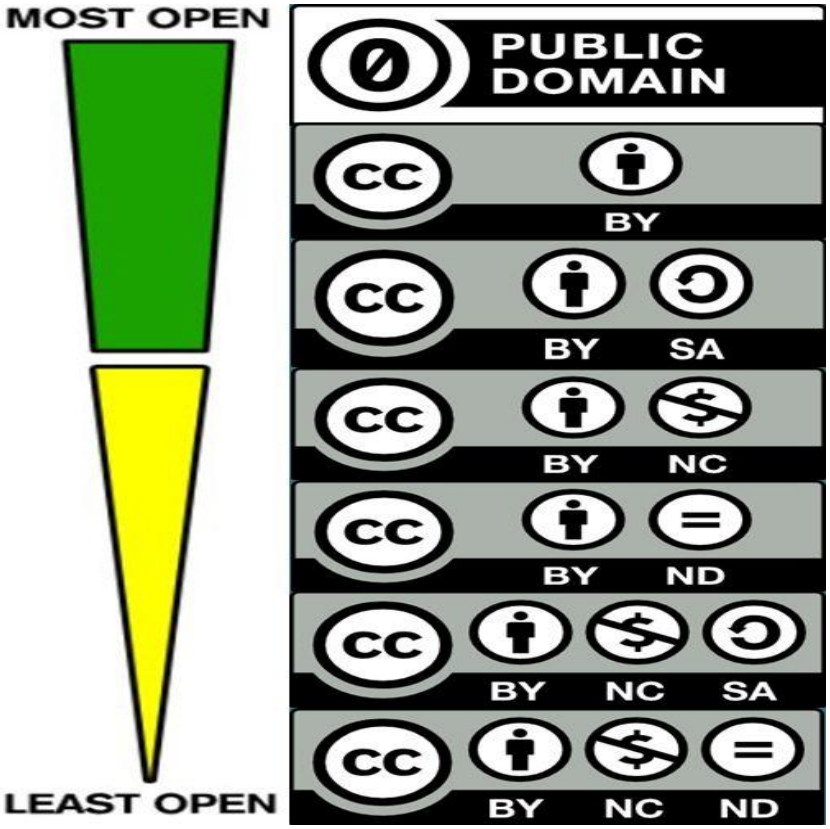
iv. *Other supporters*

On the legal perspective, Creative Commons, which is an American nonprofit organisation, developed a legal framework for sharing OER content. This legal framework consists of different types of open licences that enable overcoming the monopoly on educational content imposed by the traditional copyright legal framework. According to Green (2012), Creative Commons provides the standard legal and technical tools for sharing educational resources voluntarily. This enables not only sharing learning resources, but also offering freedoms to use the resources in a way that is compatible with technological tools available in different settings. In the traditional copyright system, educational materials are licensed under "*All-rights-reserved*" by default. According to Bissell (2009), this licence is not compatible with the core principles that underpin OER: sharing, creativity and learner engagement. Hence, the contribution of Creative Commons to the growth of the OER movement has been a critical complement to that of funding bodies, intergovernmental organisations and governments.

2.2.3 Open Licensing

The public domain is known to be the most open licence in that there is no known restriction on materials under this licence. Attribution of credit to authors of the work dedicated to the public domain is optional and the work can be used for any purpose. Additional to the public domain, the Creative Commons (CC) organisation developed a set of open licences from four optional properties: *Attribution (BY)*, *Non-Commercial (NC*), *No Derivative work (ND)* and *Share Alike (SA)* (Bissell, 2009, p. 101). The combination of these features gives six licences with different degrees of openness (Figure 2.3).

Figure 2.3 Most common open licences



Adapted from Green (2012, Slide 15) (in the public domain); and Creative Commons (2013, Slide 18) (under CC BY)

Creative Commons has been amending the licences to accommodate the concept of 4Rs of OER: reuse, redistribution, revision and repurposing of the materials (Wiley, 2007; Didderen & Verjans, 2012, p. 12). According to Green (2012), there has been effort to get rid of licences that have the *No-derivative work* and *Non-commercial* features since they are restrictive and controversial respectively. The controversy around the non-commercial feature comes especially when resources are used in education across settings. There is no universally accepted clear cut between a non-commercial and a commercial educational institution, which makes this aspect ambiguous. Despite disputes on some Creative Commons licences, all of them are open. Unlike the traditional "All-rights-reserved" licence, only some rights are reserved in Creative Commons Licences.

As illustrated in Figure 2.3, Creative Commons Attribution (CC BY) is the most open or the most accommodating of all Creative Commons licences. This licence grants permission to distribute, remix, revise, and create derivative work, even for commercial purposes, as long as credit is appropriately given to the original creator. The second most open CC licence is Creative Commons Attribution-Share Alike (CC BY-SA). This licence allows the remix, revision, redistribution and creation of derivative work even for commercial purposes, as long as credit is attributed to the original author and the new creations are licensed under the identical terms. Then follows Creative Commons Attribution-NonCommercial (CC BY-NC) which grants permission to remix, revise, and redistribute the content for non-commercial purposes as long as credit is attributed to the creator. Derivative work can be created as long as the original creator is acknowledged and the new creation is used non-commercially, but the derivative work does not have to be licensed under the same terms. Creative Commons Attribution-NoDerivatives (CC BY-ND) allows redistribution for commercial and non-commercial purposes, as long as the resources are disseminated unchanged and in whole, with credit to the original creator. Creative Commons Attribution-NonCommercial-ShareAlike (CC BY-NC-SA), grants permission to remix, revise, and create derivative work for non-commercial purposes, as long as credit is appropriately attributed to the original creator and the new creations are licensed under the identical terms. The most restrictive of open licences is Creative Commons Attribution-NonCommercial-NoDerivatives (CC BY-NC-ND). This licence only allows the reuse and redistribution of the content as long as the credit is attributed to the author, no change is made to the content, and the use is only non-commercial.

2.2.4 Miscellaneous declarations

Various declarations, principles and memorandums related to open access, open education, intellectual property, OER, MOOCs and access to information have been issued. The most commonly known are the Budapest Open Access Initiative, the Cape Town Open

Education Declaration, The Washington Declaration on Intellectual Property and the Public Interest and the 2012 Paris OER Declaration and others.

a. The Budapest Open Access Initiative

The Budapest Open Access Initiative arose from a meeting convened in Budapest by the Open Society Foundations (OSF) on 1-2 December 2001 (Open Society Foundations, 2002). This declaration was made on 14 February 2002 as a statement of principle, strategy and commitment. It champions the world-wide electronic distribution of the peer-reviewed journal literature and a completely free and unrestricted access to it by everyone as a public good. It also highlights sharing the learning of the rich with the poor and that of the poor with the rich as one of the expected outcomes.

Interested institutions and individuals were invited to help open up access by removing the barriers, especially the price barriers. In the declaration, "open access" to the literature is defined by the availability on the public Internet, permitting any users to read, download, copy, distribute, print, search, or link to the full texts of these articles, crawl them for indexing, pass them as data to software, or use them for any other lawful purpose, without financial, legal, or technical barriers other than those inseparable from gaining access to the Internet itself (Open Society Foundations, 2002). Considering that price is one of access barriers, the declaration envisaged the launch of new journals which do not charge subscription or access fees to end users. The goal of the declaration is to achieve open access to peer-reviewed journal literature. *Self-archiving* and *open-access journals* were identified as two strategies to attain this objective. Flexibility, experimentation, and adaptation to local circumstances were highly recommended to ensure a rapid, secure and sustainable progress in diverse settings.

In September 2012, ten years after the original Budapest Open Access Initiative, a set of recommendations was issued (Budapest Open Access Initiative, 2012). The recommendations were grouped into four categories: policy (1), licensing and reuse (2),

infrastructure and sustainability (3) as well as advocacy and coordination (4). On policy level, the requirement to deposit all published articles in an open access repository by institutions and countries for promotion, tenure, and rewards and institutional and national assessment was recommended. On licensing and reuse, the most accommodating Creative Commons licence (CC BY) was recommended. Concerning infrastructure, it was recommended that every institution builds an open access repository or joins a coalition of open access repository. In addition, the provision of grants to researchers to help them cover the cost of publication in open access journals was recommended. As for advocacy and recommendation, raising awareness of publishers, editors, referees and researchers on standards of professional conduct for open access and developing guidelines for open access policy were recommended. Equally, open access organisations and activists were encouraged to coordinate their activities and communicate with one another in order to avoid duplication of effort and work cohesively.

b. The Cape Town Open Education Declaration

The Cape Town Open Education Declaration is an outcome of the meeting convened by the Open Society Institute and the Shuttleworth Foundation in September 2007 (Shuttleworth Foundation and Open Society Foundations, 2007). According to Shuttleworth Foundation and Open Society Foundations (ibid), the signatories intended to accelerate efforts to promote open resources, technology and teaching practices in education. They acknowledged that the majority of the world population did not yet have access to computers and the Internet connectivity that are essential in most open education initiatives.

The declaration signatories called students, educators, authors, publishers, institutions and governments to work together to remove barriers to education. They encouraged learners and educators' contribution through the creation and use of OER and active participation in the OER movement. Educators, authors, publishers and institutions were also encouraged to contribute by releasing materials openly for revision,

improvement, sharing and translation by anyone, in a platform that allows interoperability. The release of materials in a format that is accessible to people with disabilities and people who do not yet have access to the Internet was also recommended. Finally, governments and learning institutions were urged to make policies that require the release of taxpayer-funded educational resources as open educational resources.

c. The Washington Declaration on Intellectual Property and the Public Interest

This declaration was issued in the Global Congress on Intellectual Property and Public Interest of 25-27 August 2011 (American University Washington College of Law, 2011). The major points of this declaration state that the production of an intellectual property policy should be conducted through mechanisms of openness and transparence and both developed and developing countries should have a full representation. They also emphasise giving priority to the promotion of the full range of human values in intellectual property system.

Signatories highly recommend the removal of all threats to access to essential knowledge. To support openness efforts, a commitment to call government procurement and education policies to place free and open source software in same advantages as proprietary ones and support interoperability was made. The availability of inventions that result from publically funded research to the public is also recommended. On the part of developing countries, they were encouraged to widen their flexibility and exceptions on intellectual property to facilitate the transfer of knowledge in the health, education, agriculture, food and technology fields.

d. The Paris OER Declaration

The Paris OER declaration was issued in the World OER Congress held at UNESCO's headquarters from 20 to 22 June 2012. Three important features are observed

from this declaration. Firstly, it conveys a commitment to foster awareness and use of OER to widen access to education at all levels. This commitment would contribute to social inclusion, gender equity and special need education. Secondly, the declaration promotes the reuse, revision, remix and redistribution (4 OER Rs, according to Wiley, 2007; Didderen & Verjans, 2012, p. 12) of educational materials. Finally, open licensing on educational materials produced with public funding was encouraged.

e. The Lyon Declaration

The Lyon Declaration was released in August 2014 (International Federation of Library Associations and Institutions, 2014). The declaration builds on the belief that access to information and knowledge, coupled with ICTs, catalyses sustainable development and improvement of people's lives. It also bases on the principle that informed decisions from governments, parliamentarians, local authorities, local communities, civil society, the private sector and individuals can be transformational and empowering, especially for marginalised and poor people and this would contribute to development at large. The empowered learners can actively participate in civil society, contribute solutions to development challenges and ensure accountability, transparency and good governance.

The signatories call for ending inequality via empowerment, education and socio-economic inclusion, equitable access to education and information, freedom of expression, freedom of assembly and association, and public participation of all. They also call for connection, communication and exchange of development solution among different stakeholders and an establishment of a public forum and space for wider civil society participation and engagement in decision making. Finally, they call upon UN member states to acknowledge access to information and the skills to use it effectively as critical enablers of sustainable development and include them in the post-2015 development agenda.

2.2.5 Open access publishing

Open access publishing of blindly peer-reviewed journal articles and books has recently become more popular. Weller (2014, p. 7) discusses three different ways such publishing occurs. In the first way, the *Platinum route*, an article is published in open access journal with an open licence and the author or her/his institution is not required to pay Article Processing Charges (APCs). The *Platinum route* distributes power and benefits between institutions, authors and publishers (Nkuyubwatsi et al., 2015), which makes this route more collaborative and more beneficial. This route is particularly beneficial to authors who do not have access to research funds for covering APCs. These authors only contribute the content for free and APCs are paid by other contributors. Institutions also benefit most from this route in that they can access the open content from the day of publication without any cost, neither on their part nor on the part of any member of their respective communities.

In the second route, the *Gold route*, an article is published in an open access journal or a proprietary journal under open licences, but the author or her/his institution is required to pay APCs. From the author's perspective, this route may be the least beneficial: By default, the *Gold route* shifts the financial burden from other players to the author who also contributes the content for free (Nkuyubwatsi et al., 2015). If the author does not work for an institution that accepts to pay APCs or does not have research funds that cover these charges, the *Gold route* may be inhibitive. On the other hand, if the author's institution pays the APCs, the cost may be recovered by charging more fees from learners. This may be a barrier to opening up education in that particular institution.

As for the third route known as the *Green route*, an article is published in a proprietary journal, but its earlier version which was edited in the light of feedback from reviewers is uploaded on author's websites or her/his institution's repository. Publishers may impose embargo for a specific period before the author can release the version under an open licence. In this way, the *Green route* still offers excessive power to publishers.

There has recently been an attempt to increase the embargo period in some publishing companies, which led to a boycott and dissatisfaction in academic communities in some countries (Wild, 2015; Wijkhuijs, 2015; Ramaker & Wijkhuijs, 2015). From the perspective of end users, the *Green route* may be the least open of the three open access publishing routes. Although this route does no charge institutions and authors to publish their content, the embargo imposed by publishers inhibits the authors and institutions to openly share the content without cost for a specific period.

2.2.6 From OER to MOOCs

In this sub-section, the evolution from OER to MOOC development is explored under seven points: The emergence of MOOCs (1), classification of MOOCs (2), the global expansion of MOOCs (3), suspicion of hidden agendas in MOOC practices (4), a diversity of MOOC students (5), controversies in the MOOC debate (6) and the MOOC threat and conflict (7).

a. The emergence of MOOCs

The plethora of OER fed into initiatives that intended to design courses for credits based on the existing body of openly licensed materials. It is within this perspective that the first MOOC, *Connectivism and Connective Knowledge*, emerged in Canada in 2008. This course developed at the University of Manitoba by George Siemens and Stephen Downes had been baptised a *Massive Open Online Course* (*MOOC)* in 2007 by Dave Cormier and Bryan Alexander (Daniel, 2012, p. 3). MOOCs became popular four years later after three courses at Stanford University had been made open to the public to learn online in 2011. The most famous of those courses was *CS221 Artificial Intelligence* (Daniel 2012; Jelgerhuis, 2012; Ouwehand, 2012; Rodriguez, 2012; Thrun, 2012; Valkenburg, 2012) which attracted over 160,000 learners and about 20,000 of them completed the course with

a passing grade. The two other Stanford MOOCs also attracted over a hundred thousand learners (Rodriguez, 2012). These courses included Andrew Ng's *Machine Learning*.

b. Classifications of MOOCs

The courses offered in late 2011 mark a bifurcation of MOOCs into two branches widely referred to as *Connectivist MOOCs (cMOOCs)* and *Extension MOOCs (xMOOCs)*. Originally, these two branches of MOOCs shared openness in terms of enrolment of anyone who want to learn and learning without paying any tuition fee. However, this openness has already started shrinking in xMOOCs as it will be discussed later. Overall, xMOOCs have attracted more learners, and triggered more debate than cMOOCs.

The two categories of MOOCs are also different in more features. The cMOOCs are not tailored to a specific course and have no quizzes and exams. Instead, they rely on autonomy, diversity, openness and interaction between learners (Rodriguez, 2012). They reflect the connectivist distance learning pedagogy which will be discussed in the *MOOC pedagogies* subsection. According to Rodriguez (2012) *Connectivism and Connective Knowledge*, *Personal Learning Environments Networks and Knowledge* (PLENK) delivered in 2010, *Online Learning for Today and Tomorrow (EduMOOC)* offered in 2011 by the University of Illinois Springfield are all examples of cMOOCs. Other examples of cMOOCs include *Education, Learning and Technology (Change11)* offered in 2011/2012 and *Learning Analytics (LAK12)* that was offered in 2012. As for xMOOCs, they are exemplified by the three Stanford MOOCs and most of subsequent MOOCs offered in a diversity of MOOC platforms.

The cMOOCs vs xMOOCs classification is too simplistic. In the last three years, xMOOCs have evolved rapidly and some of them are more structured as cMOOCs than original xMOOCs. To mitigate this shortcoming in MOOC classification, Conole (2013b and 2014) came up with a twelve-dimension classification scheme. In this scheme, MOOCs are categorised based on their openness, massiveness, use of multimedia, degree of

communication, degree of collaboration, learning pathway, quality assurance, amount of reflection, certification, formal learning, autonomy and diversity. Similarly, Lane, L. (2012) classified MOOCs into *network-based*, *task-based* and *content-based* types.

c. The global expansion of MOOCs

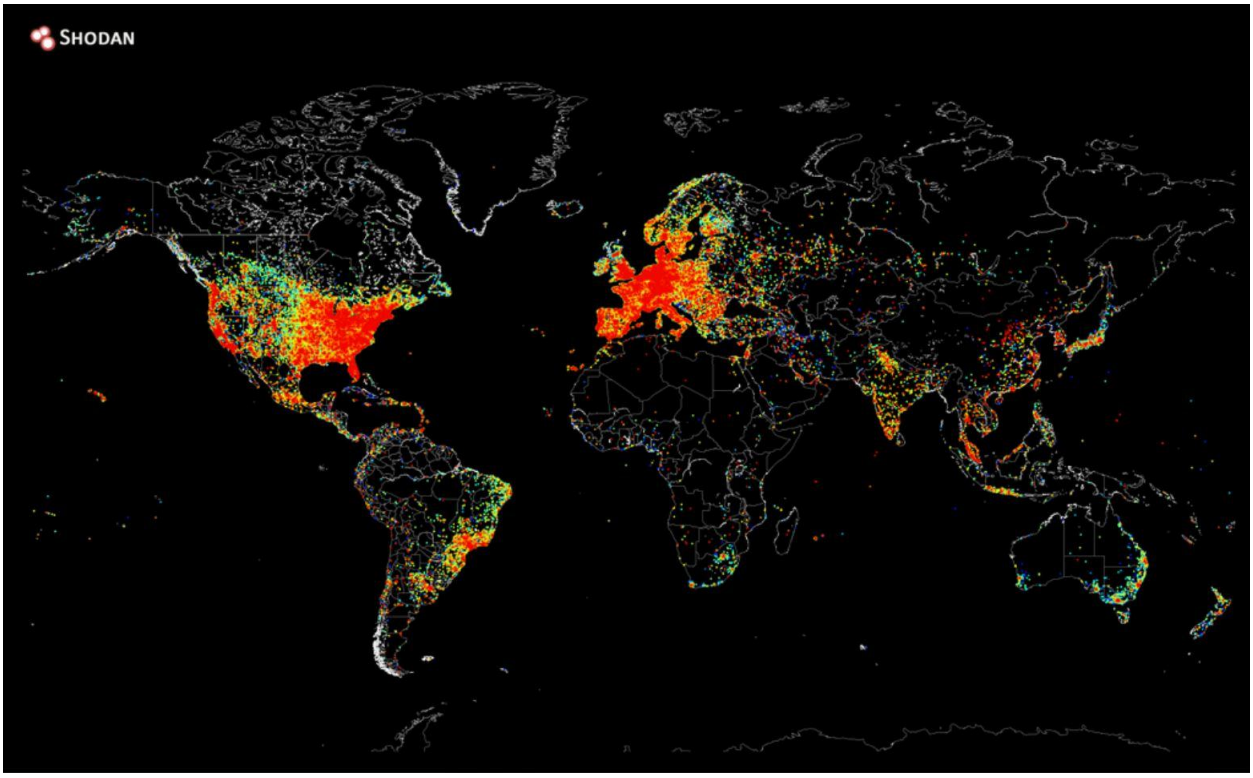
The experience of xMOOCs had effect on the way academics and institutions think of education. After tutoring *CS221* in its MOOC model, Sebastian Thrun resigned from Stanford University to launch the first MOOC platform. Udacity started in January 2012 (Thrun, 2012). Then Andrew Ng moved in a similar direction by partnering with Daphne Koller to start the Coursera platform in April 2012. Learners had already started enrolling in Coursera MOOCs in February 2012 (Koller, 2012). Unlike Sebastian Thrun, the co-founders of Coursera did not resign from Stanford University. Instead, they sought partnership with institutions from around the world. This enabled the Coursera platform to be the fastest growing platform. In the meantime, MIT and Harvard University partnered to fund the MITx which changed the name to edX.

With three MOOC platforms, the USA maintained the xMOOC platform monopoly in 2012. In December 2012, British universities led by the Open University announced the launch of the FutureLearn platform. The British response was followed by the launch of Open2Study in Australian in March 2013. In April 2013, OpenupEd, a European MOOC portal was launched. This initiative was the work of partners from 11 countries: France, Italy, Lithuania, the Netherlands, Portugal, Slovakia, Spain, UK, Russia, Turkey and Israel. More MOOC platforms were launched around the world: iVersity in Germany, Miriada x in Spain, *France Université Numerique* (FUN) in France, Schoo in Japan, eWant in China and many others.

Despite the rapid development of MOOCs in recent years, not all people in need for education have been reached. Recent reports on MOOCs have presented statistics that indicated that MOOCs have been benefiting well-educated learners in developed countries

(EADTU, 2014; Grainger, 2013; Ostrow, 2013; Alcorn, Christensen & Emanuel, 2014; Guo & Reinecke, 2014). This trend in the MOOC reach is similar to the one on Internet accessibility. According to Internet Society (2014, p. 19), people who had access to the Internet in May 2014 were 2,893,587,260. Matherly (2014) produced a map of all devices connected to the Internet (Figure 2.4) which provides a quick view on Internet access around the globe. This map hints to the reason why MOOCs have been beneficial to learners from developed countries.

Figure 2.4 A map of all devices connected to the Internet in August 2014



Source: Matherly (2014), used with permission.

d. Suspicion of hidden agendas in MOOC practices

Most MOOC providers have been advancing the provision of higher education to learners who are not included in the higher education system globally. In her presentation

that displays the slogan "The Online Evolution: Education for Everyone", Koller (2012, 3:40-3:48) states that Coursera's goal is "to take the best courses from the best instructors at the best universities and provide it [sic] to everyone around the world for free". She argues that providing top quality education to everyone around the world for free would enable establishing access to education as a fundamental human right, where everyone in the world who are motivated would get skills they need for their own, their family's and community's wellbeing. These claims are not different from Thrun's (2012) argument that if education is made free everywhere, people in the developing world may become much better and much stronger. In a similar direction, the provision of the best higher education for free was advanced by FutureLearn founders (FutureLearn, 2013).

Nevertheless, there has been suspicion of hidden agendas, especially triggered by the "*All-rights-reserved*" copyright which prevents the adaptation of most MOOCs content to different learning setting and cultural needs. According to Liyanagunawardena et al. (2013, p. 5), this restrictive use of MOOC content provides learners with a "take-it-or leave it…colonial educational experience". Suspicion of a hidden agenda to use MOOCs to expand cultural imperialism or neo-colonialism has also emerged in the literature (Liyanagunawarderna et al., 2013; Sharma, 2013, EADTU, 2014). Hence, the MOOC development may have faced resistance based on this distrust.

MOOC practices reflected in the *OpenupEd* portal may be unique in terms of openness in that pioneers highlight that an open licence is the rule of thumb for courses displayed on the portal. Maintaining the values of equity, inclusion, social justice, quality and diversity (EADTU, 2014; HOME, 2014) as well as promoting lifelong learning and social mobility are championed among main agendas of continental Europe MOOC providers; mostly key pioneers of the *OpenupEd* portal. Open licensing is part of advocacy in the Porto Declaration on European MOOCs (EADTU, 2014). This openness may be informed by the tradition of providing higher education free of charge in many European countries (Heller & Rogers, 2006; Kopp et al., 2014; Andrei, 2014). Therefore, equity,

social justice, inclusion and diversity are values that seem to be already imbedded in the existing higher education system in many European countries.

e. A diversity of MOOC students

Students join MOOCs with different objectives. Haggard (2013, p. 26) highlights four types of MOOC students identified in software analytics of Stanford University's three computer science MOOCs: *auditing* students (1), *sampling* students (2), *completing* students (3) and *disengaged* students (4). Auditing MOOC students watch lecture videos throughout the course but attempt very few, or no assessment at all. Sampling students survey the course by watching a few videos. Completing students attempt most of the assessments provided in the course. As for disengaged students, they start attempting assessment at the beginning of a MOOC, then, they occasionally watch only a few lecture videos and eventually disappear from the course.

In a similar direction, Anderson et al. (2014) based on quantitative data of how students have engaged in various courses offered by Stanford University on the Coursera platform to establish taxonomy of engagement styles in MOOCs. Five types of engagement correspond to five types of MOOC students: *viewers*, *solvers*, *all-rounders*, *collectors* and *bystanders* (Anderson et al., 2014, p. 688). Viewers watch videos and submit a few or no assignments. Solvers submit assignments and watch a few or no videos. All-rounders have a good balance between watching videos and submitting assignments. Collectors download lecture videos and other learning materials and submit a few or no assignments. As for bystanders, they enroll in MOOCs, but their participation, either by watching or downloading lecture videos, submitting assignments or contributing to the course discussion forum remains minimal, if any.

In addition to the five types of students who participate in MOOCs during the course run, Anderson et al. (2014, p. 690) identify a category of *archaeologist*: students who start their first action after the course has been completed. These students may collect

all learning resources, or view them, or engage in everything as all-rounders do. As long as their first action in the course takes place after the course has ended, they are classified as archaeologist.

f. Controversies in the MOOC debate

The emergence and rapid development of MOOCs catalysed debate in the literature, blogsphere and media. On the one hand, MOOCs have been hailed for providing freedom, autonomy and global citizenship (Levy & Schrire, no date.). According to Thrun (2012), students at Stanford University preferred taking *CS221 Artificial Intelligence* in its MOOC version rather than attending the course in the face-to-face version. On the other hand, criticism has been leveled against MOOCs. Some of MOOC critics see constructive feedback provided in these courses to be insufficient (Daniel, 2012). Others point out the low level of comprehensibility in MOOCs (Edmundson, 2012; Mazoue, 2013) and the lack of critical, creative and original thinking (Bates, 2012).

Edmundson (2012) takes radical rejection of not only MOOCs but also online education in general. He argues that in face-to-face classes, students and teachers come together and create an immediate and vital community of learning. However, this argument can be challenged in at least three ways. Firstly, learning community is not necessarily the only learning way for all learners. In other words, a learning community is not one size to fit all. Secondly, learning communities are beneficial when learners' engagement is an informed decision that seeks to address their need expressed by learners themselves rather than when enforced by instructors. Finally, learning communities are created online, and online learning communities offer learners more flexibility because they are not time and space bound as face-to-face learning communities are.

MOOCs have also been criticised for minimal tutorial support, often associated with low completion rates. Some critics have even gone far to state that MOOC professors are "only slightly more accessible than the Pope or Thomas Pynchon" (Jacobs, 2013, para.

3). While many critics see the low level of tutorial support in MOOCs as a driver to the low completion rate (Daniel, 2012; Jacobs, 2013; Rees, 2013), Kopp et al. (2014, p. 51) argue that the dropout rate in MOOCs would decrease considerably if the learning accomplishment in these courses were assessed and credit were awarded to successful learners. This argument is especially relevant when there is consideration that support needed for learning success can also be gained from peers. Equally, self-determined open learning practices do not necessarily depend upon tutorial support, but more importantly on value creation for learners. Hence, the low level of tutorial support in MOOCs may leads to the dropout of learners who need it and lack it, but not necessarily that of learners who need more value from these courses and are capable to learn on their own if this value is created.

It is also worth noting inaccuracies that marked contrasting the completion rate in MOOCs and that in conventional education. Measures and procedures used to calculate the completion rates in conventional education are not necessarily valid in the calculation of the completion rate in MOOCs. Completion rates have been reported to be 10 per cent or less in most MOOCs (Hill, 2012; Jordan, 2013; Kizilcec et al., 2013, Yuan & Powell, 2013). However, the reported completion rates in MOOCs do not make sense, especially when they include enrollees who have not intention to learn and complete MOOCs (Vu & Fadde, 2014). Since the enrollment in MOOCs is open to anyone who wants to learn and anyone who want to have a look at no cost (Weller, 2014), these courses attract more *bystanders*, *viewers* and *collectors* (Anderson et al., 2014, p. 688).

Another point to consider is that while auditing learners in conventional education are not counted in the calculation of completion rate, such learners are counted when discussing the low completion rate in MOOCs. Weller (2014, p. 103) put it that in conventional higher education, students who do not turn up and those who drop out in the first two weeks of the course are not considered as enrolled. Such learners are comparable to *bystanders* (Anderson et al., 2014, p. 688) in MOOCs. However, bystanders and other learners who have no intention to complete MOOCs such as *Viewer* and *collectors*

*(*Anderson et al., ibid) are counted in the discussion of the low completion rate in MOOCs. The inclusion of such enrollees certainly distorts an accurate picture on completion rate in MOOCs, especially when the agenda is to contrast MOOCs to conventional education.

g. The MOOC threat and conflict

MOOCs have raised varied concerns in the education industry. Haggard (2013, p. 4) outlined that less prestigious universities that are not engaged in MOOC practices are threatened to lag behind, lose market share and interest of new students". Academics have expressed concerns that universities may replace tenured professors by teaching assistants who help students through the materials developed by professors at elite universities (The Philosophy Department at San José State University, 2013; Rees, 2013). According to Rees (2013, para 6),

> the beauty of MOOCs is that they provide an easy opportunity to drastically cut labor costs by firing existing faculty members or simply hiring poorly trained ones—whom they won't have to pay well—to help administer the class.

The other group that is at risk of marginalisation if MOOCs are widely adopted consists of learners from disadvantaged settings who are not yet connected to the Internet. When Martin Bean, the former Vice-Chancellor of the UK Open University, was asked the fate of people who do not have access to ICT and broadband connectivity, his response was that they "will be in trouble" (Commonwealth of Learning, 2013, p. 4). It may still be early to know the exact impact of MOOCs on conventional education institutions and learners. Open discussion on MOOCs, their threats and opportunities, as well as inequalities in terms of access to education may trigger collective and collaborative engagement to overcome the potential harms. These topics seem to be sensitive, which often lead to avoidance of open dialogue.

There have already been some conflicts around open education, MOOCs and OER. Weller (2014, pp. 15-17) highlights three aspects of the conflict in open education. The first type of conflict is between those who use the concept of *openness* to mean freedom of access, reuse, revision, remix and redistribution of content and those who use the concept to attract users to their commercial products or to access different funds. The second type of conflict is about the market share in the education and publishing industries. Often times, incumbent struggle to monopolise the market and the power of control of access to the content. The third type of conflict is in the narrative where some narrators claim that new model will replace the conventional education system while others claim that the conventional education is superior to new innovations in education.

2.2.7 Challenges to OER and MOOC adoption

Various challenges that impede OER, MOOCs and open education adoption have been identified. These challenges inhibit actions from different categories of stakeholders in education: learners, academics, institutions and governments.

a. Challenges for learners

Despite the vast body of OER stored in repositories, the use of OER by learners has not been satisfactory (Conole, 2013a; Ouwehand, 2012; Glennie, Harley & Butcher, 2012; Ehlers, 2011). Four clusters of barriers to OER adoption by learners, which also apply to MOOCs, emerged in the related literature: lack of access to technologies, the physical learning environment, psychological factors and the lack of recognition of learning accomplishment.

Most OER and MOOC content is available in the digital format. This requires learners to have access to computers and Internet connectivity. The lack of access to computers and the Internet was identified as inhibitor to OER use and MOOC learning

(OECD, 2007; Lane, 2009; Bates, 2012; Wolfenden, 2012; Liyanagunawardena et al., 2013). The lack of access to comfortable learning environment was also discussed as inhibitor to learning from OER and MOOCs (Lane, 2009). Equally, psychological factors inhibit learning from MOOCs and OER. "Social disempowerment" (Lane, 2009, p. 9; Lane & Van Dorp, 2011, n. p.) often marked by self-perception as not being good enough for successful learning and technophobia are examples of psychological factors that inhibit learning from MOOCs and OER. Finally, the lack of recognition of learning accomplished via open learning based on OER and MOOCs inhibit learners' engagement with these resources and courses (Lane & Van Dorp, 2011; Yuan & Powell, 2013; Kopp et al., 2014). Hence, access to computer and Internet, conducive physical learning environment, open learners' empowerment and recognition of open learning accomplishment need to be established in order to engage learners in learning from OER and MOOCs.

Another inhibitor that is worth considering consists of limited literacies on the part of learners. Limited proficiency in the language (or limited linguistic literacy) in which OER and MOOC content are produced is inhibitive (Badarch et al., 2012). This is the same for limited cross-cultural literacy, especially when the content and course was produced and designed from different learning and cultural perspectives (Kanuka & Gauthier, 2012, p. 156). D'antoni (2007) noted the importance of culture and language in evaluation of the appropriateness of OER content from other contexts (p. 4). The other literacy highlighted as beneficial to OER and open course learning is social networking (Weller, 2011). This literacy is coupled with other digital literacies such as finding and evaluating the relevance of information. Hence, the lack of linguistic, cross-cultural, digital and social networking literacies inhibits successful learning from OER and MOOC.

b. Challenges for academics

The limited access to technologies was also identified as a challenge to the adoption of OER by academics (Wolfenden, 2012; Wolfenden et al., 2012). Equally, limited literacies were identified to inhibit academics' use of and contribution to OER (Hylén, no

date; OECD, 2007; Rennie & Mason, 2010; Badarch et al., 2012). Appendix 9 of *A Basic Guide to Open Educational Resources (OER)* (Butcher, 2011) and appendix 1 of *Guidelines for Open Educational Resources (OER) in Higher Education* (Commonwealth of Learning & UNESCO, 2011) summarise skills that are necessary for OER production and adoption. Those skills relate to content design, development, curation and sharing as well as networking and network management.

In addition to access and skill gaps, academics' engagement with OER was found to be hindered by the lack of motivation. The lack of motivation toward OER engagement was found to be linked to poor salary (Badarch et al., 2012) and the lack of incentives or rewards for OER production, use and sharing (Hylén, no date; OECD, 2007; McAndrew et al., 2012; Woert, 2012; Wolfenden, 2012). Motivation to write, use and share OER is also hampered by the lack of formal recognition of OER practices as academic practices (OECD, 2007), the lack of extra time to dedicate to OER practices and the absence of a sustainable business model (Hylén, no date). McAndrew et al. (2012) also noted the lack of the culture of learning and teaching, which is closely related to the resistance to change (Levy & Schrire, no date). Institutions' level of openness and engagement with OER is also likely to determine how individual academics engage with OERs. The lack of institutional openness and interest in OER discourages individuals' enthusiasm.

c. Challenges for institutions

While institutions can play a critical role in addressing many challenges that prevent academics and learners from adopting OER, their engagement in open education is also restricted by various barrier. Major challenges to OER adoption by institutions include the sustainability issue (Atkins et al., 2007; Janssen & Schuwer, 2012; McAndrew et al., 2012; Mulder, 2012), financial constraints (Levy & Schrire, no date, OECD, 2007) and lack of policies on open education and OER. The lack of detailed and benchmarked quality standards was found to be another barrier for many higher education institutions in developing countries (Rennie & Mason, 2010). A supportive policy environment is also

critical for OER to have positive impact (Bateman et al., 2012, p. 12). Butcher (2011), Wyk (2012) and Conole (2013a) highly value the role of policy in facilitating OER adoption. According to McAndrew et al. (2012), setting an agenda towards which openness operates can make difference in OER adoption. The absence of such policies or agenda may be an obstacle for institutions to justify the investment on OER, open courses and practices.

d. Challenges for governments

Some studies have shown that the most important challenges to OER adoption by governments revolves around the lack of convincing evidence on financial sustainability of OER initiatives, financial constraints and technological infrastructure (Atkins et al., 2007; OECD, 2007; McAndrew et al., 2012). For governments to support OER, MOOC and open education initiatives, a sustainable implementation strategy may need to be clarified. In a similar direction, championing the cost reduction agenda may respond to governments' financial constraints. Equally, innovation on the use of existing technologies and upgrading progressively may be a solution to inadequate technological infrastructure.

Barriers that inhibit adoption of OER, MOOC and open educational practices may be roughly classified into two categories: human-controlled barriers and long-term barriers linked to socio-economic development. Human-controlled barriers are the ones that can be addressed by different stakeholders if value is created for all of them to benefit. Addressing those barriers depends on good will of those stakeholders. The lack of recognition of accomplishment from open learning, the lack of quality benchmark and learners' social disempowerment can, for instance, be addressed by institutional leaders and academics. According to Lane, A. (2012), the European Association of Distance Teaching Universities (EADTU) members have started to explore the possibilities of recognising people's informal learning via a cost effective system, the move also envisaged by OERu. Equally, the lack of academics' motivation and the lack of recognition of their open educational practices can be addressed by institutional leaders. Academics and learners can take responsibility to increase their literacies. As for the lack of a supporting policy, this can be

addressed by policy makers if they design a supportive policy that creates value for all involved.

Long-term barriers linked to socio-economic development include the lack of access to technologies for both academics and learners, the lack of comfortable learning environment, financial constraints and inadequate technological infrastructure. There is no immediate solution to such barriers. Living with them, and managing them while learning and supporting learning practices within existing resources may be the way to move forward rather than waiting to address those resources before taking advantage of existing OER and open courses. The following subsection discusses perceived opportunities and benefits that may make the waiting decision costly.

2.2.8 Perceived MOOC and OER opportunities and benefits

In their diversity, MOOCs and OER may have different opportunities and benefits as perceived in the related literature. These courses and resources tend to be seen as transformative thanks to their relative openness and flexibility. In this sub-section, opportunities and benefits from MOOCs and OER are detailed.

a. MOOC and OER opportunities

The support from funders, governments and intergovernmental organisations is one of the opportunities that have been exploited by OER and MOOC advocates. According to Atkins et al. (2007), the Hewlett and Flora Foundation's goal is to catalyse the universal access to and use of high quality academic content. This goal fits within various governments' and organisations' agendas of transitioning toward knowledge-based societies and fostering lifelong learning. Mulder (2007) discussed the European Union (EU)'s preoccupation on encouraging independent learning, the practice that can help many member states across EU to continue the provision of free or affordable higher education in

a cost-effective way. Mulder (2007, p. 1) also argued that OER appear to offer enormous opportunities for widening participation in higher education especially in places where lifelong learning is on agenda. Similarly, Camilleri & Ehlers (2011, p. 4) highlight the potential of OER in increasing education opportunities.

The agenda of widening access to education is an ambition for many governments in both developed and developing countries. As discussed earlier, the Government of Rwanda shares the dream of transformation into a knowledge-based economy. This was outlined in its vision 2020 (Ministry of Finance and Economic Planning, 2000). Unlike European countries, however, Rwanda is under-resourced. Fostering independent and self-determined learning based on OER and open courses can be used as one of the strategies to provide equitable access to higher education in a cost-effective manner. However, this would require positioning the *opening up education* agenda as a driver of the related practices.

Some members of the Commonwealth of Small States have already started exploring using OER to widen education opportunities and improve quality (Lesperance, 2012). Such opportunities have been noted in the Porto Declaration on European MOOCs (EADTU, 2014). In this declaration, the potential of MOOCs to enable open education in a flexible way to achieve equity, social justice, inclusion, lifelong learning and social mobility is perceived as opportunity (p. 1). Signatories of this declaration call for the support from the European Commission and various governments. Briefly, the link of the potential of MOOCs as well as the ethos that underpins the OER movement to many governments' preoccupation of transitioning to knowledge-based societies through lifelong learning constitute an opportunity for MOOC and OER adoption.

Beside the support various OER initiatives have received, the recognition of OER has been exponentially rising. Lane (2010) made observation that governments are aware that OER can improve existing educational system (p. 6). He also made the point that OER are increasingly being politically accepted as education cost reducers, teaching practices

change-makers and participation in education and attainment enhancers (p. 9). This increase of OER recognition has been achieved thanks to the mobilisation of intergovernmental organisations notably UNESCO and COL. According to Wyk (2012), the two organisations expanded OER awareness and encouraged governments and institutions to support OER initiatives. This was accomplished via *Taking OER beyond the OER community: policy and capacity initiative* and *Fostering Government Support for OER Internationally* initiatives.

b. MOOC and OER benefits

OER and MOOCs have also spread thanks to perceived benefits. As discussed earlier, OER are believed to be education cost savers (Jelgerhuis, 2012; Wyk, 2012; Badarch et al., 2012; Lesperance, 2012). MOOCs and OER are freely availability to the end users. Although MOOCs and OER production is costly, their sharing is scalable to a large number of users. For the end-users, MOOCs and OER in themselves are non-rivalrous (Weller, 2011, p. 85) goods: their reach and quality are not affected by the number of users. This is particularly the case for OER and MOOCs that are openly licensed because the content can even be redistributed to reach more learners without affecting the learning of others.

The non-rivalrous aspect of MOOCs that are not openly licensed ends with the user who is enrolled in the course. While the user can use the content for personal purpose, they are not legally allowed to distribute it to other users. OER are also believed to be education quality enhancers (Wyk, 2012; Badarch et al., 2012; Lesperance, 2012; Philips, 2012). Weller (2011, p. 106) argues that OER developed in learning institutions may be of better quality since they pass through a pre-publication quality insurance filter. However, this does not necessarily mean that other materials, including the ones produced by learners may not contribute to quality. Both education cost reduction and quality enhancement have been among perceived benefits from OER and MOOCs.

Beside quality and cost, OER and MOOCs are believed to bring positive attitudinal change. Atkins et al. (2007) argue that the availability of OER would support the creation of the learning culture (p. 35) and this may be the case for MOOCs. This view seems to be shared with Mulder (2007) who argues that the open content enables learners to study flexibly and autonomously without the need for a teacher, a classroom or educational institution (p. 3). Teachers, classrooms and educational institutions can be rivalrous especially in under-resourced settings (Nkuyubwatsi, 2015a; Nkuyubwatsi et al., 2015). If a classroom is built for 50 students, it will only accommodate this number of students. If there are 500 students who need to use it, for instance, 450 of them will have to be excluded. This is the same for teachers especially when they are in face-to-face sessions. Face-to-face lectures can only be addressed to a limited number of students, and this number is very limited if technological resources such as loud speakers are not available.

Beyond the individual levels, OER is expected to bring or facilitate innovation in societies. According to Jelgerhuis (2012, p. 29), OER can play a critical role in the transition to an education system that combines innovation, customisation, and excellent quality. This view is shared with Lane (2010) who states that OER can facilitate changes in educational policies and practices at the benefit of learners, educators and institutions (p. 6). In a similar vein, Badarch et al. (2012) highlight an interest in innovative teaching methods and materials, expansion of resource accessibility to students and colleagues and enhancement of universities' visibility. According to Badarch et al. (ibid), these were some of the key drivers of OER use in many countries that were formerly members of the Soviet Union (p. 30).

Maximising impact on societies has also been noted. The White House's Office of Science and Technology Policy (OSTP, 2013) notes three benefits of OER in the society: the maximisation of impact and accountability for the federal research investment (1), the creation of new business opportunities (2) and the validation of research findings and data sets that underpin scholarly publications (3). Hence, the perception of OER as a pathway to societal impact seems to have been an important trigger of their support and development.

2.2.9 OEP and Mechanisms to foster the uptake of OER and opening up education

OEP was introduced in effort to harmonise OER initiatives and move from the production to the use of the resources to support learning and teaching practices. In the Open Educational Quality Initiative (OPAL) report addressed to policy makers in education, science and technology, Camilleri & Ehlers (2011) argue that OER had been collected in various repositories in fragmented practices. Due to the lack of adequate coordination of OER initiatives, financial resources and time might have been spent to duplicate the production of these resources. Camilleri & Ehlers (2011) suggest having agreed on standards for classification and sharing (p. 11) which would mitigate the duplication expenses.

In addition to the duplication concern, the benefit from OER that had been produced was not reaching the momentum. There has been an increase of OER resources in various repositories and open access journals and their potential benefits were widely perceived. However, the use of these resources had not been growing proportionally (Lane, 2010; Ehlers, 2011; Conole, 2012; Conole, 2013a; McAndrew et al., 2012; Woert, 2012; Ouwehand, 2012). Reasons behind the slow use of OER include the lack synergy between these resources, policies and practices. Moreover, the focus on access and availability rather than the use of OER in learning and teaching has been explicitly associated with the slow adoption of these resources (Ehlers, 2011, p. 1; Camilleri & Ehlers, 2011, p. 4).

After noticing that the OER use does not reflect the amount of resources made available, the issues behind this mismatch were investigated and mechanism to encourage the uptake of the resources was suggested. Ehlers (2011) noted that the use of OER in higher education and adult learning has been low because the focus has been placed on expansion of access to these resources rather than their capability to support educational practices and promote quality and innovation in teaching and learning (p. 1). He calls for a shift from access to quality improvement via open educational practices (OEP). According to Ehlers (2011), focusing on OEP would address the whole OER governance community:

policy makers, organisational and institutional managers or administrators, professionals and learners (p. 3). This view is also shared with Bijsterveld & Dopper (2012) who argue that the success of the transition from OER to OEP depends on policy makers, management, instructors and learners (p. 19). Borrowing and transferring Biggs' (no date, para 1) concept, a collective adoption of OEP would help achieve a "constructive alignment" between policies, institutional mandates, teaching practices as well as learning activities.

As previously discussed, the lack of harmony between policies and practices hinders the benefits from OER. Harmonising policies and practices as well as efforts of different stakeholders notably policy makers, institutional leaders, teachers and learners seems to be the primary goal of OEP promotion. Andrade et al. (2011) argue that the existence of OER policies and initiatives trigger OER use. However, policies and educational practices need to be constructively linked for fruitful OER adoption to happen.

Interestingly, policies and practices in many countries are not conducive to the mainstream adoption of OER and open learning. According to Yin & Fan (2011), most of the existing OER policies are decontextualised. Yin & Fan (ibid) suggest an integration of OER into OEP to maximise benefits from OER. For this to happen, they recommend the adoption of Wiley's (2007) 4 OER Rs model which consists of the reuse, revision, remixing and redistribution of learning resources. Yin & Fan (2011, p. 150-151) also recommend granularity which consists of producing learning resources that are made up of small units that can be broken down and reassembled for use at different time and in different contexts. Moreover, they recommend technological interoperability and open licensing.

The adoption of OER and OEP requires a collective engagement of different stakeholders. Lane (2010) argued that since well-educated and skilled learners are the only ones to benefit from OER, institutions' employees and community members need to be trained to act as mediators between OERs and learners (p. 8). Moreover, teachers need to

develop technical and pedagogical skills to adapt OER from their original format and context (p. 8). Higher education institutions have a central role in developing or sponsoring their staff's participation in such trainings.

The development of competences may have been another driver of OEP promotion. Geser (2007) argued that OERs are a means to an end: the development of competences, knowledge and skills that are necessary for success in a knowledge-based society is the end. The author groups competences which learners should learn into three pairs notably self-direction and creativity (1), critical thinking and problem-solving skills (2) as well as collaborative team-work and communication skills (3) (p. 16). He then highlighted eight domains of competences identified in the European Commission's framework for key competences for lifelong learning. These domains include communication in the mother tongue (1), communication in a foreign language (2), mathematical literacy and basic competences in science and technology (3), digital competence (4), learning to learn (5), interpersonal and civic competences (6), entrepreneurship (7), and cultural expression (8) (Geser, 2007, p. 39). Briefly, OEPs promote not only the use of OER, but more importantly, the development of the 21 century competences and skills.

2.2.10 New business models

The expansion of OER, and recently MOOCs, triggered the need for new business models. Most of the models were thought of to address the sustainability of OER and MOOC practices. Downes (2006) defined sustainability as long-term viability for all concerned. According to Janssen & Schuwer (2012), business models that have been presented so far are not convincingly responding to the sustainability puzzle. As OER and MOOCs keep growing, the quest for sustainable business models goes on. Jelgerhuis (2012, p. 31) identifies business models among the key pillars of OER, and this is likely to be the same for MOOCs. This section surveys various business models that have been discussed in the OER and MOOC literature.

The first business model consists of an open licence that prohibits the commercial use of the materials. According to Fitzgerald (2007, p. 12), this business model requires a commercial contract and the payment of licence fee for the commercial use of the materials. The permission for free use of the materials for non-commercial purpose is automatically granted as advertisement strategy. When businesses are convinced that the materials can enhance their commercial activities and want to use them for this purpose, they then pay the licence fee for the commercial use.

Another business model highlighted in Fitzgerald (2007, pp. 12-13) is the inclusion of advertisement of commercial products in electronic materials copyrighted under Creative Commons licences. This advertisement attracts attention of the users of the openly licensed materials to the promoted products. A click on the promotion link activates a revenue stream and if this leads to purchase, the creator of the openly licensed materials receives a share.

The third business model consists of making materials publicly available in one format or version while there is a different commercial version. Janssen & Schuwer (2012, p. 63) highlighted two examples of the application of such model. In the first example, *Connexions* (http://cnx.org/) provides a platform for sharing OER in electronic format. The company's benefit lies in the legal authorisation to print out and sell hard copies of the resources uploaded on its platform. In fact, the printing services are provided on demand and are paid for, and this helps the company to generate some income. As for the second example, *Flat World Knowledge*, a commercial publishing company, makes one version of all its publications openly available alongside other versions which have to be purchased.

Alternative practice of this model consists of releasing parts of courses as OER to attract independent learners to the paid complete versions. Didderen & Verjans (2012, p. 11) refer to this strategy as an "extensive teaser". According to Weller (2014), many universities are engaging in OER production and policy development not only for altruistic reason, but also for brand awareness, marketing and recruiting students. Releasing part of

courses as OER or MOOCs would help institutions market the full versions of the courses and recruit fee paying students. Downes (2006) refers to this model as the *conversion model*.

The fourth business model consists of providing OER and MOOCs for free but generating income from those who want to get certification. The model can be applied in different ways. Through its OER initiative known as FlexiLearn, Indira Ghandi National Open University (IGNOU) provided learning materials integrated with a learning management system in free course formats for personal learning at no cost (Harishankar, 2012, p. 51). In addition to materials, assessment services were provided for free. For certification, however, learners paid the course fee.

Coursera has closely related business models widely known as *specialisation* and *signature* track. This platform offers MOOCs for free. However, learners who want to have verified certificate take the MOOCs in the signature track and pay some fee. A set of courses in the same field taken within the signature track can lead to a certificate of specialisation. Many courses that are part of specialisations do not offer a free statement of accomplishment. Similarly, FutureLearn does not provide any free statement of accomplishment on its MOOCs. Instead, this company awards statement of participation at a relatively lower fee when compared to a statement of attainment by exam which cost much higher. Charging certification fee was also considered by Jacobi (2012, p. 57) as one of the strategies to run funded OER initiatives beyond their funding periods. Hence, this model might be widely used in the future if no other sustainable business models on OER and MOOCs emerge.

Sponsorship is the fifth OER business model discussed in the related literature. According to Downes (2006), this model consists of the provision of open access via TV, radio and other media with possibility for the sponsor to add intrusive marketing messages. Some technology companies, including Microsoft and Google, have already started sponsoring Udacity courses that respond to their skill needs (Ripley, 2012; Sloan, 2012). In

the first year of its launch, Udacity raised $15 million or more (Sloan, 2012). Sponsorship from governments and foundations was considered as one of the possible sources of revenue by OERu members (Witthaus, 2012). Since OER and MOOCs are inherently free of charge on the part of learners, this business model is likely to be practical and create value in countries where education is provided to citizens free of charge.

The sixth OER and MOOC business model consists of the commercialisation of various services to OER and MOOC learners. Some of the services that can be sold such as assessment and credentialing services have been mentioned under the third business model. In addition to those services, tests, guidance, additional content and explanation can be paid for or provided for free (Jacobi & Woert, 2012). Although the list of business models that might accrue from the release of OER and MOOCs is still not exhaustive, positive expectations are growing. In the memorandum that promotes public access to results of federally funded scientific research mentioned earlier, OSTP (2013, p. 3) stipulates that new business opportunities can be created from this openness. It encouraged federal agencies to set up policies that maximise business creation potential. Despite these expectations, the commercialisation of services to OER learners still needs to be refined.

The seventh business model relates to staffing. It consists of the use of volunteers. Downes (2006) highlights the role of volunteers and the necessity to support their motivation to share. He points out that Multimedia Educational Resources for Learning and Online Teaching (MERLOT) uses the volunteer model but the contributions are peer-reviewed prior to publication. He also highlights that Wikipedia has relied on only two employees while it published over a million articles in various languages. He recommended using volunteers, a call that seems to have been heard by the OERu. According to Witthaus (2012), OERu considered using volunteers referred to as ‘Academic Volunteers International’ (AVIs) in order to support OER learners. Volunteers also play various roles in MOOCs including translation of MOOC contents into various languages.

The final business model discussed in this section is the commercialisation of information about learners who enroll in various MOOCs. This business model is discussed in a couple of MOOC related literature notably Mazoue (2013), Pérez-Peňa (2012) and Ripley (2012). According to the authors, Coursera and Udacity identify highly needed skills and broker them to business companies. Coursera exploits this model via its career service link (Mazoue, 2013) and *Signature track* option. In a similar vein, Udacity has developed an employer-connection programme in which students enroll for their CVs to be shared with employers (Ripley, 2012). This business model seems to be beneficial to all parties involved. Students are offered a free system to showcase their skills to potential employers. On their part, employers easily identify talented people who adequately fit in their vacant positions. As for MOOC providers, they are paid by employers for any recruitment made via their systems.

According to Ripley (2012), 3000 learners and 350 companies were using the Udacity's employer connection program in October 2012. Given that this enrolment was only ten months after the launch of the company, this business model seems to have been productive. It is still early to accurately estimate the productivity of this model though.

To sum up, different business models have been attempted: open licence that prohibits the commercial use of the materials (1), advertising through electronic openly licensed materials (2), having multiple formats (and versions) of the content and making some open while others are commercial (3), provision of content for free and charging on certificates (4), the sponsorship model (5), provision of free learning content and charging on different services (6), the volunteer model (7) and the commercialisation of information on enrolled learners (8). All these models have been experimented and none of them seems to have addressed the sustainability issue that dominated the debate on MOOCs, though this can be arguably depend on agendas of different players. It is also worth noting that some business models such as commercialisation of information on enrolled learners pose ethical issues and may remain controversial in the open education debate.

2.2.11 OER, MOOC and Open Distance and eLearning (ODeL) initiatives and projection in Rwanda

Different OER, MOOC and open, distance and eLearning (ODeL) initiatives have been undertaken in Rwanda although their widespread impact is not evidenced yet. This subsection looks into those initiatives.

a. OER initiatives

A number of OER initiatives have been reported in Rwanda. *Rwanda Education Commons,* an initiative that was aimed as a pathway for teachers' professional development via ODeL (Ministry of Education, 2010, p. 14) is one of endeavours to develop and promote the use of OER in Rwanda. Teacher Education in Sub Saharan Africa (TESSA) is another OER initiative (Wolfenden, 2012; Wolfenden & Laidlaw, 2011) that has been hosted by a higher education institution in Rwanda. According to Wolfenden & Laidlaw (2011), the International Education Exchange, a non-governmental organisation, has worked with Kigali Institute of Education (the current University of Rwanda's College of Education), to disseminate TESSA OER materials (p. 13). TESSA OER content has also been adapted and used in conventional Bachelor of Education programmes at the institution (Wolfenden & Laidlaw, 2011, p. 80). However, evidence of the impact of the use of these OER materials for opening up higher education is lacking. The TESSA Coordinator at Kigali Institute of Education mentioned that the uptake of these OER materials was not at a large scale (Wolfenden, 2012, p. 100).

b. MOOC initiatives

Some Rwandans participate in MOOCs as learners though not as many as learners in developed societies. In addition to this participation on individual initiative, Generation Rwanda, via its Kepler "University" initiative (Baltholet, 2013; Leber, 2013; O'Neil,

2013), use MOOC content from different platforms in its campus-based education initiative. Computers with downloaded MOOC materials are provided to students. Alternatively, students access MOOCs using the Internet accessible at the Kepler "University" headquarters. This initiative builds on resources that the target learners do not have access to, and most of the learners cannot afford them. Moreover, Kepler "University" students are required to be based at the Kepler's physical headquarters where they have accommodation.

While MOOCs taken in well-resourced settings are non-rivalrous, the Kepler "University" MOOC learning opportunities are highly rivalrous as other funded higher education opportunities in Rwanda. In the first Kepler "University" intake, 2696 applications were received for only 50 slots that were available (Baltholet, 2013). According to Orme & Root (2015), around 6700 applications were submitted in 2015 and only 150 applicants would be selected. This rivalry is due to the conversion of MOOCs into the face-to-face higher education mode.

Face-to-face education is naturally rivalrous in that it relies on physical infrastructure and face-to-face instruction which are highly rivalrous. The more education relies on these rivalrous resources, the higher the cost. Kepler "University" estimated the charge per student to be between $1000 (Kamenetz, 2013) and $1500 (Leber, 2013). This fee is much higher than tuition fee in the conventional higher education. In existing public higher education institutions, tuition fee is Rwfr 600,000 (approximately $870) while in private institutions, the fee can be as low as Rwfr 450,000 (about $652).

c. ODeL initiatives and projection

Open, distance and eLearning programmes are among key priorities in the Education Sector Strategic Plan 2010-2015 (Ministry of Education, 2010, p. 14). The executive summary of the *Seven Year Government Programme* (7YGP) states that 50 per cent of higher education and 30 per cent of secondary education are supposed to be offered

via Open, Distance and eLearning by 2017 (Government of Rwanda, no date, p. 166). Current practices and attitudes do not, however, promise that this plan will be reached by 2017.

Distance learning has already been provided for in-service education of teachers and nurses. Kigali Institute of Education, for instance, has been offering distance learning for more than 10 years. However, this offering has been too low to respond to the growing demand for access to higher education in Rwanda. This is mainly due to the fact that, distance learning programmes tended to rely more on face-to-face instruction offered at different learning centres to a limited number of participants. The over-reliance on teacher-led instruction inhibited the scalability of distance learning programmes in Rwanda.

The need for expansion of ODeL in Rwandan higher education has increasingly been perceived as solution by different stakeholders in Rwanda, especially in academics and policy makers. In September 2014, the Higher Education Council (HEC) launched a call for consultancy to develop a strategy to deliver academic programmes via ODeL (Higher Education Council, 2014). In this consultancy, the HEC outlines the intention in three points:

- Adopt ODeL at the rate of 50 per cent in conventional tertiary education
- Provide an opportunity to potential students who have not been included in the conventional higher education due to family and professional commitments
- Find an alternative cost-effective academic pathway for students who cannot afford expensive conventional academic programmes.

Despite these initiatives, there have been concerns about ODeL development in Rwanda. Among these concerns are inadequate resources such as the low level of electricity coverage, inadequate Internet connectivity and experts in the field that are not many in Rwanda. With these challenges, it may be more reasonable to build on existing resources and upgrade progressively. Some Rwandan students have already been successful in using these limited resources and excel in online postgraduate programmes

offered by universities in well-resourced countries. One of such students who completed a postgraduate online programme at the University of Leicester is featured in Chapter 6.

2.2.12 Pedagogies for MOOCs, OER and open education

Technology enhanced learning, distance learning, and their descendants: OER and MOOCs, expanded perspectives on pedagogies and learning theories. Anderson & Dron (2012) discuss what they call three generations of technology-enhanced teaching which are cognitive/behaviorist (1), social constructivist (2) and connectivist (3). However, all learners do not necessarily learn in accordance with all these three generations of pedagogies, or exclusively with one of them. Fini (2009) argues that learners participated in the first MOOC, *Connectivism and Connective Knowledge*, in a number of ways according to their learning styles, personal objectives and time available to them. He also highlights that the choice of the right tool depended on each user's need, purpose and self-organisation skills (p. 19).

Pedagogies and learning theories tend to be linked to perspectives promoted in different regions, times, disciplines and sub-disciplines. Kop (2011) identified two traditions in education which have different emphases and tend to inform the bias in theories and pedagogies. The first tradition focuses on engagement with resources and the second one emphasises communication and interaction between people (p. 19). Taking into considerations these two biases, different pedagogies that emerged in the literature on OER and MOOCs are discussed.

a. Behaviorism

Promoters of behaviourism claim that learning occurs when learners adopt new behaviours or demonstrate behavioural changes as a result of their response to stimuli (Anderson & Dron, 2012, p. 3). In the behaviourist pedagogy, rules that inform the

teachers' manipulation of the learning environment are set up (Bell, 2011). Early authors on MOOCs tended to associate xMOOCs with behaviourism (Bates, 2012; Daniel, 2012) under assumption that these courses rely on information transmission. Alternatively, xMOOCs were associated with cognitive-behaviourism (Rodriguez, 2012). However, evolution of these MOOCs has indicated that such a generalisation on these courses is too simplistic. Some MOOCs hosted in xMOOC platforms are more structured as cMOOCs and rely on a combination of pedagogies (Nkuyubwatsi, 2014a, Nkuyubwatsi, 2016).

MOOCs are taken by a diversity of learners who are not necessarily limited to the course designers' bias or perspectives when they learn. These learners may learn within one or both perspectives (Kop, 2011): Regardless of how the course designer want learners to learn, some learners may benefit from engaging more with learning resources, others from engaging more in MOOC communities and others from a balance between engaging with learning material and engaging in course communities. None of the two biases/perspectives is necessarily superior to the other. Therefore, a balance between these perspectives may help learners benefit more from the courses than if they are forced to exclusively rely on learning promoted by advocates of either of the two perspectives.

b. Interaction equivalency theorem

The interaction equivalency theorem (Anderson, 2003) builds on Moore's (1989, n. p.) three types of interaction that enable distance learning: student-content interaction (1), student-teacher interaction (2) and student-student interaction (3). Anderson (ibid) argues that there is no single medium that supports the educational experience in a manner that is superior in all ways to that supported via other media. In his interaction equivalency theorem, he depicted the role of three types of interaction in the learning process. The theorem postulates that

> Deep and meaningful formal learning is supported as long as one of the three forms of interaction (student-teacher, student-student and student-content) is at a high

> level. The other two may be offered at minimal levels, or even eliminated, without degrading the educational experience. High levels of more than one of these three modes will likely provide a more satisfying educational experience, though these experiences may not be as cost or time effective as less interactive learning sequences.
>
> Anderson (2003, p. 4).

The author also notes that teacher-student interaction is the least scalable but can be transformed into learning objects (p. 5). An interactive video recorded by the teacher may be an example of conversion of teacher-student interaction. The conversion of teacher-student interaction into a learning object arguably leads to an overlap between the converted teacher-student interaction and student-content interaction. Anderson (ibid) also highlighted that high level of interaction requires active engagement of the actors (p. 6). The interaction equivalency theorem seemingly accommodates both biases discussed by Kop (2011): communication/interaction between people and engagement with resources. This inclusive aspect of the theorem makes it applicable in diverse settings: well-resourced and under-resourced, and learners with different learning preferences may find value in it.

c. A pedagogy of abundance/open pedagogy

The pedagogy of abundance is enabled by the fact that sharing a copy of a digital material does not affect the availability of the originally uploaded file. This is what Weller (2011, p. 85) refers to as a *non-rivalrous* aspect of online resources discussed earlier. According to Weller (2011), pedagogy of abundance is characterised by open, abundant, varied user-generated and easily shareable content, social and light networks which are cheap to organise and generative systems which are free and unpredictable (pp. 90-91). Weller (2014) expanded the pedagogy of abundance into *open pedagogy* (p. 11). Open pedagogy may consists of practices that enable learners' creation of artifacts, learners' suggestion of assignments, learners' establishment of their own online space and learners' participation in a continuing global community of learners and experts.

Pedagogy of abundance/open pedagogy finds its application in some distance learning programmes and recently in MOOCs. Mapping pedagogy of abundance on the two biases (Kop, 2011), this pedagogy seems to have a slight inclination towards communication and interaction between people but it does not necessarily exclude individual engagement with learning resources. Therefore, it can still be adapted for various settings and can make value to learners with diverse learning preferences.

d. The connectivist pedagogy

Connectivism is a learning theory that was recently promoted by Canadian academics. Anderson & Dron (2012, p. 8) see connectivism as the first native distance education pedagogy. Early pioneers of this theory are George Siemens and Steven Downes, the designers and facilitators of *Connectivism and Connectivist Knowledge* widely known as the first cMOOC.

Siemens (2005) discusses three most frequently used learning theories in the creation of learning environments: behaviourism, cognitivism and constructivism. According to the author, the three theories fail to address learning that is stored and manipulated by technology and to describe how learning happens within organisations. He argues that competence is developed via connections and that the capacity to form connections between sources of information, and thereby create useful information patterns, is required to learn in knowledge economy. He highlights that connectivism integrates principles explored by chaos, network, complexity and self-organisation theories and outlines leading principles of connectivism:

- 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.

Connectivism has been criticised for its lack of enough evidence to be classified as a learning theory. According to Bell (2010) and (2011), connectivism alone is not enough to inform learning and its support by technology in a networked world. She notes that connectivism lies on a diversity of theories of learning, education as well as knowledge philosophy and management (Bell, 2010, p. 529). In a similar direction, Weller (2011) acknowledges that connectivism is not yet fully developed as a pedagogic theory (p. 94).

Moreover, connectivism has many limitations related to its high demand on the part of learners. Kop (2011) argues that connectivist learners need to be self-directed, highly motivated and develop critical literacies for a high quality learning experience to occur. In her study on *Critical Literacies* (CritLit) and *Personal Learning Environment, Network and Knowledge* (PLENK) (two cMOOCs that were offered in 2010), she observes that social presence was a motivator to learners. However, she also notes that the majority of learners did not achieve a satisfactory level in the four types of activities that are characteristic to connectivism mainly aggregation, relation, creation and sharing. Another limitation of connectivism relates to its reliance on assumption of ubiquitous access to networked technology (Anderson & Dron, 2012). According to Anderson & Dron (2011, p. 90) and Anderson & Dron (2012, p. 8) connectivism risks to result into attrition for the majority of learners, the danger referred to as the “Matthew Principle” in which the rich gets richer and the poor gets poorer.

Similar concerns were expressed by Mackness et al. (2010) who argue that dynamics of connectivism are both enablers and inhibitors for learning in a MOOC

designed on the basis of connectivist principles alone (p. 271). The authors note mixed reactions from learners who participated in *Connectivism and Connective Knowledge*: Positive and stimulating on the one hand, frustrating and negative on the other. The level of autonomy provided in this MOOC was not appreciated by many learners who rated the amount of support too little. The authors also contend that meaningful connectedness and interactivity are difficult to achieve with a huge number of participants (p. 272). Therefore, connectivism may be responding to advanced learners' needs, mostly those who prefer information exchange and building connections as a learning style. Mapping it on the two biases (Kop, 2011), connectivism leans more on communication/interaction between people. However, it does not exclude engagement with learning resources in that one of its principles acknowledges that learning may reside in non-human appliances.

In short, open, distance learning, OER and MOOCs have been associated with different pedagogical and learning perspectives: behaviourism, interaction equivalency theorem, pedagogy of abundance (also known as open pedagogy) and connectivism. Many of these theories triggered debates on whether they are established theories. Beyond pedagogy, there is andragogy that champions the inclusion of adult learners' input in the learning design and heutagogy that shifts attention from teachers to learners as key agents in educational transformation. Andragogy is discussed briefly as a transition to heutagogy that has a critical position in the current study.

2.2.13 Andragogy

Andragogy is a teaching approach for adult learners as opposed to pedagogy, a teaching approach for young learners. Andragogy promotes self-directed learning (Knowles, 1975, cited in Blaschke, 2012). According to Blaschke (ibid), the teacher's role is tutoring or mentoring in andragogical approach. The provision of support to learners in developing the capacity to become more self-directed in their own learning is one of the important aspects of tutoring or mentorship. The tutor/mentor design learning objectives

and curriculum based on the learners' input and guide learners in the learning process, but the learners are responsible for their own learning (Blaschke, ibid). In andragogy, adult learners' prior knowledge and experience are acknowledged, validated and appreciated.

Andragogy has often been seen as a transition from pedagogy which underpins teacher-supported learning to heutagogy which is at the heart of learning undertaken by learners as key agents in their own educational transformation and destiny (see Figure 2.5). However, learning does not necessarily happen in a linear evolution from pedagogy, through andragogy, to heutagogy as it will be discussed under the subsection dedicated to heutagogy. In the current study, more attention is paid to pedagogy and heutagogy.

2.2.14 Heutagogy: A transformative learning approach in the MOOC and OER era

Heutagogy, also referred to as self-determined learning, is a learning theory/approach that was pioneered by Hase & Kanyon (2001) who discuss its implication in higher education and vocational education. According to Hase & Kanyon (ibid), the role of teachers should be the provision of resources and that of learners should be the actual design of courses they want to take. In this design, learners negotiate learning and assessment for addressing the problem that matters to them. Hase & Kenyon (2001) encourage teachers to relinquish power to learners. However, response to this call may have not been satisfactory. According Blaschke (2012), heutagogy did not attract extensive attention in academia due to many reasons including the reluctance to give away some power to learners.

With MOOCs, OER and open education, the power and control on learning tend to be more distributed. Stewart (2013, p. 235) argues that the central position and power of the teacher disappears as the number of students grows. Similarly, the monopoly of teachers and institutions over educational resources has decreased thanks to increased availability of open content, MOOCs and technological innovations (Barber et al., 2013;

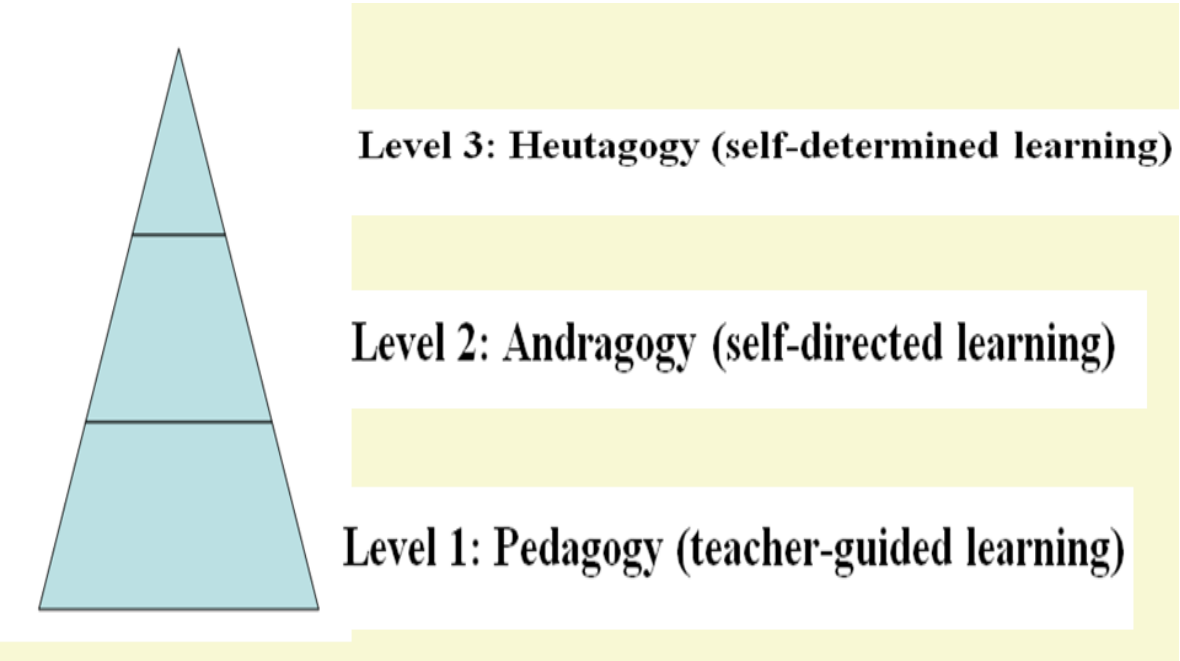
Nkuyubwatsi, 2014c). Heutagogy gained increasing attention in the literature on MOOCs (Beaven et al., 2014; Gazi, 2014; Yildiz et al., 2014; Nkuyubwatsi, 2015a). Equally, social media accelerated the growth of heutagogy, its debate and practices. A global *Heutagogy Community of Practice* is established and active on social media: LinkedIn, Facebook and Twitter.

Some authors consider heutagogy as a shift of power to the learner as a decision maker and key agent in her/his own transformation through learning as opposed to andragogy and pedagogy that may position the teacher as an important agent for enabling learning. According to Anderson (2010), heutagogy renounces the dependency on teachers promoted by pedagogy and andragogy. Self-determined learners also referred to as heutagogues demonstrate both competency and capability through self-awareness, self-directed investigation in developing independent ideas, and self-confidence (Canning & Callan, 2010, p. 80). In addition, these learners make decision on their own learning, manage themselves, their relatives, their friends and their time for their successful learning. Heutagogues in least resourced settings who do not have access to teachers or who cannot afford conventional education decide to learn on their own. Such a decision has enabled some heutagogues in Rwanda to migrate socio-economically and have access to formal higher education, the opportunity they had not had otherwise.

Blaschke (2012) argues that pedagogy and andragogy help develop knowledge, skills and competences that can be used in a familiar situation and heutagogy helps in the development of capabilities that can be reproduced in unfamiliar situations. She highlights that capability is an extension of one's own competence, and without competency there cannot be capability. This perspective concurs with other authors who see heutagogy as a further development on learners' maturity and autonomy. Canning (2010) sketches this development in three stages that start from self-confidence (1) that begins under a pedagogical support. This self-confidence evolves to a shared meaning and understanding (2) which is enabled by andragogy. This development culminates into investigation of own learning (3) which is developed by heutagogical practices. Figure 2.5 encapsulates this

evolution. Based on Canning's (ibid) framework of development from pedagogical level to heutagogical level reflected in Figure 2.5, Blaschke (ibid) highlights that instructor's control and course structuring level required in pedagogy are not required in heutagogy. Conversely, learner's maturity and independence required in heutagogy are not necessary in pedagogy.

Figure 2.5 Evolution from pedagogy to heutagogy (adapted from Canning, 2010, p. 63)



It is worth considering that learning does not necessarily always follow a lineal pathway depicted in Figure 2.5. Hockings et al. (2012) argues that "students also bring with them alternative approaches to knowledge and learning" (p. 239). In a similar direction, Jacobi & Woert (2012) assert that learners who are driven by interest and passion can choose the package of their learning rather than having institutions choosing for them. Heutagogy is compatible with either of the two biases/perspectives (Kop, 2011) discussed earlier: heutagogues can benefit from either intensive interaction with the learning content or interactions with other learners, especially when they participate in learning communities mediated by social media.

Equally importantly, heutagogy and pedagogy are not necessarily mutually exclusive. In many cases, heutagogy builds on different pedagogical resources (Nkuyubwatsi, 2015a, Nkuyubwatsi et al., 2015): learning content often produced by instructors, open education services, etc. Rwandan non-formal learners who were dedicated in their preparation for national exams learned independently using notes which had been produced by their former teachers or their collegue's teachers (those who borrowed notes from colleagues). Therefore, their heutagogical investment was based on pedagogical resources although they did not have access to teachers.

The investment of heutagogical resources can lead to acquisition of other resources needed in education that would not be obtained otherwise. That was the case for dedicated non-formal learners who, as result of scoring above the cut-off point in the national exams, won student loans for their undergraduate education. Their heutagogical investment led to acquisition of financial resources (student loans) they would not access otherwise, and consequently, pedagocical resources that were available in public higher education institutions. Since these learners were underprivileged and could not afford higher education, these pedagogical resources could not have been accessible to those learners without student loans, provision of which required scoring above specific cut-off points.

Briefly, heutagogy/self-determined learning emerged in the literature on education and learning around 2001. This learning approach/theory finds its practical application in learning from OER and MOOCs where the instructor's presence is minimal. Heutagogy positions learners as key agents in their educational transformation, but this approach has not been given enough attention. Some pioneers argue that this is because of reluctance to give away some powers to learners. Despite this reluctance, underprivileged non-formal learners in Rwanda who learned on their own in order to score above cut-off points in national exams in quest for student loans (see Chapter 1) constitute typical examples of heutagogues. The concept of heutagogy is explored more in Section 2.2.19 and Chapter 8 Section 8.1.

2.2.15 OER, MOOCs, quality and qualification/accreditation framework

The issue of quality has attracted extensive attention in the OER and MOOC literature. While the perceived potential of OER and MOOCs in the improvement of quality of education has been one of the key drivers of their rapid development, quality concerns have also been voiced. In this section, various aspects of OER and MOOC quality, qualification and accreditation frameworks covered in the literature are critically discussed.

a. OER, MOOCs and quality

Quality has been one of the most controversially debated aspects of OER and MOOCs. The provision of universal access to high quality academic content and courses has been advanced as the rationale behind OER and MOOC (Atkins et al., 2007, Koller, 2012). Badarch et al. (2012), Lesperance (2012) and Wyk (2012) concurred that OER may contribute to the improvement of the quality of education. Some organisations have put the provision of assistance in quality assurance through OER on their agendas. The Open Educational Resources Foundation, for instance, claims that it provides assistance in improving the quality of education through the implementation of OER (Open Educational Resources Foundation, 2012).

For OER and MOOCs to be of high quality, they may need to be subjected to same or similar standards as other learning and publication materials. Some OER have indeed gone through this scrutiny. This is the case of journal articles published in blindly peer-reviewed open access journals. For MOOCs, those that use the same content provided to registered students for credit at the offering university (Blom et al., 2013; Thrun, 2012) can be trusted to have been carefully checked for quality. This is the same for MOOCs offered within the agenda of attracting learners to fee-bearing courses at the providing university: Arguably, an offer of poor quality MOOCs would lead to the target learners' loss of

interest in the university rather than attracting them. Hence, the use of OERs and MOOCs in the mainstream education at the institutions that produced them, and using these resources and courses to attract students to the institution hint to quality check of those resources and courses.

OER quality assurance has been identified as one of the key priorities by the global OER community (D'antoni, 2008, D'Antoni, 2009). Low quality has been reported as one of the key reasons behind OER low uptake (Atkins et al., 2007, McAndrew et al., 2012). MOOCs have also faced criticisms related to low quality (Armstrong, 2012; Daniel, 2012; Edmundson, 2012; Mazoue, 2012; Pérez-Peňa, 2012), mainly due to limited tutorial support. However, the learning quality in MOOCs depends enormously on how learners engage with these courses. According to Wordsworth (2014, p. 209), motivated learners engage deeply with their learning and "are committed to learning and push hard to complete assignments at the highest possible level of quality".

Various suggestions and guidelines have been provided to ensure OER quality. Hylén (no date) suggests using internal quality check, peer-review and user comments as ways of OER quality management. Achieve (2011) proposes eight rubrics to rate the potential effectiveness of OER in a learning environment. The rating on those rubrics is based on a five point Likert scale that has superior, strong, limited, very weak/none or non applicable as the rating options. The eight rubrics are used to rate the degree of alignment with standards (1), the quality of explanation of the subject matter (2), the utility of the materials designed to support teaching (3), the quality of assessment (4), the quality of technology interactivity (5), the quality of instructional and practice exercises (6), opportunities for deeper learning (7) and the assurance of accessibility (8). Hence, some efforts were made to ensure quality in OER.

b. OER and qualification framework

The integration of OER practices in the broader education system is critical for the general uptake of these resources. Lane & Van Dorp (2011) highlight that adult learners want to have their informal learning converted into formal credits, certificates and qualifications. They suggest a framework based on availability, accessibility and acceptability to understand the role of OER and open and distance learning in widening participation. While availability refers to the release of OER and open courses in the websphere enabled by technology infrastructure and open licensing, the accessibility issue discussed in Lane & Van Dorp (2011) reflects restrictions caused by the digital divide and lack of recognition of OER learning. Acceptability relates to engagement with the materials which, according to the authors, often requires support from teachers or a more experienced peer and is affected by *social disempowerment* discussed earlier.

OER have been integrated in qualification framework in India (Harishankar, 2012) and the Commonwealth of Small States (Lesperance, 2012). In most of the cases, however, this integration has been an initiative of single institutions in these countries. In India, OERs that are suitable for various qualifications from certificate to postgraduate degrees and assessment services were provided free of charge at Indira Gandhi National Open University (Harishankar, 2012). However, learners paid the course fee to get certificates (Harishankar, ibid, p. 51).

At the Virtual University for Small States of the Commonwealth (VUSSC), a transnational qualification framework was created (Lesperance, 2012, p. 169, D'Antoni, 2009, p. 9). Then, OER were developed, shared and used among subject specialists from the member countries. These educators collaborated to create education opportunities, improve quality and lower education cost using various strategies including OER capacity building, creation and use (Lesperance, 2012, p.170). OER-based courses and resulting qualifications may be recognised within the small states and internationally, according to

the author. This practice was at the heart of the OERu network vision when discussions to start this network were undertaken.

c. MOOCs and accreditation framework

Many MOOC providers are not indifferent to the need for credit for some MOOC learners. According to Coursera (2013), the American Council on Education's College Credit Recommendation Service (ACE CREDIT) evaluated five of its courses and recommended a college credit. Coursera (2013) also expressed its commitment to seek accreditation for more of its courses and work with a third party to provide invigilation services on exams. Kolowich (2012) reports a similar practice in which Coursera and Antioch University came to agreement that enables the latter partner to use versions of Coursera MOOCs for credit.

More openness to offering credit on learning accomplished via MOOCs was reported across Europe. According to Blom, et al. (2013), students at École Polytechnique Fédérale de Lausanne were required to engage in additional collaborative learning undertaken in small campus-based study groups in order to gain credit in MOOCs offered by this institution. Many institutions across Europe have also been awarding the European Credit Transfer System (ECTS) credit on MOOCs. The Università Telematica Internazionale UNINETTUNO offers ECTS credit on its MOOCs featured on the OpenupEd portal. To be awarded ECTS credit, these MOOC learners have to enrol in a corresponding on-campus course and pay full tuition fee. In Germany, the University of Osnabrück and the Lübeck University of Applied Sciences have also agreed to offer ECTS credit to Iversity MOOC students who take and pass an on-campus exam (Parr, 2013). MOOC learners who want credit from the two universities pay only examination processing fee (Iversity, 2013). The University of Nicosia in Cyprus was planning to start a Master of Science in Digital Currency in 2014. The first course in this master's programme (*Introduction to Digital Currencies*) was planned to be a MOOC which would contribute 10 ECTS credits for students who successfully completed it (University of Nicosia, 2014).

ECTS credit offered on learning accomplished via MOOCs after invigilated exams (Kopp et al., 2014) or through existing Recognition of Prior Learning (RPL) system (Kjeldstad et al., 2014) was also recommended in Austria and Norway respectively. In the "Mapping the European MOOC Territory" conference organised by the HOME partnership and EADTU, many participants seemed to see ECTS as a unique opportunity for Europe to benefit from MOOCs and open education. ECTS credit on learning accomplished via MOOCs across Europe would help European countries maintain their tradition of provision of tertiary education free-of-charge or at a low price in a cost-effective way.

The most drastic milestone in the provision of credit on learning accomplished via MOOCs is probably the Masters' Degree in Computer Science entirely based on MOOCs at Georgia Institute of Technology (New, 2014). Students in this MOOC-based Master's Degree programme only pay about $6600 (Lewin, 2013; Kahn, 2013) as opposed to $25,000 (in-state tuition fee) or $60,000 (out-of-state tuition fee) paid by campus-based students for the same degree (Dodson, 2013). In other words, these MOOC students will earn the same degree as on-campus students, but they will pay only 26.4 per cent of in-state tuition fee paid by on-campus students or only 11 per cent of the out-of-state tuition fee paid on the same qualification awarded via the campus-based programme. More developments on credit on learning accomplished via MOOCs are probably yet to come.

2.2.16 Consensus, controversies and gaps in the literature

There are consensus, controversies and gaps in the literature on OER and MOOCs. The low level of adoption of OER in the mainstream education (Atkins et al., 2007; Lane, 2010; Andrade et al., 2011; Conole, 2012; Conole, 2013a; McAndrew et al., 2012; Ouwehand, 2012; Woert, 2012) tends to be commonly agreed on. The spectacular development and scalability of MOOCs, and their contribution to raising awareness on open, distance and eLearning (Weller, 2014) are also generally agreed on. In a similar direction, reports that have so far been produced on MOOCs unanimously point out that

these courses have been beneficial mostly to learners from developed countries, especially the ones who already have bachelor's degrees or higher qualifications. The lack of sustainable business model is another point of consensus in the literature on both OER and MOOCs.

Alongside these points of consensus are controversies. The quality of MOOCs and OER is still disputed, and the controversies also exist among MOOC learners: enthusiasts positively report on MOOCs while sceptics are frustrated by issues related to access, quality, lack of credit, etc. (Haggard, 2013). The *open* aspect of MOOCs has also been an issue of controversies with a diversity of meanings and degrees of openness in these courses. There are also controversies on agendas behind OER and MOOCs, with the plan to expand monopoly and cultural hegemony among the most suspected plots (Liyanagunawarderna et al., 2013; Sharma, 2013, EADTU, 2014; Atenas, 2015). Equally, the provision of credit on learning accomplished via MOOCs and OER is still disputed.

Despite consensus and controversies in the literature, research in the field of open, distance education, OER and MOOCs still has a gap that needs to be filled. The lifelong learning agenda informed most research studies in these fields, not least because most of those studies have been conducted in societies that champion this agenda. Research studies informed by the open access/opening up education agenda are needed to inform policies and practices in societies where this agenda is still relevant and are under-represented in the related literature. This under-representation is disproportional to the demand of related practices that would respond to the issue of an enormous number of learners who have not been serviced by higher education systems in those settings.

Briefly, the literature tends to agree on that the development of OER and especially MOOCs have been phenomenal. However, many issues such as quality and different agendas in related practices are still controversial. Those consensus and controversies are mainly based on the literature produced in well-resourced societies that may have shifted

towards the lifelong learning agenda. Under-resourced societies in which the open access agenda is very relevant are under-represented in the related literature.

2.2.17 Trends in MOOC, OER and open education research

The increasing spread of OER and MOOCs may have transformed how learning, is perceived and how open learning materials and courses are used. Self- directed learning (andragogy) and, especially, self-determined learning (heutagogy) seem to be gaining more space in educational research and practice. MOOCs that are scalable with impossibility to provide personalised tutorial support to anyone enrolled and the growth of social media have arguably contributed to the increase of interest in heutagogy. There have been a number of MOOC publications that discussed heutagogical practices. There is also a *Heutagogy Community of Practice* that discusses related practices via social media, mainly LinkedIn, Facebook and Twitter. Member of this community planned to initiate a Heutagogy Research Centre/Institute that may be hosted in a higher education institution.

Equally, *Learning Analytics* is growing as a field of research in education despite its apparent inability to cover learning that takes place offline. Offline learning is still the only practical way of learning for the majority of the world population since global Internet statistics discussed earlier indicate that less than 50 per cent of them have access. With more attention to self-determined learning that takes place offline, analytics of learner-generated logs constitutes another research area worth exploring. Learning logs are primarily generated for management of own learning by learners themselves, not for the research purpose. However, researching learning logs can be a secondary purpose that may help improve learning and learning support practices.

Non-formal learning and its integration in the mainstream education will also gain more terrain, especially with the promotion of competence-based education and aspirations of transformation into knowledge-based economy. With the depletion of financial

resources in formal education, different initiatives around the globe have started capitalising on non-formal learning and open education services. The OERu, which is an international collaboration of accredited higher education institutions around the world founded to provide credit to non-formal learning accomplished via OER, is an example of this move. It should be noted that this network does not have one physical location. Instead, it is a virtual network of accredited higher education institutions around the world that share the same ethos of openness and willingness to assess and offer credit to open learning accomplishment.

A similar move seems to be undertaken by some European institutions that are offering ECTS credit on learning accomplished via MOOCs as discussed earlier. Recommendations for ECTS credit on learning achieved via MOOCs have already been made across Europe. Models that build on open learning content and open educational services may be adopted in many countries, and they may constitute an interesting research area. Equally, problem-based open learning may be designed in different settings to respond to financial constraints that prevail in particular settings and more research areas may accrue.

Finally, more research and practices related to credentialing learning from MOOCs is expected in the future. Credit on xMOOCs learning accomplishment has already emerged despite the fact that these courses are very recent. As discussed earlier, the most notable practice in providing credit on learning accomplished via xMOOCs is the Masters' Degree in Computer Science entirely based on MOOCs at Georgia Institute of Technology. Recommendations on providing credit on learning accomplished via MOOCs are also emerging across the globe. Apart from recommendation for ECTS credit discussed earlier, the Governor of Texas had credit on learning accomplished via MOOCs on his education plan in attempt to make education flexible and affordable in this state (Roush, 2014). Credit on learning via MOOCs is likely to be more widespread and this may be another area of research in the near future.

2.2.18 My position as a researcher in the area of open education, OER and MOOCs

My position statement has emerged in my participation in the global discussion in the field of open education, OER and MOOCs. This participation was accomplished via papers sent to different journals for publication, conference presentation and blog entries. All this participation was part of the *Parallel development component* of my study that will be discussed in Chapter 3. In my position statements, I attempted to take a middle position in the poralised debate on MOOCs and OER. I focused more on the potential contributions of these resources and courses to the creation of educational opportunities for underprivileged people who are not yet included in the mainstream higher education.

The issue of rejection of OER and MOOCs triggered by suspicion of cultural imperialism was addressed in Nkuyubwatsi (2014b, pp. 29-30). My position in the paper is addressed to both sides involved in this distrust. If anyone intends to transform lives in a developing country, she/he may need to learn to empathise with stakeholders in those settings and be able to understand problems at hand from the perspective of people who live them. Flexibility that enables the localisation and adaptation of OER and MOOC content to the target setting is critical in building trust. On the opposite extreme, a radical rejection of all resources and courses from abroad inhibits a cross-cultural and cross-setting educational exchange. Each of the two extremes may easily slip into promotion of own interest and agendas at the expense of an overwhelming number of underprivileged learners who need access to education. Diversity and multicultural learning experience may benefit both sides. There is need to promote a cross-cultural and multi-directional exchange of knowledge, skills and expertise between stakeholders in education in both developed and developing settings.

The issue around the types of technologies that should be used in education was addressed in Nkuyubwatsi (2014a). In this paper, I discussed strengths and limitations of different learning modes I personally experienced: self-guided based on reading resources, radio learning, formal face-to-face education in both developing and developed countries,

conventional online and distance education and MOOCs. I argued that each of these learning modes and technologies it relies on can help a dedicated learner achieve a significant milestone in their learning. While a combination of learning modes is desirable where applicable, each of these modes and related technologies can contribute to bridging educational divide if education is built on learners' strengths, media learners have access to, open content and open assessment for credit.

The controversy in the literature on MOOCs and OER revolved around the two biases (Kop, 2011) discussants tend to promote. There are those who tend to exclusively promote learning via communication and interaction between humans and reject any other sort of learning. Alternatively, there may be those who over-promote interaction with learning resources at the expense of human-human interaction. My response to such attitudes is that learning is a complex, multi-dimensional migration (Nkuyubwatsi, 2014a and 2014d) rather than a prescribed linear pathway everyone has to go through. This complex migration can be across learning perspectives/biases, levels of education, technologies, languages (for those who learn in foreign languages), cultures, socio-economic development levels and geographical settings. Openness to a diversity of learning theories, learning perspectives/philosophies, cultures and generations of technologies may facilitate this complex migration.

With regard to the value of MOOCs and their contribution to education, the polarity of the debate was based on two confrontational positions. On the one hand, pro-MOOCs activists in the media and blogosphere claimed that MOOCs will replace the existing education system. The opposite extreme claims that no meaningful learning can happen in MOOCs and some had gone far to claim that online education cannot offer positive learning experience (Edmundson, 2012). My position in this debate is that conventional education, online and distance learning and MOOCs should not be contrasted as "belligerents in a zero-sum game" (Nkuyubwatsi, 2014c, p. 199). Instead, these different modes of learning can work together to open up education to millions who want to invest their effort, time and dedication on learning, but have not been serviced yet. None of these

modes of learning is necessarily superior to others and each of them has its glories and limitations. A thoughtful combination of these modes of learning, or their use in isolation can contribute to addressing the major problem in education: provision of affordable quality education to all who want to learn.

2.2.19 A framework for collaborative investment in MOOC and opening up education

As a response to a call for papers in a competition launched by the *Higher Education Online, MOOCs the European Way (HOME)* partnership, I authored a position paper on how European institutions may collaborate on provision of cost-effective MOOCs that create value to all stakeholders. After winning the competition, I was invited to give a presentation of the paper at the *Mapping the European MOOC Territory Conference* held in Porto in November 2014 (Nkuyubwatsi, 2015a). In this paper, I developed a framework for collaborative investment in MOOC and opening up education. In this framework, I highlighted different resources that can be invested to achieve an affordable provision of MOOCs and open higher education. The framework was designed with inspiration from Owens' (2012, pp.11-16) general framework for understanding innovation presented in a Venn diagram. This framework was also the basis for discussion in the *Leading Strategic Innovation in Organizations* MOOC (see Chapter 3) facilitated by the author.

Initially, the framework for collaborative investment in MOOC and opening up education was based on five categories of resources that are needed for the provision of cost-effective MOOCs and opening up higher education: political resources (1), financial resources (2), technological resources (3), pedagogical resources (4) and heutagogical resources (5). The sixth category of resources was briefly referred to, but it was elaborated later on, and the framework was expanded (Figure 2.6) in a journal article published by the *eLearning Papers* journal (Nkuyubwatsi et al., 2015).

The *framework for collaborative investment in MOOCs/ opening up education* was named so because it was designed around different categories of resources managed and controlled by different categories of stakeholders. To catalyse synergistic investment of those resources, value needs to be created for stakeholders in different categories, and those stakeholders need to see benefits of their investment. Weller's (2011) concept of *rivalrous* and *non-rivalrous* aspects of educational resources was applied to these resources. With more investment of non-rivalrous resources, education can arguably be made more shareable to a larger number of beneficiaries without undermining the learning quality.

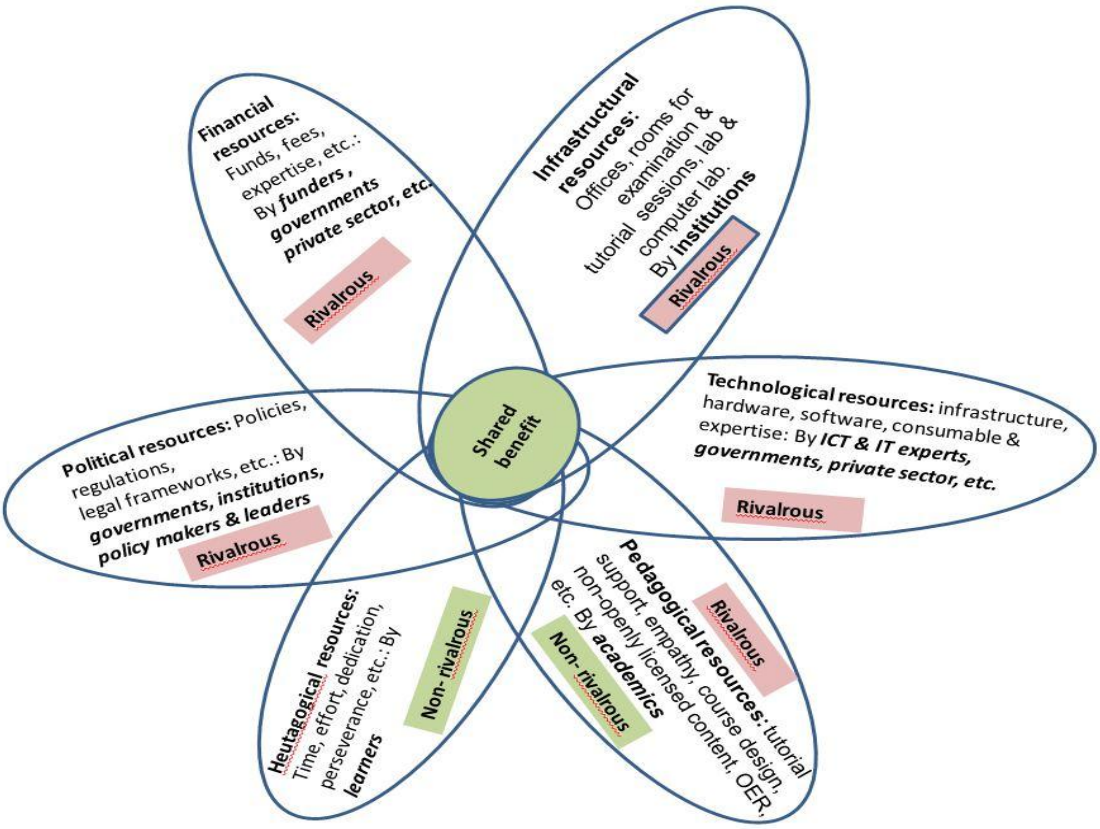
a. Political resources

Political resources consist of powers vested in people, boards, commissions and institutions that shape the national politics of education, national and institutional visions, institutional missions, national and institutional policies and strategies to reach those visions and missions. Governments are often the supreme providers of political resources. An example of such resources in the mainstream education is the power to award a degree that is conferred by state or national governments. According to Barber et al. (2013, p. 54), "the restrictions on access to this power have enabled universities to protect their positions". Kopp et al. (2014) observe different hindrances to MOOC practices including legal tensions. The investment of political resources can result in policies, regulations and legal frameworks that could enable the integration of MOOCs and their contents in opening up higher education in many countries.

Primarily, political resources are often managed and controlled by Governments from which they are also vetted in institutions, leaders and policy makers. All these different types of political resource managers invest the resources when they develop and validate policies, standards, legal frameworks, etc. that inform educational practices. Political resources are rivalrous in that they are vested in a limited number of people who occupy specific positions and institutions. Once the position is filled, others cannot be appointed in it till the person in the position leaves. However, these resources can

effectively be managed to create value for other stakeholders, which would enable collaboration in developing non-rivalrous open courses and open higher education.

Figure 2.6 A framework for collaborative investment in MOOCs and opening up education



Source: Nkuyubwatsi et al. (2015, p. 57)

b. Financial resources

Financial resources include funds invested in education and fees paid for educational services as well as expertise related to managing those funds. These resources are often managed, controlled and contributed by governments, the private sector investors, funding organisations and students/learners. Financial resources are also managed and controlled by related experts. They include, but are not limited to, governments' financial contributions to public education, tuition fees in countries where education is not provided

free of charge and fees paid for different open educational services such as assessment of accomplishment from open learning for credit. In the MOOC context, Kopp et al. (2014) highlight two ways students can contribute financial resources. They can pay invigilation and examination processing fees, the mode adopted by Iversity (2013). Students can also pay the cost of additional tutorial support if they need it and it is available. Financial resources are highly rivalrous, especially in settings where there are limited funds. That is why in the context of Rwanda, many applicants were denied student loans because related funds were running out (Nkuyubwatsi et al., 2015) and those who were awarded student loans go several months without living allowances (Ntirenganya, 2014).

c. Technological resources

Technological resources needed in education can be classified into four clusters. The first cluster includes information and communication technology (ICT) physical infrastructures that exist in specific settings. The second cluster, hardware and software, includes ICT devices such as computers and mobile devices as well as software and applications that make the devices work. The third cluster embodies skills and expertise that make technologies function as intended: these are provided by technological helpdesks, support teams and other experts. The fourth cluster, consumables, consists of a diversity of resources consumed by technological equipment, such as electric power, etc. In addition to experts, technological resources are managed and controlled by investors and different companies that have businesses in related areas such as telecommunication. In many countries, however, governments are supreme controllers of technological resources. That is why some governments order temporary or long term suspensions of some communication media such as social media and radio during special political events or for political reasons.

Many technological resources are rivalrous. An Internet bandwidth, for instance, has a specific maximum number of users beyond which the quality degrades. However, these resources can be used to move beyond the limitations incurred by other rivalrous

resources. In MOOCs, for instance, the Internet enables thousands of learners to take courses without any of them preventing other to learn. The massive expansion of online courses enabled by the Internet cannot be practical in campus-based education due to the high level of rivalrousness of physical classrooms.

d. Pedagogical resources

Pedagogical resources encompass expertise that enables a constructive alignment (Biggs, no date) between learning outcomes, learning content, learning activities, learning assessment and learning technologies. These resources also include a diversity of content used for learning, often contributed by teachers, as well as expertise and attributes such as teacher's ability to empathise with the learner. In the context of MOOCs, there have been disputes related to the limited availability of some pedagogical resources, especially tutorial support. However, MOOC tutors can reach a higher proportion of students if they take advantage of technological and heutagogical resources around them. Pedagogical resources can also be contributed by other educators who take MOOCs for their lifelong learning, which enables the decentralisation and delegation of some teachers' power (Nkuyubwatsi, 2014a). Pedagogical resources are primarily managed and controlled by the teacher, but the concept of teacher in this context goes beyond an individual in a physical classroom or institution. With technological resources, some teachers have expanded their presence across settings, which made pedagogical resources more ubiquitous.

In campus-based education systems, some pedagogical resources such as tutorial support are rivalrous. Learning materials in print format are also rivalrous. However, the Internet and open licences have enabled the removal of the rivalrous aspect from the content. According to Weller (2011), learning materials in electronic format uploaded online can be accessed and used by a huge number of users who access the content without removing it from where it was uploaded. This is especially the case when the resources are openly licensed because their access is not blocked for the sake of gaining financial resources that are rivalrous.

e. Heutagogical resources

Heutagogical resources consist of students' practices and attitudes that trigger their engagement with learning as well as time and effort spent on learning. Heutagogical practices may include the learner's definition of own vision, decision making about own learning, setting learning goals, planning their own learning process, focusing, managing and controlling their own learning using a diversity of tools, prioritising, continuing assessment of own learning progress, finding and exploiting learning opportunities (beyond those available in formal learning institutions) etc. Heutagogical attitudes include independence, passion, dedication, perseverance, the refusal to accept failure as a long term doom, management of failure as a learning tool that does not inhibit moving on, resilience to disempowerment that may be caused by rejection and discouraging comments, etc. Learners who invest heutagogical resources often do not let themselves convinced that they cannot accomplish their vision and therefore, they do not surrender in their learning. Heutagogical resources are non-rivalrous in that a dedicated learner who perseveres to grow at her/his fullest potential using limited resources accessible to her/him does not inhibit the learning of others.

Heutagogical resources and their contribution to educational accomplishment have not been given enough attention for many reasons which may include the reluctance to give away some power to learners (Blaschke, 2012). Wright (2014) argues that education has often been treated as a commercial commodity that has to be sold to learners who are considered as consumers. Such commodification of education may lead to the waste and misuse of heutagogical resources. Robinson (2010) observes that human talents are used poorly and this often occurs in formal education, and he calls for the creation of opportunities that activate talents. Activation of talents may result from re-empowering socially-disempowered learners (Lane, 2009; Lane and Van-Dorp, 2011) as discussed later in Chapter 8.

f. Infrastructural resources

Infrastructural resources consist of physical infrastructure beyond the technological one (classified under technological resources). They may include rooms needed for office work, physically invigilated examinations, laboratory sessions, etc. Infrastructural resources are mainly managed and controlled by institutions, but they may also belong to private investors (for instance, when the rooms are hired from private owners). Infrastructural resources are normally rivalrous in that those rooms have a limited capacity. However, they can be used effectively, with other resources, to keep the rivalrous nature of an educational programme low. For instance, a room entirely used to assess open learners has the potential to accommodate a higher number of beneficiaries than a classroom used to accommodate students who are required to be physically present all along the course duration. Open learners who need the room only for assessment occupy it for a few days or hours, and then, the room becomes available for other learners in need.

2.2.20 The application of components in Figure 2.6 in my learning experience

My non-formal learning that contributed to my access to formal higher education discussed in Chapter 1 relied on a diversity of resources reflected in Figure 2.6 that were available at different levels. Firstly, my learning engagement was catalysed by an effective investment of political resources that sought to establish transparency in the provision of student loans in many ways. As discussed in Chapter 1, the results in anonymously graded national exams were established as the basis for student loan provision. Moreover, these exams were made open to non-formal learners and the results, the cut-off points as well as beneficiaries of student loans were released publicly.

The transparent environment created by the enforcement of these decisions triggered my hunt and engagement with pedagogical resources. These resources consisted of teachers' notes that had been dictated by teachers during my secondary education or

borrowed from other secondary education graduates. I also had access to a few books but many of them, especially the ones I used in EFL were not developed for a specified programme. Pedagogical resources were also reflected in invigilation and marking of answer sheets submitted by national examination takers. These examinations were invigilated and anonymously marked by selected secondary education teachers.

To increase my access to pedagogical resources, I bought a few second-hand EFL materials, which incurred some financial resource investment: approximately £10 (including the equivalent of about £3 spent on a dictionary). Moreover, I spend the equivalent of about £3.5 on a radio, a technological resource that enabled me to take open radio courses on a regular basis. On biweekly basis, I had to spend about 15 pence on radio batteries. The open radio courses I engaged with added to limited pedagogical resources I had access to. The radio courses could not have been accessible from my learning environment without agreements between the radio broadcasting organisations (the BBC and the Voice of America) and the Government of Rwanda that enabled the two organisations to broadcast via Frequency Modulation (FM) infrastructure. While the radio, the batteries and FM infrastructure are technological resources, the agreements between the Government and the two broadcasting organisations involved an investment of political resources from all parties involved.

All these pedagogical, financial, technological and political resources could not have impacted my life positively if I had not invested heutagogical resources massively. I positioned learning and taking national exams in quest for student loan as a top priority. I gave up casual routines such as attending church services, wedding ceremonies and family events to have enough time dedicated to my learning. I scheduled attending the open radio course sessions on a regular basis and planned my engagement with limited learning resources I had access to. My vision to have access to higher education became the main driver of my life between 1999 and 2001.

Infrastructural resources were involved in enrollment for, as well as administration and marking of, national exams. I registered to take national exams at a directorate of the Ministry of Education that was in charge of administering national exams to non-formal learners. This directorate was hosted in a physical office. In the registration process, financial resources were also involved in that I paid the equivalent of about £15 for examination processing. This fee was much lower than the fee that was paid by formal students as tuition fee (varying from school to school) or non-formal learners who sought tutorial support (this fee also varied depending on where the support was sought from). National examination administration and marking were hosted in classrooms of selected secondary schools. Hence, the existing infrastructure built for formal education was invested to accommodate non-formal learners who needed it temporarily.

To sum up, my non formal learning that led to formal higher education was based on a constellation of resource investments across all categories that compose the framework for collaborative investment in MOOCs and opening up education (Figure 2.6). Political resource investment was reflected in different policies on national examination administration and student loan provision. This effective investment of political resources triggered my investment of heutagogical resources through engagement with limited pedagogical resources I had access to. These resources were complemented by different radio courses that could reach remote settings in Rwanda via the existing technological resources. I had to invest some financial resources on technological resources that enabled me to access the courses: a radio and batteries. I also invested financial resources to register for national examinations that were administered and marked thanks to existing infrastructural and pedagogical resources. Without this constellation of investments, my education could have ended with secondary education completion as it has been the case for many of my colleagues who had completed secondary education with better grades three years earlier. While the application of some components in Figure 2.6 in mentoring Rwandan learners and the related outcomes are discussed in Chapter 3 (Subsection 3.1.2) and Chapter 6, my most recent investment of heutagogical resources in an environment that

was richer in pedagogical, technological, infrastructural and financial resources is discussed in Chapter 8, Section 8.1.

2.2.21 The relation of the existing literature research questions and findings to the current study

My study was conducted in attempt to contribute to filling gaps that have existed in the literature on open education, MOOCs and OER discussed in 2.2.16. When I started my PhD study, MOOCs were still in their infancy and academic literature on these courses was just emerging. Apart from the shortage of academic literature on MOOCs, previous research tended to cover OER and MOOC practices as accessory to conventional academic practices. The current study is unique in that it investigates opening up higher education and the potential contribution of MOOCs, OER and different stakeholders to this endeavour. In this study, MOOCs and OER are considered as other courses and resources that are used in the provision of higher education rather than taking them as either inferior or superior products. The main focus in this study is the ultimate goal of opening up higher education and MOOCs and OER are investigated as means to this end.

2.2.22 The relation between the current study research questions and the existing literature and previous research

The current study research questions relate to barriers that inhibit different stakeholders from adopting OEP and open learning practices discussed under 2.3.7. Barriers that inhibit learners from engaging in open learning practices include *Social disempowerment* (Lane, 2009, p. 9; Lane & Van Dorp, 2011), the lack of recognition of open learning accomplishment (Lane & Van Dorp, 2011; Yuan & Powell, 2013; Kopp et al., 2014) and limited literacies (Badarch et al., 2012; Kanuka & Gauthier, 2012; D'Antoni, 2007; Weller, 2011). These barriers can be addressed by policy makers, institutional

leaders and academics if they collaborate on removing them. Learners may also improve their literacies by engaging in self-determined open learning practices.

On the part of academics, many studies suggested that they do not engage in OEP because of limited access to technologies (Wolfenden, 2012; Wolfenden et al., 2012) and limited literacies (Hylén, no date; OECD, 2007; Rennie & Mason, 2010; Badarch et al., 2012). The lack of motivation (Badarch et al., 2012) and the lack of incentives or rewards for OER production, use and sharing (Hylén, no date; OECD, 2007; McAndrew et al., 2012; Woert, 2012; Wolfenden, 2012) were also highlighted among barriers that inhibit academics' OEP. Equally, the lack of formal recognition of OER practices as standard academic practices (OECD, 2007) and the lack of extra time to dedicate to OER practices (Hylén, no date) were found among inhibitors to academics' engagement in OEP. Academics can contribute to addressing the issue of access to technologies by buying their own laptops and sometime Internet connectivity. They are also key agents for the development of the literacies they need to engage in OEP, which implies the need for their engagement in self-determined lifelong learning practices. As for issues related to motivation, incentive and formal recognition of OER practices, they can be addressed by institutional leaders and policy makers.

Institutions' engagement in opening up education and OEP is restricted by the lack of supporting policies (Butcher, 2011; Bateman et al., 2012; Wyk, 2012; Conole, 2013a) and the lack of detailed benchmarked quality standards (Rennie & Mason, 2010). These barriers can also be addressed by academics, institutional leaders and policy makers if there is value creation for the benefit of all involved. Identification of the potential contribution of each category of stakeholders in higher education to opening up this level of education or removing the inhibiting barriers was part of the current study. Before moving to Chapter 3 that details the design of the current study, it may be helpful to recapitulate key points discussed in Chapter 2.

Chapter summary

In the last two decades, open education evolved from learning objects through OER to MOOCs. This evolution was coupled with different agendas whose *open access* and *lifelong learning* were among the most promoted ones. Open education initiatives received support from funding bodies, governments, intergovernmental organisations and non-profit organisations. Among the non-profit organisations, Creative Commons played a critical role by creating a legal and technical framework for openly sharing educational and research content. This framework consists of six open licences created through a combination of four properties: attribution (1), share-alike (2), non-commercial (3) and no-derivative (4).

There have been a variety of declarations which expressed a commitment and call for participation in opening up access to educational and research content as well as to education in general. The Budapest Open Access Initiative was among the earliest declarations and was followed by a rapid development of open access publishing. Three open access publishing routes emerged: the *green route*, the *gold route* and the *platinum route*.

MOOCs emerged in 2008 to mushroom in 2011 with the bifurcation into Connectivist MOOCs (cMOOCs) and Extention MOOCs (xMOOCs). Extention MOOCs became the most important trigger of discussions in open education and higher education in general. The feeling of threat and conflict permeated debates that were catalysed by the rapid development of xMOOCs.

Various barriers inhibit different categories of stakeholders from adopting OER and MOOCs. Those barriers include, but are not limited to, the lack of recognition of accomplishment from learning OER and MOOCs, the lack of recognition of OER and MOOC practices as formal academic practices and the lack of evidence of financial sustainability of OER and MOOCs. However, many opportunities and benefits from OER

and MOOCs were perceived. Opportunities include funds on OER and MOOC initiatives while perceived benefits include cost reduction and possibility to contribute to widening access to education.

Different business models, pedagogies and learning approaches have recently emerged. OER and MOOC business models revolve around conversion, marketing, fee for certificate and sponsorship. Recent pedagogies associated with OER and MOOCs include pedagogy of abundance/open pedagogy and connectivism. As for learning approaches, heutagogy also referred to as self-determined learning, fits well with MOOCs and OER in that it positions the learner as a key agent in her/his own educational transformation.

Some higher education institutions have started offering credit on learning accomplishment from MOOC and OER. The most spectacular move in this regard is the Master's Degree in Computer Science based on MOOCs at Georgia Institute of Technology. Some European institutions have also started offering ECTS credit on learners who completed MOOCs successfully and some of them administer an invigilated examination for awarding this credit. As for open credit on learning accomplished via OER, the OERu network composed of dozens of higher education institution from around the globe seems to be leading.

While there is consensus on the low uptake of OER and the contribution of MOOCs to raising open, distance and eLearning awareness, the quality and openness of MOOCs and OER units is still controversial. Within these controversies, heutagogy, learning analytics and assessment of open learning accomplishment for credit have emerged as research interests. These areas are expected to attract more researchers as MOOCs and OER learning practices become more widespread.

Still on controversies and consensus, my position has been moderate and uniting: Contrasted concepts such as *MOOCs versus conventional education* or *pedagogy versus heutagogy* can work together to reach more learners in need for higher education. It is in this perspective that, informed by my diverse learning experience, I developed a framework

for collaborative investment in MOOCs and opening up education. Different resources that are components of the framework were invested by different stakeholders to enable my access to formal higher education.

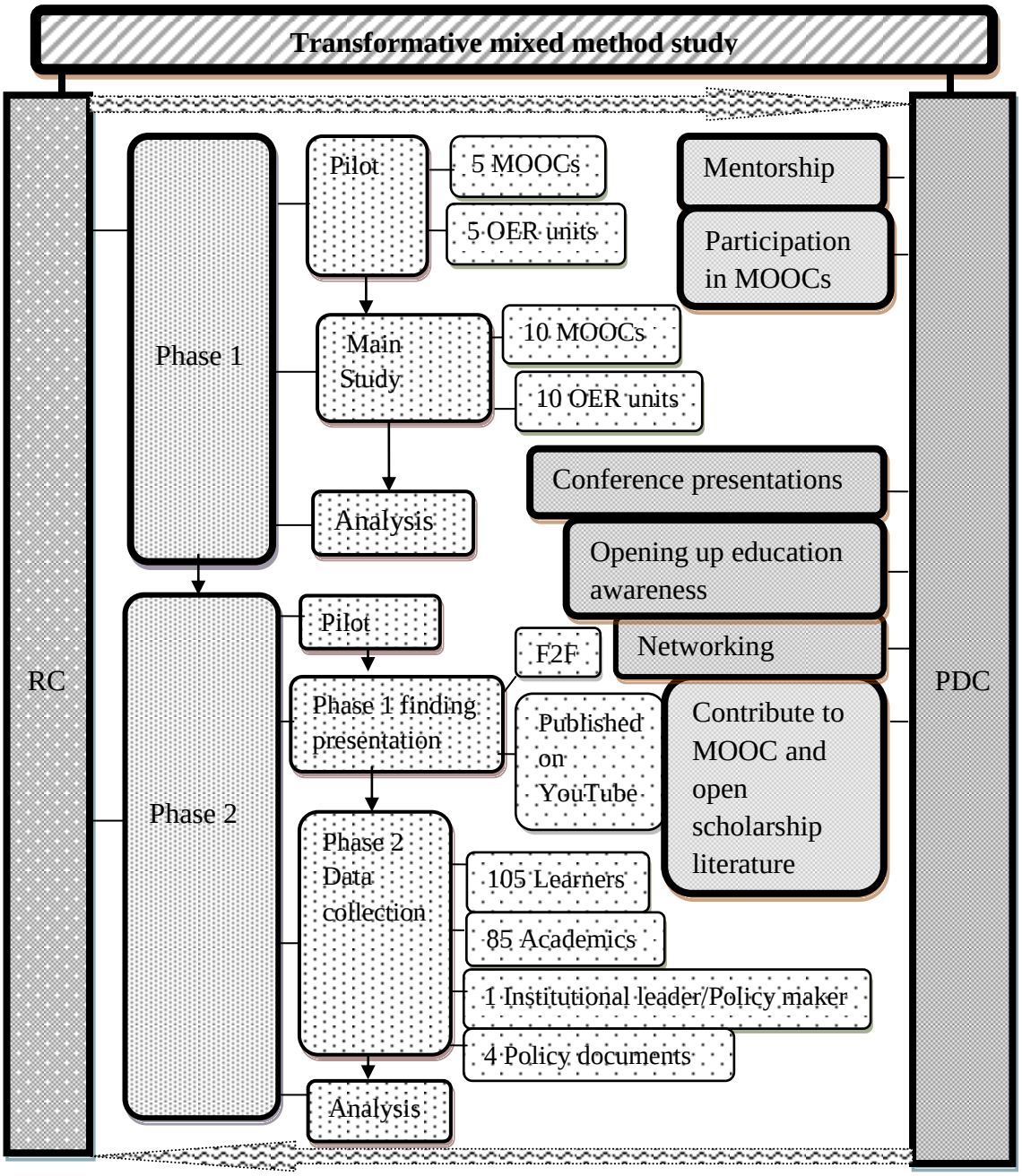
CHAPTER 3 RESEARCH METHODS

In this chapter, I discuss the research methods. The chapter consists of three major sections: *Design* (3.1), *Ethics and access* (3.2) and *Best practices* (3.3). Two major components of my study are detailed in 3.1 (the *Design* Section): the *Research* component (RC) (1) which consists of two phases and the *Parallel development* component (PDC) (2). I also discuss validity, reliability, analysis and interpretation of the findings in both phases of the *Research* component, and the link between the research component and the parallel development component. Afterward, I discuss decisions I made to keep the study within acceptable ethical guidelines in 3.2 (the *Ethics and access* Section). Finally, I discuss best practices in the current study in 3.3. Chapter 3 closes with a summary of major points covered in it.

3.1 Design

The current study has a *transformative mixed methods* (Creswell, 2014, p. 16) design. Transformative researchers move beyond research findings to catalyse actions that contribute to the improvement of the status-quo and underprivileged people's well-being. Interest in this study was triggered by a real concern of access to higher education in Rwanda. At the heart of the study was an agenda to contribute to opening up higher education, through enabling open education policies, open educational practices and open learning practices. It is the same agenda that had motivated my offer to volunteer to the Ministry of Education, the offer which was transferred to Rwanda Education Board as discussed in Chapter 1. Figure 3.1 encapsulates the research design in the current study.

Figure 3.1 Research design



A huge number of secondary education graduates who qualify and wish to attend higher education in Rwanda are not included for many reasons. Firstly, they cannot afford the high price of conventional higher education because of their underprivileged background. Secondly, the Government has too limited funds for student loans and

Government sponsorship. Additionally, the existing infrastructure is inadequate to accommodate all secondary education graduates who qualify and wish to attend higher education. The expansion of this infrastructure requires enormous financial resources that are already in shortage in Rwanda. These factors inhibit the inclusion of many secondary education graduates in the higher education system. Therefore, they constitute a major barrier to the championed transformation of Rwanda from subsistence farming toward knowledge-based economy discussed in Chapter 1.

As mentioned earlier, the study has two overlapping components: The *research component (RC)* and the *parallel development component (PDC)*. The *mixed method* aspect of the study is reflected in the research component which relies on both numerical and textual data. As for the transformative aspect, it permeates the parallel development component. Both the research component and the parallel development component have been mutually beneficial as discussed later in this section.

3.1.1 The research component

The research component consists of two phases. In phase 1, I took different MOOCs and engaged with OER units to evaluate their potential to be adapted for use in opening up higher education in Rwanda. This evaluation was made in the light of socioeconomic and infrastructural challenges discussed in Chapter 1 and enablers of OER adoption discussed in Chapter 2. As for Phase 2, I shared findings of Phase 1 via presentations and seminars organised at different University of Rwanda's campuses, conducted paper based and email surveys with learners and academics respectively, interviewed a leader at the University of Rwanda and analysed four policy documents. In this subsection, the two phases of the research component, validity, reliability and analysis of data are discussed.

a. Phase 1

In Phase 1, I took various MOOCs and I was immersed with OER units. I was a *participant investigator* in MOOCs and a *content analyst* in OER units. *Participant investigator*, rather than participant observer, is used in the current study to avoid confusion caused by how participant observation has often been used in conventional research, which tended to be a narrow frame that led to misunderstanding of my study. Participant observers have often been focusing on people and their behaviours. In online education research, participant observers have been interested in participants in course forums or other online exchange environments. In my study, interest was neither on forum participants nor their posts. Instead, I was interested in the MOOC content and activities assigned by instructors or uploaded by participants in the resource areas.

The MOOC content can be adapted to the learning setting in Rwanda to empower learners in this particular setting. This empowerment may occur by creating learning opportunities that may enable learners to grow at their fullest potentials on the basis of limited resources they have access to. The forum content was not the focus of the current study because it was enabled by technologies most Rwandan learners do not have access to. The perspective from which this content was produced may be shaped by overabundance of resources the producers had access to but are lacking to Rwandan learners. Moreover, access and use of such content would require getting permission from all participants, a process which is difficult and therefore constitute an obstacle to opening up education to Rwandan learners in need. Taken from the Rwandan context, all these barriers linked to the forum content made MOOC forums inappropriate venues to investigate the potential of these courses to be adapted for use in opening up higher education in Rwanda.

My study on MOOCs was also different from content analysis in OER units. While the MOOC content was investigated live (as courses were running), the OER unit content was not live at the time of its analysis. Therefore, the concept of *participant investigator* is

used to designate my research on MOOCs which were live courses as opposed to *content analyst* which is used to refer to my research on OER unit content which was archived.

I took various responsibilities as other MOOC students. I adopted the role of an *all-rounder* (Anderson et al., 2014, p. 688) MOOCs participant discussed in Chapter 2. I watched all video lectures, took all quizzes, submitted all assignments and graded/provided constructive feedback on the work of other participants. I also contributed to the forum discussion whenever I could although the forum content was beyond the scope of my study. Participation in the forum helped me estimate the time required to complete the courses. In OER units, I was an archive analyst or an *archaeologist* (Anderson et al., 2014, p. 690) since these courses were not running live.

i. MOOC platforms and OER repository

MOOCs I used in Phase 1 were taken from the Coursera (nine MOOCs) and FutureLearn (one MOOC) platforms. They were offered by universities from different countries: five by American universities, two by British universities, two by Australian universities and one by a German university. MOOCS were selected from different universities and different countries to avoid the dominance of one perspective in the current study. As for OER units, all of them were hosted in the MIT Open Courseware (http://ocw.mit.edu/courses/find-by-topic/), the repository that seemed to pose no access barriers.

ii. The Study objects

The objects of research in Phase 1 were ten MOOCs and ten OER units. When I started Phase 1, there were approximately 550 extension MOOCs (xMOOCs) at higher education level which were hosted in various MOOC platforms. The restriction of the current research to the xMOOCs category was motivated by the similarities of these types

of MOOCs to other courses offered in higher education institutions: lectures, reading materials in many MOOCs, quizzes, final exams, deadlines for submitting assignments, a passing grade, a distinction grade, etc. These similarities were assumed to potentially facilitate an easy assessment and conversion of these courses into an existing credit system in higher education. This conversion could contribute to addressing the barrier of lack of recognition of learning accomplishment discussed in Chapter 2. There were also a huge number of OER units in various repositories. The study was limited to OER units in repositories/courseware because they were organised as courses. Most of these units were courses that had been offered at MIT in previous years.

iii. *Samples and sampling techniques*

Phase 1 was conducted on content from ten MOOCs (Table 3.1) and ten OER units (Table 3.2). The Coursera platform dominated because it was among the earliest entrants and pioneers in the xMOOC industry. It hosted a wide variety of courses that ranged in almost all fields of study available in higher education. The ten MOOCs and ten OER units used in Phase 1 were selected from fields I could engage in and understand the content: business, humanities, entrepreneurship, technology-enhanced learning, education, Information and Communication Technology (ICT) and sustainable development for MOOCs and education and business for OER units. Table 3.1 and Table 3.2 respectively encapsulate MOOCs and OER units sampled for this study.

Table 3.1 MOOCs used in Phase 1

No	**MOOC**	**University Location**	**Platform**	**Duration**
1	Competitive Strategy (CS)	Germany	Coursera	6 weeks
2	Online Games: Literature, New Media and Narrative (OGLNMN)	USA	Coursera	7 weeks
3	Law and Entrepreneurship (LE)	USA	Coursera	6 Weeks
4	eLearning and Digital Cultures (EDC)	UK	Coursera	5 Weeks

5	Information Security and Risk Management in Context (ISRMC)	USA	Coursera	10 weeks
6	Sustainability, Society and You (SSY)	UK	FutureLearn	8 weeks
7	Grow to Greatness: Small Growth for Private Businesses (GGSGPB I)	USA	Coursera	5 weeks
8	Gamification (G)	USA	Coursera	10 weeks
9	Assessing and Teaching 21st Century Skills (AT21CS)	Australia	Coursera	6 weeks
10	Learning to Teach Online (LTO)	Australia	Coursera	8 Weeks

I based on two criteria to choose the MOOC platforms: the platform had to host xMOOCs of higher education level (1) and it had to be offering a diversity of MOOCs in varied fields of study (2). Udacity, Coursera and EdX were the only platforms that were already offering higher education level xMOOCs when I started the pilot stage. The Coursera platform seemed to meet the two criteria more than the two other pioneers thanks to its wider variety of courses and fields of study. FutureLearn was included in the study because it hosted SSY whose content was openly licensed. As discussed in Chapter 2 and Figure 2.6, openly licensed content is non-rivalrous, which constituted convenience in my study.

Table 3.2 MIT Open Courseware OER units used in Phase 1

No	**OER unit**	**Year**	**Level**
1	Media Education and the Marketplace	2005	Undergraduate
2	Technology Tools for School Reform	2005	Graduate
3	How to Develop Breakthrough Products and Services	2012	Graduate
4	Corporate Entrepreneurship: Strategies for Technology-based Development	2007	Graduate
5	Global Entrepreneurship Lab: Latin America, the Middle East, and Africa	2010	Graduate

6	Designing and Leading the Entrepreneurial Organization	2003	Graduate
7	Entrepreneurial Marketing	2002	Graduate
8	Challenge of World Poverty	2011	Undergraduate
9	Working in a Global Economy	2005	Undergraduate
10	Technology for Creative Learning	2009	Graduate

As for OER repositories, I also based on three criteria. Firstly, the repository had to be hosted by an accredited higher education institution. This was assumed to qualify the OER units it hosted as *big OER* (Weller, 2011, p. 105) whose quality check would be trusted. Secondly, the OER units hosted in the repository and all their components had to be entirely accessible for the study to be possible. Finally, the repository had to contain enough OER units so that it could offer plenty of options to choose from.

After a quick browse on a couple of repositories, the MIT Open Courseware was selected to be the source of OER units used in Phase 1. This OER repository had a search tool known as “Course Finder” which offered three alternatives to find courses: search by topic, search by course number and search by department. I used the first alternative, search by topic, to find OER units I used in this study.

Sampling for both MOOCs and OER units was purposive (Bouma & Ling, 2004). I selected the MOOCs and OER units in the fields I was interest in. This helped me keep my motivation to participate in the courses and engagement with the resources high. Basing my choice on my personal interest also enabled me to simulate motivated students and learners’ experience.

iv. *Alternatives objects, samples and sampling techniques*

Rather than researching MOOCs from only the Coursera and FutureLearn platforms and OER units from only the MIT Open Courseware, I could have made representative samples from existing MOOC platforms and OER repositories. This alternative could have provided a general picture on extension MOOCs (xMOOCs) and OER hosted in various repositories. However, this alternative did not look practical within time and financial resources that were available for the study. Waiting for emerging platforms to host enough MOOCs that meet selection criteria could have caused enormous delays in my study while extension on my PhD research and funding was limited. It made sense to start with the Coursera platform that hosted enough MOOCs at the time the phase on these courses was conducted. On OER repositories, two of them were initially targeted. The second repository was dropped after noting that it only enabled exploration of about 10 per cent of the course content, and then prompted visitors to the course page where they had to enroll and pay the course fee.

Alternatively, connectivist MOOCs (cMOOCs) could have been included in the study. Yet, their reliance on the connectivist pedagogy which is less familiar in the mainstream higher education would make them quite difficult to assess and convert into the existing higher education credit system. As discussed earlier, this convertibility was perceived to be the potential way to address the issue of the lack of recognition of accomplishment from open learning, which would ensure the learners' share in the *shared benefit* basis for collaboration in opening up higher education (See Figure 2.6).

When it comes to sampling techniques within the Coursera platform and the MIT Open Courseware, random sampling could have been adopted to select xMOOCs and OER units. This could have helped me achieve more representativeness. However, such a practice could have affected my affective aspect and understanding of MOOCs, especially if I had landed on MOOCs and OER units in the fields in which I had no prerequisites. Researching MOOCs as a participant investigator required passion, commitment and hard

work as all other participants who were dedicated to complete these courses successfully. Without this dedication, I would probably have dropped out the courses and therefore, my study would be reporting partial data.

v. *Data collection instruments*

Two types of instruments were used to collect data in Phase 1: MOOC participation logs and observation protocols.

- MOOC participation logs

In order to manage and control my engagement in MOOCs as a participant investigator, I maintained a regular record of my participation. The record was taken in tables referred to as *MOOC participation logs* (see a sample in Figure 3.2) in this study. A log had many columns that indicated the months the MOOC lasted, weeks the MOOC lasted, the dates I engaged with the MOOC, what I covered at each session, the amount of time I spent on each session and comments. The log could be flexibly expanded to as many weeks as the course lasted and to as many dates as I engaged in the courses.

Figure 3.2 A sample of a MOOC participation log

Week	date	Activities	Time	Total	Observation
1					
2					
3					

- Observation protocols: MOOC and OER unit evaluation rubrics

MOOCs and OER units were evaluated using protocols/rubrics (Appendices 1 and 2 respectively) I developed for this study. These rubrics were developed based on Achieve's (2011) rubrics for OER content evaluation discussed in Chapter 2. The adaptation of the rubrics focused on tailoring the instruments to ensure collected data responded to barriers to OER adoption discussed in Chapter 2 as well as socioeconomic and infrastructural challenges in Rwanda discussed in Chapter 1. In this adaptation, a particular focus was on how MOOCs and OER units would respond to challenges in Rwandan higher education since this was the primary focus in this study. Some of those challenges are not necessarily prevalent in the context in which the Achieve's rubrics were developed. Therefore, adaptation of the rubrics was necessary to collect data that are relevant to Rwanda.

Prior to conducting the main study, I piloted research instruments for Phase 1 on five MOOCs from the Coursera Platform and five OER units from the MIT Open Courseware. Those MOOCs and OER units were also selected based on same criteria used to select courses and units that were part of Phase 1 of the main study. The MOOCs and OER units used to pilot the instruments are presented in Table 3.3 and 3.4 respectively.

Table 3.3 MOOCs used in the pilot phase

No	**MOOC**	**University Location**	**Platform**	**Duration**
1	Artificial Intelligence Planning (AIP)	UK	Coursera	5 weeks
2	Internet History Technology and Security (IHTS)	USA	Coursera	11 weeks
3	Leading Strategic Innovations in Organizations (LSIO)	USA	Coursera	8 weeks

4	Inspiring Leadership Through Emotional Intelligence (ELTEI)	USA	Coursera	6 weeks
5	Developing Innovative Ideas for New Companies: The 1st Step in Entrepreneurship (DIINC)	USA	Coursera	6 weeks

Table 3.4 OER units used in the pilot phase

OER Unit	**Year**	**Level**
Managing Innovation and Entrepreneurship	2008	Graduate
Developmental Entrepreneurship	2003	Graduate
Computer Games and Simulations for Investigation and Education	2009	Undergraduate/ Graduate
Building and Leading Effective Teams	2005	Graduate
Internet Technology in Local and Global Communities	2005	Graduate

vi. *Alternative choices and instruments for Phase 1*

An alternative approach to research in Phase 1 would have been conducting interviews or surveys with MOOC participants, OER developers as well as students and academics at institutions that have been adopting OER regardless of their background. Indeed, this approach was suggested for collecting data from MOOCs. Interview protocols or questionnaires would have been used as instruments rather than OER and MOOC evaluation rubrics and MOOC participation logs. I would have recruited participants in the MOOC forum discussion or via social media. On OER, I would have targeted academics at MIT and other universities that have well known OER repositories. Other informants would have been academics and students at institutions that have been adopting OER. Such institutions include University of Jyväskylä, Josef Stefan Institute and the Universidad Nacional de Educación a Distancia (Holtkamp et al., 2011). However, since the settings of these alternative participants are culturally and socioeconomically different from Rwanda,

it was not clear how data from such participants would lead to conclusions that relate to opening up higher education in Rwanda.

I decided to use OER and MOOC evaluation rubrics to sieve the MOOC and OER unit content in attempt to identify components that can contribute to opening up higher education in Rwanda. The suggestion to collect data from MOOC participants was also not endorsed since most of those MOOC takers are from societies that are different from Rwanda in terms of socioeconomic development and infrastructural facilities. In addition, most MOOC learners were reported to already have a higher education qualification as discussed in Chapter 2. These participants were more likely to be driven by the lifelong learning agenda as opposed to the open access agenda that is critical in the current study. Therefore, the suggested alternative participants were not affected by issues that the research intends to contribute to addressing.

vii. *Data collection procedure*

I collected data for Phase 1 from 10 MOOCs and 10 OER units using the instruments discussed earlier: a MOOC participation logs (Figure 3.2), a MOOC evaluation rubric (Appendix 1) and an OER unit evaluation rubric (Appendix 2). At the end of each MOOC participation session, I completed the participation log. Then, at the end of each MOOC, and after exploration of each OER unit, I completed the relevant rubric. The rubrics helped me collect key data on the nature of learning materials assigned, how the materials were accessed, how the materials were licensed, etc. I collected both numerical and textual data from MOOCs and OER units.

MOOCs that were used to pilot the design and research instruments were completed between January and August 2013. Those from which data for the main study were collected were completed between August 2013 and September 2014. As for OER units, the emersion in the pilot stage was carried out between May and July 2013 while that for

OER units from which data for the main study were collected occurred between July and August 2014.

My participant investigation of MOOCs took as long as the courses were designed to last. Exceptions were SSY in which I engaged in 70 per cent of activities, LE which had some resources that were not relevant to the context of Rwanda and ISRMC that could potentially take too long to complete if any of the assigned readings was read integrally. As for OER units, each was the subject of attention for a period of one to twelve days depending on the amount of the resources that made up the unit and other competing activities. I stored the MOOC and OER unit content that was relevant to Phase 1 on two external hard drives. At the end of each MOOC, I wrote a summary of between 250 and 400 words (see Appendix 3). This was the same for OER units with which I was immersed (Appendix 4).

b. Phase 2

While Phase 1 had focused on the content side of opening up higher education (in both xMOOCs and OER units), Phase 2 shifted to the human side. This phase focused on the potential contribution of different stakeholders to addressing barriers that fall under the cluster of *human-controlled barriers* discussed in Chapter 2. The *human-controlled barriers* include the lack of recognition of open learning accomplishment (1), the lack of recognition of academics' open educational practices (2) the lack of supporting open education policies (3) and the lack of motivation (4). I was also interested in the potential contribution of different stakeholders to addressing barriers that overlap between *content-based barriers* and *human-controlled* barriers found in xMOOCs and OER units in Phase 1. Long-term barriers that are linked to financial challenges in Rwanda and globally were beyond the scope of the current study since different stakeholders seem to have no immediate control on them.

i. *The study setting in Phase 2*

The study setting for Phase 2 was the University of Rwanda and its community. The University of Rwanda's community consists of students, academics, institutional leaders and policy makers. This community does not have any geographical boundaries: The defining criterion for its members is not their geographical location, but their link to the university as student, learner admitted at the University of Rwanda, academic and leader/ policy maker. Some of its members, especially academics, are often scattered around the globe for study, training and professional development purposes. This setting constitutes the entire public higher education industry in Rwanda since the University of Rwanda is the only public higher education institution in the country since September 2013 as discussed in Chapter 1.

ii. *The population*

The study population consisted of stakeholders in Rwandan higher education who were naturally clustered in three major categories: Learners (1), academics (2) and institutional leaders/policy makers (3). Learners consisted of formal students studying with the University of Rwanda and learners who were admitted at this university on merit-basis but did not register because they could not afford higher education without Government sponsorship and student loans. Formal students may have been taking courses at the time of data collection, or they may have been in holidays. Academics consist of any teaching or research staff employed by the University of Rwanda regardless of their geographical location at the time of data collection. As for institutional leaders/policy makers, they were those who were employed by the University of Rwanda and were in position to influence institutional policies during the period of data collection.

iii. *Samples and sampling techniques*

Sample sizes and sampling techniques varied depending on the category of participants. In the "*learners"* clusters, the sample consisted of 107 students who volunteered to take part in the study. These students were recruited via *convenience sampling* (Denscombe, 2010, pp. 37-38; Cohen et al., 2011, pp. 155-156; David & Sutton, 2011, p. 131) also known as *availability sampling* (David & Sutton, ibid). According to Creswell (2013, p. 158), convenience sampling helps save money, time and effort but these advantages may come at the expense of information and credibility. In the current study, only learners who could be met on campus at the time of my visit were invited to participate. This enabled me to conduct my study with available financial resources and time.

With exception of the University of Rwanda's College of Medicine and Health Sciences (CMHS), students in many University of Rwanda's colleges had completed their exams by the time their respective colleges granted me permissions to conduct my study. After completing their exams, almost all students did not come to their respective campuses and there was no predictable time to meet the few ones who came to the campus. That is why all students invited to participate in the study belonged to the CMHS that still had students who were attending classes when this college granted me permission to conduct my study. Only those who had volunteered to participate were included in the sample. Volunteer sampling helped me include in the study participants who were interested and willing to participate. However, these willing participants' views may have been different from those of other students who did not volunteer to participate (Seale, 2012, p. 145).

On their part, academics were also recruited through convenience/availability sampling (David & Sutton, 2011). To recruit academics, I visited different campuses, met these academics in their offices or staff rooms, talked to them about my study and invited them to participate. I asked those who voluntarily accepted to participate to provide me with their email addresses so that I subsequently send them an email questionnaire. For

those academics, being part of the sample depended on their presence when I visited their respective campuses and their willingness to participate in the study. Some academics could, however, not be met face-to-face. I invited those who were in my digital social networks electronically by sending them a Facebook or Skype message.

In total, 175 academics volunteered to participate in my study and provided me with their email addresses. However, messages sent to five of these email addresses consistently bounced back. That is, the questionnaire was successfully emailed to 170 academics who constitute the sample in my study.

As for institutional leaders/policy makers, I sent them emails inviting them to participate in the study. The positions held by these types of informants made them unique for the relevance of the data to be collected. In this way, sampling institutional leaders/ policy makers was *purposive* (Bryman, 2012, p. 418) or *purposeful* (Creswell, 2014, p. 189). Emails were sent to five institutional leaders and therefore, the sample size for institutional leaders consisted of these five target recipients. However, only one of the recipients was able to fit an interview session in her busy schedule.

Prior to recruiting participants in some campuses, I made presentations on my study and Phase 1 findings as part of the facilitation of seminars that were organised. Such presentations were made at three campuses: Nyamishaba Campus (22nd May 2015), Nyarugenge Campus (29th May 2015) and Rukara Campus (17th June 2015). While recruiting participants had already begun at Nyamishaba and Nyarugenge campuses when the presentations were made at these campuses, participants from Rukara Campus were recruited during the seminar in which the presentation was made.

The presentation at Nyarugenge campus was recorded. The audience was informed that the session was going to be video-recorded, the video would be published online and the link to the online video would be emailed to them and shared to other members of the University of Rwanda's community. They were also informed that the link would be shared

via social media. Then, I asked if there were any objection to recording the presentation and no member of the audience objected. In editing the video, I focused on my presentation.

The recording was edited using limited resources and technologies that were available. Then, I created a YouTube account and published the edited version of the recording (https://www.youtube.com/watch?v=RN3Ke17Zq8w&feature=youtu.be). The link to the published YouTube video was emailed to people who had attended the recorded presentation, academics who volunteered to participate in the study and officials at the Directorate of Research, Technology Transfer and Consultancy at the CMHS. The link was also shared via social media (Facebook and Twitter) for wider dissemination. This enabled me to reach potential participants and members of the University of Rwanda's community who could not make it to different face-to-face presentations I gave.

iv. *Alternative samples and sampling techniques*

Random samples would have been picked from learners and academics, regardless of their presence on campus, with an agenda to achieve statistical representativeness. Using this technique, I could possibly have focused on equal proportions of participants from different colleges, fields of study, campuses or levels of education. However, this was not practical, given that permissions to conduct my research at different colleges were not provided at the same time; a little bit late in some colleges.

Alternatively, representative samples would have been drawn from different administrative entity in Rwanda such as districts on the part of learners. The other way of achieving representative sampling would have been including representative proportion of formal and non-formal learners. This alternative would especially have helped me include potential open education learners in the study. All the above alternatives were not used in

sampling because the study would not have been practical within time and financial resources that were available.

v. *Data collection instruments*

Two types of data collection instruments were used in Phase 2: self-completion questionnaires and an interview protocol.

- Self-completion questionnaires

I collected data from learners and academics using self-completion questionnaires. While academics completed an email questionnaire, learners completed a printed questionnaire. An email questionnaire (Appendix 5) offered flexibility to academics who were in the period of exams and had imminent deadlines for marking and submitting marks. An email questionnaire enabled them to participate in the study at their most convenient time. Equally, academics were located in different campuses of the University of Rwanda. An email questionnaire helped avoid costs related to multiple trips to different campuses to hand in the questionnaires and collect the completed questionnaires, printing and mailing questionnaires.

Bryman (2012, p. 670) identifies two ways email surveys can be conducted: *imbedded questionnaire* or *attached questionnaire*. In the current study, the questionnaire was emailed as an attached file. Some participants were expected to access the Internet via the *Pay as you go* business model when they were off-campus. An *attached email questionnaire* enabled such participants to use their Internet units for only downloading and emailing back the questionnaire. Hence, units that could have been consumed in completing a web-based questionnaire could be saved thanks to *an attached email questionnaire*: Participants could download and save the questionnaire file, complete it offline, and reconnect their modems only to email back the completed version.

Alternatively, the completed version could wait till participants are back on campus to be emailed back to me.

In addition, it may have taken less time to complete the attached questionnaire than the time that could have been required to complete an online/web questionnaire. Completing web-based questionnaires often incurs the waiting time when participants have access to slow connectivity that does not load different questionnaire pages instantly. The slow connectivity, the delay or even failure to load some pages of an online questionnaire may lead to frustration of participants and therefore, unnecessary termination of their participation. An attached email questionnaire also had a critical advantage in this study when compared to a printed questionnaire. Since participants in the category of academics were located in different campuses, some outside Rwanda, an email questionnaire helped me reach all of them in a way a printed questionnaire could not.

I started the email questionnaire addressed to academics with participant information, followed by two main sections of data collection questions. Section 1 focused on participant identification and Section 2 was dedicated to collection of data that could help answer Subsidiary Research Question 2 under Overarching Research Question 3. This subsidiary research question was "To what extent are academics at the University of Rwanda willing to contribute to OER and open courses, and adopt open education roles?" In Section 2, questions were asked for different purposes but most of them intended to find out academics' potential contribution to enablers of opening up higher education discussed in Chapter 2: Openly licensed content that could cut down the cost on the part of the institution as well as learners (1), assessment of open learners' accomplishment for credit (2), supporting off-campus open learners (3), etc. While credit constitutes benefit for open learners, cost reduction would be beneficial to both open learners and the institution. In this way, open learners and the institution would have their shares in the benefit from academics' contribution (see the *shared benefit* basis for collaboration in the framework summarised in Figure 2.6), which would motivate their participation.

Question 1 and 2 intended to identify academics' familiarity with the concept of opening up higher education. Such identification was thought to be useful in determining whether their position vis-à-vis opening up higher education and their willingness to make related contributions was based on familiarity or lack of familiarity with the concept. Question 3 intended to investigate academics' positions vis-à-vis best practices and conditions that would enable opening up higher education. Question 4 intended to investigate the willingness of these academics to contribute to opening up higher education by adopting a diversity of enabling best practices discussed in Chapter 2, and conditions under which they would make such contributions. Question 5 intended to investigate two aspects: Academics' willingness to contribute to OER by publishing their content under an open licence (1) and academics awareness of current development in open and online education (more specifically MOOCs) (2). Question 6 intended to investigate how academics were open to using social media to support off-campus open learners, one of the components of open scholarship. As for Question 7, it opened opportunity and freedom for academics to express themselves in reaction to data collection questions.

I sent the first version of the email questionnaire addressed to academics to volunteers who had accepted to participate in the pilot stage. I asked the volunteers to answer the questions, reflect on their experience answering the questions and base on this reflection to advise on how the questionnaire could be improved to make it easier to answer on the part of participants. The recommendations from these pilot stage participants included leaving a space for answers at the end of each question and present some questions in a tabular format. Following this recommendation, I left a space for answers to many questions. I also presented Section 1 questions in a table with two columns, the left column for questions and the right column for answers. In the version of the self-completion questionnaire I emailed to participants, the headings for the sections were "General information" and "Data collection questions" respectively. After discussion with my supervisor, we agreed on that all questions in both Section 1 and Section 2 were data collection questions. Subsequently, the headings changed to Section 1 and Section 2 respectively. Hence, I improved the final version (which was given multiple rounds of

proofreading and minor editing) in the light of pilot stage volunteers' and my supervisor's feedback.

On the part of learners, most participants were not expected to have their own computers and regular access to the Internet. Instead, they were expected to access and use the Internet, free of charge, only in the institution's computer labs. These labs have limited capacity so that students often have to write their names on a waiting list in order to have access to a computer and the Internet. Alternatively, learners could access the Internet in cyber cafés, but they would have to walk some distance and pay for this access. Many learners may have access to the Internet via their mobile phones. However, the interface of their phones is not good enough for completing a web-based questionnaire. Moreover, the use of their mobile Internet is not free of charge. Therefore, printed self-completion questionnaire (Appendix 6) was the best option to minimal cost on the participants' side.

I structured the self-completion questionnaire addressed to learners in a similar way as the email questionnaire addressed to academics: The questionnaire started with participant's information followed by data collection questions in two sections. Section 1 questions intended to enable participants' identification while Section 2 presented data collection questions that intended to gather information needed to answer Subsidiary Research Question 1 of the third main research question. This subsidiary research question was: "To what extent are learners willing to engage in self-determined open learning?".

The first question in Section 2, and its sub-questions, intended to investigate how participants were affected by recent difficulties in selection of student loan beneficiaries and awarding this loan. At the time, I assumed that the effect of the issue on participants would influence their perspectives vis-à-vis opening up higher education and investment of heutagogical resources (see Figure 2.6). The second research question intended to investigate participants' current level of competence development in the use of social media. These media are technological resources (Figure 2.6) often used by self-determined learners (Blaschke, 2012). Social media also offer academics with opportunities to support

self-determined learning (see *Case 2* in the first section of Chapter 8 (8.1). Question 3 in Section 2 intended to investigate participants' current self-determined/heutagogical learning practices: finding learning resources, engaging with those resources, reflecting on, documenting and sharing their learning progress and using social media for discussing their course materials with peers. Question 4 intended to investigate learners attitudes towards self-determined learning practices such as learning on their own (1), recording own learning progress (2), sharing their recordings on own progress (3), etc., if learning materials are made open. The question also intended to investigate learners' perspectives on assessment of open learning accomplishment for credit, which was discussed in the related literature (Chapter 2) among enablers of open learning. Question 5 aimed at investigating if participants were ready to give up casual routines to prioritise learning. In Question 6, I intended to get participants' views on how courses they have taken are friendly, or not, to self-determined open learning. The final question (Question 7) gave learners opportunity to share any information I had not asked them or raise any issue I had not talked about.

The original version of the self-completion questionnaire addressed to learners was in English. English was established as the language of instruction from the upper level of primary education through secondary education to higher education. However, this was not a guarantee that targeted learners' levels of English language proficiency were good enough to understand the content of the questionnaire and answer the questionnaire in an intelligible way. For this reason, the original version of the questionnaire addressed to learners was translated into Kinyarwanda. This enabled me to collect data in the language participants understood most. The translated version was sent to two experts in both English and Kinyarwanda languages to check the accuracy of translation.

Both email and printed self-completion questionnaires had information on the purpose of the survey and how the survey responses would be used. They also contained information that clearly stated that participation was completely voluntary and that

participants were free to withdraw from the research at any time. Moreover, they contained both open and closed questions. Overall, closed questions were more than open questions.

- An interview protocol

I used an interview protocol (Appendix 7) as a guide in the interview with a University of Rwanda's official who was in a leadership/policy making position. Creswell (2014, p. 194) suggests seven components of an interview protocol: a heading that indicates the date and place of interview as well as the interviewer and the interviewee (1), instruction to be followed by the interviewer (2), questions that include an ice-breaker, main interview questions and a closing statement or question (3) probes of the main questions used to follow up with interviewees' responses for elaborate information (4), space between questions for recording responses (5) a thank you statement (6) and a log to keep record on what has been collected for analysis (7). The seven components were included in the interview protocol I used in Phase 2 data collection.

vi. *Alternative choices of instruments for Phase 2*

Focus group interviews were suggested in this study. If this idea were endorsed, I would have used interview protocols rather than attached email or printed self-completion questionnaires to collect data from academics and learners respectively. On the part of academics, bringing together participants in focus groups at one physical location would have incurred exorbitant costs. Moreover, some of the target participants were not in Rwanda during the period of data collection as discussed earlier. This challenge could possibly have been overcome by conducting virtual focus group interviews in form of video conferences. Yet, access to enabling technologies was not guaranteed. Academics who could not be physically present at the University of Rwanda could possibly have been excluded from the study, and consequently, this would have contributed to the bias of the results.

On the part of learners, the alternative would have been recruiting focus groups at different colleges of the University of Rwanda and use an interview protocol. This could have required collecting data from 8 focus groups or more. Considering the academic calendar at the university, focus group interviews with learners were not practical. Students would have started their holidays before focus group interviews were completed. There was need to use a data collection instrument that allowed a quicker collection of data. A printed self-completion questionnaire was suited for this purpose.

vii. *Data collection procedures*

As soon as each college granted permission to conduct research, I started recruiting participants who belonged to the respective college. On the part of learners, I recruited the first cohort of 22 participants on 22nd May 2015 at the CMHS Nyamishaba Campus. Under the request of a head of department, I volunteered to assist him in the invigilation of an exam. Before the exam started, I introduced myself to students and invited volunteers who wanted to participate in my study to stay around after the exam session.

Initially, 33 students had stayed around after completing their exams. I handed the *participant's information sheet* to them and briefly explained the information. Then, I gave them time to read through and ask questions they may have. After explaining the information to participants and answering questions from these students, 11 of them volunteered to participate in the study. I handed an informed consent form to them and asked them to read through it. Then, I handed in the self-completion questionnaire, asked them to complete the questionnaire and the inform consent form, sign the informed consent form and submit the completed questionnaire and the signed informed consent form at different locations. Submitting the completed questionnaire and the signed informed consent form at different locations enabled me to maintain anonymity of participants.

Three hours later, I gave my presentation to an audience of 15 students. In this presentation, I explained to the audience the current trends in open, online, distance

education and eLearning, shared with them my study and findings of Phase 1, explained what I intended to do in Phase 2 and invited them to participate in my study. After the presentation, 11 more students volunteered to participate. I followed the same procedure in handing in and explaining the *participant's information sheet*, the informed consent form and the questionnaire, and in collecting the completed questionnaires and the signed informed consent forms. By the end of the day, I had already collected data from 22 participants in the learner category.

The remaining data from learners were collected from volunteers at the CMHS Nyarugenge Campus. These data were collected on three consecutive days: 25th, 26th and 27th May 2015. To collect these data, *Communication Skills* instructors who were teaching Level 2 students gave me approximately 50 minutes to visit their classes, explain my study, seek volunteers and collect data from volunteers. These instructors left classrooms after they introduced me to students, which reduced the potential influence of their powers on students' participation. Handing in and explaining the *participant's information sheet*, giving participants time to ask questions and handing in the questionnaire and the informed consent form occurred in a similar way as it had been done at Nyamishaba Campus. Equally, the completed questionnaires and the signed informed consent forms were returned in different locations to avoid pairing the questionnaires and the signed informed consent forms, which could possibly compromise anonymity.

On 25th May 2015, 20 more students volunteered, completed and returned the questionnaires and the signed informed consent forms. On 26th May, 22 more students volunteered but 2 of them withdrew from the study before they could complete and return the questionnaires and the signed informed consent forms. As for 27th May, 43 more participants volunteered and all of them completed and returned the questionnaires and the informed consent forms. All participants who had completed and returned questionnaires and the signed informed consent forms added up to 105.

On their part, academics received the email questionnaire at different times depending on when their respective colleges granted me permission to conduct my research and when academics volunteered to participate in the study. After getting permission to conduct research, I visited different offices of academics at different colleges. I talked to them about my study and gave them time to ask questions. Then, I asked volunteers to give me their email addresses so that I email to them the questionnaire later on. After collecting email addresses of volunteers, I subsequently attached the questionnaire to an email that reintroduced my study and formally invited volunteers to participate.

The first email was sent on 14th May 2015 to 27 initial volunteers from the College of Medicine and Health Sciences. Twenty-two more volunteers were recruited in the same college the following day and I sent them the email questionnaire the same day. This college was the first one to grant permission to conduct my research in it. This permission was granted on 8th May 2015, but I received it three days later (on 11th May 2015). Then, as other colleges granted the permission, I recruited volunteers among academics that belonged to the colleges and sent them the email questionnaire. From 1st June 2015, I sent regular friendly reminders to academics. In total, five reminders were sent to volunteers, with the final one sent on 29th June 2015. The completion and return of the email questionnaire ended on 30th June 2015.

As for the institutional official who participated in the interview, I emailed her the *participant's information sheet* and the *informed consent form* one day before the interview date. In the interview session, I followed Cohen et al.'s (2011) guidelines: before the interview, I informed the informant on the purpose, the nature and the likely duration of the interview session. Then, I sought her written and signed informed consent before switching on the recording device. The interview was conducted in English. During the session, I took notes on the interview protocol. At the end of the session, I took further notes on how the interview went and started initial reflection on information I had collected. The transcription of the recording started the same day of the interview session.

c. Validity

Prior to the use of the MOOC and OER unit evaluation rubrics, the self-completion questionnaires and the interview protocol, I sent these instruments to experts for critical feedback. The experts confirmed that the data that could be gathered using the instruments could help answer my research questions. Having the research instruments checked by experts added *face validity* (Bryman, 2012, p. 171) to the research. Bryman (ibid) argues that face validity, which is the apparent reflection of the content in the questions, can be achieved by asking people who are experienced or have expertise in the field to judge if the measure appears to reflect the concept concerned or the focus of attention. Both experts who made such judgment had expertise and experience in researching open education. For one of them, these expertise and experience expanded across settings and across different generations of technologies: print-based, radio, TV and online. In a similar direction, the version of the self-completion questionnaire for learners translated into Kinyarwanda was sent to two experts in both English and Kinyarwanda to check the accuracy of the translation.

I also followed Yin's (2009) three principles to increase validity of the study. Firstly, I used multiple sources of evidence. In Phase 1, I collected data from 10 MOOCs offered by institutions from four countries dispersed across three continents. I also collected data from 10 OER units. In Phase 2, I collected data from 105 students, 85 academics, 1 institutional leader/policy maker and 4 policy documents. Secondly, I created a database by storing raw data on two external hard drives. I also kept securely the content from which Phase 1 data were drawn as well as the interview recording and policy documents in Phase 2. Finally, I maintained a chain of evidence by linking the data to findings from other studies on barriers to OER adoption discussed in Chapter 2. The chain of evidence was also maintained by connecting the data to socioeconomic and infrastructural barriers to higher education in Rwanda discussed in Chapter 1. A link between various chapters was also established through a cross-sectional reference.

To ensure the validity of the interview data, I compared and contrasted them to responses from academics and learners as well as different policy documents. Denscombe (2010) recommends checking whether the interview information is corroborated by other people or other sources, the practice also known as *triangulation* (p. 189). Cohen et al. (2011, p. 204) refer to this triangulation as *concurrent validity* and reserve the term *triangulation* to an equivalent aspect of reliability. Denscombe (ibid.) goes further to caution against taking interview data at face value if it is possible to confirm or dispute statements using other sources.

In the current study, different policy documents as well as academics' and learners' responses were used to check the concurrence of interview information with other sources. I also checked this concurrence via a close observation of attitudes in the formulation of the National Policy on Open, Distance Education and eLearning that was underway during the period of Phase 2 data collection. In this regard, a particular focus was on involving different stakeholders in policy formulation, the practice that had emerged in the interview session as discussed in Chapter 5. In other words, the fidelity of the informant's statements to real life practices was checked. Such fidelity check is one of the components of reliability in qualitative methodology, according to Cohen et al. (2011, p. 203). Contradictions and concurrence between policy documents, academics' and learners' responses as well as data from the interview informant are discussed in Chapter 7.

Before moving to the next subsection dedicated to reliability, it is worth noting the blurred edge between *validity* and *reliability*. The blurring area between these two concepts is indicated by the interchangeable use of their features across the qualitative research methods literature. According to Cohen et al. (2011, p. 204), *content validity* and *concurrence validity* are basically the same as two features of reliability: *coverage of domain and comprehensiveness (1)* and *triangulation (2)* respectively. Effort made to ensure reliability in the current study is discussed in the following subsection.

d. Reliability

In effort to ensure reliability of different research instruments, I piloted them prior to their use in the main study. This pilot helped me measure the replicability of my study over time (Cohen et al., 2011, p. 199), which is an indicator of reliability (Lincoln & Guba, 1985, p. 298-299). As highlighted earlier, MOOCs and OER unit evaluation rubrics were piloted on five MOOCs and five OER units in 2013. This pilot had revealed that most OER units could contribute at a granular level. That is, some components of the units could be used to enhance courses offered in the existing higher education system. MOOCs were also found convertible into the higher education credit system in Rwanda. It is worth noting, however, that the focus of the study was not yet narrowed down to the *opening up education agenda* at the time of the pilot. As for the self-completion questionnaires, they were piloted on two learners and three academics who volunteered to participate in the pilot phase. The results of the pilot indicated willingness of learners and academics to engage in different self-determined open learning practices and open educational practices respectively.

Reliability was also ensured by closely examining the characteristics of data collected. It is in this regard that the interview data, data from policy documents, data from returned email questionnaires and data from returned printed questionnaires were compared and contrasted. As pointed out earlier, Cohen et al. (2011) refer to this practice as triangulation which they take as one of the aspects of reliability. The purpose of this triangulation was to check if the data from these different sources concurred/cohered or if there were some contradictions. Lincoln & Guba (1985, p. 318) refer to this concurrence/coherence as *confirmability*, which they considered as a feature of reliability.

In addition, links to OER units were provided in Appendix 4. Equally, real names of OER units and MOOCs were provided. The provision of links to OER units and real names of these units and MOOCS enables verification of the findings using the same rubrics. In a similar direction, the instruments used in the current study and the results will

be made available under an open licence. This will ensure accountability and remove the cost barrier to anyone who wants to verify the findings and replicate the study (OSTP, 2013). The draft of the thesis will also be made openly available to enable scrutiny by potential beneficiaries, especially those in the context where the data for Phase 2 were collected. Pole & Lampard (2002, p. 208) argue that understanding the context in which data are collected is critical to judging the research findings validity and reliability. Briefly, effort was made to enable possibilities to critique my research.

Moreover, extracts of the interview data report and discussion were shared with the informant. I requested the informant to check if the extracts were accurate, confirm this accuracy or point out anything that needed to be amended. The informant was given a period of one month for this confirmation or amendment suggestions. No issue was raised and no suggestions for amendment were made. This was the same for my mentees discussed later in the *Parallel development component* subsection. I shared with them extracts that narrated/discussed our mentorship relation and its results. I asked them to read through the extracts, confirm their accuracy or suggest any amendment to make them more accurate. One of them suggested a minor amendment, which was made accordingly. The others confirmed that the extracts were accurate. Similarly, narratives on how academics may activate and nurture the investment of heutagogical resources were shared to academics featured in the three cases in Chapter 8, Section 8.1. These academics were given three weeks to read through and confirm authenticity or suggest amendment to ensure authenticity. Two academics confirmed that the cases were authentic and the third one suggested a minor amendment to have maximal authenticity. This amendment was made as advised by this academic.

e. Analysis, interpretation and report of data

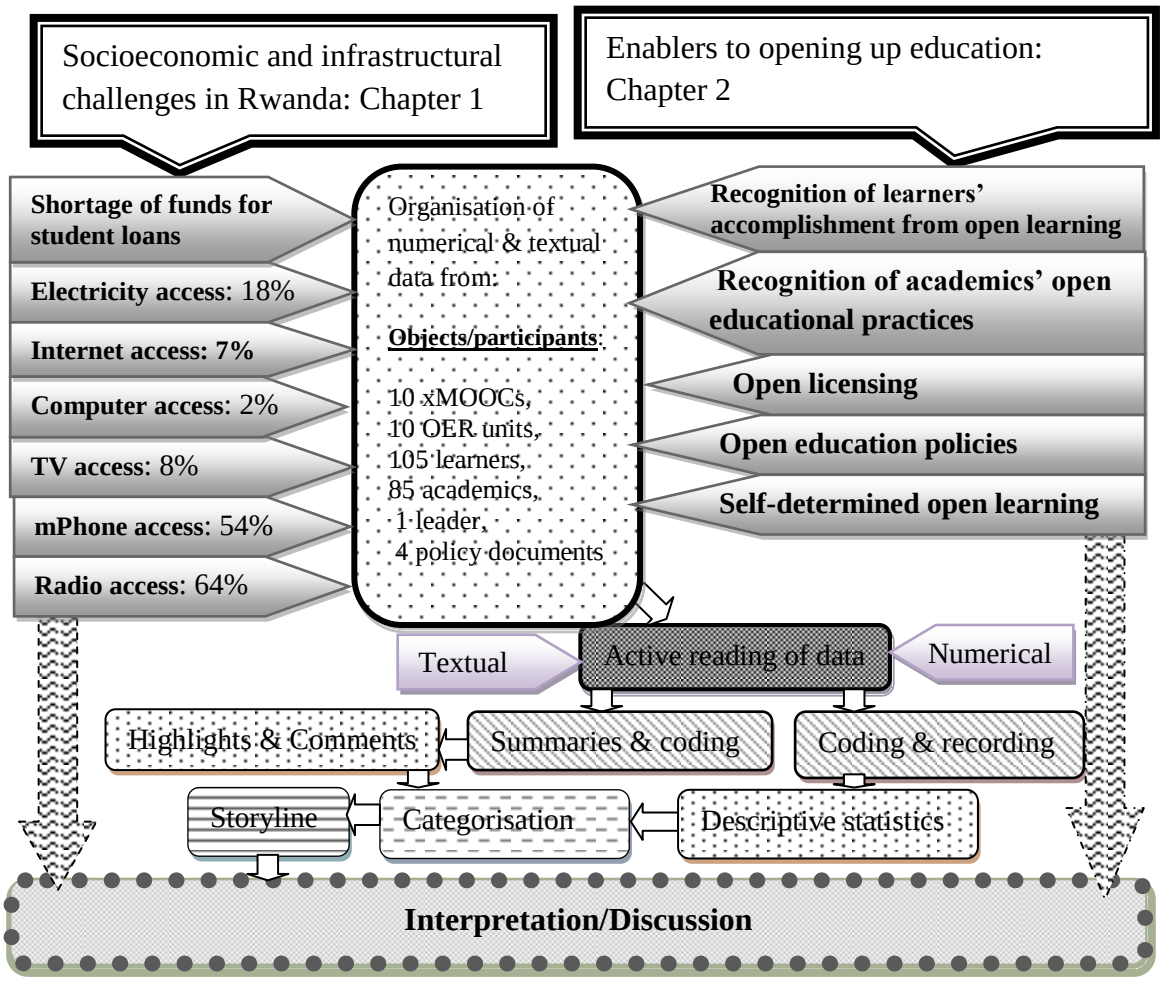
After collecting data, I organised, presented and analysed them *by research question* and by themes (Cohen et al., 2011, pp. 551-552). Although Phase 1 and Phase 2 data were collected and analysed at different periods, a similar process was undertaken in

analysing qualitative and quantitative data collected in these two phases. I was informed by Creswell's (2014, pp. 197-201) analytical framework that consists of six different stages. In Stage 1, data are organised and prepared for analysis. In Stage 2, the researcher looks and reads through all data. In Stage 3, the researcher codes all the data. In Stage 4, the researcher uses the coding process to generate description of the setting or people as well as themes for analysis. In Stage 5, the researcher presents findings in a narrative/storyline. In Stage 6, the researcher interprets findings. Figure 3.3 which was inspired by Creswell's (ibid) six stages of analysis outlines the analytical framework in the current study.

I started with organisation of date I had collected and extensive reading of the documents on/from which the data were collected: MOOCs and OER unit evaluation rubrics, the interview recording and various policy documents (1). After this extensive reading, I wrote summaries of the data collected (2). In this stage, I read and reread through the summaries and referred back to the original sources. I also coded and recorded numerical data in a spreadsheet file in stage 2. Then, I highlighted and commented on features, clauses, attitudes and practices across the data that may contribute to opening up higher education in Rwanda, or the ones that may reinforce existing barriers (3). It is also in this stage that descriptive statistics and graphs were produced. Afterward, I grouped the features, clauses, attitudes and practices in categories of enablers or inhibitors identified in the literature (4). In this stage, groups of enablers were categorised under themes and research questions which were formulated around different natural clusters: MOOCs, OER units, learners, academics and institutional leaders/policy makers. The themes emerged from the literature and the data. After this categorisation, I developed a storyline/narrative on features, clauses, attitudes and practices that would enable or inhibit opening up higher education in Rwanda (5). In this stage, I also identified concurrence/coherence (confirmation) or contradictions between data from different sources: policy documents, the interview informant, academics and learners. Finally, I discussed the findings in the light of the literature on MOOCs, OER, open education, open educational practices and self-determined learning as well as socioeconomic and infrastructural challenges highlighted in Chapter 1(6).

In this discussion, I focused on potentials offered by enablers linked to the five natural clusters: MOOCs, OER units, learners, academics and institutional leaders/policy makers. I also focused on the willingness of learners, academics and institutional leaders/policy makers to contribute to removing barriers that are not addressed in MOOCs and OER units. Equally, I highlighted how practices and attitudes of stakeholders in one category may enable or inhibit the engagement of stakeholders in other categories. This was done with the framework for collaborative investment in opening up education discussed in Chapter 2 (Figure 2.6) in mind.

Figure 3.3 Analytical framework



3.1.2 The Parallel development component

Parallel to the *research component*, I was actively involved in various activities and networks. This participation intended to contribute to the open education debate, raising awareness on opening up higher education in Rwanda and developing/enabling a better understanding of heutagogy/self-determined learning. Most of my activities in the parallel development component revolved around six categories discussed below: presentations at conferences (1), publishing in peer reviewed journals and edited books (2), networking (3), raising awareness and triggering action on opening up higher education in Rwanda (4), mentorship (5) and moving with the pace of MOOC development (6).

a. Presentations at conferences

During my PhD study, I presented five different papers at four international conferences and one local conference. One of those papers is featured in this subsection. "Cultural translation in Massive Open Online Courses (MOOCs)" was presented at the *2nd European MOOC Stakeholders' Summit (EMOOCs 2014)* held in Lausanne, Switzerland, on 10-12 February 2014. This paper was authored to contribute to settling the dispute on *cultural imperialism* that emerged in at least three conferences related to open education I attended, including EMOOCs 2014.

In this paper, a call was addressed to two extremes in this debate. On the one hand, empathy and understanding of challenges in developing settings from the perspective of people who live those challenges was recommended to players in well-resourced settings who claimed to be transforming learning in under-resourced settings. These players were also called to openly license their content to enable a cross-cultural adaptation and wider dissemination of the content if they really wanted to contribute to opening education in under-resourced settings. On the opposite extreme, a radical rejection of content and courses from well-resourced societies, simply because they are not locally-made was

critiqued. This attitude benefits the privileged minority of people in under-resourced settings at the expense of the underprivileged majority who are not included in the higher education system. A cross-cultural and multidirectional exchange of knowledge and expertise was recommended to both belligerents. The paper was selected among best papers presented at the conference and was published in a peer-reviewed journal as discussed in the following subsection. The paper was also selected for republication in a special edition of the journal as discussed in Chapter 6. The following subsection focuses on publication in refereed journals and books.

b. Publishing in peer reviewed journals and edited books

Five papers were published in peer reviewed journals and one paper in an edited book. All these papers were sent to open access journals or publishers who abide to the *Platinum* open access publishing route (Weller, 2014, p. 7). Two of those papers are featured in this subsection: The first paper is an improved version of "Cultural translation in Massive Open Online Courses (MOOCs)" published in Issue 37 of the *eLearning Papers* journal in March 2014.

The second paper featured in this subsection was co-authored with some academics at the University of Rwanda who participated in Phase 2 of my study. "Towards innovation in digital and open scholarship for non-rivalrous lifelong learning and supporting open learning: The case of the Open Scholars Network" was co-authored to contribute to addressing a challenge that had emerged in Phase 2 data collection. Some academics had expressed a concern of their inability to access their journal articles published under "*All-right reserved*". These academics may address this issue by publishing in open access journals, but many of them were discouraged by exorbitant Article Processing Charges (APCs). One of the intentions of the authors who collaborated on writing the paper was to contribute to a better understanding of different open access publishing routes among academics at the University of Rwanda. The paper was published in Issue 44 of the "*eLearning Papers*" journal. The results of this practice are presented in Chapter 6.

c. Networking

I have been participating in different global and local professional networks in the areas of open education, eLearning/learning technologies and heutagogy. One of such networks is the *Global Open Educational Resources Graduate Network (GO-GN),* a network of OER, MOOCs and open education PhD researchers and their supervisors who were interested in joining the network as experts. The GO-GN organised different seminars. I participated in the first seminar that was held in Cape Town, South Africa, from 6th to 13th December 2013 and the third seminar that was held in Arlington, USA, from 17th to 18th November 2014. I was also a member of the *Open Education Working Group Advisory Board* in 2014. Moreover, I have been a member of the *Heutagogy Community of Practice* which discusses the concept of heutagogy/self-determined learning and its practical application in education. This community is active via social media: LinkedIn, Twitter and Facebook.

Besides these formal networks, I have been in various informal networks with different categories of stakeholders who promote open education as well as experts in the field. These informal networks are mediated via social media mainly Twitter, LinkedIn and Facebook. Participation in these social media networks enabled me to reach global experts in the field of OER, MOOCs and open education.

d. Raising awareness/triggering action on opening up higher education in Rwanda

As discussed in Chapter 1, my offer to volunteer in open education related initiatives to the Ministry of Education that ended up being undertaken at Rwanda Education Board was motivated by an agenda to contribute to opening up higher education. After starting my PhD course, I continued to contribute to such initiatives remotely. In November 2012, I drafted a section on open educational practices in the final report on the College of Open and Distance Learning (Mukama et al., 2013). In May 2013, I volunteered to translate the 2012 Paris OER Declaration into Kinyarwanda in effort to raise awareness

of open education principles encapsulated in this declaration in Rwanda. I also kept sharing my published papers with key stakeholders who could potentially contribute to opening up higher education in Rwanda.

In late 2014 and early 2015, I participated regularly in open live Twitter sessions that were hosted by the then Rwanda's Minister of Education. In these sessions, I triggered discussion on opening up higher education in Rwanda. Presentations I gave and seminars I facilitated at different campuses of the University of Rwanda during the field work period also constitute my contribution to raising awareness of open education in Rwanda. The outcome of this participation is discussed in Chapter 6.

e. Mentorship

During my PhD research, I provided voluntary mentorship to learners in Rwanda. In my mentorship, I focused on building the mentees' self-confidence and activating their investment of heutagogical resources (Chapter 2 and Figure 2.6) to avoid their surrender. This practice enabled a practical application of heutagogy, which made difference in the mentees' performance. With permission from the concerned mentees, three distinctive cases are discussed below.

My first mentee was applying for the Commonwealth Award for his PhD study in the UK. He was concerned about meeting the requirements from the nominating agency, Rwanda Education Board (REB), by the submission deadline. He almost surrendered before submitting his application. My mentorship advice was to carry on with the application and focus on meeting all requirements from the Commonwealth Scholarship Commission. I emphasised that if he felt it was difficult to meet all the requirements from REB, this experience was shared with other applicants. I also highlighted that he may be the only one who meet most of the requirements from REB. This mentee changed his mind and submitted his application. He ended up being the only winner of the Commonwealth

Award from Rwanda in the 2013/2014 cohort. He is now doing his PhD research in England, under the Commonwealth Award.

My second mentee was an undergraduate student whose dream had been to apply for an international scholarship. Our mentorship relation had already started about three years prior to the start of my PhD research. She had completed secondary education with a pass grade and had no chance of winning a scholarship locally or internationally due to this low performance. She could not even be eligible to apply for student loan in Rwanda because it is highly competitive and rivalrous as discussed in Chapter 1. She had worked full-time for three years, with a monthly salary of approximately £35. With this low earning, her savings could not even pay tuition fee for only one year. Her family was poor and could not afford tuition fee in higher education.

At the beginning of our mentorship relation, the mentee attributed the apparent impossibility to get student loan or scholarship to her underprivileged background. She was hopeless because there was no important figure in her family who could help her get student loan or a scholarship. My argument was that she could not get student loan or scholarship due to her low performance in the national exams. I emphasised that if her performance were high, she could apply for international scholarship that are provided on merit-basis. Initially, she did not believe learners from low income families can win such scholarships. However, my success on applications for scholarships and awards (mainly the Rotary University Scholarship Scheme and the Fulbright Scholar Award) for my postgraduate education in the UK and USA convinced the mentee that international scholarships provided on merit basis can also be awarded to underprivileged learners.

After this conviction, I advised the mentee that there was always possibility for her to win an international scholarship, despite her low performance in the national exams. This possibility was to start undergraduate education in a local institution, paying tuition fee herself, and aim to complete undergraduate education with a high distinction (a first class in the current grading system). To have such a high performance, I emphasised the

necessity to prioritise learning over everything and invest in it the maximum amount of time and effort. The mentee took risk and left her underpaying job to invest most time and effort on learning. The outcome of this decision and associated dedication is presented in Chapter 6.

My third mentee was a University of Leicester student who was taking an online postgraduate course from Rwanda. In the early stage of my PhD research, I was approached by a University of Leicester's academic who was asking if I could possibly volunteer in mentoring an online Rwandan student, the request I responded to positively. This mentee worked for a college that was not connected to the Internet yet. With the combination of all public higher education institutions into the University of Rwanda discussed in Chapter 1, this college became one of the campuses of this university. The mentee had to pay for four kilometer bike rides to a nearby hospital where he could access the Internet. He could also tether his Samsung phone to his iPad provided by the University of Leicester at the beginning of the programme or to his laptop to access the Internet.

In our first Skype mentorship session, the mentee was concerned about the poor quality and irregularity of the Internet he could access and mentioned that he had considered dropping out. I shared with him my online learning experience with the Open University, which sometimes entailed a three-hour bus trip to access the Internet. I highlighted that this required giving up social and family events to prioritise learning. I reassured the mentee that he would be successful if he does the same and combine both online and offline learning. The outcome of this mentorship is also presented in Chapter 6.

f. Tracing the MOOC development

My active participation in MOOCs did not stop with the 15 courses used in the research components. I continued taking MOOCs to remain up-to-date with the rapid development of these courses. In this practice, I ensured the workload was manageable by taking a limited number of MOOCs that were running concurrently. Taking more MOOCs

beyond the ones that were used in the main study enabled me to identify more courses that can contribute indirectly to opening up higher education in Rwanda. Those MOOCs are discussed in Chapter 4.

3.1.3 Interconnection between the research component and the parallel development component

The research component and the parallel development component have been feeding into each other. Most of the papers I presented at different conferences and sent to various journals for publication were authored in the light of insights from MOOCs I had taken for use in Phase 1 of the research component. For instance LSIO, AT21CS and LTO inspired "Fostering collaborative investment in Massive Open Online Courses (MOOCs)" presented at the *Mapping the European MOOC Territory Conference* and later on published in the book edited by EADTU members who were also involved in the HOME partnership. In this way, the parallel development component benefited from the research component.

The benefit in the opposite direction seems to have been more significant. The framework for collaborative investment in opening up education (Figure 2.6) that informed Phase 2 design and data collection was initially developed in the paper that was authored for the *Mapping the European MOOC Territory Conference*. Writing papers for conferences and journals also contributed to the improvement of the research component, especially with regard to the collection of the relevant literature that was discussed in Chapter 2 and informed interpretation of findings in Chapter 7. Equally, constructive feedback from reviewers was transferable in the improvement of the research component of my thesis.

Additionally, links to many journal articles that constitute this literature used in discussion of findings were shared on Facebook and tweeted just after publication. The

majority of them were published under open licences since they were authored by experts who abide to open education and open scholarship principles. My participation in networks mediated via social media enabled me to have instant access to those resources.

Moreover, my mentorship created a strong link between me and the mentees, which paid off at different stages of my research. My first mentee described in the previous subsection was among volunteers who participated in the category of academics and so were other academics I mentored. He was also among the experts who checked the authenticity of translation of the self-completion questionnaire addressed to learners and participated in the pilot of the email questionnaire addressed to academics. My third mentee who was studying with the University Leicester organised a seminar at one of the University of Rwanda's campuses, the most successful of all seminars and presentations I gave at different campuses of this university. In this seminar, 23 academics volunteered to participate in my study and this was a significant contribution to the research component of my study.

Finally, my mentorship enabled me to test the concept of heutagogy which is critical to the current study. When my third mentee expressed his concerns in our first Skype session, I had no doubt on tutorial support and high quality content he would get from the University of Leicester. Tutorial support and learning content constitute pedagogical resources (Chapter 2 and Figure 2.6). It clearly appeared to me that what the mentee needed was the activation of investment of heutagogical resources (more time, more effort, dedication, perseverance, prioritisation of learning, planning of own learning, etc.) to complement pedagogical resources that were available at the University of Leicester. Similarly, my second mentee made exceptional accomplishment thanks to heutagogical investment. Details on the outcomes of this mentorship engagement are presented in Chapter 6.

3.2 Ethics and access

In order to conduct my research ethically, I engaged in the practice of giving back all along my study. In Phase 1, I moved beyond taking resources that were available in different MOOCs for my own interest. I also participated actively with intention to contribute to better learning experience of MOOC participants, which was one way to give back. In this regard, I contributed comments in the forum and constructive feedback to other MOOC learners' assignments even though this was beyond the scope of my research. Rather than critiquing MOOCs and how they run indifferently, I was part of participants who were contributing to successful run of these courses. This participation was motivated by my conviction that any course, MOOCs included, can be bad or good depending on its participants (instructors' included). I wanted to be a positive shaper of MOOCs I investigated rather than being an indifferent observer who does not empathise with experience of other participants.

Other beneficiaries of my practice of giving back are my mentees, their sponsoring organisations and participants in Phase 2 of my study. The Commonwealth Scholarship Commission sponsored 80 per cent of my PhD tuition fee and stipend to cover my living expenses. My volunteer mentorship to a Commonwealth scholarship applicant was a way of giving back. Similarly, my volunteer to mentor a Rwandan student who was studying with the University of Leicester was a way of giving back not least because the university sponsored 20 per cent of my PhD tuition fee. Equally importantly, I gave back by leading a team of co-authors of an article published in Issue 44 of the *eLearning Papers* journal. This article was written to contribute to raising awareness of academics, especially the ones at the University of Rwanda, on choices they can make to avoid enormous charges required for openly publishing their work. This initiative was in response to the issue that had been raised during my field work period in Rwanda.

Beyond giving back, I engaged in regular discussions and self-appraisal on ethical dimensions at various stages. I conducted self-appraisal in the light of Stutchbury & Fox's

(2009, pp. 495-496) ethical grid and had some discussion with one of the authors to have her perspective on my ethical practices. This enabled me to pre-emptively detect potential issues and plan for contingent and conterxtualised ethical decision making in a way that is responsive and sensitive to the research context (Whiteman, 2012, p. 13). One of the decisions made in the light of this self-appraisal was on Phase 2 data collection in a way that aligned with effective management of both the research funds and time. In this phase, I decided to minimise cost (in terms of both time and money) on the part of both funders and participants. This principal informed my decisions on conducting Phase 2 data collection and planning to transfer to the writing up status on time.

In Phase 1, the discussion had been on whether permission to conduct research on MOOCs was needed. Coursera's terms of use allowed to "download material from the sites only for your own personal, non-commercial use" (Coursera, 2014, para 16). This study was conducted within the limits of this permission: the content downloaded from the platform was not distributed to other users and was not used for any commercial purpose. The use of the forum discussion content could have required permission from participants, but this type of content was not of interest in my research. As for FutureLearn, the MOOC from this platform I used in this research had content that had been released under CC BY-NC-SA UK 2.0 licence (please see details on open licences in Chapter 2). Therefore, permission to use the content in research was also inherently provided and the content was used within the limits of the permission offered via this open licence.

Although Phase 1 of the research component did not involve human participants, I sought ethical approvals from the University of Leicester. This created an opportunities to discuss the ethical dimension in my research with members of the University of Leicester's Ethics Committee. Phase 2 of the research component involved various stakeholders in Rwandan higher education. Ethical approvals were sought from both the University of Leicester and the University of Rwanda. In addition, permissions to conduct research at different colleges of the University of Rwanda were sought.

Prior to collecting Phase 2 data from participants, I provided them with enough information about my research. I informed them about the purpose of my research and why their participation was an invaluable contribution (Newby, 2010) to both my study and effort to open up higher education in Rwanda. I also informed them on the process in which they would engaged, why their contribution was necessary, how the information they provided would be used, to whom it would be reported and their right to withdraw from the research at any stage (British Educational Research Association, 2011, p. 5-6).

Moreover, I sought signed informed consent from participants in the "*learners"* category and from the interview informant. As for participants in the "*academics"* category, they were informed that their decision to complete and email back the questionnaire meant that they had consented to voluntarily participate in the study and grant me permission to use the information they provided in my research. This information was included in the *information to participants* section of the email questionnaire file. Not seeking signed informed consent from academics was not simply a short cut to conduct my research in easy way. Instead, this decision was made to avoid incurring financial cost related to printing informed consent forms and scanning the completed and signed versions and related time. The negligence to avoid this cost could have affected participation since many academics did not have easy access to printers and more importantly, scanners.

Effort was made to ensure confidentiality and privacy. On the part of academics and learners, participation was anonymous: their identity was not included in the returned questionnaires. Questionnaires returned from learners were submitted in different locations from signed informed consent forms. This helped me avoid any possibility of having a completed questionnaire paired with an informed consent form signed by the participant who completed the specific questionnaire. The signed informed consent forms had participants' names and pairing them with completed questionnaires could jeopardise participants' anonymity. On the part of academics, the files of completed questionnaires returned via email were given code names that had nothing to do with real names of participants who returned them.

However, confidentiality, anonymity and privacy could not be guaranteed on the part of the interview informant since she was in a unique leadership position. More importantly, the privacy of my mentees discussed in the parallel development component had to be unveiled to ensure reliability and enable possibility to verify the transformative outcomes of this mentorship reported in this study. This was done with permissions of the concerned mentees who shared my conviction that the revelation of our mentorship relation outcomes can inspire learners in underprivileged settings. Many of these learners are socioeconomically underprivileged and therefore, socially disempowered (Lane, 2009; Lane & Van Dorp, 2011). The inspiration from my mentees' accomplishment may constitute social empowerment (Lane, ibid; Lane & Van Dorp, ibid) that may make difference in underprivileged learners' lives.

My thesis and journal articles arising from my PhD research will be published under open licences. Equally, a copy of the thesis will be made available for the University of Rwanda's library in both printed and electronic format. Online publication of research reports and related papers is recommended in British Educational Research Association's (2011, p. 8) research ethics guidelines. In addition to online publication of my thesis and related papers, the open licences under which they will be copyrighted will eliminate their rivalrous nature (Weller, 2011), one of the major barriers to opening up higher education in Rwanda. Open licences will also enable a public scrutiny of my work without incurring any cost on the part of the public.

In order to gain access to the research field, I maintained connections I had built when I was working in Rwanda and created new ones. I stayed in touch with the University of Rwanda, especially its college of Medicine and Health Sciences. This college emerged from a combination of Kigali Health Institute I worked for prior to starting my PhD course and the Faculty of Medicine and the School of Public Health, both from the former National University of Rwanda. Finally, the open education policy brief discussed earlier was emailed to officials at both the University of Rwanda and the Ministry of Education.

3.3 Best practices

In the current study, I combined research, hands-on experience with research objects and active participation in the research context. This helped me develop a more accurate understanding of the potential contribution of the research objects in addressing a specific education challenge in that setting. I also mentored learners from the research context which enabled me to activate and test heutagogical practices in this context. My goal in the current study was to end up with not only a report of findings, but also a better understanding on how part of the findings may translate into heutagogical open learning and open educational practices.

To have first-hand experience of learning with minimal rivalrous resources (Chapter 2 and Figure 2.6), I actively participated, as an *all-rounder* (Anderson et al., 2014, p. 688), in at least 25 MOOCs. Such participation also enabled me to experience self-determined open learning which is critical for success in open learning. Equally, this participation helped me develop a perspective of one of the key stakeholders in MOOCs and open education: the learner's perspective. Therefore, being a participant investigator helped me walk the talk on the investment of heutagogical resources.

Although such an involvement may lead to bias, this kind of bias can be controlled by transparently reporting findings. Every researcher should make effort to achieve this transparency. I made such effort by keeping all content from which data were collected in safe database to enable verification either by me or others. Unlike biases based on engaging with learning objects that can be addressed when there is willingness, biases based on the lack of enough information is not likely to be addressed since researchers may not even be aware that they are biased. This is why I made a choice to engage with MOOCs to have first-hand experience with and information on these courses rather than relying on conflicting depictions of these courses that had emerged in the literature, media and blogosphere.

I was also actively engaged with OER units, which enabled me to uncover, with measurable evidence, an issue in the related literature. The repository the units were drawn from has consistently been cited as an example of OER repository (D'Antoni, 2009; Schaffert, 2010; Didderen & Verjans, 2012). However, the amount and nature of openly licensed resources in most OER units hosted in this repository seem to have not been critically discussed. As discussed in chapters 4 and 7, this amount is far below expectations triggered by the way the repository has been over-promoted. This is especially the case when the agenda is opening up higher education in the sense of achieving open access (Weller, 2011) rather than marketing. Have I not engaged with the units, with a close examination of every resource in them, this fact would probably have not been uncovered as it rarely appears in the published OER literature.

Finally, the study was also linked to a specific setting and a real open education issue in that setting without being indifferent to what participants experienced. The prevailing contextual challenges were kept in mind and my role in the context was not abandoned for the sake of research. I avoided inaction which, itself, may emerge from ethical blindness (Whiteman, 2012, p. 40). Whenever I felt I could contribute to the wellbeing of people in that setting, I did not hesitate to make my contribution. The study was conducted within a solution-oriented approach and participants were involved in solution finding. It is in this perspective that the paper that covered open access publishing was co-authored with some of the participants in this study. Briefly, I did not forget my social responsibility for the sake of research.

Chapter Summary

In this Chapter, I discussed the study design: *transformative mixed methods* design. The study consists of two major components: the *research* component and the *parallel development* component. The research component had two phases. Phase 1 focused on the content side of open education. In this phase, I investigated the potential of xMOOCs and OER units to be adapted for use in opening up higher education in Rwanda. Data were

collected from 10 xMOOCs and 10 OER units using rubrics and a MOOC participation log. In Phase 2, I focused on the human-side of opening up education: the interest was on the potential contribution of different stakeholders in Rwandan higher education to opening up this level of education. Data were collected from 105 learners, 85 academics, one institutional leader/policy maker and four policy documents. An email questionnaire, a printed questionnaire and an interview protocol were used to collect these data.

The collected data were organised, presented and analysed by research questions and by themes. Then, they were discussed in the light of socioeconomic and infrastructural challenges discussed in Chapter 1 and enablers to open education discussed in Chapter 2. Phase 1 findings are presented in Chapter 4 while Phase 2 findings are presented in Chapter 5.

The parallel development component consisted of my contributions to different academic conferences, peer-reviewed journals, networks, awareness of open education in Rwanda, policy brief on open education in Rwanda, mentorship and keeping up with the MOOC development. Selected outcomes of this participation are presented in Chapter 6.

Both the research component and the parallel development component were mutually beneficial. Many of the papers I authored were inspired by MOOCs I participated in as part of my PhD research. In opposite direction, mentorship helped me build connections that paid off when I was collecting data for Phase 2 of the research component and put the concept of heutagogy in practice.

Various decisions were made to keep the study as ethical as possible. Those include giving back all along my study (1), ethical self-appraisal (2), regular discussion of potential ethical issues (3), seeking research ethics approvals and different permissions to conduct my research in the target context (4) and building relations with potential participants and beneficiaries (5). Briefly, I adopted a participatory approach, which enabled me to contribute to open education related research, policy and practices all along the study.

CHAPTER 4 PHASE 1 RESULTS

In this chapter, findings on MOOCs and OER units are presented. Overarching research questions in Phase 1 were "*Which MOOCs can potentially be adapted for use in opening up Rwandan higher education?*" and "*Which OER units can potentially be adapted for use in opening up Rwandan higher education?*". To answer these questions, I participated in MOOCs and engaged with OER units, and I noted all features in these courses and resources that would enable their use to address challenges in Rwandan higher education discussed in Chapter 1.

This chapter starts with an elaboration of organisation and analysis of data from MOOCs in Section 4.1 followed by a general overview of MOOCs evaluated in Section 4.2. In Section 4.3, the features of those MOOCs are presented in detail in the themes that emerged in data analysis. These findings on MOOCs are also published in Nkuyubwatsi (2016). In Section 4.4, I answer the first research question. In Section 4.5, I present additional findings on MOOCs. In Section 4.6, I present a general overview of OER units analysed. In Section 4.7, a detailed account of features in the OER units is presented. Similar to MOOC features, OER unit features are presented in two themes that emerged in analysis. In Section 4.8, I answer the second research question. Additional findings on OER units are presented in Section 4.9, before wrapping up the chapter with a summary of Phase 1 key findings.

4.1 Organisation, analysis and interpretation of data on MOOCs

Data on MOOCs were organised in ten clusters (major areas) of statements that composed the MOOC evaluation rubric (see Appendix 1). The first cluster, *Student orientation*, intended to investigate the amount and quality of information provided on specific MOOCs regarding the workload, recommended background and study guide. This investigation was expected to help find out if MOOCs would be cost effective not only in terms of money but also in terms of learners' time management. While MOOCs are free of

charge on the part of learners, ineffective orientation on these courses may be costly (in term of time) to learners. In the context of OER, MOOCs and informal learning, Miyazoe & Anderson (2013) make an important reminder that "time is money". These authors argue that time invested by the learner may help reduce the cost of education without undermining the quality. This implies that misinformation about MOOCs and OER make education costly, especially when learners' time is wasted due to this misinformation.

The second cluster, *Quality of explanation of the subject matter*, intended to investigate the potential of MOOCs in providing quality learning. In the context of this study, quality learning refers to possibility for positive transformation among learners who are dedicated and make enough heutagogical resource investment (see Chapter 2 and Figure 2.6) rather than the frequency of the teacher's presence in the course. With a minimal or no teacher's presence, quality learning may be enabled by learning materials that have been designed in a way that enables learner-content interaction (Anderson, 2003).

The third cluster, *Utility of materials designed to support learning and teaching*, intended to investigate the comprehensibility of MOOCs and their content, the aspect that is critical in courses where teacher's presence is reduced. Statements in this cluster also investigated openness to a diversity of learning approaches, which was thought to enable multiple ways for learners to demonstrate what they know and engage with their learning (McAndrew et al., 2012).

The fourth cluster helped investigate the fit of MOOCs in different classifications that had been suggested in the related literature. The fifth cluster, *Openness and accessibility*, was included with an agenda to investigate accessibility of MOOCs and their content not only in terms of responding to needs of learners with disability, but, equally importantly, those of learners with socioeconomic and technological disadvantages. The sixth cluster, *Quality of assessments*, aimed at investigating a constructive alignment (Biggs, no date) between the course objective, the content and assessment and validity as well as awareness of learners' diversity in MOOC assessment.

The seventh cluster, *Quality of technological interactivity*, intended to investigate how technologies used in MOOCs allow learners to manage and control their own learning. The eighth cluster, *Quality of instructional and practice exercises*, was included to enable the investigation on how MOOCs enable the reinforcement of learning through exercises. The ninth cluster, *Opportunities for deeper learning*, helped investigating whether MOOCs can enable deeper learning needed for high quality learning. As for the final cluster, *Fit in the Rwandan higher education system*, it helped to investigate the transferability of MOOCs in the Rwandan credit system on the basis of the workload in these courses.

The preparation and organisation of the data in the ten clusters started during data collection, but at this level, I was in Stage 1 of Creswell's (2014, pp. 197-201) analytical framework discussed in Chapter 3. In Stage 2 of the framework, I looked and read through all the data I had collected on MOOCs. In Stage 3, I coded the data on MOOCs. In Stage 4, I used the codes produced in the previous stage to generate description of the themes for analysis. It is in this stage that six analytical themes under which data were analysed were identified: learning materials (1), learning activities (2), learning assessment (3), workload in MOOCs (4), scalability (5) and licensing/legal framework (6). In Stage 5, I developed the narratives/storylines that present findings in the following two sections: *General overview of MOOCs evaluated* (Section 4.2) and *A detailed look at features of MOOCs evaluated* (Section 4.3). The latter narrative/storyline presented findings across six analytical categories identified in the previous stage. In Stage 6, I interpreted/discussed the findings in the light of the related literature (Chapter 2) and socioeconomic and infrastructural challenges that prevail in Rwanda (Chapter 1).

4.2 General overview of MOOCs evaluated

In Phase 1, data were collected from 10 MOOCs: CS, OGLNMN, LE, EDC, ISRMC, SSY, GGSGPB I, Gamification, AT21CS and LTO (See Chapter 3 for the full name of the MOOCs). All the ten MOOCs had a start and an end date, and were all facilitated by instructors. Enrollment in the courses was free of charge and learners could

engage in the courses as much or as little as they wanted. As discussed in Chapter 2, however, it is too naïve to assume that MOOCs are very similar even when they are provided by institutions located in the same country. Some aspects were shared by many MOOCs and not present in many others as discussed below.

A statement of accomplishment was awarded to learners who completed CS, OGLNMN, LE, EDC, GGSGPB I, Gamification and AT21CS with a score that was equal or superior to the passing grade that was specified in each of these MOOCs. The passing grade could vary from MOOC to MOOC, apparently depending on the grading system in the country where the course provider was located. In some MOOCs, a statement of accomplishment with distinction was awarded to students who had scored above a higher cut-off point or completed more assignments. Students who earned a statement of accomplishment could link the MOOCs to their LinkedIn profile and/or tweet their grades.

LTO did not award a statement of accomplishment, but it awarded a verified certificate. Students who were not interested in this verified certificate could not link the MOOC to their LinkedIn profile. Yet, their results were published in their record of completed courses if they had obtained the passing grade. As for ISRMC, neither a statement of accomplishment nor a verified certificate was awarded. The student's result in the course was not published in the record of completed courses. SSY awarded a *statement of participation* at the cost of £24 and a *statement of attainment by exam* which cost £119.

The MOOC contents could be based on video materials, assigned readings, discussion forum, weekly quizzes and final exams. Video materials could consist of instructors' lectures, sessions in which experts in the field were interviewed, recordings of guest speakers' talks, recordings of live events and other video materials available on the web. The length of the video materials could vary from less than 3 minutes to more than 25 minutes in some MOOCs. In most MOOCs, these videos had imbedded quizzes that mainly consisted of multiple choice questions. Exceptions were AT21CS and LTO whose quizzes consisted of votes after which statistics that indicated peers' perspectives were released and

ISRMC whose videos were interrupted by pauses in which important information was highlighted. The video materials hosted on the Coursera platform were interactive. The students could adjust the speech rate, repeat the video as much as they wanted and add captions in English. In some MOOCs, these captions were also available in many other languages.

Discussion of the learning materials was mainly enabled by the course forum in all the 9 MOOCs that were offered via the Coursera platform. In SSY that was offered via the FutureLearn platform, discussions were held on webpages where the content of units of the MOOC was published. In addition to the forum discussion or web comments, Google hangouts were hosted in some MOOCs. Equally, Twitter hashtags were created and shared with course communities in many MOOCs. Most of the MOOCs that encouraged tweeting had a Twitter aggregation on the course website. In some MOOCs, learners were also required or encouraged to publish and share links to their blog posts and comment on peers' posts. The level of instructors' responsiveness to learners' contributions varied across MOOCs.

Assessment in MOOCs was diverse. To some extent, this diversity may reflect diversity in assessment systems across countries offering universities were located in. However, this should not be taken as an exclusive basis of diversity in MOOCs assessment. MOOCs offered by institutions located in the same countries were not necessarily assessed in the same way. In some MOOCs, assessment was only based on multiple choice quizzes and final exams that could be attempted many times. Questions changed at subsequent attempts in some of these MOOCs. Questions did not change in LE, but a penalty of 20 per cent of the grade applied at each attempt, after the first one. In Gamification, this penalty applied after the second attempt. Assessment in OGLNMN, EDC, Gamification, AT21CS and LTO could include peer-reviewed projects, peer-reviewed essays, production and submission of digital artefacts for peer review, and these could be additional to quizzes and final exams. Participation in the forum discussion contributed to the final grade in some MOOCs.

The MOOCs lasted for a period that varied between 5 and 10 weeks. They required between four and seven hour per week to engage with all learning activities and materials. My participation in these MOOCs varied between 15 and 57 hours per course. While this chapter presents key findings, detailed descriptions of each MOOC are presented in Appendix 4.

4.3 A detailed look at features of MOOCs evaluated

MOOCs and their features that may contribute to opening up higher education in Rwanda were analysed in the light of socioeconomic and technological challenges discussed in Chapter 1 and barriers to adoption of open educational practices discussed in Chapter 2. Using Creswell's (2014, pp. 197-201) analytical framework discussed in Chapter 3, six analytical categories were identified in Stage 4 of analysis (See Section 4.1). Below are the findings on MOOCs across the six analytical categories.

4.3.1 Learning materials

The nature of learning materials could vary across MOOCs. In OGLNMN, MOOC students were assigned same readings and asked to watch the same movie as formal students enrolled at the offering university. In ISRMC and GGSGPB I, peer reviewed learning materials and policy documents used by organisations, including governmental institutions, were assigned. Peer-reviewed journal articles, reports and policy documents were also suggested and provided in EDC, SSY, AT21CS and LTO. A diversity of learning materials increased the *content-based* (Lane, L., 2012, para 6) aspect of these MOOCs. In CS and Gamification, similar materials were suggested but they were to be purchased by learners who wanted to have access to them.

Assigned readings could include articles published in peer-reviewed journals, books, book chapters, eBooks, blog posts, policy documents used by governmental

institutions and others. Learners enrolled in MOOCs could access and download most of these reading materials for their learning at a convenient time and place. However, a few readings could not be downloaded and had to be read online. Some MOOCs also provided PowerPoint slides and/or transcripts of video materials. In most MOOCs, these materials were not openly licensed except in SSY and LTO.

The assigned materials could be globally relevant in nine MOOCs. Exception was LE, which was offered by a university located in the state of Illinois, USA. In this course, most of the assigned readings were only relevant to Illinois. Some readings in this specific MOOC could also be relevant to the entire USA. The limited geographical relevance of materials assigned in this MOOC is mainly due to the nature of the course which included an aspect of the field of law. However, this limitation could have been mitigated by assigning learners from other settings to find law documents that are relevant in their respective settings rather than requiring all of them to read laws that are relevant to Illinois. Each country has relevant laws and regulations that are specific to that country and this is an opportunity that could have been exploited to make the course more relevant to learners from around the globe.

Resources in other MOOCs were diversified, and they were of similar rigour as learning materials in conventional education courses in which credit is awarded at different levels. For this reason, these materials can support high quality learning. Awarding credit to learners who successfully complete MOOCs is often inhibited by sensitive reasons and threats, often masked behind the quality concept. Such inhibitors may include the reluctance to empower learners as managers and controllers of their own learning (Blaschke, 2012) and the concern on how institutions will continue to make money in the MOOC and open era. Without these inhibitors, the quality of learning and related accomplishment that could be enabled by the diverse learning resources offered in most MOOCs discussed above may be awarded credit at different levels of higher education. To expand the award of credit on learning accomplished on the basis of those resources in

least resourced settings such as Rwanda, barriers to legal and cost-free adaptation, reuse and redistribution of the resources would need to be removed.

4.3.2 Learning activities

There was also a cross-MOOC variety of learning activities. Activities in some MOOCs, mainly, CS, LE and ISRMC consisted of watching lecture videos, reading assigned materials and participation in the forum. SSY and GGSGPB I also included self-assessment and reflection on practices related to the course and sharing these reflections on the course website as comment or in the forum. Reflection was also a critical component in OGLNMN, SSY, GGSGPB I, AT21CS and LTO. In OGLNMN, reflection was based on the students' experience in a virtual game environment. Reflection in SSY consisted of self-assessment vis-à-vis sustainability practices covered in the course materials using tools provided by instructors and sharing the reflection on own evaluation with peers. In AT21CS, students were given recordings of learners who were involved in a collaborative project. Then, they evaluated the level of development of collaborative problem solving competencies using a rubric provided by instructors. Finally, they could reflect on the evaluation process and share this reflection with their peers. As for LTO, reflection was imbedded in the course assignment which required designing projects based on the concepts covered in the class. In these projects, the designer's and other stakeholders' roles had to be explicit. Thanks to the diversity of activities assigned in OGLNMN, SSY, Gamification, AT21CS and LTO, these courses were *task-based* (Lane, L. 2012, para 5), a MOOC aspect discussed in Chapter 2.

In some MOOCs, social media played a significant role in learning and supporting learning practices. Twitter hash tags were created and shared to participants in EDC, SSY, Gamification, AT21CS and LTO. In addition, Facebook communities were created in EDC, AT21CS and LTO. These social media are often not formally controlled by instructors, which arguably contributed to the *learning autonomy* (Conole, 2013b and

2014) and flexibility. Learners who engage in the use of social media for their own learning of MOOCs make an independent decision to participate in learning networks. In this way, social media increased the *network-based* (Lane, L., 2012, para 4) aspect of MOOCs discussed in Chapter 2.

A diversity of learning activities in MOOCs that were of focus in the current study may lead to quality learning if learners invest their heutagogical resources (see Figure 2.6). If the inhibitors to awarding credit on accomplishment from learning MOOCs are removed, learners who make such an investment and complete these open courses successfully may be awarded credit. Expansion of credit awarded on accomplishment enabled by these diverse activities in under-resourced settings such as Rwanda would also require the removal of barriers to adaptation, reuse and redistribution of the content on which the MOOC activities were based on.

More importantly, MOOCs provide opportunities to develop competencies needed in the 21st century in a way that most conventional education courses do not: the use of social media enables MOOC students to build networks with peers from all over the world without the need to travel to one physical location. This opportunity would responds to social economic challenge in Rwanda discussed in Chapter 1: Most learners in Rwanda are unable to afford the costs of flights to other countries where they would meet global peers. However, they can afford trips to cyber cafés and access to the Internet in these cafés, or via their mobile devices, to meet global peers via social media.

4.3.3 Learning Assessment in MOOCs

With exception of ISRMC, assessment in MOOCs was broadly classified in two categories. In the first category, learning could be assessed via automated quizzes or exams. In this study, this type of assessment is referred to as *retention assessment*. This category of assessment also includes forum posts (with exception of elaborate posts written

in the light of specific guidelines) or votes and computer-graded work that contributed to the final grade. In the second category, assessment was based on work submitted by students for peer grading. This type of assessment is referred to as *product assessment* in this study. It includes forum entries that were elaborate and written in the light of specified guidelines and posted for constructive feedback, projects, essays, digital artefacts and any other work submitted for peer-review.

Learning assessment in three Coursera MOOCs exclusively fell in the *retention assessment* category: CC, GGSGPB I and LE. Assessment in SSY can also be classified in this category in that a statement of participation was awarded based on the amount of activities checked as completed by students themselves (the proportion of 50 per cent of activities checked as completed was required). However, the nature of exam administered to those who had completed at least 70 per cent of activities who wanted the statement of attainment by exam could not be investigated. The exam processing fee was higher than the cost of a single module in Rwandan higher education. This led to conclusion that taken with this statement of attainment, this MOOC was unlikely to contribute to opening up higher education in Rwanda where an overwhelming majority of learners are even unable to pay lower fees charged on courses in Rwandan higher education.

Assessment in OGLNMN, Gamification, AT21CS and LTO overlapped between retention-assessment and product assessment. It consisted of automated quizzes and final exams as well as peer-graded work. As for assessment in EDC, it exclusively fell in the *product assessment* category. Learning in this MOOC was only assessed via a digital artefact submitted for peer grading.

MOOCs are not unique in using the two types of assessment, not least because most of these courses were developed by academics in existing higher education institutions. Courses I took from conventional higher education institutions in both developed and under-developed settings were also assessed via one or a combination of the two types of assessment. For instance, many courses at the former National University of Rwanda

(NUR) had class sizes that were multiple times bigger than the ones in institutions located in well-resources settings. These courses were assessed in a way that makes it easy to mark, often via multiple choice and short-answer questions only. Some other courses I took at NUR or other conventional higher education institutions in well-resourced countries combined the two types of assessment while others heavily assessed the product (papers or essays). Hence, the two types of assessment in MOOCs would also be used to award credit on MOOCs, but the aspect of invigilation may need to be added to address concerns on identity. For assessment of learning accomplished on the basis of the MOOC content for credit to be expanded in under-resourced settings, barriers to reusing, redistribution, remixing and repurposing of the content discussed earlier would need to be removed.

4.3.4 Workload in MOOCs

Weekly workload was suggested in all MOOCs except GGSGPB I. However, the suggested workload did not necessarily reflect the real workload (the actual amount of time needed to complete all activities in the course). In this study, my real workload is the sum of hours I spent on MOOC activities as regularly recorded in the MOOC participation log. In CS, OGLNMN, EDC and Gamification, my real workload fell within the ranges of the suggested workload (see Table 4.1). My real workload was slightly higher than the suggested workload in AT21CS and LTO (eight and nine hours higher respectively). In ISRMC and SSY, the real workload was far beyond the suggested workload. I had planned my participation in these courses in accordance with the suggested workload. After noting that the amount of time needed to complete ISRMC and SSY was far more that the suggested workload, I decided to drop some activities in these two MOOCs. In LE, I dropped reading activities because the assigned materials were not relevant to the Rwandan context. It is worth noting that the real workload may slightly vary depending on each learner's speed. However, extreme differences between the suggested and real workloads in ISRMC and SSY presented in Table 4.1 suggest inaccurate estimations of the suggested workloads in the two courses.

Table 4.1 Suggested and real workloads in MOOCs

MOOC	**No of weeks**	**Suggested workload: hours/week**	**Suggested workload/ Total hours**	**My real workload: total hours**
CS	6	4-6	24-36	29
OGLNMN	7	6-7	42-49	46
LE	6	5-7	30-42	15 (without reading activities)
EDC	5	5-7	25-35	27
ISRMC	10	4-6	40-60	44 (with only Week 1 readings that required more than 6 hours)
SSY	8	2-5	16-40	53 (on 70 per cent of activities)
GGSGPB I	5	NA	NA	26
G	10	4-8	40-80	44
AT21CS	6	4-5	24-30	38
LTO	8	3-6	24-48	57

The workload in MOOCs is comparable to that of different units in modules in Rwandan higher education. This comparability may help convert MOOCs into units if barriers that inhibit awarding credit on accomplishment from learning MOOCs are removed. Convertibility of MOOCs into module units that have specified numbers of credits would create value to learners, and this value would be a share of learners in the *shared benefit* basis for collaboration in Figure 2.6. This convertibility is discussed further in Chapter 7.

4.3.5 The scalability of MOOCs

Instructors in six of the ten MOOCs shared information on the class sizes with MOOC participants. As indicated in Table 4.2, the number of participants who enrolled in the six MOOCs varied from about 16,000 to over 70,000 students. This high enrollment in

MOOCs is enabled by the scalability of these courses. That is, their ability to accommodate a far larger number of learners when compared to traditional education courses. It is worth noting that these figures included any individual who enrolled in the courses: *viewers*, *solvers*, *all-rounders*, *collectors* and *bystanders* (Anderson et al., 2014, p. 688) discussed in details in Chapter 2. Figures of *all-rounders* who invested seriously on MOOCs learning activities and assessment and their completion rates were not made available.

Table 4.2 Gross enrollment in MOOCs

MOOC	**Estimate enrollment**
CS	About 70,000
OGLNMN	Over 44,000
EDC	20,232
Gamification	Over 70,000
AT21CS	About 16,000
LTO	About 16,000

The design of MOOCs in a way that make these courses scalable may inspire the design of other courses that intend to reach a large number of learners, especially those in settings that are under-serviced. Most of learners in MOOCs have minimal contact with instructors. This minimal contact necessitates the investment of heutagogical resources (see Chapter 2 and Figure 2.6) if learners want to complete these courses successfully. Activation and support of this investment may be a unique niche for innovation for opening up higher education in least resourced settings. This activation and support of the investment of heutagogical resources are discussed in Chapter 8, Section 8.1.

4.3.6 Licensing/legal framework

The content in eight of the ten MOOCs was copyrighted under *All-rights-reserved*. The redistribution of this content requires written permission from Coursera as explicitly

highlighted in the terms of use on this platform. The use of the content beyond individual level is as restricted as the use of any other materials copyrighted under *All-rights-reserved*. In LTO, 85 of 93 videos were copyrighted under creative commons licences. Those include 63 videos, 67.74 per cent of all videos, copyrighted under CC BY-NC and 22 videos, 23.65 per cent of all videos, copyrighted under CC BY-NC-ND. That makes a proportion of more than 91 per cent of open licensing on the course lecture videos. In addition to these video materials, the learning content presented in textual format, either as web materials or PowerPoint slides saved in PDF files were copyrighted under CC BY-NC as highlighted on the *Course Design and FAQs* course web page. Learning materials in SSY were also openly licensed: they were released under the CC BY-NC-SA UK 2.0.

4.4 Which MOOCs can potentially be adapted for use in opening up Rwandan higher education?

Based on the findings presented under the six themes discussed in Section 4.3, MOOCs present opportunities for opening up higher education if no barriers stand on the way. The main barrier was found in the sixth analytical theme, *Licensing/legal framework*. As highlighted in the findings presented under this analytical theme, content in 8 MOOCs was copyrighted under *All-right-reserved*, which blocks expansion of opportunities discussed in the previous five analytical themes/categories. Only SSY and LTO were found to have enough resources that are copyrighted under open licences that allow the reuse, redistribution and repurposing of the content. Hence, only these two MOOCs have the potential to be adapted for use in opening up Rwandan higher education.

Learning materials, learning activities, and learning assessment in most MOOCs were diversified and enough to provide quality learning to learners who want to seriously engage with the courses. In addition, these courses were found to be scalable which would enable reaching a large number of learners without the need to exclude other learners. Moreover, all MOOCs used in the current study were open for enrollment and learning free of charge, which may contribute to the inclusion of learners from low income families (the

overwhelming majority in Rwanda) who are unable to afford the cost of higher education. This openness is indeed very important in under-resourced countries such as Rwanda where even student loans are only available to a very small proportion of people who qualify and wish to attend higher education and cannot afford the cost on their own.

However, most Rwandan learners are inhibited by different socioeconomic and infrastructural limitations so that MOOCs in their original formats can only be accessible to a tiny minority of privileged learners. For opening up higher education in Rwanda via MOOCs, adaptation of those courses to learners is critical and seems to be more practical than adaptation of Rwandan learners to the original formats of MOOCs. This is where most MOOCs fall short: The licence under which most of their content is released does not legally authorise this practice. Only SSY and LTO are open in this aspect and therefore, these two MOOCs can be legally adapted for use in opening up higher education in Rwanda.

4.5 Additional findings

Beyond the findings that helped answer the research question that guided the investigation on MOOCs, further findings are worth noting. Some MOOCs were found to have the potential to contribute indirectly to opening up higher education in Rwanda (1). In addition, most MOOCs were found to have the potential to contribute directly to the broader open education agenda (2). MOOCs that may contribute indirectly to opening up higher education in Rwanda are presented in Subsection 4.5.1 while those that may contribute directly to the broader open education agenda are presented in Subsection 4.5.2.

4.5.1 The potential indirect contribution of MOOCs to opening up higher education in Rwanda

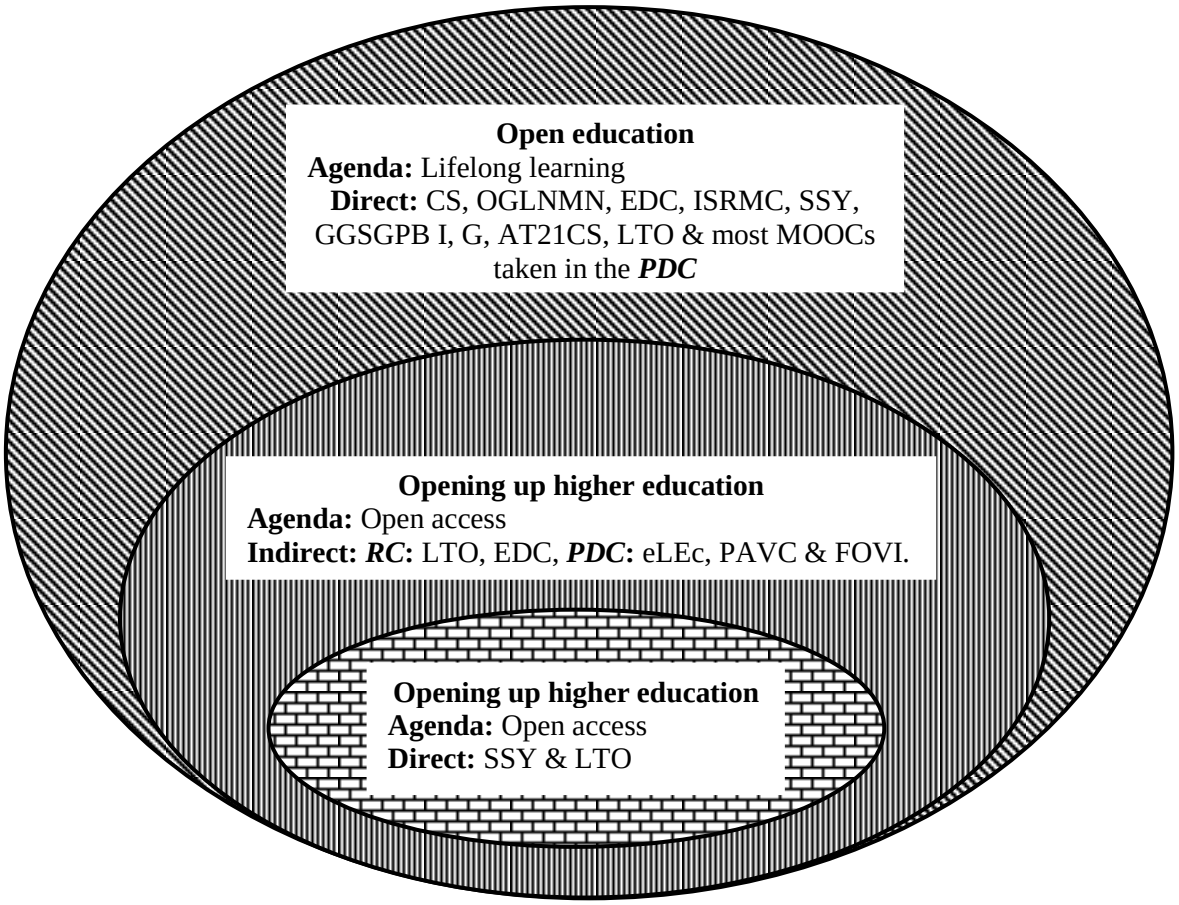
In addition to its potential to be adapted for direct use in opening up higher education in Rwanda enabled by open licences under which its content was released, LTO may also contribute indirectly to opening up higher education thanks to its focus. The MOOC focuses on online and distance education, and openly licensed resources and their contribution to education were discussed in the course. This focus was shared with EDC and many other MOOCs I took as part of the *Parallel development component*, mainly eLEc, PAVC and FOVI (see Figure 4.1). These courses may be beneficial to stakeholders in Rwandan higher education who want to develop competences in open, online, distance education, eLearning and related open educational practices and services. If competencies acquired are used to open up education to underprivileged learners who are unable to afford campus-based education, then these MOOCs would have contributed indirectly to opening up higher education.

4.5.2 The potential contribution of MOOCs to open education in Rwanda

Shifting attention from the specific agenda of opening up higher education to the broader agenda of open education, most MOOCs may potentially contribute to open education in its broader sense (Figure 4.1). As discussed in Chapter 2, the broader open education concept as used in the current study relates to either the *open access* agenda or the *lifelong learning* agenda (Weller, 2011, p. 96) or both. Most MOOCs evaluated in the current study may be taken by professionals in different fields who want to engage in professional development and lifelong learning. These courses are freely availability to anyone who wants to engage in lifelong learning, provided s/he has access to Internet needed to learn these courses in their original formats. Therefore, these MOOCs would help Rwandan learners who are privileged to have access to the Internet to engage in lifelong learning. There was only one exception: LE in which the relevance of most of the

content was restricted to the state in which the offering university is located or not beyond the United States of America if the content is relevant beyond the specific state.

Figure 4.1 Potential contribution of MOOCs to open and opening up higher education in Rwanda



4.6 Overview of OER units analysed in this study

Data collected from OER units were categorised in a similar way as those collected from MOOCs. The difference was the MOOC evaluation rubric cluster on MOOC classification that did not have equivalent in the OER unit evaluation rubric. In Stage 4 of analysis of data collected from OER units, I identified two analytical themes from limited

data that were gathered from materials that could be accessed free of charge: legal download and storage (1) and licensing (2). The Stage 5 narratives and the Stage 6 discussion were conducted in a similar way on both MOOCs and OER units.

Unlike MOOCs which were live courses, all OER units were archives of resources used in courses taught at Massachusetts Institute of Technology (MIT) in the past. These units consist of course information, course calendars, syllabi, lists of assigned and suggested readings, projects assigned to students and handouts in some units. In all units, these types of materials were copyrighted under CC BY-NC-SA (please see more details on different CC licences in Chapter 2).

The number of readings varied from unit to unit. The *How to Develop "Breakthrough" Products and Services* unit had fewest assigned and suggested readings (11 in total) and the *Technological Tools for School Reform* unit had the highest number of such readings (88 readings). Unlike the list of assigned and suggested readings that was openly licensed, the degree of openness of the readings per se was diverse. Most of these core learning materials were not openly licensed. A significant number of them had to be purchased from Amazon. Figure 4.2 illustrates how Amazon's web pages from which the readings assigned or suggested in OER units had to be purchased were linked to the list of the readings provided in those units.

Figure 4.2 A screen shot of links to Amazon pages incorporated in OER unit list of readings

Buy at Amazon Meier, Deborah. *In Schools We Trust*. Boston, MA: Beacon Press, 2003. ISBN: 9780807031513.

Buy at Amazon Tatum, Beverly Daniel. *Why Are All the Black Kids Sitting Together in the Cafeteria?* New York, NY: Harper Collins Publishers, 1997, Introduction, chapters 1, 2, 4, 10, and Epilogue. ISBN: 9780465091270.

Buy at Amazon Lawrence-Lightfoot, Sara. *The Essential Conversation*. New York, NY: Random House, 2003, Introduction, chapter 3, and Conclusion. ISBN: 9780375505270.

Buy at Amazon Duckworth, Eleanor Ruth. "*The Having of Wonderful Ideas" and Other Essays on Teaching and Learning*. New York, NY: Teachers College Press, Teachers College, Columbia University, 1996. ISBN: 9780807735138.

Many other readings could be purchased from other commercial websites such as the MIT *Sloan Management Review* website or the *Harvard Business Review* website. Links to these websites were also provided. The payment for the reading materials could be done either by buying copies of the files or by paying periodical subscriptions to the websites.

In some units, short versions of the assigned or suggested reading materials were available free of charge. However, the full versions of most of these resources had to be purchased. For many other readings, access to full versions required paid subscription. Full versions of some readings could be accessed and used free of charge, but users had to join online communities to have free access to them. Joining these communities was free of charge. It only required filling in registration forms.

Some readings could be accessed for free but this did not mean that their reuse, revision, remix and redistribution were authorised. Licence was not clearly specified for many of them. Some readings could be downloaded after acceptance of terms of conditions which stipulated that the user should be affiliated with a licensee institution as a student, an educator, a researcher or an alumnus for downloading the resources. This was especially the case for readings that were available in the Journal Storage (JSTOR), a digital library that provides full text searches to about 2000 journals and is accessible to more than 8000 institutions (Wikipedia, 2015). A few of the assigned/suggested readings accessible via JSTOR could be downloaded and used for non-commercial purpose. In some OER units, a few readings could also be accessed on other websites. Some of these readings had a note that permission to use them for educational and research purpose has been granted.

Links to reading materials assigned or suggested in various OER units worked differently. Some of these links were broken. In most units, a few assigned or suggested readings had no links. However, most of these materials could be googled and found from other websites. The degree of openness on these resources also varied.

Some units also contained video materials. This was the case of *Media Education and the Marketplace* that had links to English as Second Language (ESL) videos, *How to Develop "Breakthrough" Products and Services* that had four lecture videos and *Challenge of World Poverty* which had 22 videos and their transcripts. In addition, *Challenge of World Poverty* had 7 more assigned video materials that were available on external websites such as YouTube. All these video materials and their transcripts (where they were provided) were copyrighted under CC BY-NC-SA with exception of the ones hosted on external websites.

4.7 A detailed look at features in OER units analysed

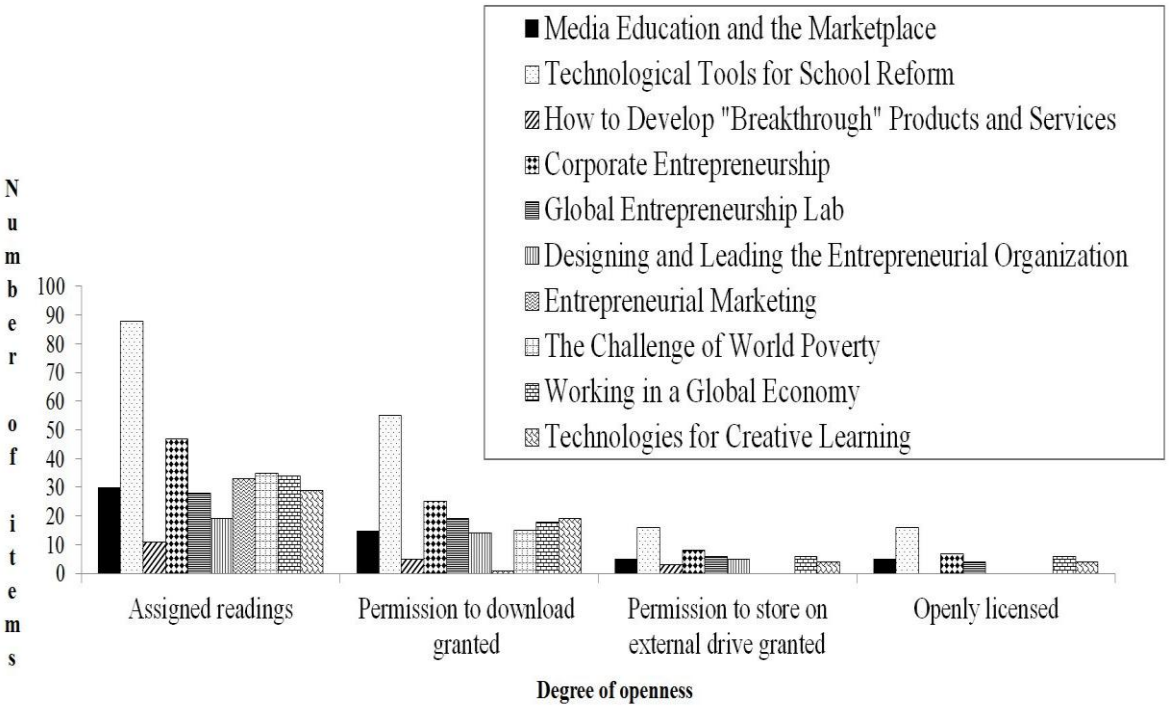
Data on OER units were also analysed *by research question* and by themes (Cohen, 2011, pp. 551-552) and in the light of Creswell's (2014, pp. 197-201) analytical framework. Two analytical categories were identified in Stage 4 of analysis (please see the *analysis* section in Chapter 3 for details of those stages) from limited data that were gathered from materials that could be accessed free of charge: legal download and storage (1) and licensing (2).

4.7.1 Permission to legally download and store the content

Only a certain proportion of materials presented in all the ten OER units could be legally downloaded and stored on hard drives. Figure 4.3 indicates that *Technological Tools for School Reform* had the highest number of assigned or suggested readings that could be legally downloaded and stored on a hard drive (16 readings in total). This OER unit was followed by *Corporate Entrepreneurship: Strategies for Technology-Based New Business Development* which had 8 assigned and suggested readings that could be legally downloaded and stored on hard drives.

Percentages of resources that could be legally downloaded and stored on hard drives were also calculated. When attention shifts from raw numbers to percentages (Figure 4.4), "*How to Develop "Breakthrough" Products and Services"* leads with 27.27 per cent of assigned or suggested readings that could be legally downloaded and stored. This is probably because fewer readings (only 11) were assigned or suggested in this unit than in other units. Permission to download and store 3 of the 11 reading resources was granted. *How to Develop "Breakthrough" Products and Services* was followed by *Designing and Leading the Entrepreneurial Organization* with 26.3 per cent and *Global Entrepreneurship Lab: Latin America, the Middle East, and Africa* with 21.4 per cent of assigned and suggested readings that could be legally downloaded and stored on hard drives.

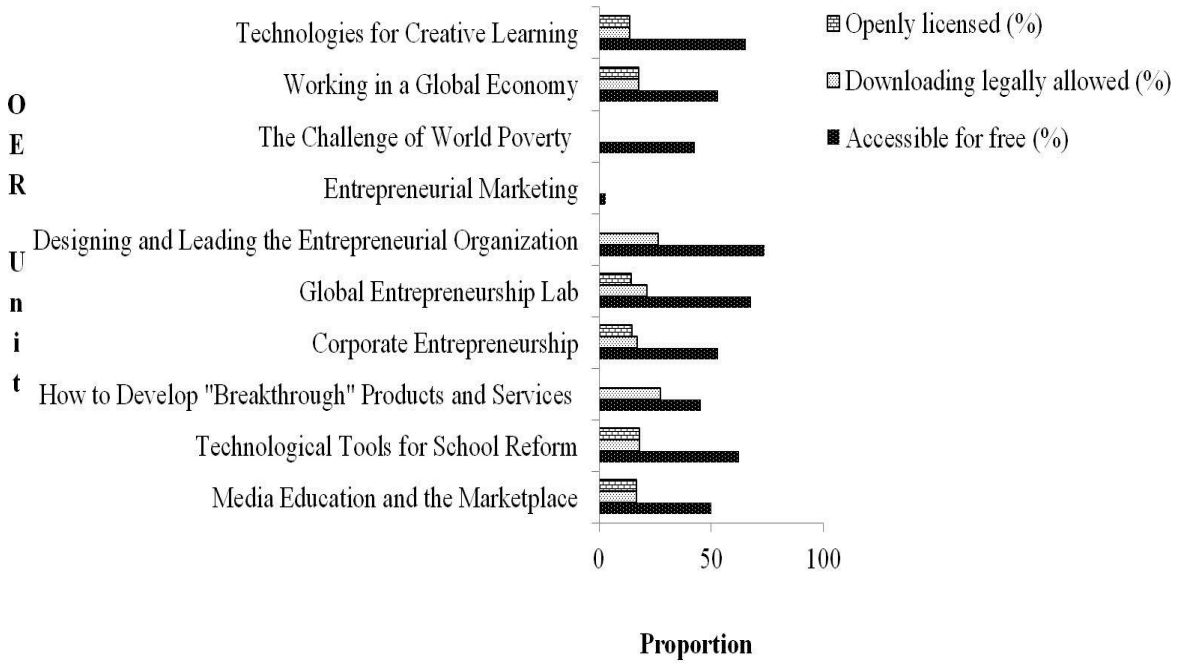
Figure 4.3 Readings assigned/suggested in OER units and their openness



It is worth noting, however, that two OER units had video materials. *How to Develop "Breakthrough" Products and Services* had 4 video materials and *Challenge of*

World Poverty had 22 videos. The transcripts of the videos were also provided in *Challenge of World Poverty*. All these videos in both OER units and the transcripts in *Challenge of World Poverty* were copyrighted under CC BY-NC-SA. The videos (and the transcripts) were additional to assigned and suggested readings and other types of resources provided in all OER units: course information, syllabus, calendar, list of readings and projects.

Figure 4.4 The degree of openness of readings assigned or suggested in OER units (%)



Putting together videos, transcripts, assigned readings and suggested readings gives a total of 79 items in *Challenge of World Poverty* and 15 items in *How to Develop "Breakthrough" Products and Services*. Considering only resources that could be legally downloaded and stored, free of charge, beyond course information, syllabus, calendar, list of readings and projects, *Challenge of World Poverty* leads in terms of proportion. In this OER unit, 44 out of 79 resources (55.69 per cent) could be legally downloaded and stored free of charge. This unit was followed by *How to Develop "Breakthrough" Products*

and Services with 7 out of 15 resources (46.6 per cent) that could be legally downloaded and stored.

4.7.2 Licensing in OER units

As highlighted earlier, course information, syllabus, calendar, list of readings, quizzes and exams (where available) and projects were copyrighted under CC BY-NC-SA in all the OER units. Lecture notes, videos and some ESL/EFL materials, where provided, were also copyrighted under this licence.

However, a handful of the reading materials assigned or suggested in these units were OER (Figure 4.3 and Figure 4.4). Most of the assigned and suggested readings had to be purchased from *Amazon* or similar selling sites (Figure 4.2). Other readings could be downloaded online, but they were copyrighted under *All rights reserved* or licence was not clarified. When licence is not specified, the rule of thumb is treating the resources as copyrighted under *All right reserved* to avoid any risk of legal hassle related to copyright dispute (Green, 2012). Permissions to use a few assigned and suggested readings for educational purpose were granted in most OER units. For many other readings, such permission was limited to the use for personal learning. Redistribution, even for educational purpose, was not permitted.

As illustrated in Figure 4.3, the *Technological Tools for School Reform* OER unit had the highest number of assigned and suggested readings that were openly licensed. In this unit, 16 (out of 88) assigned or suggested readings were openly licensed. That is, 18.1 per cent of the readings assigned or suggested in this unit were openly licensed. *Technological Tools for School Reform* was followed by *Corporate Entrepreneurship: Strategies for Technology-Based New Business Development* with 7 out of 47 (14.8 per cent) readings that were openly licensed. Then *Working in a Global Economy* follows with 6 out of 34 assigned and suggested

readings (17.6 per cent) that were openly licensed. After *Working in World Poverty, Media Education and the Marketplace* comes with 5 out of 30 (16.6 per cent) assigned and suggested readings that were openly licensed. It is worth noting that when attention is on proportions (Figure 4.4), *Corporate Entrepreneurship: Strategies for Technology-Based New Business Development* (14.8 per cent) ranks behind *Working in World Poverty* and *Media Education and the Marketplace* (17.6 per cent and 16.6 per cent respectively).

Interestingly, four OER units had no assigned or suggested reading that was openly licensed. Those units are *How to Develop "Breakthrough" Products and Services*, *Designing and Leading the Entrepreneurial Organization*, *Entrepreneurial Marketing* and *Challenge of World Poverty*. However, counting videos along assigned and suggested readings, *Challenge of World Poverty* leads with 44 out of 79 items (55.69 per cent) that were openly licensed.

4.8 Which OER units can potentially be adapted for use in opening up Rwandan higher education?

Based on the amount of openly licensed items in the OER units, only *Challenge of World Poverty* was found to have the potential to be adapted for use in opening up higher education. As highlighted in Section 4.7, this unit had 44 items (22 lecture videos and their transcripts) that were openly licensed. This high number of openly licensed resources may be the basis for designing an open course that is responsive and sensitive to socioeconomic and infrastructural challenges that prevail in Rwanda. The reading resources that were not openly licensed in this unit may be replaced by articles in open access journals that have been published under open licences. Other units were found to have too little amount of resources that were openly licensed to adapt the whole unit and use it in opening up higher education. Openly licensed resources in those units may only be used at a granular level. Hence, those units would not be adapted as courses as *Challenge of World Poverty* would.

4.9 Additional findings: Restrictions in openness of OER units

Restrictions in openness of OER units are reflected in the amount of freedoms granted to the users of the resources that were openly licensed. This specifically refers to the 4 OER Rs: reuse, revision/repurpose, remix and redistribution (Wiley, 2007; Didderen & Verjans, 2012, p. 12). Permission to apply these 4 OER Rs was reflected in the specific open licences under which the resources were released. Open licences provide different degrees of freedom with the public domain being the most accommodating while CC BY-NC-ND is the most restrictive (Green, 2012; Creative Commons, 2013).

In most openly licensed materials assigned or suggested in the ten OER units, permission to apply the 4 OER Rs was granted. However, most of these licences also had the Non-Commercial (NC) property. This property has already been reported to have triggered disputes when the resources are used in education across settings (Green, 2012). The dispute on this aspect is more likely to inhibit the recognition of open learning accomplished using OER, which would inhibit learners' share in the *shared benefit* basis for collaboration in Figure 2.6. The lack of recognition of open learning was, indeed, one of the barriers to OER adoption discussed in Chapter 2. For this recognition to happen in a sustainable manner, open learners who used openly licensed resources may be charged assessment processing fee. Within the open access agenda, this fee would be expected to be lower than tuition fees in conventional higher education in Rwanda in order to accommodate an overwhelming number of learners who are unable to afford the existing conventional higher education.

Charging such fee may be considered by copyright holders as commercialisation of their content. This may lead to legal action against institutions that charged assessment processing fee to accommodate the non-included learners. To avoid these legal hassles, institutions may avoid engaging in open educational practices that recognise accomplishment from open learning practices based on openly licensed content that has the NC property.

To address this restriction, institutions and open educators may communicate with copyright holders before using the resources that bear the NC (and the No Derivative work (ND)) property. Discussion on the intended use of OER materials that are copyrighted under restrictive open licences may lead to agreement between the users and the copyright holders. Such discussions can also lead to acquisition of more permission related to the use of the content.

Chapter Summary

Two MOOCs were found to have the potential for being adapted and used in opening up higher education in Rwanda: SSY and LTO. Most of the content in the two MOOCs was openly licensed. Additional to its potential for being adapted and used in opening up higher education, LTO was also found to have the potential to contribute indirectly to opening up higher education. This potential indirect contribution may be enabled by the focus of the MOOC on competencies that may be transferable in opening up higher education, the aspect this MOOC shared with EDC and other MOOCs completed in the *Parallel development component*: FOVI, eLEc and PAVC. Moreover, all MOOCs evaluated in this study were found to have the potential to contribute to the broader open access agenda in Rwanda.

As for OER units, only one of the ten units analysed, *Challenge of World Poverty*, was found to have enough openly licensed resources. This made this unit adaptable for use in opening up higher education in Rwanda. Although none of the assigned and suggested readings was openly licensed in this unit, 22 videos and their transcripts were provided and they were released under an open licence. In other OER units, limited openly licensed materials may be adapted and used at a granular level but not as courses. Adaptation of the openly licensed material may be done with caution since some of the open licences on the matiarals have restrictive properties: the *Non-commercial* and the *No Derivative work* properties.

CHAPTER 5 PHASE 2 RESULTS

While Chapter 4 focused on the content side of opening up higher education, Chapter 5 focuses on the human side: stakeholders in the target setting. The overarching research question in Phase 2 was "*What is the potential contribution of different stakeholders in Rwandan higher education to opening up this level of education?*". In this Chapter, I present results on the potential contribution of these stakeholders (some of which are also published in Nkuyubwatsi et al., 2015). The chapter consists of three major sections. Section 5.1 is dedicated to learners' willingness to engage in heutagogical/self-determined open learning practices. Section 5.2 focuses on academics' willingness to contribute to OER and open courses, and adopt open education roles. As for Section 5.3, it focuses on the University of Rwanda's leaders' and policy makers' willingness to develop an institutional open education policy that recognises academics' Open Educational Practices (OEP) and assess accomplishment from Open Learning Practices (OLP) for credit. This chapter winds up with a summary of all these findings.

As discussed in Chapter 3, questions in Section 2 of the questionnaires were asked to primarily find out academics' and learners' potential contribution to enablers of opening up higher education discussed in Chapter 2. On the part of learners, the primary focus was on their potential to invest heutagogical resources (see Figure 2.6) in open learning. Heutagogical resources are invested when learners find learning resources, engage with those resources, reflect on, document and share their learning progress, use social media for discussing their course materials with peers, manage and control their own learning and engage in other self-determined learning practices. Dedicated learners who engage in these practices cannot inhibit other learners to engage in learning in a similar way. For this reason, heutagogical resources are non-rivalrous (Figure 2.6): An intensive investment of these resources does not lead to their depletion as it happens on financial resources and many other rivalrous resources. Instead, heutagogical resources replenish: the more they are invested, the more their increase. Dedicated learners who regularly engage in practices highlighted above become experts and the speed of their self-determined learning

increases. As for academics, the main focus was on their potential contribution to openly licensed content (non-rivalrous resources as discussed in Chapter 2 and Figure 2.6), assessment of open learners' accomplishment for credit (to ensure the open learners' share in the *shared benefit* basis for collaboration in opening up higher education in Figure 2.6) and support of off-campus open learners. This contribution from academics would constitute pedagogical resources (Figure 2.6) needed to open up higher education.

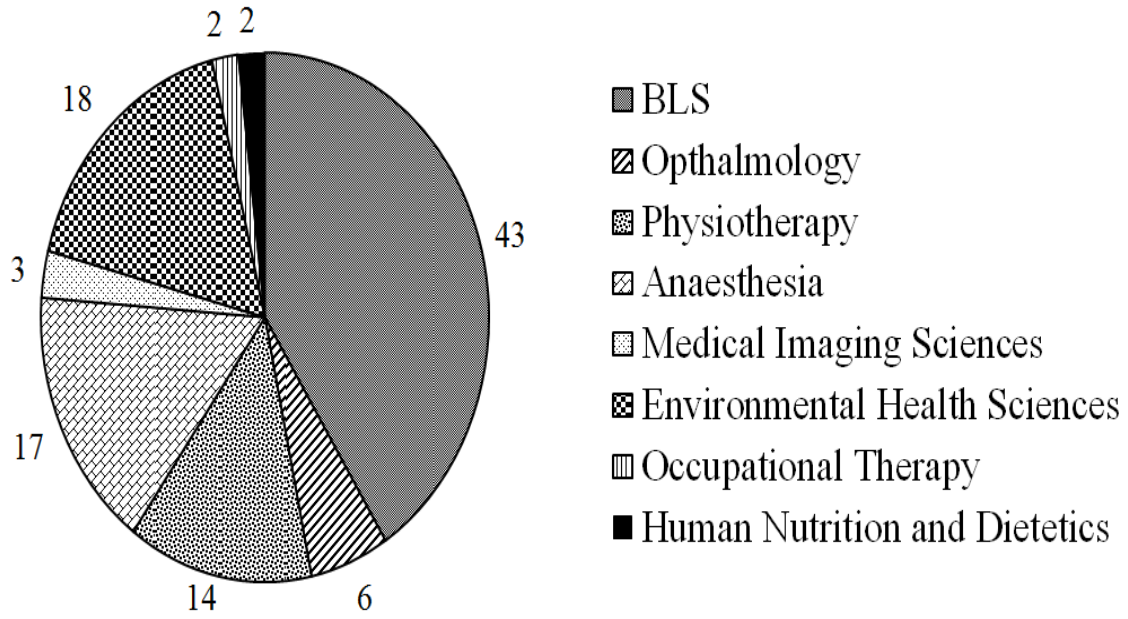
5.1 Learners' willingness to engage in self-determined open learning

Learners' participation is critical for the success of opening up higher education. Since learners are at the core of an educational practice, the success of related initiatives would depend on how these key stakeholders (learners) respond. In the current study, learner's willingness to engage in self-determined open learning practices was investigated in the light of the subsidiary research question "*To what extent are learners willing to engage in self-determined open learning?*"

5.1.1 Participants' demographic

In the category of *learner participants*, 107 volunteers received a questionnaire and an informed consent form. Two of them withdrew and did not return the completed questionnaire and the signed informed consent form. That is, 105 participants returned the completed questionnaire and the signed consent form, which gave a return rate of 98.13 per cent.

Figure 5.1 Distribution of student participants across different fields of study



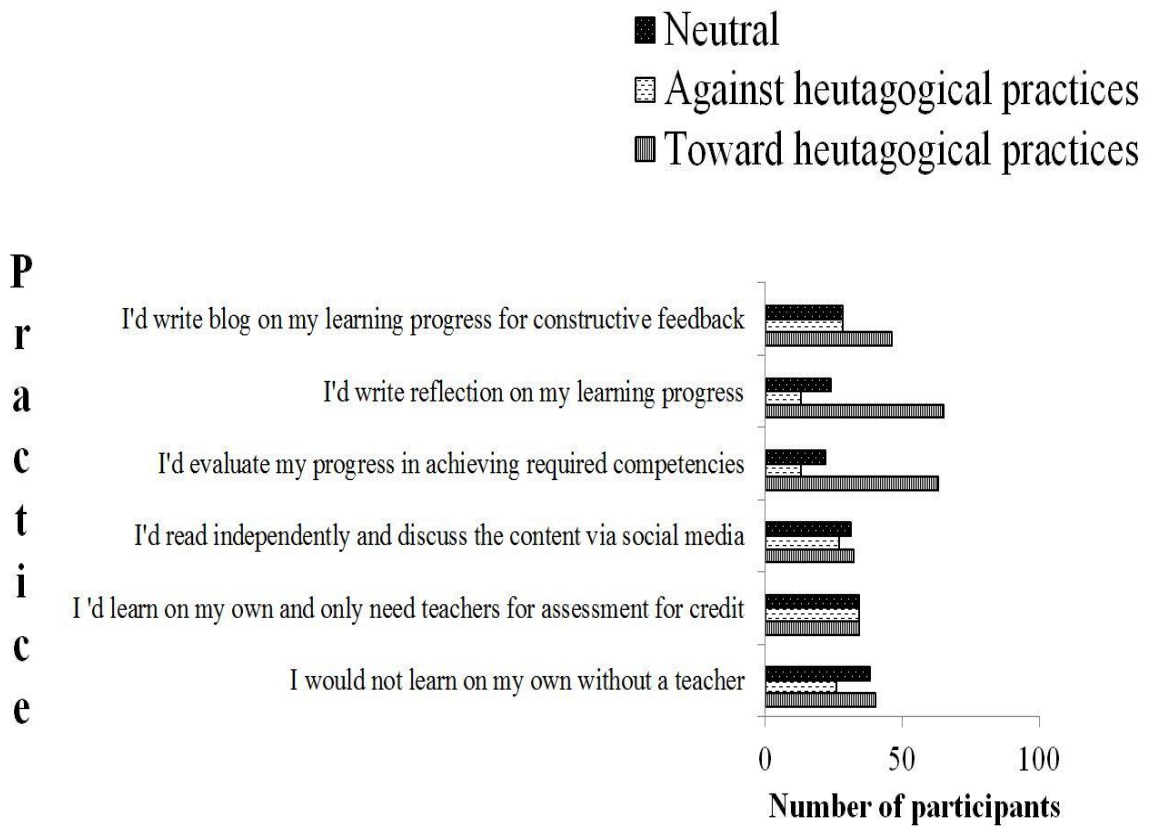
As indicated in Figure 5.1, these students were unevenly distributed in different fields of study at the University of Rwanda College of Medicine and Health Sciences. The Biomedical Laboratory Sciences (BLS) had the highest number of volunteers (43 participants or 40.9 per cent) followed by Environmental Health Sciences and Anaesthesia that had 18 (17 per cent) and 17 (16 per cent) volunteers respectively. Most of participants were in the second year of their undergraduate education (83 participants or 79 per cent). Seventeen participants (16 per cent) were in the first years while only four participants (3.8 per cent) were in the fourth year. One participant did not indicate her/his level in the completed questionnaire. These participants were studying for bachelor's degrees (79 participants or 75.2 per cent) and undergraduate advanced diplomas (26 participants representing 24.7 per cent).

5.1.2 Students' intention to engage in heutagogical/ self-determined open learning practices

Self-determined/heutagogical open learning practices may be powerful enablers in the inclusion of underprivileged learners in the higher education system. In the current study, learners expressed willingness to engage in different self-determined/heutagogical open learning practices if the learning content is made available (Figure 5.2). Forty participants (38 per cent) reported that they would learn on their own without a teacher. When assessment of open learning for credit is made available, positions of participants split equally between inclination towards and against learning on own and seek teachers for assessment and neutrality vis-à-vis this practice: 34 participants (32.38 per cent) for each of the three positions. When it comes to reading independently and discussing the content via social media, 32 participants (30.47 per cent) inclined towards this practice, 31 participants (29.52 per cent) were neutral, 27 participants (25.7 per cent) inclined against this practice.

More participants were willing to evaluate own progress in achieving required competences: 63 participants (60 per cent) were willing to engage in this practice, 22 participants (20.95 per cent) were neutral and only 13 participants (12.38 per cent) were not interested in engaging in this practice. The trend was the same when it comes to writing reflection on own learning progress: 65 participants (61.9 per cent) were willing to engage in this practice, 24 participants (22.85 per cent) were neutral and 13 participants (12.38 per cent) were not interested in engaging in this practice. Forty-six participants (43.8 per cent) were also willing to engage in writing blog posts on own learning progress for constructive feedback, 28 participants (26.66 per cent) were neutral and other 28 participants were not interested in this practice.

Figure 5.2 Participants' positions vis-à-vis self-determined open learning practices



The number of participants who would use resources made available without assessment for credit was higher than that of those who pose assessment as a condition for using those resources. In total, 58 participants (55.2 per cent) would use these resources without assessment for credit as opposed to 42 participants (40 per cent) who would only use them if they were assessed for credit. However, seventy-nine participants (75.2 per cent) expressed willingness to give up casual routines to prioritise learning if content were made openly available and the *assessment for credit* condition were met. The routines most learners would give up to prioritise learning clustered under *Movies, games and TV* (watching movies, TV series, TV matches and face-to-face games) with 32 participants (30.4 per cent) who would give up such routines. The second most frequent cluster was *socio-cultural and leisure events* (social events, leisure trips, entertainment, attending

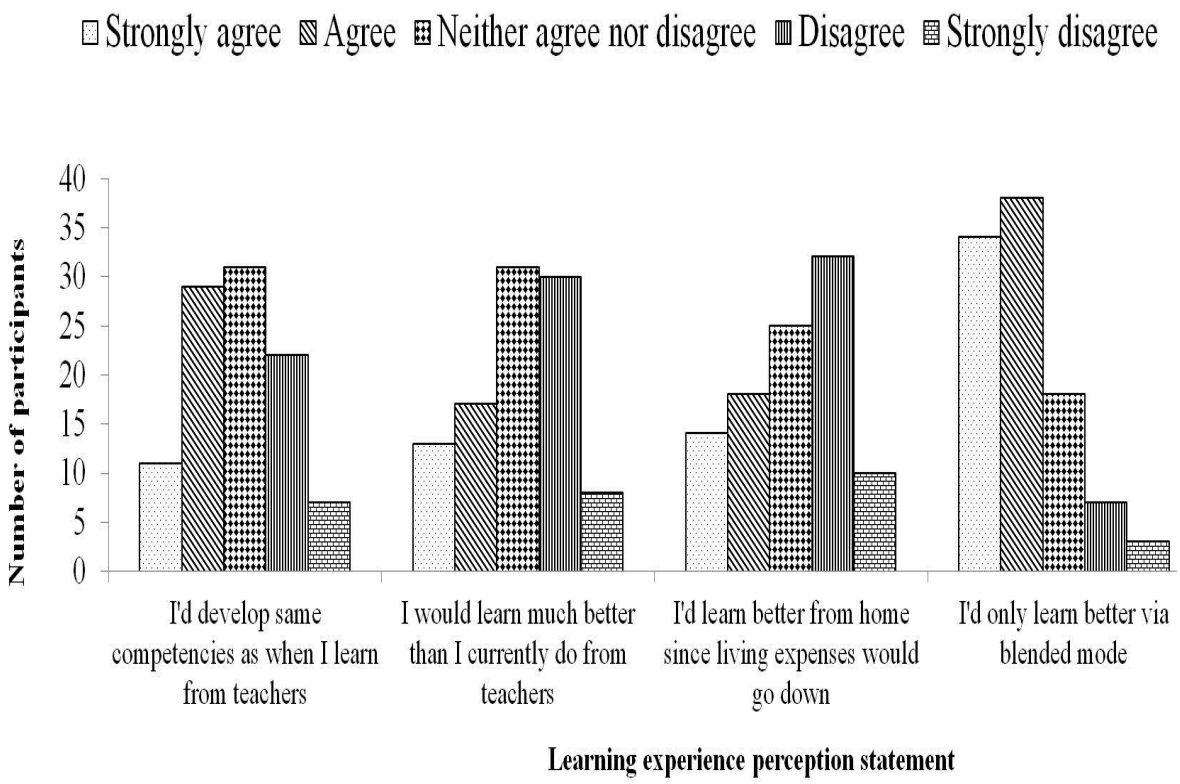
wedding ceremonies, social hangouts, social visits and other related events) with 29 participants (27.6 per cent) who would give up such routines. Then, *Extended rest* (including extended sleep and extended holidays) followed with 16 participants (15.2 per cent) who would give up such routines. Finally, *Social media* (virtual social events conducted via computers connected to the Internet or mobile phones) combines responses from 9 participants (8.5 per cent) who would give up such routines.

5.1.3 Students' perceptions of own self-determined open learning experience and success

Perceptions on own potentials to succeed in learning at the higher education level can play a critical role in the learners' success. As discussed in Chapter 2, self-perception as not being good enough for higher education, which is an indicator of social disempowerment (Lane, 2009, p. 9; Lane & Van Dorp, 2011, n. p.), can be an important inhibitor to a learner's success. In a similar direction, self-perception as being unable to learn independently can inhibit learners' benefit from self-determined learning.

Forty participants (38 per cent) thought that, via self-determined open learning based on openly available resources, they would develop same competences as the ones they develop via learning from teachers. In the opposite direction, 29 participants (27.6 per cent) thought they would develop less competence via self-determined open learning. Thirty-one participants (29.5 per cent) were neutral. If choosing between the two learning modes is possible, 38 participants (36.1 per cent) thought they would learn better from teachers while 30 participants (28.5 per cent) thought they would learn better through self-determined open learning. Forty-two participants (40 per cent) did not support the idea that making learning resources openly available would lead to better learning as result of the reduction of living expenses while 32 participants (30.4 per cent) did. The blended learning mode that combines learning from teachers and self-determined open learning practices was most preferred by participants (72 participants or 68.5 per cent).

Figure 5.3 Students' perceptions on their own potential self-determined open learning experience



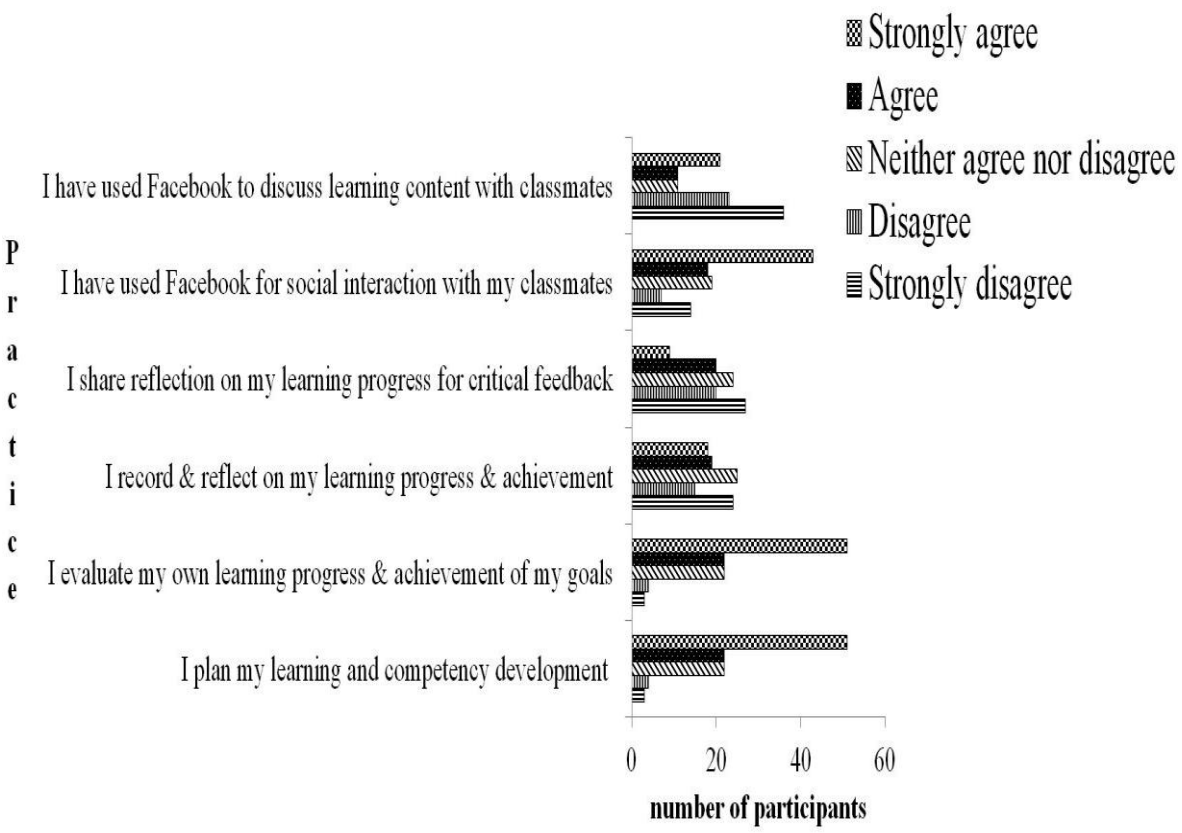
5.1.4 Current students' self-determined learning practices

While learners' perceptions on how they would benefit from self-determined open learning practices are hypothetical, the study moved further to investigate the current level of students' self-determined learning practices. Seventy-three participants (69.5 per cent) reported that they plan their own learning and competency development. These participants include 51 participants (48.5 per cent) who strongly agreed with the related statement in the questionnaire and 22 (20.9 per cent) who agreed with the statement. The same numbers of participants (73) reported that they evaluate their own learning progress and achievement of their own learning goals.

When it comes to recording and writing reflection on own learning progress and accomplishment, the statistics dropped with 37 participants (35.2 per cent) who engage in this heutagogical practice. While 18 of these 37 participants (17.1 per cent of all participants) strongly agreed with the related statement, 19 of them (18 per cent of all participants) agreed with the statement. The number of those who share their reflection for constructive feedback was even lower: Only 29 participants (27.6 per cent of all participants) reported to do so. These include 9 participants (8.5 per cent) who strongly agreed with the related statements and 20 participants (19 per cent of all participants) who agreed with the statement.

In this study, the use of social media in self-determined learning was also investigated. Facebook was one of the social media participants reported to use. As illustrated in Figure 5.4, this social media was reported to be used to discuss learning content at the rate of 30.4 per cent (32 participants). The users of Facebook for discussing the learning content included 11 participants (10.4 per cent) who agreed with the related statement and 21 participants (20 per cent) who strongly agreed with the statement. It is worth noting that the use of Facebook to discuss the learning content was lower than the use of this social media for social interaction with classmates. In total, 61 participants (58 per cent of all participants) reported the use of Facebook for social interaction with classmates. These include 43 participants (40.9 per cent) who strongly agreed with the related statement and 18 participants (17.1 per cent) who agreed with it.

Figure 5.4 Current University of Rwanda's students' self-determined learning practices



5.1.5 Students' perceptions on self-determined open learning practice friendly courses

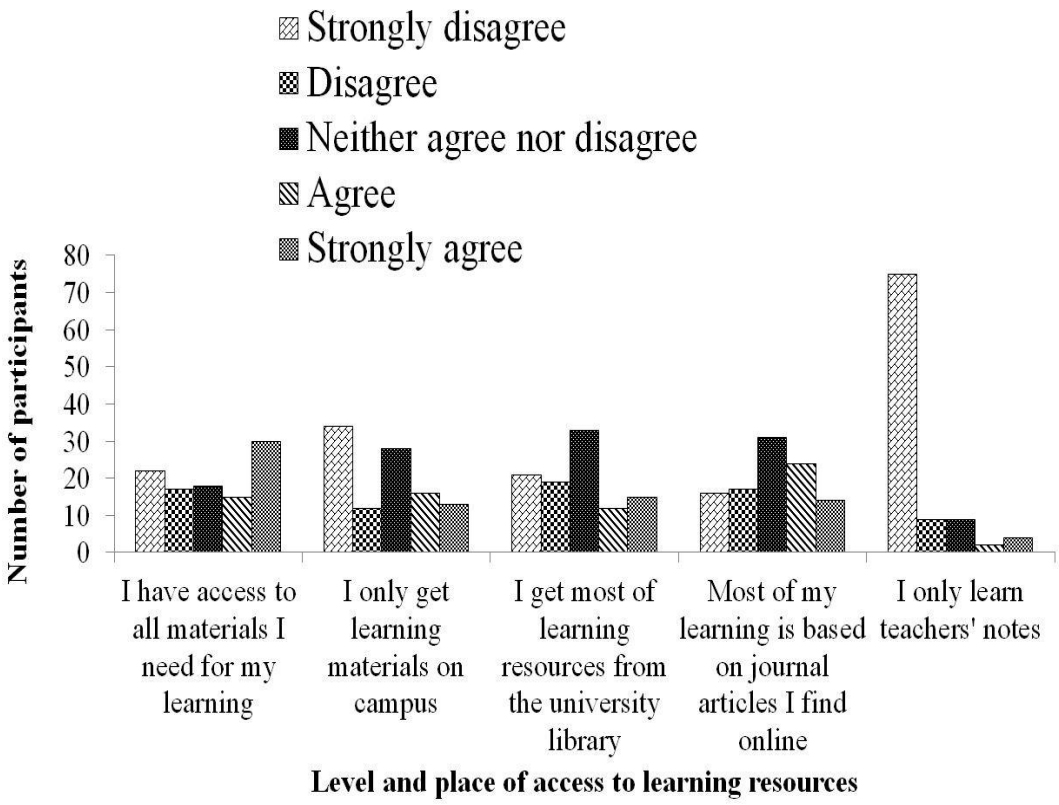
Although self-determined open learning can be transformative, it would be naïve to assume that all courses would require the same proportion of heutagagical engagement for learners' success. Students/participants were given opportunity to categorise classes they have learned based on their perceptions on where they can take the courses without affecting their success. Three categories were provided: Courses that can be completely learned *off-campus*, courses that can be taken in *blended mode* and courses that should be completely taken *on campus*.

In this classification, most courses were scattered across the three categories, and most frequently cited courses appeared in two or three categories. An example was *Lab Management* which was classified in courses that can be learned off-campus by 14 participants (32.5 per cent of participants from the Biomedical Laboratory Sciences). The same course was classified in courses that should be learned via the blended mode that combines off-campus learning and face-to-face sessions by 9 participants (20.9 per cent of participants from the Biomedical Laboratory Sciences). The course was also classified in courses that should be entirely learned on campus by one participant. Exception was the "*Building Construction and Techniques*" taught in the Environmental Health Sciences field. This course was unanimously classified in classes that should be entirely learned on campus by 5 participants (27.7 per cent of participants from the relevant field) and was not classified in any other category of courses.

5.1.6 Sources of learning materials and levels of access

Access to learning materials/resources (referred to as pedagogical resources in Chapter 2 and Figure 2.6) is critical for self-determined open learners' success. In fact, the investment of heutagogical resources builds on available pedagogical resources, even when self-determined learners hunt out themselves pedagogical resources (see Chapter 1). The way students access learning resources and their levels of satisfaction with this access were investigated in the current study. Participants reported different ways of access to learning resources and diverse degrees of satisfaction with access to materials they need for their learning. Figure 5.5 shows that 45 participants (42.8 per cent) felt they had access to all materials they needed for their learning. These include 30 participants (28.5 per cent) who strongly agreed with the related statement, "*I have access to all materials I need for my learning*", and 15 participants (14.2 per cent) who agreed with the statement.

Figure 5.5 Levels of satisfaction with and sources of access to learning materials

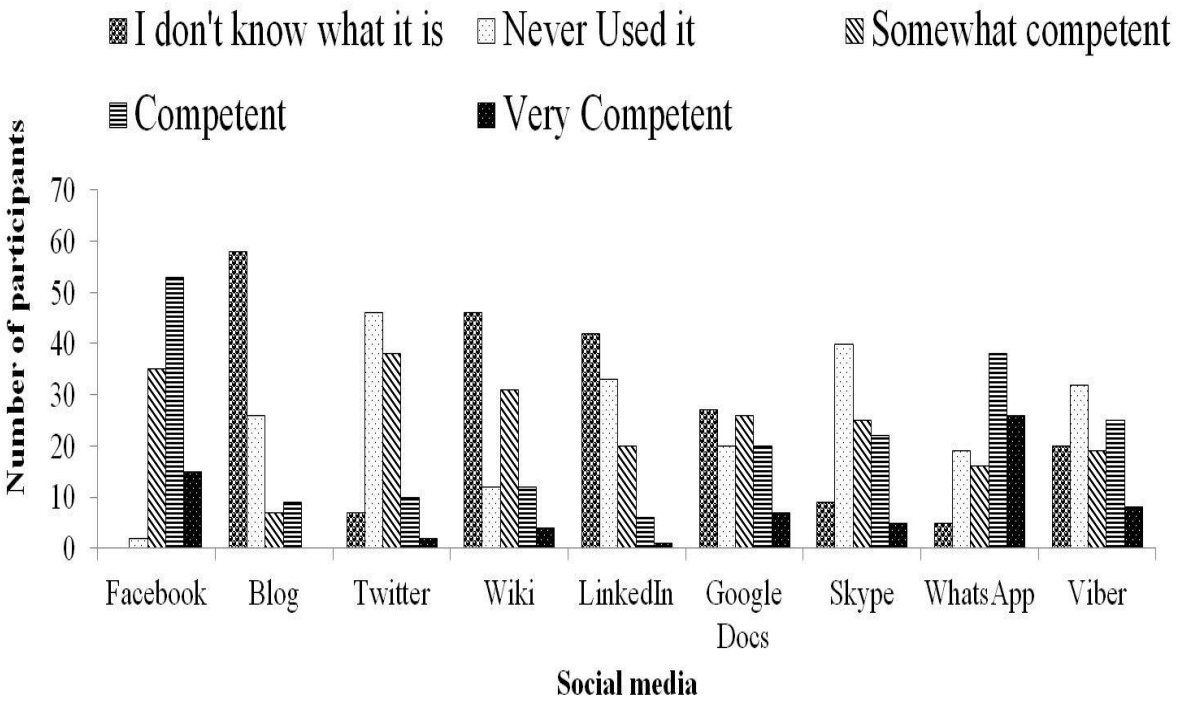


When it comes to the source of access to learning materials, the library serves students slightly higher than the Internet. Forty participants (38.9 per cent) reported that they get most learning resources from the university library while 33 participants (31.4 per cent) reported that they get most learning materials from the web. Forty-six participants (43.8 per cent) access learning materials when they are on-campus. These participants include 34 participants (32.3 per cent) who strongly agreed with the statement "*I only access learning materials when I am on campus*" and 12 participants (11.4 per cent) who agreed with this statement. The overwhelming majority of participants (84 participants or 80 per cent of all participants) reported that they learn beyond teachers' notes. Those include 75 participants (71.4 per cent) who strongly disagreed with the statement "*Most of my learning is based on teachers' notes*" and 9 participants (8.5 per cent) who disagreed with the same statements.

5.1.7 Students' perceptions on own competence in using social media

Social media have recently been considered as tools that foster self-determined learning (heutagogical) practices, especially the ones that occur in networks (Blaschke, 2012). In this study, the current level of University of Rwanda's students' perceptions on own competences in the use of social media was investigated. Figure 5.6 encapsulates students' perceptions on their own competence development in different social media.

Figure 5.6 Students' perceptions on own competence in the use of social media



Overall, *Facebook* was the leading social medium in terms of students' perception on competence development as indicated in Figure 5.6. Sixty-eight participants (64.7 per cent) reported to be competent or very competent in the use of *Facebook*. These include 53 participants (50.4 per cent) who reported themselves as competent and 15 participants (14.2 per cent) who thought they were very competent in the use of this social medium. *Facebook* was followed by *WhatsApp* on which 38 participants (36.1 per cent) reported to be competent and 26 participants (24.7 per cent) reported to be very competent. This gave a

total of 64 participants (60.9 per cent) who reported to be able to use this social medium at least competently.

Competent users of blog are much fewer when compared to participants who expressed willingness to engage in blogging on their learning progress for constructive feedback. As discussed earlier, 46 participants (43.8 per cent) inclined toward this practice (either agreed or strongly agreed with the related statement) while only nine participants (8.57 per cent) saw themselves as competent users of this social media. None of the participants reported to be a very competent blogger.

It is worth noting that the figures on Google Docs may have been inflated by the confusion of this social medium with any document that can be downloaded via the Google search engine. Some participants' comments on questions that investigated their current use of social media in their learning reflected this confusion. The example is one participant's comment on the statement "*I have used Google Docs to work on group assignments*" which was "That is where I get most learning materials".

Finally, participants were given an open opportunity to express their thoughts or concerns that emerged as they participated in the study. The most frequent concern revolved around the difficulty in accessing the Internet that was raised by 11 of 33 participants who provided additional information. This was followed by a recommendation to have a blended mode that involves a face-to-face tutorial support at some stages of the course that was made by 4 participants. Three other participants expressed their request for free access to educational resources as well as accessible and inclusive education.

5.2 Academics' willingness to contribute to OER and open courses, and adopt open education roles

Academics' role in opening up higher education is as critical as that of learners. While self-determined open learners invest their heutagogical resources, this investment builds on pedagogical resources invested by academics (more on both pedagogical and heutagogical resources is discussed in Chapter 2 and presented in Figure 2.6). Some of pedagogical resources that may be invested in opening up higher education include openly licensed content, tutorial support and open educational services. This subsection focuses on academics' willingness to make such an investment. The investigation of this willingness was conducted in the light of the second subsidiary research question of Research question 3: "*To what extent are academics at the University of Rwanda willing to contribute to OER and open courses, and adopt open education roles?*".

5.2.1 Participants' demographic

As discussed in Chapter 3, email questionnaires were sent to 170 valid emails from 175 emails that had been provided by academics who had volunteered to participate in the study. Eighty-eight questionnaires were returned: 85 completed questionnaires and 3 questionnaires that were returned without answers to questions that would help answer the guiding subsidiary research question. The three questionnaires were invalidated. This gave a 50 per cent return rate (85 out of 170 recipients of questionnaires returned them with valid answers).

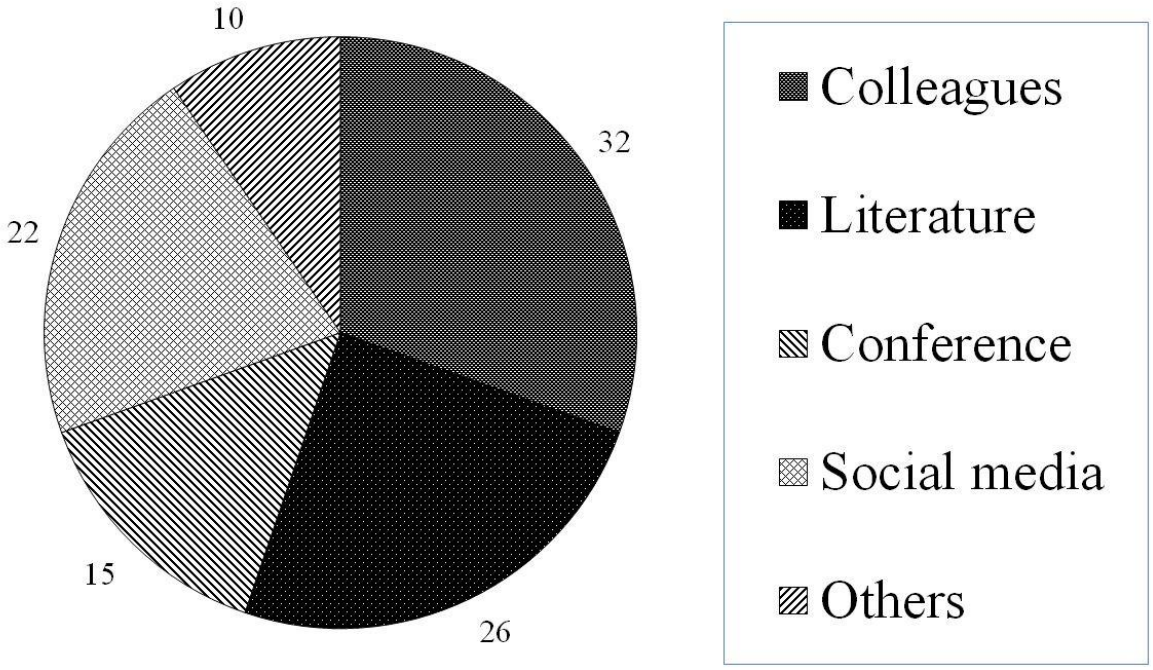
About half of completed questionnaires were returned by academics from the College of Medicine and Health Sciences (43 of all valid questionnaires or 50.5 per cent). The College of Education followed with 18 valid returned questionnaires: 21.1 per cent of all returned questionnaires. Twelve questionnaires (14.1 per cent of all valid returned

questionnaires) were from the College of Science and Technology. Questionnaires returned from the College of Business and Economics and the College of Art and Social Sciences were seven (8.2 per cent) and five (5.8 per cent) respectively.

Most of participants had master's degrees as the highest academic qualification: 55 participants (64.7 per cent) were master's degree holders. Master's degree holders were followed by bachelor's degree holders who were 20 or 23.5 per cent. Seven participants (8.2 per cent) were PhD holders, 2 were postgraduate diploma holders and one was a Medical Doctor. The qualification statistics tended to be reflected in academic positions held by the participants. Thirty-eight (44.7 per cent) were assistant lecturers and 26 (30.5 per cent) were tutorial assistants. Lecturers were 14 (16.4 per cent), senior lecturers were six (7 per cent) and only one full professor participated in the study.

The majority of participants (58 or 68.2 per cent) reported that they were aware of the concept of opening up education while 21 (24.7 per cent) were unaware of this concept. As illustrated in Figure 5.7, thirty-two of those who were aware of opening up education had learned it from colleagues, 26 from academic literature, 22 from social media and 15 from academic conferences they had attended. Other sources of information on opening up education included the partnership between the College of Medicine and Health Sciences and Tulane University (highlighted by two participants), workshops (two participants) and myself (two participants mentioned that they learned the concept from a PhD research student).

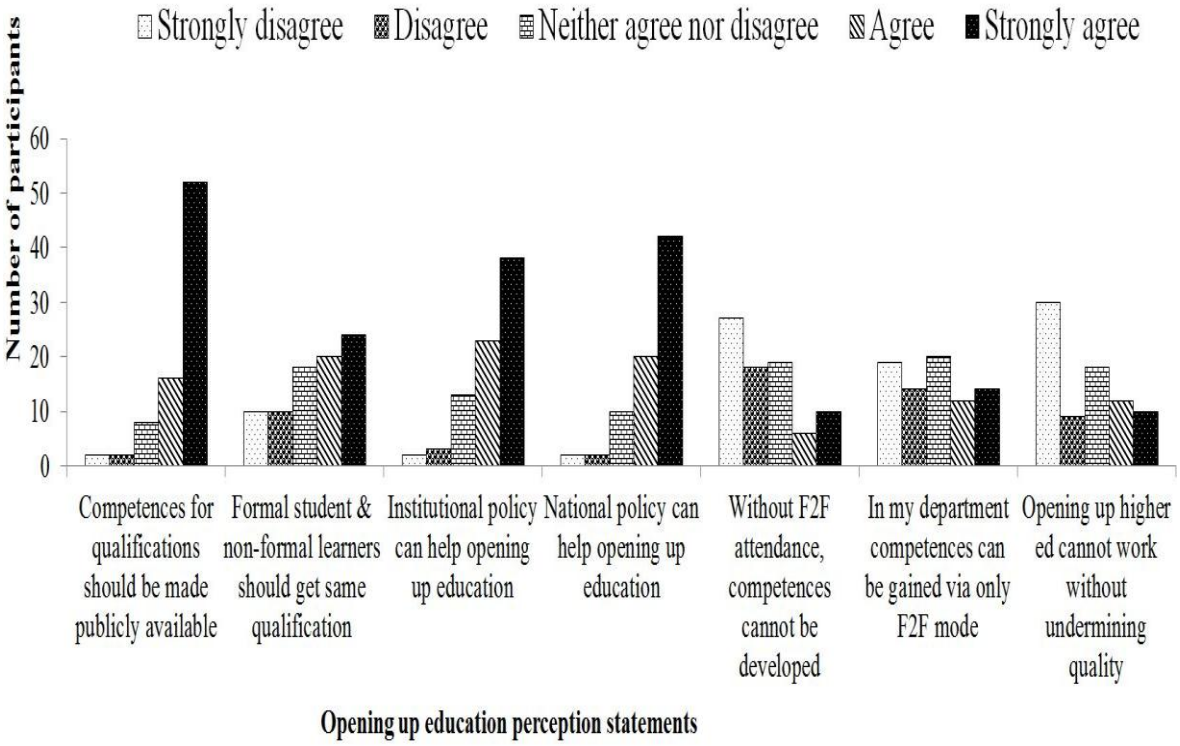
Figure 5.7 Sources of information on opening up education among academics at the University of Rwanda



5.2.2 Academics' perceptions on opening up education

As illustrated in Figure 5.8, 68 participants (80 per cent of all participants who returned valid data) supported the idea of making a list of competencies needed for award of different qualifications publicly available. These included 52 participants (61.1 per cent) who strongly agreed with the related statement in the questionnaire and 16 participants (18.8 per cent) who agreed with it. Although a few academics commented on the statement, their comments were diversified. While some participants who supported the idea highlighted that this practice would help students focus on competence development and enable the profitability of education to the public, one participant expressed concern of laziness that may be triggered by the practice.

Figure 5.8 Academics' perceptions on opening up higher education



With regard to awarding same qualifications to formal students and non-formal learners based on competencies they demonstrated via the same or similar assessment administered to both categories of learners, 44 academics (51.7 per cent) supported the idea. These included 24 (28.2 per cent) who strongly supported the idea (strongly agreed with the related statement) and 20 (23.5 per cent) who agreed with the statement. Comments on this statement were also diversified. Two participants highlighted the need for effective assessment that would evaluate those competences. Two other participants emphasised the need to award qualifications based on competencies developed and evidenced rather than basing on the learning mode. One of these two participants expressed his support as follow: "It is obvious and a matter of justice. The qualification should sanction the mastery of competencies not the mode of education delivery".

However, not all comments were positive about the idea. One academic stated that non-formal learners are interested in qualifications rather than competence development. Another one said that although competencies would be the same for both formal students and non-formal learners, recognition of formal education is mandate.

Most participants see national and institutional policies and strategies as enablers of opening up higher education. Sixty-one participants (71.6 per cent) agreed on the statement "*Opening content and assessment of open learning accomplishment can help open up higher education if they are supported by institutional policy and strategy*". Twenty-three of these participants (27 per cent) strongly agreed with the statement while 38 (44.7 per cent) agreed with it. When attention shifts to a national policy and strategy, 62 participants (72.9 per cent) reported that this policy and strategy would enable opening up higher education. These included 42 participants (49.4 per cent) who strongly agreed with the statement and 20 participants (23.5 per cent) who agreed with it.

Participants' perceptions on the appropriate mode for competence development were also diversified. Forty-five participants (52.9 per cent) expressed disagreement with the statement "*Without attending higher education face-to-face, learners cannot develop competencies required for academic credit and qualification*". These included 27 participants (31. 7 per cent) who strongly disagreed with the statement and 18 participants (21.1 per cent) who disagreed with it. Comments provided on the statement highlighted that courses that require experiment and practical work would necessitate face-to-face sessions. Some other academics stressed the role of the learners and one of them expressed this role in these words: "*It can depend on the leaner if he/she is lazy or hard worker*".

Perceptions tended to be more distributed when the statement applied to participants' respective departments and the nature of courses in those departments. Nineteen participants (22.35 per cent) strongly disagreed with the statement "*Due to the nature of the field of study and courses, learners in my department can develop competencies needed for qualification via only face-to-face mode*" while 14 others (16.47

per cent) disagreed with it. A similar number of participants (14 or 16.47 per cent) strongly agreed with the statement while 12 participants (14.11 per cent) agreed with it. Comments on this statement reiterated the comments on the previous one, especially on modules that have experimental, clinical or practical components that would need face-to-face sessions.

The final statement of Question 3 in Section 2 that investigated academics' perceptions on opening up higher education was "*There is no way the concept of opening up higher education in Rwanda can be applied without undermining quality*". Thirty participants (35.29 per cent) strongly disagreed with the statement, nine (10.58 per cent) disagreed with it, 12 (14.11 per cent) agreed with it and 10 (11.76 per cent) strongly agreed with it. Eighteen participants (21.17 per cent) were neutral. Comments that expressed concerns on quality degradation if an agenda to open up higher education is undertaken were provided. These concerns were mainly triggered by inadequate infrastructure, the lack of academics' preparedness and the lack of access to technologies by learners. On optimistic side, one comment highlighted that different stakeholders can work on opening up higher education without undermining quality.

Statement 1 under Question 5 in section 2 also investigated academics' perceptions on opening up higher education with a particular focus on technological infrastructure. The statement was "*I think opening up higher education cannot be successfully implemented in Rwanda because there are not technologies to make it happen*". Thirty-three participants (38.82 per cent) strongly disagreed with the statement and 17 participants (20 per cent) disagreed with it. Eighteen participants (21.17 per cent) were neutral on the statement, five (5.88 per cent) agreed with it and eight (9.41 per cent) strongly agreed with it.

Comments on this statement tended to agree on that the basic technology to open up higher education is available in Rwanda. The comments also agreed on the need to upgrade the existing technological infrastructure progressively. The most important barrier was rather the lack of enabling policies. Other barriers that were highlighted included the lack of political will, the lack of related competencies in academia, the lack of awareness and

the lack of involvement of all stakeholders. Only 2 of 14 comments on this statement highlighted that technological infrastructure is not enough to successfully open up higher education in Rwanda, but one of the two participants who made such comments saw a valid solution in the second statement under Question 5 in section 2. The statement was "*I think opening up higher education can be successfully implemented in Rwanda if the Ministry of Education, the University of Rwanda, academics and learners are all involved and develop ownership*". Academics' responses on this statement will be detailed towards the end of the following subsection.

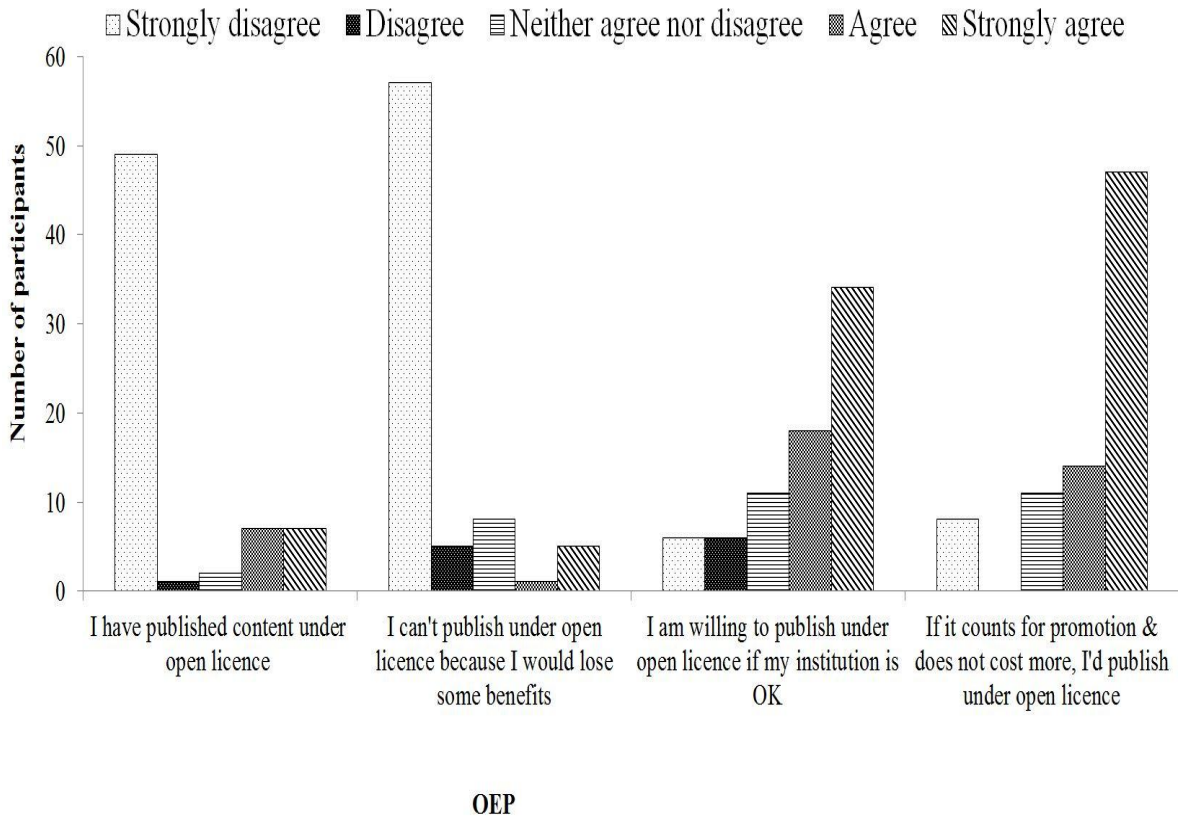
5.2.3 Academics' willingness to adopt practices related to OER, open courses and open education roles

As earlier highlighted, the investigation of academics' willingness to adopt practices related to OER, open courses and open education roles was conducted in the light of the subsidiary research question "*To what extent are academics at the University of Rwanda willing to contribute to OER and open courses, and adopt open education roles?*". The results on academics' willingness to make such a contribution are presented below. Some of these results were also published in Nkuyubwatsi et al. (2015).

As indicated in Figure 5.9, most of academics have not published content under an open licence, but were willing to do so. Fifty-seven academics (67 per cent) strongly disagreed with the statement that claimed that they would not publish under an open licence because they would lose some benefits and five others (5.88 per cent) disagreed with it. Fifty-two participants (61.1 per cent) expressed their willingness to publish under an open licence if the institution is OK with this practice. Similarly, 61 participants (71.7 per cent) were willing to publish under an open licence if this practice does not incur more cost and their open publications lead to academic promotion. Although academics who thought they would lose some benefit by publishing under an open licence were not many,

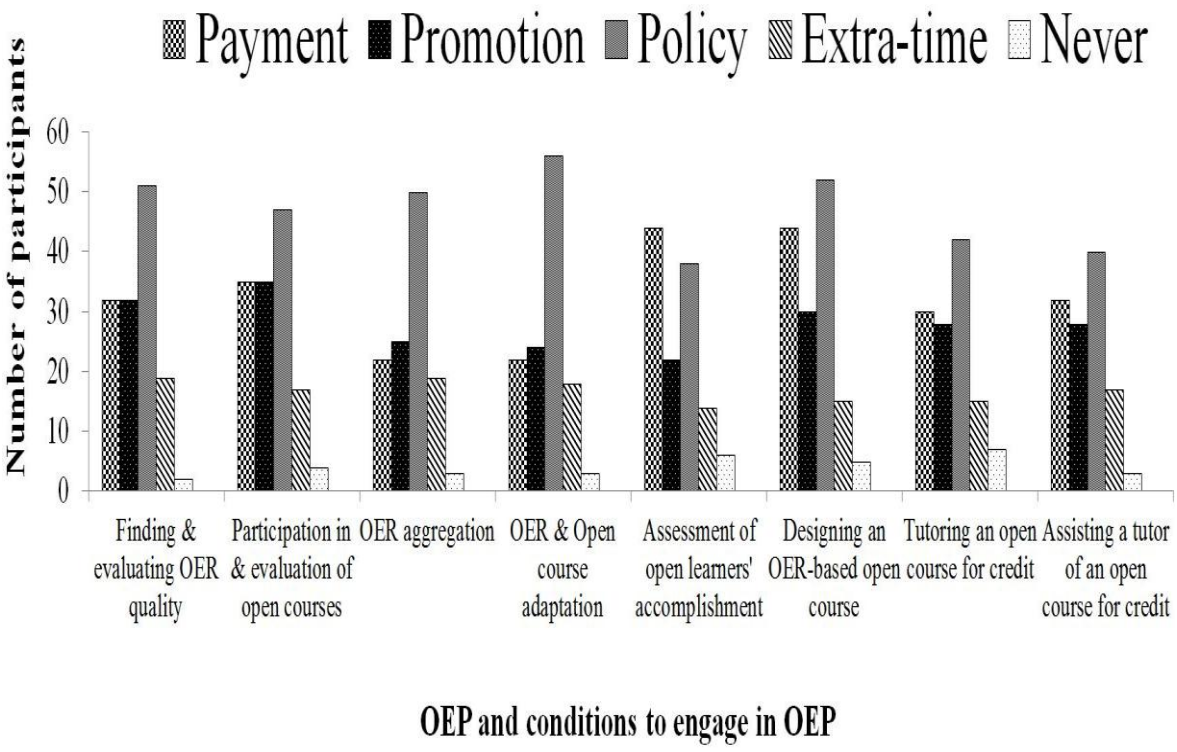
it is worth noting concerns they raised. One of them highlighted that s/he prefers to publish in high impact journals which are often not open.

Figure 5.9 Academics' willingness to contribute open educational resources



Academics also expressed willingness to engage in different open education roles and conditions under which they would engage in these roles were investigated. The specific open education roles and conditions under which academics would engage in those roles are summarised in Figure 5.10. The roles include finding OER and evaluation of their quality (1), participation in and evaluation of an open course (2), aggregation of OER (3), OER and open course adaptation (4) and assessment of accomplishment from open learning based on OER and open courses for credit (5).

Figure 5.10 Conditions for academics to engage in open education roles and contribute to open courses



An overwhelming majority of participants would engage in these open education roles if one or more of these four conditions is met: they are paid for it (1), their practices related to these roles lead to academic promotion (2), these roles are supported by a national or an institutional policy (3), they have extra-time (4). Academics who said they would never engage in those open education roles varied between 2.3 per cent who would never find and evaluate OER quality and 7 per cent who would never assess open learning accomplishment for credit. When it comes to participation in open courses and evaluation of their quality, only 4.7 per cent reported that they would never engage in this practice. As for OER aggregation as well as OER and open course content adaptation, 3.5 per cent reported that they would never participate in these practices.

Overall, policy was found to be the most enabling condition for academics to engage in different open education roles. Exception was on assessment of accomplishment

from open learning based on OER and open courses for credit on which payment would be the most important catalyst of academics' engagement. On this specific open education role, policy was the second most important condition. For all the four remaining open education roles, promotion and payment were either the second or the third most important condition for academics' engagement after policy.

Figure 5.10 also indicates academics' willingness to contribute to open courses and conditions under which they would make this contribution. Similar to the engagement in open education roles, policy was found to be the most important enabler of academics' potential contribution to open courses. The second and third most important conditions were found to be payment and promotion respectively. Only 5.8 per cent of participants would never design an OER-based course. When it comes to tutoring an open course for credit, only 8.2 per cent of participants said they would never engage in this practice. As for assisting a tutor of an open course offered for credit, only 3.5 per cent said they would never engage in this practice.

It is also worth noting academics' response to Statement 2 under Question 5, Section 2. The statement was "*I think opening up higher education can be successfully implemented in Rwanda if the Ministry of Education, the University of Rwanda, academics and learners are all involved and develop ownership*" as highlighted earlier. Fifty-two participants (61.1 per cent) strongly agreed with the statement and 17 (20 per cent) agreed with it. Eight participants (9.4 per cent) expressed neutrality on the statement and only 3 participants (3.5 per cent) disagreed with it.

Eleven participants commented on the statement in the questionnaire they completed and six of them tended to agree on the importance of engaging all stakeholders for opening up higher education to be successfully implemented. One participant's comment stated that "*Once these stakeholders join their hands, it can happen…*". Another participant highlighted that "*If the mentioned parts [sic] take things serious, it can be successfully implemented*". A third participant went further to stress that the best model

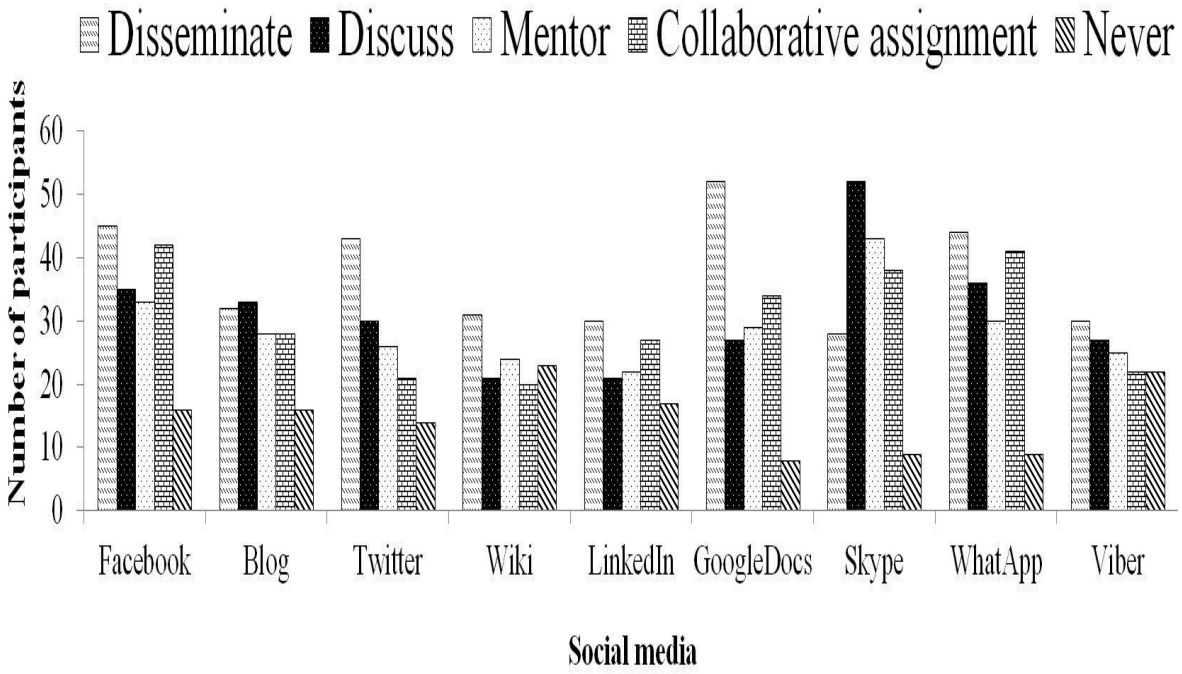
would be to involve all stakeholders in related policy design. Some comments were, however, skeptical on the possibility to involve all stakeholders for making opening up higher education run successfully. "*The main problem is that decision makers would hardly be committed to this cause*", so stated another participant. Two participants also emphasised giving enough attention to challenges (including financial constraints and resistance to change mentioned by one of them).

5.2.4 The potential role of social media in academics' open educational practices

Academics were also asked to indicate the way they would use social media to support off-campus learners. The target social media were Facebook, blog, Twitter, Wiki, LinkenIn, Google Docs, Skype, WhatApp, and Viber (Figure 5.11). Google Docs was the least rejected social media: eight participants (9.4 per cent) reported that they would never use it to support off-campus learning. Google Docs was followed by Skype and WhatApp which would never be used by nine participants (10.5 per cent) to support off-campus learners.

However, it is worth noting that some of these participants may have thought that any file that can be googled and downloaded is referred to as Google Doc. This issue was noted in data collected from learners. In addition, a concern that many participants may not be familiar with different social media was raised in additional comments. One participant expressed this concern as follow: "*Just to mention my worry about some respondents' unfamiliarity with the tools mentioned in question 6. I personally have no problem with them though*".

Figure 5.11 Academics' willingness to use social media to support off-campus learning



The dissemination of relevant information to learners was the most dominant purpose for which academics would use social media. As Figure 5.11 illustrates, this purpose dominated on 7 of the 9 social media: Facebook, Twitter, Wiki, LinkedIn, Google Docs, WhatsApp and Viber. The proportion of academics who would use the 9 social media to disseminate relevant information to learners varied between the lowest 32.9 per cent (28 participants in total) who would use Skype for this purpose to the highest 61.5 per cent (52 participants) who would use Google Docs for the same purpose.

However, since possibility of confusion of Google Docs with any file that can be googled may have occurred as highlighted earlier, it is worth considering the second media that would be used by most participants to disseminate relevant information to learners. Facebook would be used by 45 participants (52.9 per cent) to disseminate information. This social media would also be used to organise group and collaborative assignments at the rate of 49.4 per cent (42 participants) and discuss the learning content with learners at the rate

of 41.1 per cent (35 participants). As for mentoring learners in their learning process, Facebook would be used for this purpose at the rate of 38.8 per cent (33 participants).

When it comes to blog and Skype, discussion of the learning content with learners was the most dominant purpose for the potential uses of both social media. Thirty-three participants (38.8 per cent) reported that they would use blog for this purpose while 32 participants (37.6 per cent) reported that they would use the same social media to disseminate relevant information to learners. The number of academics who would use Skype to discuss the learning content with learners was much higher. Fifty-two participants (61.1 per cent) said they would use Skype for such discussion. Skype would also be used to mentor learners in their learning process at the rate of 50.5 per cent (43 participants), to organise group and collaborative assignments at the rate of 44.7 per cent (38 participants) and to disseminate relevant information to learners at the rate of 32.9 per cent (28 participants).

Finally, the mixed comments provided on the last open question in the questionnaire addressed to academics are worth noting. Many of these comments reiterated the critical role of policy as well as concerns on technological access and quality in open education. Others were optimistic on the potential of open courses to increase access to higher education. Equally, some comments expressed the need for the development of competences needed for opening up higher education. One of the comments specifically referred to the need to develop competences in the use of social media to support learners. "*I wish I could be educated on how to use the social media programs to support the learning process of my students*", so commented one participant. Another comment requested to organise a workshop at the university level as soon as possible so that academics learn more about open learning and opening up education. Equally, the need for incentives was also raised in this comment:

> You ask questions as if you are not Rwandan: With this working motivational environment (little salary, poor equipment and infrastructure, etc) how can you use

> such social media oriented in academics [sic]? Have you ever seen any lecturer getting a laptop from the institution as it happens to other civil servants in public administration?

5.3 Leaders/policy makers' willingness to recognise academics' OEP and credibly certify self-determined open learners' accomplishment

Unlike learners and academics' willingness to engage in practices that would enable opening up higher education that was investigated using survey questionnaires, interviews were planned to investigate the willingness of the University of Rwanda's leaders and policy makers. As highlighted in Chapter 3, email invitations were sent to five institutional leaders/policy makers. Two of the recipients responded and only one of them was able to fit an interview session in her schedule.

The informant highlighted that policies at the University of Rwanda are developed in a participatory process. The informant also listed existing policy documents, which I subsequently analysed for identification of any intention to recognise academics' open educational practices (OEP) and credibly certify accomplishment from self-determined open learning practices. While recognition of academics' OEP would facilitate ensuring academics' share in the *shared benefit* basis for collaboration in opening up higher education (Figure 2.6), credible certification of accomplishment of open learners would constitute the learner's share.

The intention to ensure both academics' share and the learners' share may be expressed in the interview or the policy documents. While data from the interview session may reflect perspectives of only the informant who participated, policy documents are often expected to be published after different leaders/policy makers have contributed their input and endorsed the published version. Therefore, both the interview recording and different policy documents were given value in the current study. Policy documents were

analysed before analysing the interview data. Results in this section are presented in two major subsections that reflect themes that emerged in data analysis.

5.3.1 Decontextualised policies at the University of Rwanda

Four policy documents that were uploaded on the University of Rwanda's website were analysed: The open access policy and procedures (1), the general academic regulations for open and distance learning programmes (2), the academic workload framework (3) and the policy and procedures on academic staff appointments and promotions (4).

The University of Rwanda's *open access policy and procedures* (The University of Rwanda, 2015b) was supposed to be effective on 1 March 2015. In this document, a commitment to the promotion of open access publishing for the sake of providing and improving wider access to scholarly and research output of the University of Rwanda is expressed. A commitment to make research output freely available and accessible in ways that permit its use for the benefit of a wider society is also expressed in this policy document (p. 2). Equally, the university expresses its commitment to encourage researchers to publish in open access journals (p. 1). Preference on the *Green* open access publishing route is highlighted (p. 2), but the *Gold* open access publishing route would also be supported if it is appropriate and resources are available (pp. 2-3). The *Platinum* open access publishing route is not referred to in this policy document, but it is conflated with the *Gold* route. According to this policy document, an article published within the *Gold* open access publishing route "can be published in an open access journal free of charge or after payment of article processing charges (APC), depending on conditions of the publisher" (p. 1). Therefore, the *Gold* route in the University of Rwanda's context means both the *Gold* and the *Platinum* open access publishing routes (Weller, 2014, p. 7).

The general academic regulations for open and distance learning programmes (The University of Rwanda, 2014a) stipulates that registration will occur at the beginning of each module rather than per academic year as done in the conventional education system (Article 31). Nevertheless, Article 48 states that readmission is on semester basis. In Article 88, the guidelines require attendance of seminars, practical sessions, tutorials and face-to-face sessions at the rate of 85 per cent for passing a module (p. 15). The regulations do not make any clarification of the distance learning academic staff workload. Neither assessment of accomplishment from open learning based on open courses or openly licensed resources for credit is mentioned in these regulations. Overall, the regulations do not address key enablers of open learning practices: assessment of open learning for credit, open educational services, open educational practices, openly licensed learning resources and open courses.

The academic workload (The University of Rwanda, 2014b) consists of activities that fall under four categories: contact teaching time per module, preparation time per module, the number of students taking a module and supervision time per student (p. 1). For one hour of student contact, the framework allows one hour of preparation regardless of whether the programme is distance learning or face-to-face (p. 3). According to the framework, teaching time includes student academic advising in face-to-face, online and distance learning as well as tutoring and producing course materials (p. 4).

The policy and procedures on academic staff appointments and promotions (The University of Rwanda, 2014c) classify accomplishments that lead to academic promotions (and appointments) in five clusters: research (1), teaching in higher education (2), knowledge transfer/income generation (3), academic administration or management (4) and outreach to business and community (5) (p. 3). The policy and procedures also mention the contribution of curation in academic promotion (p. 16). Nevertheless, no more clarifications on the kind of curation and conditions under which this practice makes such contribution are provided. Equally, the policy and procedures highlight the contribution of pedagogic innovation (p. 33) without specifying such innovation. In this policy document,

it was also stated that inventions and innovation that have impact on social and economic development should be considered for promotion (p. 42). However, in a note on conditions for promotion based on knowledge transfer, advanced professional practice and scholarly/teaching/learning/pedagogical activities found in appendix 3 of the document, it was highlighted that the related activities should contribute to economic and/or civic development of Scotland (rather than that of Rwanda):

> NOTE: *These activities would normally be expected to lead to the production of a variety of types of published work (including monographs, CD ROMs, textbooks, refereed and other articles, seminar papers, practice protocol, consultancy report, etc.),* ***and/or*** *artefacts, patents, spin out companies and licensing agreements* ***and/or*** *national/internal invitations to make presentations, lead workshops and/or act as an advisor and/or successful strategic partnership projects with industry and/orthe [sic] community which contribute towards the economic and/or civic development of Scotland and beyond.*
>
> The University of Rwanda (2014c, p. 37)

Overall, most of these policy documents were found to be decontextualised in different aspects, which makes them unlikely to trigger interest of different stakeholders in Rwandan higher education in open up this level of education. Decontextualisation was reflected in the lack of attention to the *Platinum* open access publishing route that would be of financial benefit and safe to academics and institutions in Rwanda (Nkuyubwatsi et al., 2015), the statement that is relevant to academics in Scotland, rather than those in Rwanda and the lack of attention to critical enablers of opening up higher education: assessment of open learners' accomplishment for credit (learners' share in the *shared benefit* basis for collaboration in Figure 2.6), recognition of academics' OEP (academics' share in the *shared benefit* basis for collaboration) and the use openly licensed resources. Hence, none of the documents was found to fit well in the framework for collaborative investment in opening up higher education (Chapter 2). These policies need substantial review if they have to support opening up higher education.

5.3.2 Contradiction, awareness, control and confusion

Similar to policy document analysis, the interview analysis focused on identification of any indicator of the willingness to recognise academics' engagement in OEP and support assessment of accomplishment from self-determined open learning practices for credit. Four subthemes/patterns emerged in the analysis of the interview recording: contradiction with some policies, the lack of awareness, control and confusion of openness and electronic format of the content.

a. Contradiction

Despite an explicit expression of commitment to promote open access publishing and encourage researchers to publish their research articles in open access journals, the interview with a University of Rwanda's official revealed a different attitude, although it may be inappropriate to generalise this attitude to all leaders/policy makers at the university. When asked about her position vis-à-vis raising awareness of an open access publishing route that does not charge publication fee, the informant responded as follow: "we do not focus really on open access or not… we would like our staff to publish in credible journals… whether they are open access or not, it doesn't matter as far as we are concerned". In this way, the informant and the open access policy and procedures were contradictory. I probed by asking if there are open access academic journals that are credible and the informant admitted that some of open access journals are highly credible.

b. Awareness

I shared with the informant the issue raised by an academic at the University of Rwanda who had an article published in an academic journal after giving away the copyright. The academic was lamenting that he can no longer access and share the article with his students unless it is paid for. I asked if this issue would constitute a barrier to open

access to academic content produced at the University of Rwanda and therefore contribute to inaccessibility of higher education in Rwanda. The informant insisted that it is the authors' choice to publish under such conditions. I also asked if the practice of journals that charge publication fee to the University of Rwanda's academics to publish their work as open access content do not create barrier to open access publishing at the university. The informant reiterated that it is the academics' choice because they believe such journals are prestigious.

In the interview, I went further and highlighted that academics at the University of Rwanda may be making decision to publish with such journals because they do not have information on an alternative open access publishing route that does not charge fee. The response was "You know, we have not really taken trouble ourselves to teach them about that." I probed to check if the University of Rwanda would have any intention to raise such awareness and the response was that this can be done.

On the part of the informant, there may also be the lack of awareness on copyright regulations across settings. This lack of awareness is reflected in the informant's statements on reproduction of content that has not been released under an open licence:

> …you are told not to photocopy the whole book. You can photocopy a chapter of a book. Another chapter of a book. When I was doing my PhD...that was already in the seventies..sorry in the eighties, I would go to places where there is a lot of materials..we photocopy except the preliminary pages, and I had all my books…

c. Control

The informant argued that the issue of main concern at the University of Rwanda is not access to the content, but the lack of the reading culture. She revealed that the university has access to more than 33,000 electronic resources which are not used beyond the rate of 2 per cent. These resources are paid by the Swedish International Development

Cooperation Agency (SIDA), according to the informant. A probe revealed that those resources are only accessible to people who are affiliated with the University of Rwanda and 58 other institutions or the National Library that access the resources through the university. The informant insisted that all users of the content must be registered somewhere. “Somebody must be somewhere,..somebody must come and register. So now..if we are registering, the university, it means that university we register is a community”, so asserted the informant. The theme of control was also reflected in the informant’s opinion that publishing under an open licence “is like the content is somebody else’s”.

d. Confusion

When I asked the informant on permissions that are granted to everyone to have access to the content published under an open licence and use, remix, revise and redistribute it, her response was that journals at the University of Rwanda are also open access and are published within the African Journal Online (AJOL) which has specific open licences. I checked the AJOL’s “Information on open access” and I noted that the content published by AJOL are online but have no specific open licence. In a call for papers that was made during the period of data collection, it was highlighted that authors sign an agreement that transfer the copyright to the University of Rwanda. Via a Facebook message, I checked with an author of an article published by one of the university’s journals, if he had signed the copyright transfer agreement. The author confirmed that he had to sign this agreement for his article to be published. His article was published online, but without an open licence, which implies the confusion between an electronic format and openness of the content. This confusion stands out more in the informant’s statements below:

> So, in short, there is one thing, open access is good, but good when you have Internet, you have got the equipment, the ICT, you have got all those things and place, yes, it is good. And you even have printers to print if you have to….a print

> material can go in each village in Rwanda, but an open access [material] can be reached by very few who can have Internet connectivity, who can have a computer, so, end of the story.
>
> ([materials] is my own addition).

To sum up, no intention to recognise academics' OEP, assess open learners' accomplishment for credit or encourage open learning practices could be identified in the analysis of the policy documents and the interview recording. For this reason, the current policy environment at the University of Rwanda does not guarantee learners' and academics' shares in the *shared benefit* basis for collaboration in opening up higher education (Figure 2.6). Without these academics' and learners' shares, these critical stakeholders may not participate in related initiatives.

Chapter Summary

In this study, learners expressed willingness to engage in heutagogical/self-determined open learning practices. Such practices include giving up casual routines to prioritise learning, writing reflection on own learning progress, evaluating own progress towards achieving learning competencies, sharing reflection on own learning via blog posts to get constructive feedback and learning independently. Learners who would engage in these practices without assessment for credit were 55.2 per cent; higher than those who require assessment for credit for their engagement.

Academics also expressed their willingness to contribute to opening up higher education. The majority of participants were willing to publish under open licences, design OER-based courses, tutor open courses for credit and assist tutors of open courses for credit. Equally, academics expressed willingness to find OER and evaluate their quality, participate in open courses and evaluate their quality, aggregate OER, adapt OER and open courses and assess accomplishment from open learning practices. An institutional/national

policy, promotion, payment and extra time were found to be important enablers of such contribution.

Academics' willingness may, however, be inhibited by the lack of recognition of their participation in these practices. Similarly, learners may be inhibited by the lack of assessment of their open learning accomplishment for credit. Intention to recognise academics' open educational practices and assess open learning accomplishment for credit could not emerge in the interview with an institutional official and was not identified in four policy documents I analysed. While most of the policy documents were decontextualised, the interview revealed contradiction with some policies, lack of awareness, desire to control and confusion of openness and electronic format of the content. Hence, the current policy environment at the University of Rwanda does not promise learners' and academics' shares in the *shared benefit* basis for collaboration in opening up higher education.

CHAPTER 6 THE OUTCOMES OF THE PARALLEL DEVELOPMENT

As discussed in Chapter 3, transformative researchers move beyond research findings to catalyse actions that contribute to the improvement of the status-quo and underprivileged people's well-being. In the current study, this move was reflected in my involvement in different events detailed in the parallel development component (please see Chapter 3 for more details). This brief chapter contemplates the outcomes of my involvement in the parallel development component. The cases featured in this chapter were included after obtaining permission from the concerned individuals except the materials that were released under an open licence by which this permission was inherently provided. The chapter consists of five sections: Inspiration to *eLearning Papers* readers (6.1), inspiration to academics at the University of Rwanda (6.2), a national policy on open, distance education and eLearning (6.3), transformative moves from a pass grade to a first class (6.4) and from intention to drop out to a distinction (6.5).

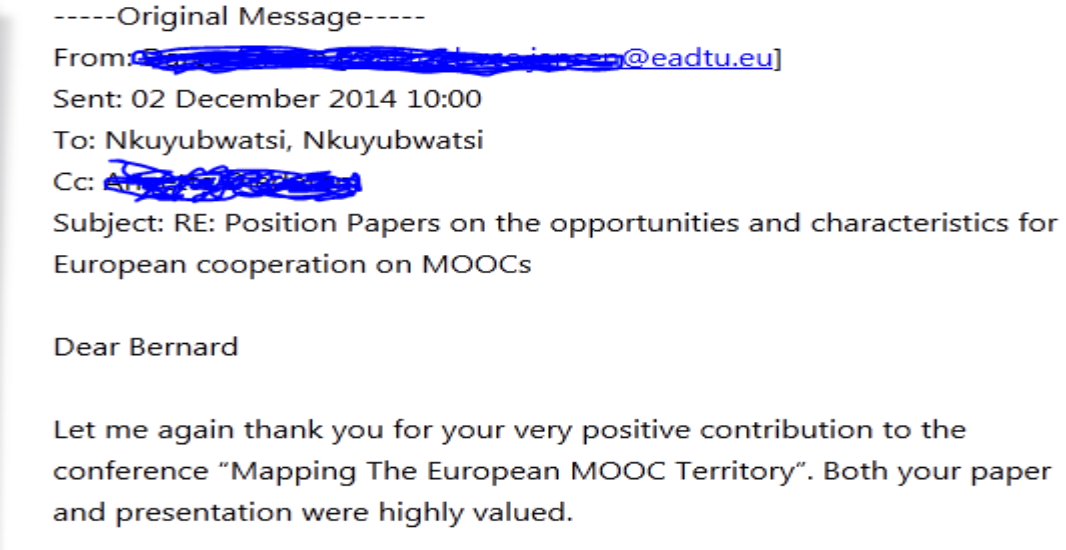
6.1 Inspiration to *eLearning Papers* readers

As discussed in Chapter 3, my article "Cultural translation in Massive Open Online Courses (MOOCs)" that was presented at the *2nd European MOOC Stakeholders' Summit (EMOOCs 2014)* was selected among best papers presented at this conference and was published in Issue 37 of the *eLearning Papers* journal. A few months after its publication in this issue, this paper was again selected among "most intriguing and inspiring papers" (Ullmo & Koskinen, 2014, p. 5) published by the journal that year and was re-published in a special edition of the journal in September 2014. According to the editors, articles published in this special edition were evaluated based on their quality and the feedback from readers.

The cross-cultural and multidirectional exchange of knowledge and expertise that was recommended in the article seems to have been heard by or aligned with agendas of members of the European Association of Distance Teaching Universities (EADTU). In

November 2015, EADTU, through its "*Higher education Online, MOOCs the European Way (HOME)*" partnership, hosted the *Mapping the European MOOC Territory* conference that was held in Porto, Portugal. The conference focused on opportunities and characteristics for European cooperation on MOOCs. In this conference, I was invited to present a paper that I had submitted as a response to a call for papers in a competition organised by the HOME project (See Chapter 2). It is in this paper that the framework for collaborative investment in MOOCs, open education and opening up education (Figure 2.6) was conceptualised. Both my paper and presentation were highly valued as positive contribution to the conference as evidenced by the feedback from an EADTU official (Figure 6.1).

Figure 6.1 Feedback on my presentation and paper contribution to the HOME project


-----Original Message-----
From: [redacted]@eadtu.eu]
Sent: 02 December 2014 10:00
To: Nkuyubwatsi, Nkuyubwatsi
Cc: [redacted]
Subject: RE: Position Papers on the opportunities and characteristics for European cooperation on MOOCs

Dear Bernard

Let me again thank you for your very positive contribution to the conference "Mapping The European MOOC Territory". Both your paper and presentation were highly valued.

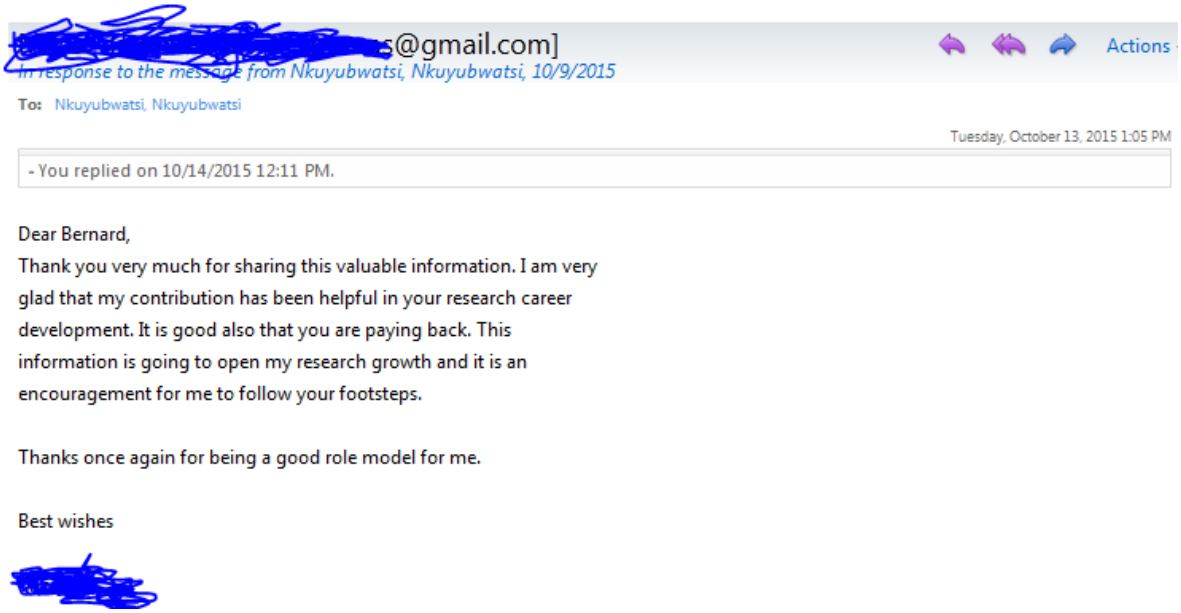
(The screenshot was taken and used with the sender's permission)

6.2 Inspiration to academics at the University of Rwanda

A link to the article I authored with three University of Rwanda's academics was shared with all other academics who had volunteered to participate in the study. These

academics were encouraged to disseminate the article among their colleagues since the article contained information that may save them from enormous charges for the publication of their work. Some of these academics responded expressing gratitude for giving back, others highlighted that our practice inspired their research practice. Figure 6.2 presents feedback from one of those academics.

Figure 6.2 Feedback from one of the University of Rwanda's academics on the article shared with them


[redacted]s@gmail.com]

Actions

In response to the message from Nkuyubwatsi, Nkuyubwatsi, 10/9/2015

To: Nkuyubwatsi, Nkuyubwatsi

Tuesday, October 13, 2015 1:05 PM

- You replied on 10/14/2015 12:11 PM.

Dear Bernard,
Thank you very much for sharing this valuable information. I am very glad that my contribution has been helpful in your research career development. It is good also that you are paying back. This information is going to open my research growth and it is an encouragement for me to follow your footsteps.

Thanks once again for being a good role model for me.

Best wishes

[redacted]

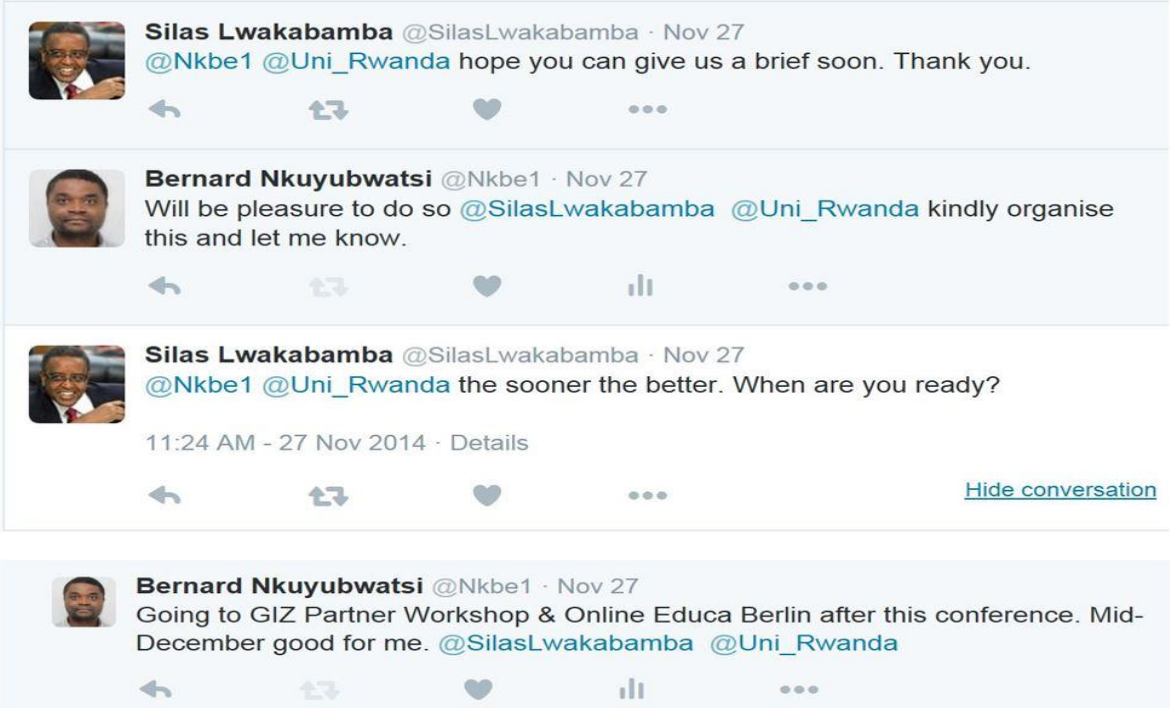
(The screenshot was taken and used with the sender's permission)

6.3 A national policy on open, distance education and eLearning

My contribution to live twitter sessions that were hosted by Rwanda's Minister of Education and the discussion I had raised on the need to open up higher education in Rwanda (see Chapter 3) led to the Minister's invitation to contribute a related policy brief (see Figure 6.3). I contributed this policy brief in December 2014. In January, 2015, I made a follow up to check if the Ministry of Education and the University of Rwanda could see

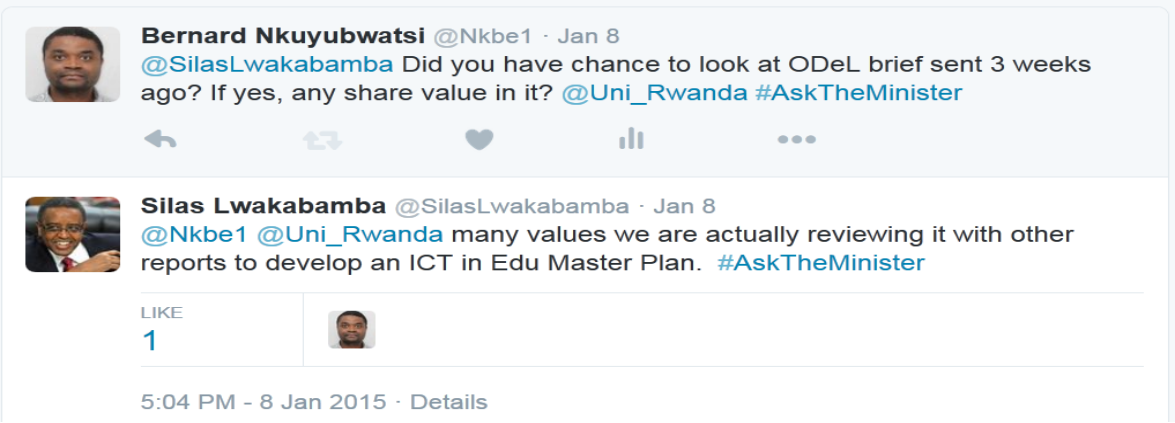
any niche for shared value in the policy brief (Figure 6.4). The Minister's response was that the policy brief had value and was being reviewed with other reports for the development of ICT in education master plan. In March 2015, the Minister delegated responsibilities to formulate a national policy on open, distance education and eLearning to the University of Rwanda, College of Education. This was followed by the appointment of a Task Force on the development of this policy. The policy was under development during the period of Phase 2 data collection.

Figure 6.3 Invitation to contribute a policy brief on open and distance education in Rwanda



(The screenshots were taken and used with permission of the tweet author)

Figure 6.4 Follow up and feedback on a policy brief on open and distance education in Rwanda



(The screenshot was taken and used with permission of the tweet author)

6.4 Transformative move from a pass grade to a first class

The ambitious decision of my second mentee introduced in the *Parallel development component* (Chapter 3) paid off. As highlighted in Chapter 3, this mentee decided to stop her underpaying job to invest most of her effort and time on her undergraduate education, with an agenda to complete this level of education with the highest performance possible. This dedication enabled the mentee to accomplish an exceptional migration. She completed her first year with an upper second class, very close to a first class. This provided me with an opportunity to reassure her that she could definitely make it to a first class.

Although she came from a low income family, her investment of heutagogical resources (non-rivalrous) and resulting high performance attracted financial resources, rivalrous resources (see Chapter 2 and Figure 2.6) she could not get otherwise. Part of her tuition fee was donations from individuals who felt it was wrong to let down such a high performing student. In the subsequent three years, her performance was a first class and her average undergraduate grade was a first class. After her four year epic move from a pass

grade to a first class, she is more likely to win an international scholarship for her postgraduate education. In addition, she has been receiving invitations to submit her applications and participate in interviews with employers who have been headhunting skilled graduates. She recently secured a job in which her earning is five times more than her earning prior to this migration.

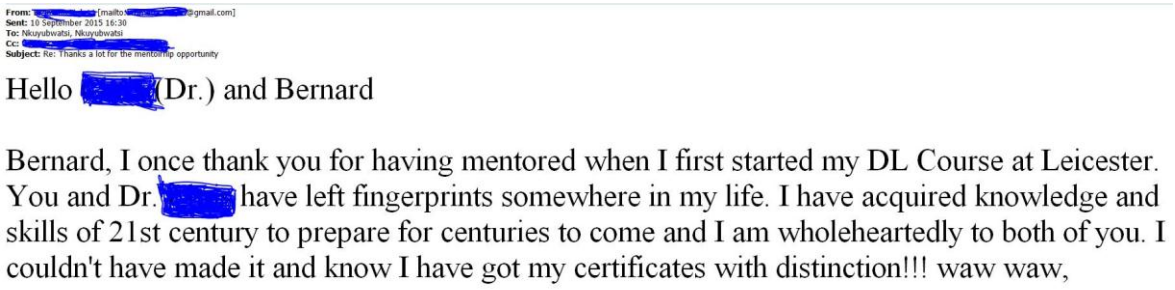
An earlier presentation on a similar migration triggered skepticism, under the lack of evidence pretext. This skepticism was probably caused by the fact that exceptional accomplishment of self-determined learners sounded hypothetical to the audience. To address such skepticism, the mentee voluntarily shared her credentials for verification of authenticity if there is any doubt. The credentials she shared are a secondary education completion certificate with a pass grade and an undergraduate degree certificate (and related transcripts) with a first class. She also expressed willingness to grant permission to anyone who may want to verify the authenticity of the documents with awarding institutions.

6.5 From intention to drop out to a distinction

A similar accomplishment was made by my third mentee who was concerned and considering dropping out in his online master's degree programme with the University of Leicester. The consideration of dropping out was mentioned by the mentee in our first Skype session (see Chapter 3). I reassured the mentee that he could be successful with limited access to the Internet he had and decided to disclose my online learning experience with him. I shared with him heutagogical strategies I used to succeed in the programme: prioritising learning over everything, recording my investment on learning on a regular basis, spending more time on learning to compensate unavoidable disadvantages (learning in a foreign language, irregular Internet access, irregular electric power, learning courses designed from foreign perspectives, etc.) and keeping my learning speed ahead by completing many activities before the start of their respective weeks.

About a year and half after our mentorship relation had started, the University of Leicester's academic who had initiated this relation disclosed that the mentee was top of the class. Later on, this mentee confirmed his high performance sharing with both the academic and me the information on completion of his MA with distinction (Figure 6. 5). From this experience, this mentee developed conviction that open and distance learning can be transformative in expanding higher education opportunities in Rwanda.

Figure 6.5 The third mentee's confirmation of completion of his MA with distinction


From: [redacted] [mailto:[redacted]@gmail.com]
Sent: 10 September 2015 16:30
To: Nkuyubwatsi, Nkuyubwatsi
Cc: [redacted]
Subject: Re: Thanks a lot for the mentorship opportunity

Hello [redacted] (Dr.) and Bernard

Bernard, I once thank you for having mentored when I first started my DL Course at Leicester. You and Dr. [redacted] have left fingerprints somewhere in my life. I have acquired knowledge and skills of 21st century to prepare for centuries to come and I am wholeheartedly to both of you. I couldn't have made it and know I have got my certificates with distinction!!! waw waw,

(Screenshot taken and used with the sender's permission)

Chapter summary

My move beyond the research components catalysed different actions some of which yielded transformative outcomes. The outcomes of this move include the inspiration to *eLearning Papers* readers (1), inspiration to the University of Rwanda's academics (2) and an invitation to contribute a policy brief that was followed by delegation of responsibilities and the appointment of a Task Force to formulate a related national policy (3). More transformative outcomes have been my mentees' moves from a pass grade to a first class (4) and from the lack of self-confidence and intention to drop out to completing a postgraduate online programme at the University of Leicester with a distinction (top of the class). The following chapter (Chapter 7) discusses the *research component* findings and the *parallel development component* outcomes.

CHAPTER 7 DISCUSSION

This chapter discusses the results that were based on to answer research questions in chapters 4 and 5 and their implication, as well as the *parallel development* outcomes presented in Chapter 6. The chapter consists of ten major sections. The first two sections (7.1 and 7.2) focus on the discussion of findings on MOOCs. The third section (7.3) shifts to the discussion of findings on OER units. In the fourth section (7.4), perceptions on openness in MOOCs and OER units are critically discussed. The following three sections (7.5, 7.6 and 7.7) are dedicated to the discussion of findings on the potential contribution of different stakeholders to opening up higher education in Rwanda. Section 7.5 discusses findings on the potential contribution of learners. Then, Section 7.6 moves to the discussion of findings on the potential contribution of academics and Section 7.7 discusses findings on the potential contribution of institutional leaders/policy makers. Section 7.8 discusses similarities and differences between MOOCs and OER units (1) and between the potential contributions of different stakeholders (2). Section 8.9 discusses implication on policies and practices. Finally, Section 7.10 discusses the transformative outcomes of the *Parallel development* presented in Chapter 6. Chapter 7 winds up with a summary of points discussed in its sections.

7.1 MOOCs and their opportunities for opening up higher education

Although MOOCs have limitations that will be discussed in different sections of this chapter, these courses offer access to a plethora of learning resources to students who are enrolled free of charge. This free access to learning resources may be an opportunity to learners in under-resourced settings. As highlighted in Chapter 4, students at the university that offered OGLNMN and MOOC students were assigned same materials. In this case, self-determined (Hase & Kanyon, 2001; Anderson, 2010; Canning 2010; Canning & Callan, 2010; Blaschke, 2012) MOOC learners also referred to as heutagogues (Nkuyubwatsi, 2015a) may benefit from these resources in similar or comparable ways as

on-campus students. Such learners may also benefit from learning materials in other MOOCs that were found to be *content-based* (Lane, L., 2012, para 6).

The use of social media in xMOOCs blurs the boundaries between the two most familiar types of MOOCs: xMOOCs and cMOOCs (Rodriguez, 2012; Daniel, 2012). Classification of MOOCs in these two categories was already criticised to be simplistic (Conole, 2013b and 2014). EDC harnessed features of both xMOOCs and cMOOCs and learning in LTO was significantly enabled by social media.

Another classification of MOOCs discussed in Chapter 2 distinguishes three categories: *network-based* MOOCs, *task-based* MOOCs and *content-based* MOOCs (Lane, L., 2012). As results of the current study indicated, no clear cut between these three categories could be identified. As noted in Chapter 4, AT21CS and LTO may be accurately classified in all the three categories thanks to a diversity of learning resources, activities and network opportunities provided in these courses. Similarly, EDC may be accurately categorised as both a *content-based* course and a *network-based* course: Diverse learning resources were provided and networking opportunities such as Facebook and Twitter hash tag enabled communities, as well as Google hangouts were created. The use of social media in AT21CS, LTO, EDC and other MOOCs confirmed Blom et al.'s (2013) argument that MOOCs can enable both individual and social learning.

Results presented in Chapter 4 indicated that assessment in many MOOCs (OGLNMN, EDC, Gamification, AT21CS and LTO) moved beyond automated multiple choice questions (MCQs) to assess more complex skills. These findings were in contrast to earlier tendency to generalise MCQ quizzes and exams as the only mode of assessment in xMOOCs (Daniel, 2012, p. 7). This improvement in MOOC assessment may, however, still be not enough to catalyse assessment of learning accomplished via these courses for credit. Invigilated examination for assessing learning accomplished via MOOCs has been recommended as a precondition for awarding credit to successful learners (Cisel, no date; Kopp et al., 2014; Verstelle et al., 2014; Iversity, 2013). For administration of this

examination, learners who are not formally enrolled in higher education institutions may be required to pay examination processing fee (Iversity, 2013). With an agenda to open up higher education, this fee may be much lower than the tuition fee in existing institutions. The Open Educational Resources Tertiary Education Network expected this practice to cut down the cost of higher education at 80 per cent (Hoosen, 2012, p. 19).

Invigilated examinations can possibly address the issue of lack of recognition of accomplishment from open learning practices. As highlighted in Chapter 2, such recognition was noted among catalysts of learners' engagement in open learning practices (Lane & Van Dorp, 2011; Yuan & Powell, 2013; Kopp et al., 2014; Mulder, 2015). Awarding credit on learning accomplished via MOOCs can be challenging to institutions that exclusively use these courses to attract MOOC students to campus-based fee-bearing courses (Nkuyubwatsi, 2014a). However, credit constitutes an opportunity for, and may position institutions that have enough public funds in the vanguard in MOOC and open, online education and eLearning innovations (Dillenbourg, 2015; Nkuyubwatsi, 2015a). Therefore, the benefit from assessment of accomplishment from learning based on MOOCs for credit mainly depends on the agenda championed by specific MOOC providers.

MOOC providers who have tradition of providing higher education free of charge (Heller & Rogers, 2006; Kopp et al., 2014; Andrei, 2014) or at low price (Spinu, 2013) may benefit most from assessing MOOC-based learning for credit. Such assessment and resulting credit may create value to stakeholders who want to make higher education more accessible and more affordable to citizens in a sustainable and cost-effective manner. This may especially be the case for institutions in the continental Europe that have been championing equity, inclusion, social justice, diversity and social mobility (EADTU, 2014; HOME, 2014) as their main higher education agendas. Some institutions on this continent have already started assessing learning based on MOOCs for credit (Blom et al., 2013; Parr, 2013; Iversity, 2013; University of Nicosia, 2014; Mulder & Jansen, 2015; Nkuyubwatsi, 2015a). In addition, the provision of ECTS credit on learning accomplished via MOOCs and measures to ensure quality learning in these courses were recommended

across Europe (Kopp et al., 2014; Kjeldstad et al., 2014). Hence, learners' share in the *shared benefit* basis for collaboration in MOOCs and opening up higher education (Figure 2.6) may continue to grow in the near future.

MOOCs are highly scalable and their model has the potential to contribute to opening up education to more people. The scalability in MOOCs is seemingly enabled by the electronic nature of the resources in these courses that make them non-rivalrous (Weller, 2011, p. 85). These resources can be used simultaneously by a huge number of users, which seems to have been the major enabler of reaching up to 70,000 students in MOOCs used in this study. The non-rivalrous nature of electronic resources can be deliberately increased by publishing them under an open licence (Nkuyubwatsi, 2015a). In this study, only two MOOCs had learning materials that were openly licensed. The content in the two MOOCs can be legally reproduced, adapted and redistributed to reach learners beyond the reach of MOOCs in their original formats.

7.2 The potential contribution of MOOCs to opening up higher education and open education in Rwanda

Open licensing of learning resources is critical to this study since it allows legal access, adaptation and redistribution of the content across learning settings and cultures at no cost. In this way, open licensing responds to the socioeconomic and infrastructural issues in Rwanda (see Chapter 1). Arguably the high cost of educational resources contributes to the rivalrous nature of higher education in this country. When institutions spend a lot on non-openly licensed resources, they may want to recover the cost by increasing tuition fee. This is indeed one of the key justifications advanced by the Vice Chancellor of the University of Free State (Jansen, 2015) when South Africa was stirred by the October 2015 *#FeeMustFall* student protest that ended with a zero increase on tuition fee. Fees charged on students constitute financial resources which are highly rivalrous (See Chapter 2 and Figure 2.6). The rivalrous nature of financial resources (and infrastructure

that requires enormous financial resources) is behind the denial of student loans to most secondary education graduates who qualify and wish to attend higher education in Rwanda.

7.2.1 The potential of MOOC adaptation for direct use in opening up higher education in Rwanda

Opening up higher education in Rwanda relates to the *open access* (Weller, 2011, p. 96) agenda. Open licensing (Fitzgerald, 2007; Prabhala, 2009; Arnoldus, 2012; Green, 2012; McAndrew et al., 2012; Open Educational Resources Foundation, 2012; UNESCO, 2012; Creative Commons, 2013) that enables legal adaptation and redistribution of content was adopted in SSY and LTO. Thanks to open licences, educators in Rwanda may engage in legal adaptation, revision and enhancement of the content of these two MOOCs and redistribution of the content or derivative work via media and technologies most Rwandan learners have access to.

The most ubiquitous technologies in Rwanda are radio and mobile phones (National Institute of Statistics of Rwanda, 2014). To disseminate the MOOC content to more learners, audio recordings may need to be created from the MOOC lecture videos. This would be the same for the OER unit video materials that were openly licensed. The derivative audio files may be broadcast to reach the majority of learners who do not have access to high quality Internet that is needed to stream and download video MOOC materials (Liyanagunawardena et al., 2013) and videos in the *Challenge of World Poverty* OER unit. The broadcast audio recordings may be played via the learners' mobile phones and radio; two affordable technologies for most learners and most ubiquitous technologies in Rwanda. As for textual content, it can be printed out to reach more learners who do not have access to the Internet.

7.2.2 Convertibility of MOOCs into Rwandan higher education credit system

Based on my real workload in different MOOCs presented in Chapter 4 (Table 4.1), the convertibility of these courses into Rwandan higher education credit system was estimated (Table 7.1). This practice was motivated by my position (see Chapter 2) on that MOOCs and the existing higher education system do not need to be approached as if one mode has to be used exclusively and monopolistically in awarding formal credit (See Chapter 2). If there is good will to open up higher education to underprivileged learners, accomplishment from open learning can be assessed and open learners who meet same qualification standards as formal students can be awarded credit. The practice of estimating credit point that can be awarded on each MOOC successfully completed based on my real workload may be replicated.

Table 7.1 Convertibility of MOOCs into Rwandan higher education credit system

MOOC	**Real workload**	**Convertibility in Rwandan credit system**
CS	29	3
OGLNMN	46	5
LE	15	NA
EDC	27	3
ISRMC	44 (with only Week 1 readings that required more than 6 hours)	10 (with reading assigned in all weeks)
SSY	53 (on 70 per cent of activities)	8 (all activities included)
GGSGPB I	26	3
Gamification	44	5
AT21CS	38	4
LTO	57	6

According to The University of Rwandan (2014a, p. 12), a credit is equivalent to "ten hours of notional student learning effort". A module weight can vary between 5 and 20 credits, but the university reserves the flexibility to consider modules of other lengths. Most modules consist of several units that may have different credit points, mostly three or four credits per unit. As illustrated in Table 7.1, LE was found to be not convertible into the credit system in Rwandan higher education due to irrelevance of its content to this context. All the other MOOCs were found to be convertible into the credit system used in Rwandan higher education. CS, EDC and GGSGPB I were convertible into three credit units in a module. AT21CS was convertible into a four credit unit. Gamification and OGLNMN were found to be equivalent to five credit units in a module, or independent 5 credit modules. LTO and SSY were convertible into a six credit unit and an eight credit unit respectively. As for ISRMC, it was estimated to be equivalent to a ten credit unit in a module of more than 10 credits or a stand-alone module of 10 credits.

7.2.3 The potential of MOOCs to contribute indirectly to opening up higher education in Rwanda

MOOCs that focus on open, online and distance education and eLearning such as LTO, EDC, eLEc, PAVC and FOVI were found to have the potential to contribute indirectly to opening up higher education in Rwanda. If these MOOCs are taken by educators who want to develop competences needed for opening up higher education and competencies developed are used for this purpose, these courses would be making indirect contribution to opening up higher education. This indirect contribution may still serve the *open access* agenda (Weller, 2011, p. 96), especially if acquired competencies are used to reach underprivileged learners who are unable to afford campus-based education. Further potential of MOOCs beyond this indirect contribution and the direct contribution to opening up higher education is discussed in the following subsection.

7.2.4 The potential of MOOCs to contribute to the broader open education agenda in Rwanda

As noted in additional findings presented in Chapter 4, nine MOOCs were found to have the potential to contribute to the broader open education agenda. In this study, the broader open education concept relates to either the *open access* agenda or the *lifelong learning* agenda (Weller, 2011, p. 96) or both. According to the National Institute of Statistics of Rwanda (2014), the 2012 census revealed that only 7 per cent of households in Rwanda have access to the Internet, and computers are owned at the rate of only 2 per cent. These statistics suggest that only a tiny minority of privileged Rwandans who have access to reliable Internet and computers may benefit from MOOCs in their original format. This aligns with reports that indicated that MOOCs have been reaching learners who are already educated, especially, those in well-resourced settings (Grainger, 2013; Ostrow, 2013; Alcorn, Christensen & Emanuel, 2014; EADTU, 2014; Guo & Reinecke, 2014).

LE in which most content was not relevant to the Rwandan context would not contribute to the broader open education agenda in this country. The relevance of learning materials to the learner's context was found to be an important factor to positive learning experience (Open Society Foundations, 2002; D'Antoni, 2007; Holtkamp et al., 2011; Lane & Van Dorp, 2011; Mikroyannidis et al., 2011; Kanuka & Gauthier, 2012; Wolfenden et al., 2012; Nkuyubwatsi, 2014b). In LE, the task of finding relevant learning resources could have been delegated to students. Levey (2012) recommends assigning the task of searching and sharing relevant resources to students, a practice which enables them to contribute to a collection of the learning content.

7.3 The potential adaptation of OER units for use in opening up higher education in Rwanda

With only one OER unit found to have enough openly licensed materials (see Chapter 4), openness in the MIT Open Courseware OER units did not seem to match the

way the repository has been promoted (UNESCO, 2002). The low amount and nature of openly licensed resources in most OER units in this repository hint to the dominance of the marketing agenda (Didderen & Verjans; 2012, p. 11; Weller, 2014) in the MIT Open Courseware initiative. That is, in most OER units, the MIT seems to have been using openly licensed course information, syllabus, course calendar, assignment and the list of readings to advertise non-openly licensed assigned and suggested readings, one of the OER business models suggested by Fitzgerald (2007, pp. 12-13). This marketing agenda may have intended to convert visitors into consumers (Downes, 2006) at the benefit of external venders from whom the reading materials had to be purchased (and the MIT, if this institutions received a share on the related profits).

The dominance of the marketing agenda in OER units is probably one of the reasons why OER adoption has been below expectation (Lane, 2010; Ehlers, 2011; Conole, 2012; Conole, 2013a; Glennie, Harley & Butcher, 2012; McAndrew et al., 2012; Ouwehand, 2012; Woert, 2012). Different stakeholders may have not seen the fit between their needs and the materials made open in OER units. This asymmetry between end users' needs and what OER units present as openly licensed resources may have been the rationale behind the scarcity of evidence of the contribution of OER to opening up education.

7.4 Revisiting perceptions on openness of OER in repositories vis-à-vis MOOCs

OER units were contrasted to xMOOCs that were used in this study. The MOOCs that were based on OER materials were found to have the most potential in terms of contributing to opening up higher education in Rwanda. This was the case of SSY and LTO that had at least 90 per cent of materials that were openly licensed. This finding suggests that the widely suspected masked agendas (Liyanagunawarderna et al., 2013; Sharma, 2013; EADTU, 2014) may not necessarily apply to all xMOOCs.

Atenas (2015) suggests that the MOOCs content be deposited in OER repositories to open it up. If this content is deposited in the way that link core readings to external purchase websites as it was the case in the ten OER units, then, the majority of MOOCs content will rather be less openly accessible. Enrolled learners who have not paid tuition fee at the offering institutions would have to pay fee to access assigned readings and other core learning resources in MOOCs that are currently accessible for free. Most of such resources were not accessible for free in the OER units analysed in the current study. Therefore, xMOOCs were found to be generally more open than OER units.

MOOCs whose materials were not openly licensed seemed to be more open than OER units when the amount of content that is freely accessible to users is considered. As discussed in Chapter 4, assigned learning materials in these MOOCs were accessible and legally usable by participants who enrolled in the course free of charge. Learners had permission to download the content for individual or personal use without any charge. In contrast, there were restrictions to free access to most of the reading materials assigned in most OER units. These materials could be accessed only after paying fee at external vending websites. Therefore, the privilege offered to learners to enroll in MOOCs, free of charge, and access all learning materials, including the assigned and suggested readings, was not found in OER units.

7.5 Learners' potential contribution

The content in MOOCs and OER constitutes pedagogical resources (see Chapter 2 and Figure 2.6). As discussed in Chapter 2, Hase & Kanyon (2001) redefine the role of teachers as provision of (these pedagogical) resources and that of learners as the actual design of courses they might take and negotiating the learning and assessment. Learners' benefit from pedagogical resources depends on their own investment of heutagogical resources. Findings presented in Chapter 5 indicate that learners were willing to invest heutagogical resources through independent learning from open resources, evaluation of own progress towards achieving different competencies, writing reflections on own

learning progress, getting feedback on own learning progress via blogging and giving up casual routines for prioritising learning.

Assessment for credit was not found to be an important motivation trigger for self-determined open learning practices based on openly licensed content. This finding is in contrast to the literature that suggests that credit for learning accomplishment would boost learners' engagement in the use of OER and MOOCs (Lane & Van Dorp, 2011; Yuan & Powell, 2013; Kopp et al.; 2014). The seemingly low level of interest in credit for open learning accomplishment may be due to the fact that participants in the current study are formal students who may be enjoying the status-quo in conventional education. Learners who are currently not included in the system may have a different level of interest in open learning and assessment of related accomplishment for credit. These learners could not participate in the study. Alternatively, the lack of interest in assessment of open learning for credit may be the result of unfamiliarity with this practice because its use in Rwandan higher education institutions was limited to language proficiency/placement test.

7.6 Academics' potential contribution

While learners primarily manage and control *heutagogical resources*, academics mainly manage and control *pedagogical resources* (See Chapter 2). As results in Chapter 5 indicate, academics were willing to contribution pedagogical resources by publishing under open licences if this contributes to their promotion. This willingness may, however, be inhibited by the lack of information on open access publishing routes, which exposes these academics to predatory and vanity publishers (Nkuyubwatsi et al., 2015). As discussed in a later section, the University of Rwanda's *open access policy and procedures* document does not mention the *Platinum* open access publishing route (Weller, 2014, p. 7) that is safe from such publishers.

Although 71.7 per cent of academics expressed willingness to publish under open licences if the cost barrier is removed and their practice leads to academic promotion, it is

worth noting the reason advanced against this practice: *high impact* journals are often not open access. The citation-based impact factor has recently been adopted in deciding academics' promotions. That is why many of them have been lured to overestimate the value of the number of citations of their work over the real impact of the work in changing learners' and other people's lives. However, the citation-based impact factor also attracted serious criticism due to malicious manipulations it triggered: coercing authors to cite articles in the same journal in return for acceptance of their manuscripts (Matthews, 2015), an explicit bias toward experiential sciences over social sciences (Calver & Beattie, 2015), putting reputation of the author over the quality of the manuscript (Ramaker & Wijkhuijs, 2015; Wijkhuijs, 2015) as well as editorial self-citation and development of citation networks (Hall & Page, 2015). Other malpractices caused by the citation-based impact factor are commercialisation of co-authorship (Hvistendahl, 2013) and paying for affiliation with highly cited authors (Haustein & Larivière, 2015).

Participants also expressed the willingness to contribute to open courses though some conditions may have to be met for this contribution to occur. Policy was found to be the most important condition for academics to make such a contribution, followed by payment and promotion. These findings concur with authors who found policy (McAndrew et al., 2012), incentives (OECD, 2007; McAndrew et al., 2012; Woert, 2012; Wolfenden, 2012; Hylén, no date) and salary (Badarch et al., 2012) among important enablers of OER and OEP adoption.

Similarly, an overwhelming majority of participants reported that they would engage in different open education roles under different conditions. The most important enabler of this participation was policy which was also highlighted among critical enablers of OER and OEP adoption (McAndrew et al., 2012). Overall, the second most important condition was promotion which is one of the ways to recognise OEP as standard academic practice (OECD, 2007) and to provide incentives/rewards for engagement in OEP (OECD, 2007; McAndrew et al., 2012; Woert, 2012; Wolfenden, 2012; Hylén, no date). Payment that would address the low salary issue (Badarch et al., 2012) was the third most important

condition for engaging in various open education roles and the first one on assessment of accomplishment from open learning for credit.

In general, academics were positive about practices that could enable opening up higher education. As highlighted earlier, 80 per cent of academics who participated in the study support the idea of making a list of competencies needed for award of different qualifications publicly available. This support is mainly motivated by the belief that this practice would lead to more competence development and more public profit from education. However, the concern that such a practice would trigger laziness was also expressed in the current study. Benson et al. (2011) found a similar concern in their study on academics' perceptions, attitudes and practices towards blended learning in a British university: some academics were concerned on the potential laziness of students if teachers provide resources rather than letting students find the resources themselves. Therefore, the concern of laziness that may be triggered by open sharing of learning resources is not a particularity of Rwandan academics.

Overall, academics see national and institutional policies and strategies as critical enablers of opening up higher education. The proportion of participants who thought that openly licensed resources and assessment of accomplishment from open learning practices would help to open up higher education if they were supported by a national policy was 72.9 per cent as revealed in analysis. The proportion of those who thought that open content and the assessment of open learning accomplishment would contribute to opening up higher education if they were supported by an institutional policy was 71.6 per cent. These findings concur with the literature that highlights the role of policies in triggering the adoption of OER and related practices (Butcher, 2011; Bateman et al., 2012; McAndrew et al.; 2012; Wyk, 2012; Conole, 2013a).

Although open and distance learning is not practised at a large scale in Rwanda, this mode of learning tends to be accepted by the majority of academics who participated in the study. As highlighted earlier, 52.9 per cent of participants thought that learners can develop

competencies required for academic credit and qualification without attending face-to-face sessions. Some academics highlighted that this would depend on the amount of investment from the learners. According to these participants, hard workers would be successful in, and benefit from, open and distance learning. This view of academics at the University of Rwanda aligns with suggestions that self-determined learning practices contribute to the learners' capability development (Hase & Kanyon, 2001; Canning & Callan, 2010; Blaschke, 2012). Academics highlighted the nature of courses as another factor to successful learning without attending face-to-face sessions.

Some academics also raised concerns on that opening up higher education would affect the quality of education because they think the infrastructure that exists in Rwanda is inadequate. This concern was also voiced in other settings (Atkins et al., 2007; McAndrew et al., 2012; Bateman, et al., 2012). In some under-resourced settings, however, OER adoption was backed by the agenda to overcome infrastructural challenges (Omollo et al., 2012). The other concern raised by these participants was the lack of academics' preparedness which relates to limited competencies (Hylén, no date; OECD, 2007; Rennie & Mason, 2010; Badarch et al., 2012). Equally, the lack of access to technologies by learners also highlighted in Lane (2009), Wolfenden (2012), OECD (2007), Bates (2012) and Liyanagunawardena et al. (2013) was raised among concerns.

One academic who participated in the study expressed a low level of motivation towards using social media to support opening up higher education in Rwanda. According to her/his comment, academics in Rwanda are poorly incentivised and their salaries are low. The lack of motivation mainly linked to poor salary (Badarch et al., 2012) or the lack of incentives or rewards (OECD, 2007; McAndrew et al., 2012; Woert, 2012; Wolfenden, 2012; Hylén, no date) was discussed in the related literature among inhibitors of OER adoption. At the University of Rwanda, no incentives seem to have been envisaged for encouraging academics to engage in opening up higher education. The lack of provision of laptops raised by the participant also links to the lack of access to technologies identified

among inhibitors of OER adoption by academics (Wolfenden, 2012; Wolfenden et al., 2012).

Finally, the involvement of all stakeholders in policy design was suggested by some academics who completed the email questionnaire. This involvement is one of the discussion foci in the following section.

7.7 Institutional leaders/policy makers' potential contribution

Unlike learners and academics who were willing to engage in open learning practices and open educational practices (OEP) respectively, the willingness of leaders/policy makers to support these academics and learners could not be identified. Institutional leaders/policy makers' support to learners and academics may be reflected in their support for assessment of open learning accomplishment for credit and related open learning/educational services (Ouwehand, 2012; Mulder & Janssen, 2013, p. 36). Support of such an assessment, related services and other OEP may guarantee learners' and academic shares in the *shared benefit* basis for collaboration in opening up higher education (Figure 2.6).

As discussed in Chapter 5, *decontextualisation* was the main theme that emerged in data from policy documents analysed. Decontextualisation in the University of Rwanda's policy on academic staff appointment and promotion was most prominent in the statement that was relevant to academics in Scotland rather than those in Rwanda. This suggests that rather than involving different stakeholders in the process of formulation (a practice recommended by academics as highlighted earlier), the policy on academic staff appointment and promotion was copied from a Scottish context and pasted into the University of Rwanda's context, without appropriate adaptation to be relevant in Rwanda. Yin & Fan (2011) note that decontextualised OER policies inhibit the benefit from these resources.

The general academic regulations for open and distance learning programmes lack critical ingredients for opening up higher education: the use of openly licensed content, assessment of accomplishment from open learning for credit and recognition of academics' OEP. Assessment of open learning accomplishment for credit was discussed among potential enablers of learners' engagement in OER, MOOCs or related learning practices (Lane & Van Dorp, 2011; Yuan & Powell, 2013; Kopp et al., 2014). In a similar direction, the lack of formal recognition of OEP inhibits adoption of OER (OECD, 2007). Other inhibitors to the adoption of OER and related practices include the lack of motivation due to low salaries (Badarch et al., 2012) and the lack of incentives or rewards for OER production, use and sharing (Hylén, no date; OECD, 2007; McAndrew et al., 2012; Woert, 2012; Wolfenden, 2012).

Similar to other University of Rwanda's policy documents, the open access policy and procedures may discourage, rather than encourage academics' contribution. The policy does not mention the *Platinum* open access publishing route (Weller, 2014, p. 7), which exposes academics to predatory and vanity publishers (Nkuyubwatsi et al., 2015). Some academics have already been targeted by such publishers who asked them to pay up to the sum of their six month salary (Nkuyubwatsi et al., ibid). The *Platinum* open access publishing route distributes power and freedom between the author, the publisher and the user of the content. In this route, authors democratically choose to openly share their work without being charged money for their open sharing practice and often retain the copyright on their work. Hence, the open access policy and procedures that lack information on the *Platinum* open access publishing route does not respond to socioeconomic challenges that prevail in Rwanda, and does not protect academics in Rwanda, which may hinder their contribution.

Other themes that emerged from data in the category of leaders and policy makers were *contradiction* and *awareness*. The informant's contradiction with the University of Rwanda's open access policy and procedures on raising awareness of open access publishing may indicate a low level of interest in open access and open education among

some leaders/policy makers at the University of Rwanda. Moreover, the informant herself may be unaware of copyright regulations across settings as her statement seemed to encourage infringement of copyright regulations. This was especially the case in this extract "…you are told not to photocopy the whole book. You can photocopy a chapter of a book. Another chapter of a book….".

The informant may also be unaware of recent disputes that involved Elsevier, the company that she advanced as a contributor to open access through the release of academic articles under an open licence. Elsevier has recently been criticised for its attempt to increase the embago period and subscription fees on its articles. This attitude led to boycotts and dissatisfaction in academic communities in some countries (Wild, 2015; Wijkhuijs, 2015; Ramaker & Wijkhuijs, 2015). Elsevier's attitude also led to the resignation of the entire team of editors and editorial board in one of its journals in order to start a competing open access journal (Ingram, 2015; Moody, 2015). Hence, the informant may lack critical information related to the open access publishing industry if she was not deliberately using the concept of *open* in a questionable way (Mulder & Jansen; 2015).

Another theme was *control on access to the content*. Access to electronic resources the informant highlighted requires affiliation with a higher education institution. Such an affiliation may be considered as a *threshold for accessing knowledge* conveyed in the content (Weller, 2011, p. 7). According to Weller (ibid), the digitisation and online availability of the content removes the threshold to access knowledge. This has, however, not been the case at the University of Rwanda in that there is control on who access the content or not. Despite the digital format and online publication of the resources, the affiliation (threshold to access the content) was denied to a huge number of underprivileged learners who wish to attend higher education but cannot afford it. The 42.7 per cent of underprivileged students who were admitted at the University of Rwanda on merit-basis and subsequently denied student loans and could consequently not register (see Chapter 1) cannot access the content. Hence, there is control on who benefit from the cost waiver enjoyed by the University of Rwanda.

This may hint to the possibility that the resources available at the University of Rwanda may have been promoted as "open" for the sake of accessing funds (Weller, 2014, p. 15) rather than being used to reach more people in need for access to higher education. Alternatively, the funders may have had intention to make the resources open, which seems to have not been realised. If there is control on who can access the content or not, then the resources should not be referred to as open. Referring to such resources as *open* may be one of the questionable ways the concept of *openness* has been used (Mulder & Jansen, 2015). In the context of open education, the concept of "open resources" often refers to openly licensed materials (UNESCO, 2012). If the electronic resources at the University of Rwanda were openly licensed in a way that allows derivative work, knowledge they convey could possibly be disseminated to underprivileged open learners using media accessible or affordable to those learners.

The final theme, *confusion*, may overlap with the theme of *control* discussed above. In the informant's understanding, openness seemed to be equivalent to the electronic format of the content. This was indicated in her argument that a print material can be disseminated to remote villages while open access materials are only for those who are privileged to have access to the Internet, computers and other technologies. The UNESCO's (2012) definition of OER discussed in Chapter 2 makes it clear that these resources may be in digital format or otherwise. O*penness* of educational and research materials is reflected in permissions to apply 4 OER Rs (Reuse, revision, remix and redistribution) (Wiley, 2007; Didderen & Verjans, 2012, p.12). These permissions are granted through some of open licences (Bissell, 2009; Green, 2012; Creative Commons, 2013) discussed in Chapter 2.

Once the content, in either electronic format or print format, is released under an open licence, an unlimited number of copies can be legally made in different formats. These copies can be disseminated or redistributed in a way that responds to circumstances that prevail in the learning settings of underprivileged learners. In contrast, if the content is not copyrighted under an open licence, there are often restrictions in terms of duplication of

the content, which inhibits legal redistribution of the content free of charge. This applies to non-openly licensed content in both print and electronic formats.

7.8 Similarities and differences between different enablers and stakeholders

MOOCs and OER units were similar in that all of them were online or mainly consisted of online resources. Exploration of these resources required no payment of fee. Unlike most MOOCs, all OER units had at least a few materials that were released under an open licence. However, this does not mean that OER units were more open than MOOCs. The main difference between findings on MOOCs and OER units relied in the amount of resources that could be accessed without payment of fee. Although each OER unit had some items that had been released under an open licence, MOOCs had more resources that could be accessed, legally downloaded and used without paying any fee. In contrast to OER units in which most required readings could be accessed only after being purchased, all required learning resources in MOOCs were accessible and usable for personal learning free of charge.

Different stakeholders also had some similarities and differences. All stakeholders were generally positive about open, distance education and opening up higher education. On the part of learners, they were willing to engage in different self-determined open learning practices. Academics were willing to engage in different OEP. Institutional leaders made effort to develop related policies, although these policies need review to trigger related practices. Moreover the open access policy and procedures may increase availability of openly licensed resources that are critical in opening up higher education. Unlike learners' and academics' willingness to engage in different practices that may contribute to opening up higher education that was identified in the related findings, the leaders' willingness to contribute to opening up higher education could not be found. As discussed earlier, existing policies were found to be decontextualised, and most of them may discourage rather than encourage other stakeholders' participation.

7.9 Implication on policies and practices

As discussed in Chapter 3 and 6, my agenda was to move beyond research findings and use these findings to inform policies and practices. It is in this perspective that I was engaged in different activities in the *Parallel development* component. Some of these activities consisted of sharing my research and findings with different stakeholders on a regular basis. In a recent discussion of my study findings with an official at the University of Rwanda, this leader acknowledged that the policy developers may have had limited knowledge and experience, if any, with open, distance education, eLearning and opening up higher education. The official was open to advice for review of the policies.

This openness promises an improvement of existing policies in a way that complement academics' and learners' willingness with that of leaders and policy makers. The issues discussed in the themes of decontextualisation, contradiction, awareness, control and confusion may be addressed in this policy improvement. The involvement of academics and learners (both current and prospective) is expected if there is any intention to ensure their shares in the *shared benefit* basis for collaboration. Equally importantly, the National Policy on Open, Distance Education and eLearning (See Chapter 6, Section 6.3) has now been validated. This national policy may inform the review and amendment of the institutional policies analysed in the current study and practices from different stakeholders that may contribute to opening up higher education. In addition to this national policy, other outcomes of my involvement in the Parallel development component include transformative learning discussed in the following section.

7.10 The transformative outcomes of the parallel development

With limited information and knowledge on heutagogy, open/distance learning and related practices in Rwanda discussed earlier, the contribution of the current study in this setting would be at a low level. To deal with this issue, I actively engaged in different initiatives discussed in Chapter 3 (the *Parallel development component* Section). This

engagement was motivated by the agenda to contribute to the improvement of the status-quo. Discussion in this section focuses on the outcomes of one of those initiatives: mentoring Rwandan learners.

At the beginning of my mentorship relation with the second and third mentees highlighted in Chapter 6, the learners exhibited signs of social disempowerment (Lane, 2009, p. 9; Lane & Van Dorp, 2011, n. p.). The second mentee's social disempowerment was reflected in her self-perception as not being good enough for winning neither scholarship nor student loan due to her low socioeconomic background. As for the third mentee, his social disempowerment was reflected in his self-perception as not being well prepared to successfully complete an online postgraduate education in a British university due to unreliable access to Internet connectivity.

Convinced that social disempowerment can be addressed, I reassured the mentees that they could excel if they manage and control their own learning, invest more time, effort, dedication and perseverance in their learning. In this way, I avoided my mentees' perception of their socioeconomic status as natural, inevitable and necessary (Kincheloe & McLaren, 2005, p. 304), or acceptance of their underprivileged situation as a lifelong doom (Nkuyubwatsi, 2015a). Then, I focused on activation of their investment of heutagogical resources (See Chapter 2 and Figure 2.6). When heutagogical resources are invested, self-determined learners /heutagogues position themselves at the centre of their educational transformation. Since their learning is driven by their own visions, these learners manage and control their own success. It is at this level that heutagogical resources become a critical ingredient and a complement to other resources (that may be pedagogical, financial, technological, infrastructural and political) to lead to outstanding accomplishment of the learners.

After reassuring the second mentee, she accepted managing and taking control of her own learning as demonstrated by her dedication and subsequent shift in performance. As discussed in Chapter 6, she was so dedicated that she left her job to prioritise her

undergraduate education although she was not sure how she would pay tuition fee for subsequent semesters. The resulting high performance attracted financial resources she could not get otherwise. After her performance in the first year was very close to a first class, tuition fees in subsequent years were mainly funded by generous donations from people she had impressed. She reinforced her impression by scoring above the requirements for a first class grade in all the following years. This led to completion of her undergraduate education with first class. As a result, she attracted attention of many employers who invited her to submit her job applications and sit for interviews. She ended up getting a job that pays her five time more than what she earned prior to her decision to give up her job to prioritise her undergraduate education.

In the case of the third mentee, I had no doubt on adequate level of access to pedagogical resources (learning materials and tutorial support) from the University of Leicester he had access to. The mentee had also secured financial resources in that he had been awarded student loan and government sponsorship for his postgraduate education at the University of Leicester. Equally, the mentee had access to some technological resources: he had an iPad received from the University of Leicester and a laptop. He also owned a Samsung iPhone that could be tethered to the iPad. Although the quality of mobile phone Internet in Rwanda may be not good enough for online learning, the mentee could access a backup Internet, probably more reliable, at a nearby hospital located in about four kilometers.

Based on my online learning experience in Rwanda, I could see clearly that what the mentee needed was activation of the investment of his heutagogical resources to compensate some technological resource limitations (lack of access to reliable Internet at home and in the office) with more time, effort, dedication and perseverance. He could leverage online and offline learning and spend more time on learning to compansate the amount of time that could be lost in downloading or streaming learning materials due to slow Internet connectivity.

The performance of the two mentees constitutes robust evidence that heutagogy (Hase & Kanyon, 2001; Anderson, 2010; Canning, 2010; Canning & Callan, 2010; Blaschke, 2012) works and is transformative. While most studies on heutagogy conducted in well-resourced settings have been focusing on learning in communities enabled by web 2.0 technologies, the accomplishment of the second mentee indicates that heutagogical learning of underprivileged learners may be a solitary journey such learners dedicatedly take to achieve their socioeconomic inclusion. In the pursuit of her own vision, the mentee did not participate in any community of members who shared her vision. Although she may have been inspired by a similar migration I personally undertook (see Chapter 1), our mentorship sessions were so sporadic that it would not resemble regular participation in learning communities enabled by social media. In short, the activation of heutagogical resource investment enabled a transformative migration of the two underprivileged mentees; a powerful piece of evidence on how heutagogy makes difference.

Chapter Summary

Findings in the current study challenge earlier attempts to classify xMOOCs in fixed categories and suggest that these courses may have different values depending on agendas advanced by beneficiaries. Focusing on the context of Rwanda, the potential of the two MOOCs that may be legally adapted for direct use in opening up higher education was enabled by the non-rivalrous nature of the course content mainly enabled by open licences. Thanks to those licences, derivative materials can be produced and disseminated via technologies most Rwandan learners have access to.

Two MOOCs evaluated in the research component and three other MOOCs completed in the parallel development component may contribute indirectly to opening up higher education. Those courses can help in the development of competencies needed for adaptation and redistribution of the content to learners in Rwanda. As for other MOOCs, most of them can still be taken by Rwandan learners who want to engage in lifelong learning. Within the lifelong learning agenda, these courses may only be beneficial to a

privileged minority of Rwandans, which would be confirming the issue reported in the existing literature on MOOCs.

The content in only one OER unit may also be adapted for use in opening up higher education (within the open access agenda). This finding is in contrast to earlier studies that intended to claim that OER units are more open than MOOCs. Instead, the findings in the current study concur with authors who pointed out the marketing agenda of many institutions that are engaged in OER initiatives.

Assessment for credit was not found to be a precondition for learners' engagement in heutagogical/self-determined open learning. This was probably due to the fact that participants in the current study were formal students, many of whom may be enjoying the status-quo and may not need opening up education. Another reason may have been participants' unfamiliarity with assessment of open learning for credit.

Academics' willingness to contribute to OER may be inhibited by the decontextualisation of existing policies, one of the key themes that emerged from data. Other themes included contradiction with existing policy documents, the lack of awareness of different enablers of opening up higher education, desire to control access to the existing digital content, and confusion of openness of the content and its electronic format.

Finally, the outcomes of the parallel development confirmed the possibility to re-empower socially disempowered learners for transformative learning. Re-empowerment started from avoiding that underprivileged learners accept their status-quo as a natural, inevitable, necessary and lifelong doom. Then, their investment of heutagogical resources was activated to complement other resources that were in shortage or limited. This is what led to their transformative learning. The resulting performance evidences the power of complementing pedagogy with heutagogy.

CHAPTER 8 CONCLUSIONS

The socioeconomic and infrastructural challenges described in Chapter 1 constitute a unique niche for transformative innovations and research in open and opening up higher education in Rwanda. This thesis aimed at investigating xMOOCs and OER units in the MIT Open Courseware that have the potential to be adapted for use in opening up higher education and the potential contribution of different stakeholders to this agenda. This investigation was conducted in the light of enablers of OER and open educational practice adoption discussed in the related literature as well as the socioeconomic and infrastructural limitations in the target setting. In this chapter, activating and supporting self-determined learning (8.1), the main contributions (8.2), the main conclusions (8.3), limitations (8.4), recommendations for policies and practices (8.5) and future studies (8.6) are presented.

8.1 Activating and supporting self-determined learning

Although self-determined learners do not wait to have access to a teacher for starting their own learning, academics/teachers/mentors may activate and support learners' investment of heutagogical resources (see Figure 2.6). Activation of the investment of heutagogical resources may particularly be needed for learners who may be disempowered by socioeconomic disadvantages (Lane, 2009; Lane & Van Dorp, 2011). To activate the investment of heutagogical resources among such learners, academics may want to reassure the learners that their social economic disadvantages can be managed, controlled and turned into a learning advantage. It is this reassurance that my mentorship discussed in Chapter 6 focused on, to enable my mentees' moves from a pass grade to a first class (1) and from the intention to drop out to completing an online master's degree programme with a distinction (2).

To be able to activate the investment of heutagogical resources, an academic/teacher/mentor needs to firmly believe in re-empowerment of disempowered learners. First-hand experience with successful learning under conditions that are similar to those under which the learners concerned are subjected makes it easier for academics/mentors/teachers to have glimpse on such re-empowerment. Alternatively, the academic/teacher/mentor may learn to listen to, and empathise with learners as well as respect their own visions (see empathy as part of pedagogical resources in Chapter 2 and Figure 2.6). An empathetic academic/teacher/mentor would respond to the learner's vision by availing resources that are needed for the learner's vision fulfillment. This kind of mentorship requires an open mind on the part of the academic/teacher/mentor and innovation in linking the learner's vision with institutional requirements for qualifications.

This section discusses best practices of three academics: one who activated my heutagogical resource investment in writing for academic conferences (and journals) and two others who nurtured this investment. The outcome of this heutagogical resource investment has been additional to my thesis: During my PhD study, six articles have been published in peer-reviewed journals that contribute to the ultimate goal of my study: Opening up higher education. In addition, two more journal articles have been accepted for publication and are in the copyediting process. Besides publication in peer-reviewed journals, two other articles were published in an edited collection and conference proceedings respectively. In addition, I co-authored a report on assessment and recognition of accomplishment from MOOC-based and open learning with one of those academics. This report may provide institutions that are willing to assess MOOC-based and open learning for credit with insights on related enabling practices, and may help create value for open learners.

Moreover, I was invited to give presentations at different conferences, in some cases, after winning competitions in which other experts participated (see Chapter 6).

Information on related calls for papers was shared via social media, which are part of technological resources discussed in Chapter 2 and Figure 2.6. Expenses incurred by most trips to conferences in which I was invited to give presentations were covered by organisations, networks and institutions that could see value in my work, including the GO-GN and EADTU. In this way, my investment of heutagogical resources attracted the investment of financial resources (Figure 2.6).

To be awarded the PhD degree, there was no requirement to publish journal articles and other academic work or give presentations at academic conferences. Without the ability to link my vision and institutional requirements for different qualifications exhibited by academics featured in this section, I could not have made the significant accomplishment and contribution beyond a PhD thesis. Most of these academics (if not all) are members of editorial boards of journals and were already committed to finding promising writers and encouraging them to contribute from their scholarship and research, both as single authors and in co-authorship. This membership facilitated their fast understanding of the development that would accrue from my interest to write conference and journal articles, and its transferability to thesis writing. Below is a narrative on how the three academics activated or supported my heutagogical resource investment.

8.1.1 Case 1

Back in 2009, a professor at Eastern Michigan University encouraged the class to attend and give presentations at academic conferences related to TESOL: the field of specialisation of the MA programme I was taking with this institution. Attending and giving presentations at academic conferences was not required for the award of the MATESOL degree. However, the professor challenged students for their development beyond institutional requirements for qualifications.

The first conference I attended was the Michigan TESOL that took place in October 2009 in Grand Rapids; about three to four hour bus/car trip from the university location (Ypsilanti). The professor gave me a ride/lift to and from the conference venue. The trip was an exciting opportunity to explore Michigan landscape and its colorful fall/autumn: My very first experience with a northern hemisphere fall/autumn. I could see, live rather than in pictures/books, trees that changed colours as a result of the season pattern, which made the trip fascinating.

More importantly, this was a mentorship ride/trip as our conversation focused on participation in, and giving presentations at, conferences. The professor encouraged me to submit an abstract of my class paper to the TESOL convention that was to be held in Boston in March 2010. Initially, I hesitated and asked if anyone would be interested in a presentation of a class paper. This doubt hinted to a self-perception as not being good enough for conference presentation: a sign of social disempowerment (Lane, 2009; Lane & Van Dorp, 2011). The professor convinced me that the paper would be of interest since it would contribute a perspective from an under-resourced setting: the perspective that was lacking in North American discourse on TESOL. I submitted the abstract and it was accepted. After giving my presentation at the 2010 TESOL convention, I realised that conference presentation is not prerogative of established professors and top experts, but a pathway to develop expertise. Due to financial resource shortage and the heavy workload in both the MATESOL and MAODE, I could not participate in conferences as often as I wished, but the seed was planted to burgeon at the start of my PhD study.

8.1.2 Case 2

When I started my PhD study, a professor at the University of Leicester asked me if I needed to take academic writing classes. This could have been duplication since I had

already taken two academic writing classes: one at Ohio University and the other at Eastern Michigan University, the latter being the most advanced offered by the university. My response was that I rather wanted to challenge myself in practicing academic writing at a more advanced level: Writing papers for academic conferences and peer-reviewed journals. From then on, the professor started mentorship on writing conference and journal articles and related abstracts. She later on invited an editor of an academic journal to facilitate a workshop that was addressed to PhD students in the department she was heading. The professor also shared different calls for papers that had foci that were related to my PhD study area via social media. Via these media, the professor linked me to professional communities of experts in the field of open education. She also linked me to the *Heutagogy Community of Practice* (see Chapter 2 and 3). Moreover, this professor has been involving me in related projects, which resulted in co-authoring a journal article and the report highlighted earlier. All these practices helped me develop competences needed for writing papers for academic conferences and journals as well as participating in, and leading, project teams.

8.1.3 Case 3

I shared my plan to write conference and journal articles with another professor at the University of Leicester. This professor's response was that one publication per year would be a significant accomplishment, and two publications per year would be excellent. This professor also mentored me in the process and was kin to read and comment on drafts of my manuscripts. The professor has experience in open and distance learning across different generations of technologies: paper-based, radio, TV and the Internet. His experience in the field expands across settings: well-resourced and under-resourced ones. This diverse experience may be behind his unique capability to demonstrate empathy on different barriers linked to the shortage of resources that I discussed in my manuscripts and PhD thesis. He often shared stories of similar challenges and practices that had enabled

overcoming those challenges in different settings. This professor helped me realise that challenges will always be around, but they can be managed and controlled to open up higher education.

To sum up, the three cases discussed in this section exemplify how academics who care about the development of learners at the fullest potential (including the ones in under-resourced settings) can activate and support self-determined learning. Self-determined learning can be activated by reassuring disempowered learners on their potential to excel. This reassurance may lead to the investment of heutagogical resources. Once learners are empowered/have been re-empowered and ready to invest heutagogical resources, self-determined learning can be supported through a respectful listening to the learners and avail resources needed for the fulfillment of their visions. Effort and time invested by the learner constitute heutagogical resources. As for empathy exhibited by teachers/academics/mentors and resources they avail for learners' development at the fullest potential, they constitute pedagogical resources. Other pedagogical resources consist of content developed by academics, tutorial support, open educational services, etc. In my case, social media, which are technological resources, were used to share calls for papers.

Most of expenses or financial resources I needed for travelling to venues where conferences in which I was invited to give presentations took place were covered by different organisations, institutions or networks, including the GO-GN and EADTU. In this way, my investment of heutagogical resources beyond my PhD thesis attracted financial resources. Hence, the accomplishment made beyond my PhD thesis was not only based on pedagogical resources, but an intricate combination of different categories of resources discussed in Figure 2.6. The cases discussed in this section will hopefully inspire academics across settings in their endeavour to activate and/or support the investment of heutagogical resources among learners.

8.2 Contributions to knowledge, practices and policies

This study focused on Rwanda, the setting that is underrepresented in academic literature, especially in the fields of open, distance education and eLearning as well as opening up higher education. In this way, it addressed the need for related research that may inform policies and practices to enable opening up higher education in this setting. As discussed earlier, many secondary education graduates qualify and wish to attend higher education but are not included due to the shortage of funds for student loans and the lack of financial capabilities on the part of their families. This thesis provides insights for potential innovations within limited resources available to make higher education less rivalrous and therefore, contribute to the transformation of underprivileged learners.

The study had a transformative mixed method design and consisted of two major components: the *research component* and the *parallel development component*. It combined findings from qualitative and quantitative data collected in the *research component* as well as transformative outcomes of my actions and participation in the development of knowledge, practices and policies that may enable opening up higher education that were triggered or made in the *parallel development component*. My participation took different forms: presentation at different conferences, writing peer-reviewed articles for open access journals, networking, raising awareness/triggering action on opening up higher education in Rwanda, mentorship, etc. This participation enabled me to contribute to knowledge and related policies and practices all along the study and get feedback from potential beneficiaries.

The main contributions of this study are: 1) a framework for collaborative investment in MOOCs, open education and opening up education (Figure 2.6), 2) a comprehensive evaluation of MOOCs and how they would contribute to opening up education and open education across settings (see Chapter 4), 3) positioning the potential contribution of MOOCs within the “open access” and the “lifelong learning” agendas (Weller, 2011, p. 96) in Rwanda (see Chapter 4), 4) a comprehensive evaluation of open

educational resources and their potential contribution to opening up higher education in Rwanda (see Chapter 4) and 5) a better understanding of the concept of *heutagogy/self-determined learning* (Hase & Kanyon, 2001; Anderson, 2010; Canning, 2010; Canning & Callan, 2010; Blaschke, 2012) and its practical application to Rwandan learners (See Chapter 2, Chapter 6 and the previous section).

Equally importantly, the study contributed to a better understanding of transformative research and its design. I moved beyond research findings to catalysing actions, some of which were transformative. During this PhD study, I mentored several Rwandan learners. In this mentorship, I re-empowered underprivileged learners and activated their investment of heutagogical resources (see Chapter 2, Chapter 3 and Chapter 6), which led to their transformative educational migration. This enabled one of the mentees to move from intention to drop out to completion of an online postgraduate programme at the University of Leicester with distinction. Another mentee moved from secondary education completion with a pass grade to undergraduate education completion with a first class. The concerned mentees were willing to share their credentials for verification if there is any doubt on their transformative move enabled by this mentorship. The transformative accomplishments of these mentees constitute robust evidence that heutagogy works, and is indeed a powerful enabler of high performance. Other mentees won funds and awards they were applying for in order to do their PhD studies.

Moreover, I participated in different online discussions on education development in Rwanda which culminated in the development of a national policy on open, distance education and eLearning. From late 2014 to early 2015, The Minister of Education in Rwanda hosted live Twitter sessions in which I participated and raised discussion on the need to open up higher education. Under the Minister's invitation, I contributed a policy brief on open and distance education in Rwanda, the brief that was emailed to the Minister and senior officials at the University of Rwanda. Subsequent to this contribution, the Minister delegated responsibilities to coordinate the formulation of a National Policy on Open, Distance Education and eLearning to the University of Rwanda's College of

Education. Following this delegation of responsibilities, a Task Force was appointed to develop this national policy. The policy has recently been validated.

8.3 Conclusions

The main conclusions in this study fall under five potential contributors to opening up higher education: xMOOCs (1), OER (2), learners (3), academics (4) and institutional leaders/policy makers (5). These conclusions emerged from data that were collected, analysed and discussed in the light of three overarching research questions:

1. Which MOOCs can potentially be adapted for use in opening up Rwandan higher education?
2. Which OER units can potentially be adapted for use in opening up Rwandan higher education?
3. What is the potential contribution of different stakeholders in Rwandan higher education to opening up this level of education?

Research question 3 had three subsidiary questions: *To what extent are learners willing to engage in self-determined open learning?* (1), *To what extent are academics at the University of Rwanda willing to contribute to OER and open courses, and adopt open education roles?* (2) and *To what extent are the University of Rwanda's leaders and policy makers willing to develop an institutional open education policy and strategy that recognises academics' open educational practices/roles and credibly certify competencies developed via self-determined open learning?* (3). The key conclusions linked to their corresponding research questions are presented in Table 8.1. Additional conclusions are also presented in this table and summarised in the subsequent discussion.

Table 8.1 Main conclusions linked to research questions

Main research questions	**Subsidiary research question**	**Conclusions**
Which MOOCs can potentially be adapted for use in opening up Rwandan higher education?	NA	SSY and LTO can be adapted to be used in a way that directly contribute to opening up higher education in Rwanda thanks to an open licence on all or most of their content.
		Additional findings • In addition to the possibility to adapt LTO for direct contribution to opening up higher education enabled by open licensing for most of its content, this MOOC has the potential to contribute to academics' and other stakeholders' development of competencies needed to open up higher education thanks to its focus. This was also the case for EDC and other MOOCs taken in the parallel development component (FOVI, eLEc and PAVC) whose content was not openly licensed. Therefore, LTO, EDC, FOVI, eLEc and PAVC can contribute indirectly to opening up higher education. • Nine MOOCs evaluated in the research component may contribute to the broader open education agenda. Only LE in which the relevance of a significant amount of the content was limited to the state of Illinois would not contribute to the broader open

		access agenda in Rwanda and other settings beyond that state.
Which OER units can potentially be adapted for use in opening up Rwandan higher education?	NA	Only the *Challenge of World Poverty* OER unit was found to have the potential to be adapted for use in opening up higher education in Rwanda. Unlike other OER units, the *Challenge of World Poverty* OER unit had enough openly licensed resources: 22 videos and their transcripts. In other OER units, only course information, course calendar, syllabus, a list of assigned and suggested readings, projects, assignments, exams and very few (if any) assigned or suggested readings were openly licensed.
What is the potential contribution of different stakeholders in Rwandan higher education to opening up this level of education?	To what extent are learners willing to engage in self-determined open learning?	Learners were willing to engage in heutagogical/self-determined open learning practices such as giving up casual routines to prioritise learning, writing reflection on own learning progress, evaluating own progress towards achieving learning competencies, sharing reflection on own learning via blog posts to get constructive feedback and learning independently. Assessment for credit was not found to be the precondition for the majority of learners' engagement in such practices. However, this assessment and related credit was found to be an additional motivator to most learners who would engage in these practices without assessment for credit.
	To what extent are academics at the	Academics were willing to contribute to opening up higher education by publishing their work under open

	University of Rwanda willing to contribute to OER and open courses, and adopt open education roles?	licences, designing OER-based courses, tutoring open courses for credit, assisting tutors of open courses for credit, finding OER and evaluating their quality, participating in open courses and evaluating their quality, aggregating OER, adapting OER and open courses and assessing accomplishment from open learning practices. However, academics' practices would need to be supported by an institutional/national policy or/and contribute to promotion. Alternatively, academics would have to be paid for their related work or have extra time to make such contributions.
	To what extent are the University of Rwanda's leaders and policy makers willing to develop an institutional open education policy and strategy that recognises academics' open education roles and credibly certify competencies developed via self-determined open learning?	• No evidence of institutional leaders/policy makers' intention to recognise academics' open educational practices and assess open learning accomplishment for credit could be found in the current study. • Some of the policy documents analysed were decontextualised and one of them still had a statement that is relevant to academics in Scotland rather than academics in Rwanda, which hint to a "copy and paste" culture in policy document production. • Interview data reveal contradiction with the policy and procedures on open access, the lack of awareness of many aspects of open access and opening up education, desire to control access to the content and confusion of openness and electronic format of the content.

Content in SSY, LTO and the *Challenge of World Poverty* OER unit can be adapted to create derivative work that can be redistributed using media and technologies most target learners in Rwanda have access to. For instance, audio materials may be produced as derivative work from videos provided in these MOOCs and OER unit. The derivative work would be disseminated, accessed and learned via the most ubiquitous technologies that are available in Rwanda: radio and mobile phones.

Different open educational/learning services would need to be provided to assess and credibly certify accomplishment from open learning based on the two MOOCs and the OER unit content or their derivative resources. This would trigger learners' engagement in related open learning practices. Policies that support these practices would also need to be developed.

MOOCs have often been perceived as being less open than OER units in different repositories. Atenas (2015) went further to suggest that MOOC contents be deposited in OER repositories to increase their openness. In the current study, OER units were not found to be more open than MOOCs. While only one out of ten OER units was found to have enough openly licensed content (55.69 per cent of the content), two out of ten MOOCs were found to have enough openly licensed content (more than 90 per cent of the content in one MOOC and 100 per cent in the other). Content in all MOOCs, including assigned readings, could be accessed, free of charge, by all learners who had registered for free. As for OER units, most of the assigned readings could only be accessed after purchasing them at external vendors' websites, which hinted to a marketing agenda that may have dominated the MIT Open Courseware repository. An alternative way of accessing the assigned readings may probably be having registered and paid tuition fee at MIT at the time the courses were offered, but paying tuition fee does not guarantee free access to the resources. Students in American universities still spend quite a lot of money on assigned books (many of which are sometimes not substantially used in their classes).

To take most from MOOC and OER openly licensed content, learners would need to engage in self-determined open learning practices. Although the majority of learners were willing to engage in these practices, those who inclined toward learning from teachers outnumbered those who inclined toward self-determined open learning if the opportunity to choose is available. Blended learning was more preferred than exclusive off-campus self-determined open learning and exclusive on-campus learning from teachers. Different needs of learners were also reflected on their lists of courses and the most appropriate learning mode through which they would be taken without affecting success. Equally importantly, Facebook and some other social media were found to be the potential tools to support open learning and many students reported to be competent in the use of these media.

Still on social media, an overwhelming majority of academics were open to using these technologies/media to support open learning in different ways: disseminate relevant information to open learners, discuss the learning content with open learners, mentor open learners, and assign collaborative work to open learners. Most academics also supported the idea of opening up higher education although a few of them expressed concerns such as quality degradation and limited access to the Internet and computer technologies among learners. Overall, a supporting policy was perceived as the most enabling factor.

Existing policies seem to have not been drafted to support self-determined open learning and open educational practices. Recognition of academics' open educational practices and assessment of accomplishment from open learning for credit are not covered in the existing policy documents. Raising awareness of open educational practices was not among priorities at the University of Rwanda despite a related commitment expressed in the universities' open access policy and procedures. Limited information on open education and open educational practices also permeated different policy documents and was reflected in different confusions of related concepts in an interview with an institutional leader. Moreover, the *Platinum* open access publishing route, which could be of financial benefit to the University of Rwanda's academics and would offer immediate access to academic content to the university's community was conflated with the *Gold* route. The

disadvantages of the *Gold* route in the context of Rwanda include the exposure of academics to predatory and vanity publishers (Nkuyubwatsi et al., 2015), which may incur exorbitant cost on the part of these academics or the university.

8.4 Limitations

In the current study, effort was made to ensure validity and reliability of the study and its findings. As discussed earlier, research instruments were sent to experts who confirmed their *face validity* (Bryman, 2012, p. 171). Equally, I ensured *concurrent validity* (Cohen et al., 2011, p. 204) by comparing and contrasting data from different sources, which also enabled me to achieve triangulation and *confirmability* (Lincoln & Guba, 1985, p. 318). Despite all the efforts I made, this study results are still subject to different limitations. Certain conditions could not be fully controlled to ensure perfection on the validity and transferability of the results. Due to those limiting conditions, the generalisability, especially the one based on statistical theories, does not apply to this study. The conditions that were restrictive to the current study are discussed below.

8.4.1 Surrogate learning environment and experience

My participant observation in MOOCs did not necessarily provide experience that would be provided to learners in Rwanda. During Phase 1 of the research component, I had access to reliable Internet connectivity, electricity and I fully controlled the use of my time. These privileges may not be offered to Rwandan learners who would engage in self-determined open learning practices from Rwanda as well as academics who may participate in different open educational practices. Learners in Rwanda may also not necessarily have an extensive experience in online learning I had when I conducted my study on MOOCs. When I started my PhD study, I already had a five year experience in online learning. This experience distinguishes me from learners who need to benefit from opening up education

that was of particular focus in this study. Most of these learners have never taken an online or distance learning course.

8.4.2 Biases

Due to my own experience as a self-determined learner who, once, was a victim of exclusion from student loan, an academic and an advocate of open education in Rwanda (see Chapter 1), I brought a certain degree of bias to this study. The transformative aspect that was critical in the current study was informed by the transformation I personally experience. That transformation has shaped my world view and perspective on learning, and underpinned my interest in activating the investment of heutagogical resources among my mentees. Although my mentorship produced powerful evidence that the investment of heutagogical resources leads to transformative outcomes, I had a limited number of mentees.

Moreover, the majority of learners who participated in Phase 2 of the research component indicated willingness to engage in heutagogical open learning practices. Yet, the level of their investment of heutagogical resources and the subsequent transformation in their lives could not be verified with factual evidence. Many participants may have reported willingness to engage in heutagogical/self-determined open learning practices to avoid being perceived as lazy, although the questionnaire survey was anonymous. This is the same for academics who may have reported willingness to engage in different open educational practices due to a possible feeling of being perceived as selfish. Therefore, this study may be subject to biases linked to both my own background and the participants' perceptions.

8.4.3 Participants' limited knowledge in the field of open and distance education, OER, MOOCs and related practices

Open, distance education and eLearning are not well developed in Rwanda and many of participants were not familiar with key concepts in this field. More importantly, recent developments in the field, mainly open educational resources and MOOCs were still new concepts in Rwanda. The concept of self-determined open learning is also not widely known in Rwanda although some underprivileged learners engaged in such practices to make transformative accomplishments.

Although only 24.7 per cent of academics reported that they were unaware of the concept of opening up education (see Chapter 5), the knowledge of the majority of participants who had heard of the concept was probably rudimentary. As discussed in Chapter 5, one participant expressed a concern that many academics who participated in the study may be unfamiliar with some of the concepts/technologies that were in the email questionnaire they completed. Equally, one of the learners who participated in the study provided this comment on Google Docs: "That is where I get most learning materials". As discussed earlier, this comment suggests that this participant may have taken any file that can be googled and downloaded from the web for Google Docs. Such confusion may have affected the data collected from both learners and academics.

Limited information on open access publishing was also reflected in the confusion of the *Gold* and the *Platinum* open access publishing routes in the University of Rwanda's open access policy and procedures. The *Platinum* route is of most financial benefit to academics and learning institutions (Nkuyubwatsi et al., 2015). Within this route, academics would openly publish their work, without paying for their open sharing practice, not least because APCs required to publish in the *Gold* route are very high when compared to Rwandan academics' salaries. Moreover, the University of Rwanda has limited funds to cover APCs on behalf of all its academics who want to publish in open access journals through the *Gold* route as it happens in well-resourced institutions. Even if the University

of Rwanda would be able to pay those APCs, the related cost would probably be recovered by charging students more fees. This practice would exacerbate inaccessibility of higher education in a country where more than 42 per cent of students who had been admitted in the public higher education were denied student loans, and were consequently unable to register and attend classes because of low income in their families.

The *Platinum* route would help the University of Rwanda's academics and researchers publish in open access journals without any cost on the part of the authors and the institution. Despite this advantage, the *Platinum* route is not in the university's open access policy and procedures. Instead, it is conflated with the *Gold* open access publishing route. As discussed earlier, this confusion exposes academics at this university to predatory and vanity publishers who often operate under a shelter offered by the *Gold* open access publishing route. Therefore, the absence of the *Platinum* open access publishing route in the University of Rwanda's open access policy and procedures hints to limited information on open access publishing routes that may prevail among this institution's leaders and policy makers.

This hint was strengthened by the university's official's confusion of *openness of content* and its *electronic format* in an interview I conducted. Equally, the argument that open access publishing has been there for ages, with an example of publishing companies that used to release the content free of charge for third world countries two or three years after publication may hint to the limited information on recent developments in open access publishing, including the *Platinum* route. The limited information on the part of the informant may also have affected data from the interview and the quality of the interview in general.

8.4.4 Resource constraints

This study was conducted within limited time, financial resources, infrastructural resources and political resources that were available (Nkuyubwatsi et al., 2015). Often times, I had no control on those resources and this inhibited me from addressing some of the limitations discussed earlier. For instance, I had planned to give presentations on my research prior to collecting data from participants. This could have contributed to addressing the issue of their lack of enough information in the field of my research, which is still new in Rwanda. After securing ethical clearance from the University of Rwanda's College of Medicine and Health Sciences (as it had been required by the university's officials), the ethical clearance committee at this college decided that I also needed permissions to conduct my research from each college principal. This committee also decided that letters of application for those permissions had to be written by the committee, not myself as a researcher.

The process of sending the permission application letters and receiving feedback letters took some time (more than a month in some colleges). Since I had only three months for my off-campus study, I had to be responsive to this situation. As soon as I received permission to conduct my research at each college, I started recruiting participants and collecting data without waiting for officials at the college to organise a seminar in which my presentation could be given. At some colleges, those presentations were organised and cancelled many times because the presentation venue had to host other events that were later on given more priorities. At one college, the seminar was cancelled three times and it ended up not taking place. Had I waited for giving presentations before collecting data, I would have spent all the limited time I had for field work waiting for related arrangements without collecting enough data. Although my decision to collect data before making presentations was the best one in this situation, the quality of data collected could have been improved by the presentations that could have provided participants with information on the key concepts in my research.

8.4.5 Sampling

Purposive sampling for both MOOCs and OER units used in Phase 1 and the institutional leader/policy maker interviewed in Phase 2 enabled me to be fully immersed with the research objects to collect enough data, and conduct an interview with a relevant informant. In Phase 2, convenience sampling/availability sampling and volunteer sampling were also used in sampling learners and academics who participated in the study. These sampling techniques enabled me to save money and time, and include in the study participants who were interested and willing to participate.

However, these advantages may have been accumulated at the expense of representativeness and generalisability of the results since probabilistic sampling was not involved. In the category of learners, only formal students participated, and all these participants belong to only one college of the University of Rwanda. The opinion of these students who were in the medical field may be different from that of students in other fields of study. More importantly, learners who qualify and wish to attend higher education but have not been included may have completely different opinions since they may perceive themselves as victims of the status-quo. This may especially be the case for students who had been admitted at the University of Rwanda on merit basis, but were denied student loans, and consequently, they could not register and attend courses. Therefore, a great deal of caution is needed in generalising the current study results.

8.4.6 Context

The study focused on opening up higher education in Rwanda, a context which has distinctive social economic and infrastructural challenges. Opinions from different participants in this study as well as decisions, attitudes and actions of the mentees discussed in the *parallel development component* of this study may have been shaped by their first-hand experience with those challenges. The conclusions of this study are more

applicable to this particular context. While these conclusions may be very relevant to other settings that share similar challenges as Rwanda, their generalisation to well-resourced settings may be inappropriate.

8.5 Recommendations for policies and practices

As discussed previously, the current study had an agenda to influence policies and practices in Rwanda and this influence has already started. However, more needs to be done to expand benefits from those policies and practices. The following are recommendations for policies and practices.

8.5.1 Contextualise existing policies

Many of existing policies at the University of Rwanda need contextualisation so that they inform practices that respond to the growing need for opening up higher education in the country. Contextualisation moves beyond taking policies used in other settings and replace words that are relevant to the original context by corresponding words in the new context of application. In the University of Rwanda's *policy and procedures on academic staff appointments and promotions* (The University of Rwanda, 2014c), this simplistic replacement was not even completely made as discussed earlier: On 14 June 2016, the related policy document still contained a statement that is relevant to academics in Scotland and irrelevant to those in Rwanda. Instead, contextualisation of policies would consist of designing (or reviewing existing) policies within an agenda to address real contextual challenges.

One of the real challenges in Rwandan higher education that may be addressed by contextualised policies consists of losses that may be incurred by predatory and vanity publishers on academics in Rwanda and higher education institutions in this country. The *open access policy and procedures* (The University of Rwanda, 2015b) lacks the *Platinum*

open access publishing route that is safe from those publishers. This policy and procedures can be contextualised by adding this route for the benefit and safety of academics at the university, the university community and the country at large. Another more important issue that policies may need to be contextualised to address is an overwhelming number of learners, including top performers in national exams, who are not included in the higher education system. The *general academic regulations for open and distance learning programmes* (The University of Rwanda, 2014a) lack critical enablers of practices that may contribute to opening up higher education in Rwanda: Assessment of open learning accomplishment for credit, open learning services, OEP, openly licensed resources and open courses. The regulations can be contextualised by including these enablers.

8.5.2 Involve different stakeholders in policy formulation for ownership development

As highlighted in Chapter 5 and 7, the interview informant claimed that policies at the University of Rwanda are formulated within a participatory approach. However, the publication of the version of the *policy and procedures on academic staff appointments and promotions* document that had a statement that was relevant to academics in Scotland rather than those in Rwanda may invalidate this claim. It is more likely that at least one of hundreds of academics at the University of Rwanda could have noted the irrelevant statement in the policy document if they had been involved in the policy formulation. Moreover, no signs of a participatory approach could be observed in the process of formulation of a national policy on open, distance education and eLearning that was under development during the fieldwork period. As noted earlier, responsibilities to coordinate the formulation of this policy were delegated to the University of Rwanda's College of Education. Involving different stakeholders in policy design was perceived as a key enabler of opening up higher education in Rwanda by academics.

While not involving different stakeholders may not inhibit the enforcement of policies, opening up higher education moves beyond enforcement for its success. For

opening up higher education, stakeholders' engagement is as important as policy enforcement. Without either of the two ingredients, opening up higher education will hardly succeed. Stakeholders' engagement is more likely to accrue from ownership development, which on its part may be triggered by each stakeholder's perceived benefits from opening up higher education. Therefore, involving different stakeholders in policy formulation may help them voice their interests and needs, and if the policy is designed to meet those interests and needs, ownership may accrue.

8.5.3 Innovate within a collaborative investment framework for non-rivalrous education

Funds for higher education have dramatically decreased in Rwanda while the demand for higher education has been increasing, and this may be the case in many other countries (Barber et al., 2013; Nkuyubwatsi, 2014c). With ownership development that may accrue from the involvement of different categories of stakeholders recommended earlier, different resources may be invested (see Chapter 2 and Figure 2.6). This investment may be facilitated by value creation for the benefit of all stakeholders involved.

Value creation for all stakeholders to invest in opening up higher education and benefit from their investments is a key component of a framework for collaborative investment in MOOCs, open education and opening up education (See the *Shared benefit* basis in Figure 2.6). It should be noted that this investment is not simplistically reduced to financial investment, a naïve perception that would lead to exclusion of underprivileged stakeholders who do not possess enough financial resources. The framework for collaborative investment relies on the principle that any willing stakeholder can invest in opening up education regardless of their social economic background.

Diverse resources that can be invested within the collaborative investment framework are discussed in Chapter 2 and Figure 2.6. The rivalrous nature of some of these

resources inhibits expansion of higher education opportunities in under-resourced settings. However, a thoughtful combination of rivalrous and non-rivalrous resources may lead to non-rivalrous higher education in which all learners who want to invest their heutagogical resources are included. Therefore, innovations within the framework for collaborative investment in opening up higher education are worth undertaking.

8.5.4 Engage in continuing discussion and negotiations for collaborative problem solving

Opening up higher education in Rwanda is the quest for different categories of stakeholders in Rwandan higher education. No single category of stakeholders can claim to be able to address barriers to higher education, on their own, without working with other stakeholders. A continuing open discussion and negotiations on addressing inhibitive issues and a collaborative problem solving approach are needed. In these discussion and negotiations, the focus would be on removing barriers to opening up higher education that pertain to behaviours and attitudes of stakeholders in different categories. This may be done in a way that distributes benefits among all stakeholders who invest different resources at their fullest potential.

8.5.5 Explore open and digital scholarship opportunities for professional development and contributing to opening up higher education

The decrease of funds for higher education does not inhibit only the inclusion of many underprivileged learners who wish and qualify to attend higher education, but professional development of different stakeholders that would enable such inclusion is also inhibited. As discussed earlier, the field of open, distance education and eLearning is new to most stakeholders in Rwandan higher education. For these stakeholders to successful implement opening up higher education, they may need to hone their competences in the field.

Many MOOCs were found to have the potential to contribute to such professional development with minimal consumption of financial resources that are in shortage in Rwanda. This was the case of LTO, EDC, FOVI, eLEc and PAVC as discussed earlier. For different stakeholders to take most from these open courses, they would need to engage in different open scholarship practices. Such practices include engaging in open courses (Veletsianos & Kimmons, 2012, p. 168) and participating in (and regularly contributing to) social networks (Veletsianos & Kimmons, ibid; Weller, 2011, p. 99). Many of the MOOCs mentioned above would enable different stakeholders to build self-confidence in trying new technologies and using them to support learning, one of digital scholarship practice (Weller, ibid).

As discussed in Chapter 5, the wish to develop competences in using social media to support learning emerged in data collected from academics. These competences may be developed by participating in the MOOCs mentioned above, especially if different stakeholders combine the MOOC content and social networking opportunities offered in most of these open courses. This combination would provide these stakeholders with not only insights on opening up higher education, but also hands-on experience in the development of open scholarship practices needed for opening up higher education.

Open scholarship would also enable academics to contribute openly licensed content. Such content is one of the cornerstones of opening up higher education. Academics would contribute openly licensed content by publishing their research articles in open access journals, which is also a hallmark of open scholarship (Veletsianos & Kimmons, ibid; Weller, ibid). To engage in this open scholarship practice without consumption of enormous financial resources that are in shortage in Rwanda, academics may want to explore the *Platinum* open access publishing route. In this route, neither authors nor their institutions are required to pay anything for the publication of their work. That work would be openly licenced and freely available for the use of any academic and learners in Rwanda and elsewhere from the very first day of publication.

8.5.6 Prioritise technologies accessible to Rwandan learners over technologies used in other settings

The success in opening up higher education does not depend on joining the bandwagon in using technologies in education and just imitating practices in other settings. Instead, this success relies on using available technologies to respond to contextual needs and demands. It is worth learning a lesson from the Rwandan mentee who was concerned that his access to Internet was poorer when compared to that of his classmates in well-resourced societies because he did not have access to reliable Internet at home. This disadvantage did not prevent the learner from completing his online MA programme top of the class; with a distinction.

As long as access to the learning content is made available, performance does not necessarily depend on ease of access and the comfort within which learning occurs. The mentee moved from the feeling of being disadvantaged and the intention to drop out to completing the programme with outstanding performance, despite the fact that he often had to pay for four kilometre bike rides to access the Internet at a nearby hospital. This transformative accomplishment should inform different stakeholders in Rwandan higher education to innovate in the use of most ubiquitous technologies in this setting to respond to contextual needs. Such innovations would help empower underprivileged learners in their own progressive migrations across socioeconomic, educational and technological access levels rather than excluding them by championing technologies they do not have access to.

8.6 Future studies

This study contributed to filling gaps in the literature related to the field of open, distance education and eLearning, including OER and MOOCs, and heutagogy. Nevertheless, more research in these areas is needed. Some of the potential considerations for future research include learners who had been admitted on merit basis but were denied

students loans and were unable to register and attend classes (1), secondary education graduates who qualify and wish to attend higher education but were not shortlisted to apply for student loans due to limited funds (2), samples that include learners from different colleges and fields of study (3), the role of assessment of accomplishment from open learning for credit in triggering self-determined open learning practices (4), the potential role of mobile phones and radio to opening up higher education in under-resourced settings (5), the investment of heutagogical resources and its relation to success among learners in Rwanda (6) and socioeconomic disempowerment and its effects on heutagogical investment and learning success (7). Research on these topics will help contribute to filling the gap in the related fields and bring to light learning practices in under-resourced settings which are under-represented in academic literature.

Questions that may be answered by future studies may include the following: In the context of shortage of funds for student loans and other grants, is not including underprivileged learners in the higher education system better than opening up higher education to them by availing open learning resources and open educational services? What are the effective strategies to catalyse a widespread heutagogical investment? How can the contributions of all stakeholders to opening up higher education be assured? Is limiting access to higher education in proportion with availability of financial resources more sustainable than opening up higher education to learners from all socioeconomic backgrounds and benefit from their subsequent contribution to the knowledge society? What is the most effective way to make higher education equitable and accessible to learners who wish to invest their heutagogical resources regardless of their socioeconomic background? What are strategies to minimise the higher education costs on the part of underprivileged learners without undermining quality and sustainability?

Further research should consider campus-based learning and off-campus self-determined open learning equally and focus more on the resulting performance of the learners. Same or similar assessment for campus-based students and off-campus self-determined open learners may help determine the difference between the two types of

learning. Equally importantly, exclusion of self-determined open learners from credit, qualifications and related privileges such as eligibility for job and scholarship applications would need to cease. Equal treatment of both campus-based students and self-determined open learners, basing on their performance, would help eliminate extraneous factors that may lead to bias results in related research.

Still on self-determined/heutagogical open learning, related research may need to have transformative and longitudinal designs. Transformative design may help researchers catalyse heutagogical investment among learners and investigate measurable outcomes of heutagogical practices. It is important to note that transformative researchers' action will not primarily intend to make their research possible. Instead, the primary goal for transform researchers' action will be to transform learners' lives. This is where the difference between transformative studies and intervention studies lies. While intervention researchers' action primarily intends to collect data, transformative researchers' action intends to contribute to the improvement of the status-quo. As for longitudinal studies, they will enable researchers to note measurable transformation of self-determined learners over time.

Equally importantly, future research may focus on MOOCs hosted in other platforms and investigate what they would contribute to opening up higher education. In this regard, platforms from different countries may need to be researched. Within platforms that host courses from institutions located in different countries, the inclusion of MOOCs from countries that are geographically and culturally dispersed in samples may need to be considered. In platforms that host courses from universities located in the same country, diversification of providing institutions may be the criteria on which sampling is based.

In addition, future research may give more attention to MOOCs that are designed from openly licensed content. At the beginning of this study, the identification of those MOOCs was serendipitous. As the MOOC movement developed, however, it has been easier to locate such MOOCs. The OpenupEd portal may be the first venue to research such

MOOCs. According to OpenupEd (no date), open licensing of the course content is the rule for MOOCs displayed on its portal. In this way, the portal may constitute an aggregation of openly licensed MOOCs, which may make the location of such courses easier.

Moreover, future studies may shift attention to other open courseware to investigate the amount of resources that are openly licensed in archives of courses they host. This would help to know if the little amount of resources that were openly licensed in OER units is a particularity of the MIT Open Courseware, or if this is a shared trend in different open courseware. In this regard, the Open Education Consortium Courseware may be an interesting target since the consortium is made up of hundreds of institutions from all over the globe. The diversity of these institutions' locations may also suppose a diversity of agendas and diverse degrees of openness.

Finally, the contribution of OER materials that are available in open access journals to opening up higher education is also worth researching. Unlike the MIT open Courseware OER units in which a small proportion of the content (often consisting of course information, course calendar, syllabus, a list of assigned and suggested readings and projects) was openly licensed, most open access journals release all their articles with an open licence. Permissions to reuse, revise, remix and redistribute 100 per cent of the content published by many of those journals are granted from the day the content is published. These journals may constitute a powerful enabler to opening up higher education that is worth investigating.

Chapter summary

The contributions of the current study overlapped between the *research component* and the *parallel development component*. Those contributions include feeling the gap of the shortage of relevant academic literature from the Rwandan context (1), a framework for collaborative investment in open education and opening up education (2), a deeper understanding of the concept of *non-rivalrous resources* (Weller, 2011, p. 85) and how it

may apply to open and opening up education (3), a deeper understanding of the concepts of *open scholarship* and *digital scholarship* and how they may be introduced in academic practice in Rwanda (4), a comprehensive evaluation of MOOCs and how they would contribute to opening up higher education across settings (5), positioning MOOCs within the "open access" and the "lifelong learning" agendas (Weller, 2011, p. 96) in Rwanda (6), a comprehensive evaluation of OER and their potential contribution to opening up higher education in Rwanda (7), an in-depth understanding of the concept of heutagogy/self-determined learning and its practical application (8) and a better understanding of transformative research and its design (9).

Only two MOOCs, SSY and LTO, were found to have the potential to be adapted for direct use in opening up higher education in Rwanda thanks to open licences on all or most of their content. LTO was also found to have the potential to contribution indirectly to opening up higher education in Rwanda, along with EDC and three other MOOCs taken in the *parallel development component*: FOVI, eLEc and PAVC. When it comes to OER units, only 1 out of ten units was found to have enough openly licensed resources and hence, the potential to be adapted for direct use in opening up higher education in Rwanda. Openly licensed content in MOOCs and OER units would be adapted and the derivative work that can be disseminated using media and technologies most learners in Rwanda have access to would need to be created. Open learning services and enabling policies would need to be developed for the two MOOCs and the OER unit to contribute to opening up higher education.

Moving to different stakeholders, learners were willing to engage in different heutagogical/self-determined open learning practices. Academics were also willing to contribute to opening up higher education in different ways if their contribution is supported by an institutional/national policy, contributes to promotion, is paid for or if they have extra time. Recognition of academics' open educational practices and assessment of open learning accomplishment for credit is not yet a component of policies or discourse of institutional leaders/policy makers in Rwanda. Some of policies at the University of

Rwanda were found to have components that were irrelevant to the context of application. In a similar direction, themes of contradiction with existing policies (1), the lack of awareness of some aspects of open access and open education (2), the control on access to electronic content (3) and confusion of openness and the electronic format of the content (4) emerged in interview data.

The current study was subjected to different limitations, which calls for caution in generalising its findings and conclusions. The limitations included surrogate learning environment and experience (1), participants' limited knowledge in the field of open and distance education, OER, MOOCs and related practices (2), limited resources and time (3), sampling (4) and the context of focus (5).

Recommendations for policies and practices include contextualisation of existing policies (1), involving different stakeholders in policy formulation for ownership development (2), innovating within a collaborative investment framework to build non-rivalrous education (3), engaging in continuing open discussion and negotiations for collaborative problem solving (4), adopting open scholarship opportunities for professional development and supporting open learning (5) and prioritising technologies that learners have access to (6). As for further studies, they may focus on heutagogy and its potential to empower underprivileged learners, MOOCs based on openly licensed content, and OER materials in open access journals and their potential contribution to opening up higher education.

APPENDICES

Appendix 1: MOOC evaluation rubric

This rubric was adapted from Achieve (2011). It is used to evaluate MOOCs in their ten facets: learner orientation, the quality of explanation, the utility of the material to support learning and teaching, MOOC classification, the degree of openness and accessibility, the form of assessment, the level of interactivity, the type of instructional and practical exercises, the opportunities for deeper learning and the fit in Rwandan higher education system (appropriateness within Rwandan higher education in this study). It can be adapted for reuse in different settings or to evaluate online courses of different types. Prior to the use of the rubric, it was reviewed by experts in online education. Then it was tested on five MOOCs from the Coursera platform.

MOOC:

The delivery period:

5= Positive (The statement very much reflects the reality)

1= Negative (The statement does not at all reflect the reality)

Major areas	**Aspects evaluated**	**1**	**2**	**3**	**4**	**5**	**NA**	**Comments**
Student orientation	The MOOC provides accurate (heuristic) information about the scope it covers and the workload to enable students to make the right choice.							
	The MOOC provides information about recommended prerequisite for maximizing benefits from it							
	The MOOC includes a study guide							

Quality of explanation of the subject matter	The MOOC provides comprehensive information so effectively that the target audience should be able to understand the subject matter							
	The MOOC connects important associated concepts within the subject matter							
	The MOOC does not need to be augmented with additional explanation or materials							
	The main ideas of the subject matter addressed in the MOOC are clearly identified for the learner.							
Utility of materials designed to support learning and teaching	The MOOC provides materials that are comprehensive and easy to understand and use.							
	The MOOC includes suggestions for ways to use the materials with a variety of learners.							
	The MOOC and all its components are provided and function as intended and described. For example, the list of materials is complete, and explanations make sense.							

	The materials in the MOOC facilitate the use of a mix of instructional approaches (direct instruction, group work, investigations, etc.).							
Type of MOOCs based on Lane L. (2012) and Conole (2013)	The MOOC is content-based							
	The MOOC is task-based							
	The MOOC is network-based							
	The MOOC is quality assured							
	The MOOC encourages reflection on learning							
	The MOOC enable learning autonomy							
	The MOOC is part of formal learning (credit offered)							
	Certificate of accomplishment is offered							
	The MOOC align with the concept of diversity							
Openness and accessibility	The MOOC materials are copyrighted under an open license							
	The MOOC provides alternative for access to materials for people with low Internet access							

	The MOOC is accessible to students with disabilities							
Quality of assessments	All of the skills and knowledge assessed align clearly with the content and performance expectations intended, as stated or implied in the MOOC.							
	The most important aspects of the expectations are targeted and are given appropriate weight/attention in the assessment.							
	The assessment modes used in the MOOC, such as Multiple Choice Questions (MCQs), true/false format questions, questions that demand short and long constructed response, or group work require the student to demonstrate proficiency in the intended concept/skill.							
	The level of difficulty is the result of the complexity of the subject-area content and performance expectations and of the degree of cognitive demand, rather than a result of unrelated issues (e.g. The lack of cultural translation enablers).							

Quality of technological interactivity	The MOOC is responsive to student input in a way that creates an individualized learning experience. This means the MOOC adapts to the user based on what s/he does, or the MOOC allows the user some flexibility or individual control during the learning experience.							
	The interactive element is purposeful and directly related to learning.							
	The MOOC is well-designed and easy to use/learn, encouraging learner use and engagement.							
	The MOOC appears to function flawlessly on the intended platform.							
Quality of instructional and practice exercises	The MOOC offers more exercises than needed for the average student to facilitate mastery of the targeted skills, as stated or implied in the course syllabus. For complex tasks, one or two rich practice exercises may be considered more than enough.							
	The exercises are clearly written and supported by accurate answer keys or scoring guidelines as							

	applicable.							
	There are a variety of exercise types and/or the exercises are available in a variety of formats, as appropriate to the targeted concepts and skills. For more complex practice exercises the formats used provide an opportunity for the learner to integrate a variety of skills.							
Opportunities for deeper learning	At least three of the deeper learning skills from the list identified at the bottom of this rubric are required in the MOOC.							
	The MOOC offers a range of cognitive demand that is appropriate and supportive of the material.							
	Appropriate scaffolding and direction are provided.							
	The MOOC includes appropriate and timely formative feedback							
Fit in the Rwandan higher education	The MOOC would fit within levels of higher education in Rwanda							
	The MOOC would fit within the credit system in Rwandan higher							

system	education							
	The MOOC would fit within the fields of study ranked as priority in Rwanda							

Deeper learning skills:

- Think critically and solve complex problems.
- Work collaboratively.
- Communicate effectively.
- Learn how to learn.
- Reason abstractly.
- Construct viable arguments and critique the reasoning of others.
- Apply discrete knowledge and skills to real-world situations.
- Construct, use, or analyze models.

Adapted from Achieve (2011) *Rubrics for Evaluating Open Educational Resource (OER) Objects*, available from http://www.achieve.org/files/AchieveOERRubrics.pdf (last accessed 10 November 2015).

Appendix 2: OER unit evaluation rubric

This rubric was adapted from Achieve (2011). It is used to evaluate OER units in their nine facets: learner orientation, the quality of explanation, the utility of the material to support teaching, the degree of openness and accessibility, the form of assessment, the level of interactivity, the type of instructional and practical exercises, the opportunities for deeper learning and a cross-cultural relevance (appropriateness within Rwandan higher education in this study). It can be adapted for reuse in different settings or to evaluate online courses of different types. Prior to the use of the rubric, it was reviewed by experts in online education. Then it was tested on five OER units from the MIT Open Courseware.

OER unit:

URL:

Workload:

5= Positive (The statement very much reflects the reality)

1= Negative (The statement does not at all reflect the reality)

Major areas	**Aspects evaluated**	**1**	**2**	**3**	**4**	**5**	**NA**	**Comments**
Learner orientation and metadata	The OER unit provides accurate and enough information about the scope it covers to enable the learner to make the right choice.							
	The OER unit provides information about recommended prerequisite for maximizing benefits from it							
	The OER unit includes a study guide							
Quality of explanation of	The OER unit provides comprehensive information so							

the subject matter	effectively that the target audience should be able to understand the subject matter							
	The OER unit connects important associated concepts within the subject matter							
	The OER unit does not need to be augmented with additional explanation or materials							
	The main ideas of the subject matter addressed in the OER unit are clearly identified for the learner.							
Utility of materials designed to support teaching	The OER unit provides materials that are comprehensive and easy to understand and use.							
	The OER unit suggests ways for teachers to use the materials in their teaching							
	The OER unit suggests ways to use the materials with a variety of learners							
	The OER unit and all components are provided and function as intended and described. For example, the time needed for lesson planning and learning appears accurately estimated, the list of materials is complete, and explanations make							

	sense.							
	For larger OER units, materials facilitate the use of a mix of instructional approaches (direct instruction, group work, investigations, etc.).							
Openness, accessibility	All the required learning materials are openly licensed							
	Suggested readings/resources are openly licensed							
	Alternatives for accessing and using learning materials with low connectivity are provided							
	The materials are accessible to students with disability							
Quality of assessments	All of the skills and knowledge assessed align clearly with the content and performance expectations intended, as stated or implied in the OER unit.							
	The most important aspects of the expectations are targeted and are given appropriate weight/attention in the assessment.							
	The assessment modes used in the unit, such as Multiple Choice Questions (MCQs), true/false format questions, questions that							

	demand short and long constructed response, or group work require the student to demonstrate proficiency in the intended concept/skill.							
	The level of difficulty is a result of the complexity of the subject-area content and performance expectations and of the degree of cognitive demand, rather than a result of unrelated issues (e.g. the lack of cultural translation enablers).							
Quality of technological interactivity	The OER unit is responsive to student input in a way that creates an individualized learning experience. This means the OER unit adapts to the user based on what s/he does, or the unit allows the user some flexibility or individual control during the learning experience.							
	The interactive element is purposeful and directly related to learning.							
	The OER unit is well-designed and easy to use, encouraging learner use and engagement							
	The OER unit appears to function flawlessly on the							

	intended platform.							
Quality of instructional and practice exercises	The OER unit offers more exercises than needed for the average student to facilitate mastery of the targeted skills, as stated or implied in the unit. For complex tasks, one or two rich practice exercises may be considered more than enough.							
	The exercises are clearly written and supported by accurate answer keys or scoring guidelines as applicable.							
	There are a variety of exercise types and/or the exercises are available in a variety of formats, as appropriate to the targeted concepts and skills. For more complex practice exercises the formats used provide an opportunity for the learner to integrate a variety of skills.							
Opportunities for deeper learning	At least three of the deeper learning skills from the list identified at the bottom of this rubric are required in the OER unit.							
	The OER unit offers a range of cognitive demand that is							

	appropriate and supportive of the material.							
	Appropriate scaffolding and direction are provided.							
	The OER unit includes appropriate and timely formative feedback							
Fit in the Rwandan higher education system	The OER unit would fit within levels of higher education in Rwanda							
	The OER unit would fit within the credit system in Rwandan higher education							
	The OER unit would fit within the fields of study ranked as priority in Rwanda							

Deeper learning skills:

- Think critically and solve complex problems.
- Work collaboratively.
- Communicate effectively.
- Learn how to learn.
- Reason abstractly.
- Construct viable arguments and critique the reasoning of others.
- Apply discrete knowledge and skills to real-world situations.
- Construct, use, or analyze models.

Adapted from Achieve (2011) *Rubrics for Evaluating Open Educational Resource (OER) Objects*, available from http://www.achieve.org/files/AchieveOERRubrics.pdf (accessed 26 December 2012).

Appendix 3: Summary of MOOCs used in the study

1. ***Competitive Strategy (CS): 1 July-11 August 2013***

This MOOC lasted for six weeks and required between four and six hour per week to engage with all learning activities and materials. It was based on lecture videos, discussion forum, weekly quizzes and a final exam. Lecture videos had in video quizzes for continuous assessment. Each lecture video had a PDF file of corresponding PowerPoint slides. It was possible to download and save these files as PDF documents. To complete the MOOC successfully, the student had to attempt all weekly quizzes and the final exam. However, not all weekly quizzes contributed to the final grade. Only three weekly quizzes in which the students scored the highest contributed 20 percent of the grade each: 60 percent all together. Another 40 percent was contributed by the final exam. Originally, instructors had announced that if the total of the grade in three weekly quizzes the student scored most and the final exam add up to 50 percent, this sum would be written on the statement of accomplishment. If the total were below 50 percent, the student would receive a statement of accomplishment provided that they had attempted all weekly quizzes and the final exam. However, these guidelines were not followed literally since the awarded statements of accomplishment were with distinction or not. Weekly quizzes had 10 questions each and students were allowed three attempts on weekly quizzes. As for the final exam, they were only allowed two attempts. Students had 90 minutes to answer and submit the exam. Failure to submit the exam within 90 minutes could result in the system locking the screen and only answers saved being submitted for grade. The highest grades obtained from the three attempts on weekly quizzes or two attempts on the final exam were maintained as effective scores. Significant changes were made on the second and third attempts. In total, 29 hours were invested on all activities in this MOOC.

2. ***Online Games: Literature, New Media and Narrative (OGLNMN): 9 September to 21 October 2013***

The MOOC ran for six weeks. It had two tracks: the standard track and the distinction track. The standard track was awarded a certificate of accomplishment and the distinction track was awarded a certificate of accomplishment with distinction. The award

criterion on both tracks was achieving a grade of 70 percent. However, the Standard Track only tested student knowledge of the subject through weekly quizzes. The standard track required watching weekly lectures (some of which could be skipped without penalty) and taking weekly quizzes. As for the Distinction Track, it contained three peer assessment exercises in addition to quizzes. The first assignment required students to play the Lord of the Ring Online and then either create a multimedia narrative using screenshots of the game and screen-capture video. Alternatively, the student could write an essay describing their experience in one of the game scene. The second assignment required reading the Lord of The Ring, watching the related movie and playing the related game. Then the student had to either write an essay or create a multimedia narrative that compared and contrasted one scene across media. The third assignment provided three alternatives: write an essay that discussed how a game that remediates one of the poems covered in previous weeks could be designed (1), discuss the same design using other media (2) and create a game that remediated one of those poems (3). In addition, weekly quizzes in the distinction track had a higher number of questions. They consisted of all questions asked to students in the standard track plus questions related to the experience of playing The Lord of the Ring Online. Lecture videos were of three types: Short lectures by the instructor in which he conveyed key concepts, history, and theory, small seminars in which students enrolled at the offering university talked about their experience with gaming or discussed romance poems with the professor and in-game sessions in which extracts of the action of the Lord of the Rings Online were played. For continuous assessment, the monotony of lecture videos was broken by quizzes. A total of 46 hours was spent on this MOOC.

3. Law and Entrepreneurship (LE): 23 October to 4 December 2013

The MOOC consisted of video lectures, an eBook reading and participation in the discussion forum. It covered legal practices needed for entrepreneurs who want to start a business, both physically and online. Video lectures could be downloaded, but the eBook had to be read online. In other words, the eBook could neither be printed nor downloaded for offline reading. The lectures had no in-video quizzes but they were relatively short. The length of the video lectures varied between 2:06 minutes and 8:09 minutes. Most videos

were less than five minute. There were also recommended reading materials. The lectures made reference to laws in Illinois, the state where the offering university is based and sometimes referred to Federal laws in the United States of America (USA). In addition to watching the lecture videos, students were recommended to read the eBook on law and entrepreneurship. This book also discussed legal practices for entrepreneurs with main reference to federal laws in the USA. Each week had a quiz that was taken after watching lecture videos and reading the assigned materials. Students were allowed three attempts to the quiz. However, they could get full grade at the first attempt only. At any subsequent attempt, they lost 20 percent of the full grade as a penalty. That is, their effective score was the highest grade, either 100 percent of the student's grade on first attempt, or the student's grade on the second attempt minus 20 percent of the full grade, or the student's grade on the third attempt minus 40 percent of the full grade. No changes were made on the questions on the second and third attempts. Quizzes contributed 70 percent of the MOOC overall grade. Another 30 percent was from student's participation in the forum discussion. To get full credit on the forum discussion, students had to accumulate ten points from posts, thread started or response to their colleagues' posts. A single contribution of any of the three ways was equivalent to 0.5 point. Students also collected points from votes on their contributions: 20 votes from colleagues contribute 0.5 point. Only 15 hours were spent on this MOOC. Learning materials that were only relevant to Illinois were skipped.

4. eLearning and Digital Cultures (EDC): 4 November to 9 December 2013

This MOOC lasted for five weeks and the suggested workload was between five and seven hours of engagement with course materials per week. Weekly learning activities consisted of watching one or two short lecture videos, reading the suggested materials, participating in the forum discussion, participating in the course Google hang-out, blogging on the course materials, micro-blogging via Twitter and producing and sharing a digital artifact. Students were not required to participate in all these activities. Instead, they were advised to participate in at least two of them in order to be able to produce a digital artifact that meets the course requirements in the final course week. The lecture videos did not have quizzes and there were no weekly quizzes. The entire course was assessed via a

digital artifact submitted in Week 5. This digital artifact was peer-graded in the light guidelines from instructors. One of the final week videos was dedicated to providing constructive feedback using a friendly language. This MOOC was heavily based on reading materials. Suggested materials included academic publications such as book chapters from edited collections. In Week 3, students were invited to participate in an optional image competition. Students had to take pictures that reflected one of the concepts or themes covered and post it to the course Flicker page. Students who wanted could visit this page and comment on the pictures. The rating of the images submitted was done using Flicker's automated system that determines the interestingness of images. In the Week 4 Google hangout, the instructors invited two of the students who completed the course in the previous offering. These students provided some tips related to submitting a digital artifact and providing constructive feedback in a positive way. This MOOC was also unique in the way it was organized and extensive guidance or study guide was provided at various course web pages. A total of 27 hours was invested to complete the MOOC.

5. ***Information Security and Risk Management in Context (ISRMC): 11 December 2013-19 February 2014***

This was a ten week MOOC which required between four and six hours of work on the course materials. It consisted of lecture videos, forum discussion, reading materials, weekly quizzes and optional peer-graded assignments. Unlike many MOOCs that have in lecture videos, this MOOC had highlights that emphasized important information. These highlights appeared when the lecture video paused. After reading the pieces of information, the student clicked the *continue* button to resume the lecture. Lectures were provided by the instructor and various guest speakers who worked in various information security companies. These guest speakers were experts in business recovery continuity and disaster recovery who worked or had worked with the USA Department of Defense as contractors. Reading materials consisted of various publications on information security policies and issues. The reading materials were academic publications in the field of Information Insurance and many of them were guidelines and policies developed by highly reputed organizations and used or recommended by government institutions in the USA and

globally. Each week had at least one or more of such readings, in addition to the lecture videos. In weekly quizzes, students were allowed three attempts. The highest grade of the three attempts was maintained as effective score. However, taking these quizzes was optional and simply helped the students in self-assessment. The final week lectures consisted of a discussion panel of academics, a chief executive officer, a research scientist and an executive director. The panelists had expertise in social media security with end user's perspective, virtual world security, social media security in authoritarian countries and law. As opposed to many other Coursera MOOCs, this course did not award a statement of accomplishment to students who successfully complete it. Neither was it displayed in the list of the student's past MOOCs. Without reading the suggested reading materials, I spent 44 hours on it. Reading materials could at least take a similar or more amount of time.

6. Sustainability Society and You (SSY): 06 January -2 March 2014

This eight week MOOC required two to five hours of engagement per week, according to the instructor's suggestion. It consisted of a few lecture videos, reading materials and discussion on the course website in comment format. Each week had two or three videos that served the purpose of introducing the week theme, illustrating some issues on the course themes and wrapping up the weekly discussion. Each video had a transcript in PDF format which could be downloaded and used offline. Students could mark each web page they have completed as done. The MOOC content was based on OER and this content was copyrighted under CC BY-NC-SA UK 2.0 licence. Students were encouraged to write reflection on the course in blog posts and comment on their peers' posts. They could also use Twitter for micro blogging. Most reading materials were provided in html format and a PDF file of the same content was uploaded at the bottom of the page. Some html contents consisted of summarised versions of an article on a course topic. A full version of the article was also provided as a PDF file and students were recommended to read this full version. The content linked to global summits and international conferences that discussed the course theme. The course also provided tools that are used in measuring individuals' behaviours vis-à-vis issues discussed. A statement of participation could be awarded to

students who had covered at least 50 percent of the course activities if they paid £24. A total of 53 hours and 30 minutes was invested to participate in 70 percent of the course activities.

7. Grow to Greatness: Small Growth for Private Businesses (GGSGPB I): 20 january-24 February 2014

The course was designed around success stories in planning and managing private business growth. These stories were case studies of companies that successful grew their businesses. The operation setting of these companies was diversifies to cover North America, South America, Asia and Africa. Each week discussed a new content theme. In Weeks 2 and 5 students engaged in workshops where they were asked to use and apply the course tools and concepts to create growth strategies for two different real-life businesses of their choices. The weekly lecture videos have corresponding slides provided as PowerPoint and PDF files. These slides and lecture videos could be downloaded and used offline. Students could take notes in the slides as they listen to the corresponding lecture videos. Each lecture video also had a link to the discussion forum. However, instead of leading to the thread that discussed questions and concepts covered in that specific video, the links led to the general forum discussion page. Captions in some videos were available in three languages: English, Spanish and Portuguese. In other videos, captions were available in English and Spanish. Video lectures had quizzes. Unlike in other MOOCs that asked questions, one by one, at a specific lecture video pause, four questions were released at the same time. Some videos ran up to twenty-five minutes without interruption. Yet, the instructor asked some questions and asked students to pause the videos and write their answers or reflections to the questions on a piece of paper or verbalise them. The graded assessment consisted of only the final exams and, unlike many other Coursera MOOCs, this course did not have weekly graded quizzes. The final exam consisted of forty questions which are taken in a period of 90 minutes and only one attempted was allowed. Once the exam had been started, it had to be completed and submitted. An interruption during the

final exams would screw up every chance on this exam. A total of 26 hours was spent on this MOOC.

8. Gamification (G): 27 January-7 April 2014

The MOOC consisted of video lectures, forum discussion, quizzes, peer-assessed assignments and a final exam. Videos had in-lecture quizzes as many other Coursera MOOCs. These lectures had captions that could be customized in four languages: English, Ukrainian, Turkish and Russian. Each video lecture had a PDF file of related PowerPoint slides. The course was assessed via four quizzes that contributed 35 percent of the total grade, three written assessment that were peer-graded and contributed another 35 percent and a final exam that contributed 30 percent. Students could take quizzes twice without penalty. After the second attempt, they lost 20 percent of the obtained score. Quiz 1 contributed 5 percent of the grade. Quiz 2 was divided into two parts and each of these parts also contributed 5 percent of the final grade. As for quiz 3 and 4, they contributed 10 percent of the grade each. In the first peer assessment, the instructor described a hypothetical company that would operate in the USA for which students had to write a concept paper for a gamification system. The deliverable at this stage could be up to a maximum of 300 words. In the second peer-graded work, the instructor did the same by describing an American company that had a serious problem of obesity among its employees. This time, students had to describe a gamified system that could be used to motivate behavioural change among employees in effort to reduce obesity and therefore the cost related to consequent health problems. The deliverable at this stage could be up to 500 words. As for the third peer-graded assignment, another company was described for students to write a gamified system that could encourage collaborative consumption. This gamified system had to include the definition of the business objective, delineation of the target behaviour, the description of players, the design of an activity loop, the fun element and the deployment of appropriate tools. The deliverable for this assignment could be up to a maximum of 1500 words. As for the final exams, it consisted of 20 multiple choice questions each of which was grade on 1.5 points. Similar to homework quizzes, some of

the questions asked for a single correct answer (radio button) and other asked participants to check multiple correct answers (checkboxes). Students who scored 70 percent of the total grade were awarded a statement of accomplishment. A total of 44 hours was spent on this MOOC.

9. Assessing and Teaching 21st Century Skills (AT21CS): 30 June-04 August, 2014

This course lasted for five weeks and the sixth extra week was provided for completing peer-assessment on written assignment that was submitted by the end of Week 5. The course consisted of lecture videos, links to reading materials, the forum discussion and the use of social media. Video lectures included those presented by the course instructors, videos of students who worked collaboratively to solve a problem and interviews with experts in the field. Unlike other MOOCs on the Coursera platform, most of in-lecture quizzes in this course were not multiple choice questions with one or multiple correct answers, or true/false questions or short answers to be typed on the screen. Instead, these quizzes requested students to provide their point of view on various issues and the feedback consisted of a poll that indicated other participants' perspectives. The course was assessed through two quizzes which contributed 5 percent of the total grade each and two peer-reviewed assignments. The first quiz was provided in Week 3 and the second one in Week 5. Unlike quizzes in most Coursera courses that seemed to evaluate the retention of the information presented in the lecture videos, quizzes in this MOOC were based on practical application of the concepts learned. These quizzes were linked to scenarios in which different reports were provided and MOOC student had to map the levels of development of collaborative problem solving competences in those scenarios. The first peer-reviewed assignment required writing an eight hundred word essay that presents a real life or hypothetical situation of collaborative problem solving in practice and map collaborative problem solving competences development of at least one of the collaborators. The assignment is submitted in Week 2 and contributes 40 percent of the total grade. The second assignment consisted of an essay of 1000 words which presented the design for collaborative problem solving in the classroom or professional setting. The design in this assignment consisted of the presentation of the background and problem to

be solved, the training/teaching strategy and the assessment/review strategy. The essay contributed 50 percent of the total grade. In total, 38 hours were invested on this MOOC.

10. Learning to Teach Online (LTO): 28 July-28 September 2014

This was an eight week MOOC which required three to six hours of engagement per week. Each week covered one module. In this MOOC, all materials for the eight weeks were released at the beginning of the courses and students could start from wherever they wanted. The course materials were built on an OER unit which had the same name as the course. It consisted of 93 videos: 63 copyrighted under CC BY-NC, 22 video under CC BY-NC-ND and only 8 videos were copyrighted under *All Right Reserved*. This MOOC only awarded a verified certificate to students who had chosen to pay and take it within Coursera's signature track. Those who passed the MOOC outside the signature track did not receive the statement of accomplishment and the MOOC could not be linked to their LinkedIn profile. However, their grade was displayed on the student record and could be showcased via a tweet. Students could pass the class either within the Standard Track which required 50 percent of the grade or within the Distinction Track which required 75 percent of the grade. The final grade could be accumulated from eight sets of activities which contributed 5 percent each and three peer-assessed assignments which contributed 10 percent, 20 percent and 30 percent respectively. In addition to video and reading materials, each module had one set of three activities which were completed online for a period that could vary between 15 and 30 minutes per activity. The full grade (5 percent) was given to students who completed and submitted all the three activities in the set. After submitting the activities, the student received feedback consisting mainly of charts with vertical bars that reflected percentages of peers' responses on different questions and a personalised list of additional resources based on each individual student's responses. The three assignments built on one another and were graded by two peers. In Assignment 1, students were required to critically analyse and reflect on their understanding of the benefit and risks of open web 2.0 technologies and institutionally supported technologies such as learning management systems. They also had to analyse and reflect on the consideration of using both types of technologies, based on the context of application as well as institutions'

policies and strategies about the use of different technologies for online learning and teaching in an essay of a maximum of 800 words or in an equivalent format such as video or PowerPoint presentation. In Assignment 2, students reviewed and critically analysed one of their real or hypothetical teaching activities, assignments or designs and identified where an online learning strategy could be incorporated to improve teaching or learning experience. Then they discussed and justified the integration of technology in this activity, assessment or design. The maximum word count for Assignment 2 was 1200 words. Students could discuss the course content and share information in the forum and via social media. The course Facebook community and twitter hashtag were created. The forum had a place where students could post questions and vote their peers' questions every week. The weekly question threads were started by instructors each Friday of the previous week to close the Friday of the question related module week. After the thread closure, instructors selected five highly voted questions and answered them in question and answer (Q&A) video recordings that were released every Monday. Subtitle to these Q&A videos were made available the following day (on Tuesday). In total, 57 hours were invested on this MOOC.

Appendix 4: A summary of OER units analysed in the study

1. ***Media Education and the Marketplace (available from http://ocw.mit.edu/courses/global-studies-and-languages/21g-034-media-education-and-the-marketplace-fall-2005/, last accessed 10 November 2015).***

This unit focused on the spread of information and communication technologies (ICTs) and examined the effect and potential of this expansion in developing settings. It presented case studies that used ICTs to have positive impact. It consisted of lectures provided by guest speakers, a list of readings on the related literature, students' presentations on the readings, fieldwork projects proposed by instructors or conceived by students themselves and a final project on a topic provided by the instructor or that emerged from the reading or student's mind. Thirty readings were assigned in this unit. Twelve of these readings had to be purchased from *Amazon*. A link to the *Amazon* pages where students could buy the books was provided. One weekly reading required an annual subscription of $78 on the *Chronicle of Higher Education* and another required a subscription on the *High Beam Research* which offered a seven day trials for free and payment was required afterwards. No links to two readings (which were working papers) were provided and the readings could not be found via a Google search. Other reading materials could be accessed with the varying degree of freedom to use. One of those materials was available as a full text article in PDF format and PowerPoint slides converted into PDF. To download the prose PDF file, acceptance of terms of conditions which stipulated that the user should be associated with a licensee institution as student, educator, researcher or alumni for downloading the resources was required. Another reading could be downloaded, but the authors' permission was required to quote from it. Another reading was accessible under condition of joining a Google+ and Facebook group linked to it. As for another, it was only accessible for reading online. Downloading the file required signing up an account to be a member of a related research community. Five other readings could be accessed as PDF files via Google search, but the license for dissemination, use and reuse was not specified. Similarly, one reading could be found, via a Google search, as

web material, but its licence was not clearly specified. Permission to download, save on a hard drive and use was granted on five readings: two were available from the MIT website, one from the Journal Storage (JSTOR) which could be downloaded and used for non-commercial purpose and two readings, one from *Wired Magazine* and another from the *Millenium* which could be used for free. In addition to these readings, students were tasked to find from the web and read various materials available on topics given by instructors. Links to five collections of these materials were provided. Moreover, all thirteen handouts provided in the course were still accessible in the MIT Open Courseware as OER. The unit also had a link to English as Second Language (ESL) materials that consist of four videos and three PDF files. The videos opened in the Real Media (RM) player. My attempt to download them and save them on a hard drive failed. The videos could also open as VideoLAN Client (VLC) media player, but the voice was lost. The comprehension of the course materials was sometimes hindered by the use of acronyms that had not been defined. The course information, syllabus, calendar, list of readings, lecture notes, projects and ESL materials were copyrighted under CC BY-NC-SA.

2. ***Technological Tools for School Reform (available from http://ocw.mit.edu/courses/media-arts-and-sciences/mas-963-technological-tools-for-school-reform-fall-2005/, last accessed 10 November 2015)***

This unit focused on the potential impact of modern technologies on the school reform; with a particular emphasis on the strategies to introduce an innovative educational idea. Suggested readings added up to 88 items. They consisted of journal articles, conference papers and thesis, dissertations and other class papers in PDF format or web materials as well as other links to various forms of reading materials. Thirty-three of the 88 items were links to *Amazon* pages where different books or reading materials could be purchased. Four of the links to the suggested reading materials were broken. Two of these suggested materials could be found in PDF format via Google search and the other two could not be found. Thirty-seven links to other items were active and led to the suggested reading materials in either PDF format or web material format. Twenty-five of these links

led to materials hosted to external websites with five copyrighted under *All right reserved*, seventeen had no specific information on licences, one was on Wikipedia under CC BY-SA and two were in the public domain. No links to 15 suggested reading materials were provided. Three of these fifteen readings could not be found via Google search and another one could be found but it had to be purchased from *Amazon*. Twenty-two of the suggested readings could be accessed via the Media MIT repository or other MIT web pages. Four of these Media MIT repository resources are copyrighted under *All rights reserved* but the author of one of them is the copyright owner and he granted permission to copy and redistribute. For another reading, permission to use free of charge for personal or classroom purpose and non-commercially was granted provided that the copies have the same licence note at the front page (Similar to CC BY-NC-SA). The licences for the other seventeen readings that were available at the MIT related websites were not specified. In the project, seven links were provided: One was a link to a Wikipedia article also copyrighted under CC BY-SA and six others were links to examples of students project in PDF format which had a note that the permission to use the work was provided. The course information, syllabus, calendar, list of readings, lecture notes and projects were copyrighted under CC BY-NC-SA.

3. *How to Develop "Breakthrough" Products and Services (available from http://ocw.mit.edu/courses/sloan-school-of-management/15-356-how-to-develop-breakthrough-products-and-services-spring-2012/, last accessed 10 November 2015)*

The OER unit focused on methods for the development of practical idea generation. In this unit, two assignments in which students wrote a seven-page paper for each were provided. Students were supposed to choose the topic of their assignment as long as it is related to the course. The unit was designed for 12 class sessions. In total, eleven readings were required. Four of these readings had to be purchased on *Amazon*, and access to a full-length PDF file of another one via a different source cost $8.95. Another link led to a subscription page where subscribers receive two articles for free every month; they have to pay $6.50 for each subsequent article they want to access. Members also receive a free

newsletter. To have unlimited access to digital content, quarterly magazine, free newsletter and the entire archive, subscribers have to pay $75 per year. Three other articles can be accessed for free as long as the user subscribes to the owners' electronic environment. Licence was not clearly specified for other two readings. The unit also had four video lectures that last between around 42 and 64 minutes. These videos could be downloaded from iTunes, which required installation of software to be able to download and use them offline. All the videos were copyrighted under CC BY-NC-SA, which is the same licence for course information, syllabus, list of readings and assignments.

4. Corporate Entrepreneurship: Strategies for Technology-Based New Business Development (available from http://ocw.mit.edu/courses/sloan-school-of-management/15-369-corporate-entrepreneurship-strategies-for-technology-based-new-business-development-fall-2007/, last accessed 10 November 2015)

The OER unit focused on different approaches that are used to generate new technology-based products and businesses. The unit suggested 7 sessions for which 31 reading materials were assigned, 6 were suggested and 10 were recommended, making a total of 47 reading materials. All the ten recommended readings, one assigned reading and one suggested reading had to be purchased via *Amazon*. That makes a total of 12 reading materials that had to be bought from the *Amazon* site. All the links to the *Amazon* pages were active. No links to other assigned, suggested and recommended reading materials were provided. Thirty-one of the reading materials were available via Google search. Five of them were available via the MIT *Sloan Management Review* and a full PDF text of the article had to be purchased for $6.50 each copy. Permission to share these articles has also to be purchased and the cost varies depending on the number of people it would be shared with. Three resources were available via the *Harvard Business Review* and all of them cost $8.95. The copyright permission had to be purchased separately at the cost of $8.95 for two of the resources and $6.50 for the third one. Four resources were available via *Questia Advertising Network* and access to them required a registration and weekly payment of $1.93. Another resource was available via Apple's iTunes preview and cost $3.99 per copy.

Four reading materials could not be found via Google search. Seventeen reading materials could be accessed, 11 as downloadable PDF files and 6 as web materials, but licensing on these materials was not clarified. Another resource was available at the *ResearchGate* website, but access to the full-text version requires a free subscription to join the *ResearchGate* community. The course also has seven lecture notes and three guest presentations. Links to five lecture notes and the three guest presentations were provided and those links led to PDF files. All the links were active. No links to two lecture notes were provided and these notes could not be found via Google search. The course information, syllabus, list of readings, lecture notes and assignments were copyrighted under CC BY-NC-SA.

5. ***Global Entrepreneurship Lab: Latin America, the Middle East, and Africa (available from http://ocw.mit.edu/courses/sloan-school-of-management/15-389b-global-entrepreneurship-lab-latin-america-the-middle-east-and-africa-fall-2010/, last accessed 10 November 2015)***

This unit was based on internship that was provided in partnership with the MIT Sloan School of Management and entrepreneurial companies. A total of 23 readings were assigned and recommended, including 16 readings and 7 cases for the course project. Links to 8 of these reading materials were provided. Six of these links were active and two were broken. Two of the six active links led to the documents available at the International Monetary Fund (IMF) website in both PDF and web material formats. Permission to copy, print and use for personal, non-commercial usage was provided. Redistribution of, and creation of derivative work from IMF materials requires permission from the organisation. Another active link led to a PDF file that could be downloaded and saved, but the licence was not clarified. Two other links led to the readings that were available as web materials. One of them was copyrighted under *all right reserved* and the licence on the other was not clarified. Another link led to a preview version of the reading whose a full PDF text cost $6 and copyright permission costs $4.50 per copy. Both of the readings whose links were broken were available via Google search in PDF format and were copyrighted under CC BY-NC-ND. No links to eight readings were provided. Four of these resources could be

found via Google search, four others could not be found. Three of the four readings whose links were not provided but could be found via Google search were available as PDF files which were copyrighted under *all rights reserved*. For another one, only a short preview text was available and a full PDF text cost $8.95. Copyright permission cost $6.95 for each copy. For assessment, seven cases were provided and teams of students had to choose one of the cases and write an analytical discussion of issues which were central to the case. Links to four of the cases were provided: three of them were active and one was broken, but the case could be found via Google search. Only a preview short text was available for one of the cases. A full-text file in PDF format could be purchased at $8.95 and copyright permission cost $6.95 per copy. Three other cases were copyrighted under *All rights reserved*, two under CC BY-NC-ND and licence was not clarified for another case. Finally, five other readings were recommended, but not required. One of them had to be purchased from the *Amazon* site, and one could be purchased from the *Harvard Business Review* at the cost of $6.95 per each copy. Copyright permission also cost $6.95 per each copy. The remaining three recommended resources were copyrighted under *all rights reserved*. The course information, syllabus, calendar, list of readings, assignments and projects were copyrighted under CC BY-NC-SA.

6. ***Designing and Leading the Entrepreneurial Organization (available from http://ocw.mit.edu/courses/sloan-school-of-management/15-394-designing-and-leading-the-entrepreneurial-organization-spring-2003/, last accessed 10 November 2015)***

The unit consists of materials that made up a course that focused on building, running and growing an organisation. The course aimed at developing students' competences in organisational design, human resource management, leadership and organisational behaviour, all related to a new and small company. Most of the course materials consist of cases that illustrate the success or failure of entrepreneurial companies. The course assessment had two components: class participation which contributed 50 percent of the grade and the course project that contributed another 50 percent. Class participation consisted of attendance, punctuality, preparedness, respect to others and their

contributions. There was an extra-credit for students who could write an analysis of the cases presented in the class. This extra-credit was added to the participation grade. Seventeen reading materials were provided and required while two other readings were suggested as optional. No links were provided to those readings but all of them could be found via Google search. For seven of these readings, the Google search only finds short previews at various websites where the books were advertised and could be purchased. Three other readings consist of article and their Google search lead to pages where they had to be purchase: two at the *Harvard Business Review* webpage and one at the *MIT Sloan Management Review* page. Both articles available at the *Harvard Business Review* web page cost $8.95 per copy and the copyright permission had to be purchased. However, this permission cost $8.95 per copy for one article while it cost $6.95 per copy for another. As for the article available at *MIT Sloan Management Review*, it cost $6.50 per copy and the cost of copyright permission varied depending on the number of copies to be made. Eight readings were also available, via Google search, as PDF files that could be downloaded and saved. Four of them bore a note that redistribution required permission and the email address from which this permission could be sought was provided. However, it was not clear if downloading and saving the readings on a hard drive did not infringe the copyright regulations. Another reading displayed a note that redistribution without permission was prohibited. Another was copyrighted under *all rights reserved* while another could be read only online. It could also be downloaded and saved from the JSTOR after agreeing to the terms of conditions that state that the user has to be affiliated with an institution licencee. Licence for four other readings was not clarified. A link to the class session summary and 22 links to lecture notes were also provided. All these links were actives. In the course project, students were given three options depending on their interests. Students who were interested in entrepreneurial companies could conduct a strategic analysis of policies and practices in an organisation and make recommendations that could add value to the competitiveness of the company. Those who were interested in leadership could negotiate with the instructor to conduct a personal development project which included the analysis of their own social capital and their plan to develop more their professional networks. As for those who were interested in launching their entrepreneurial venture, they could write

an expanded business plan. The course information, syllabus, calendar, list of readings, lecture notes and projects were copyrighted under CC BY-NC-SA.

7. ***Entrepreneurial Marketing (available from http://ocw.mit.edu/courses/sloan-school-of-management/15-835-entrepreneurial-marketing-spring-2002/, last accessed 10 November 2015)***

The unit focused on marketing concepts, methods and strategic issues that are relevant for start-up and early-stage entrepreneurial companies. In its assessment, students produced a marketing plan for an entrepreneurial company of their own choice. Thirty-three readings were assigned, two of which were optional and 31 were required. No link to any of these readings was provided. Twenty-nine of the readings could be found via Google search while four other could not be found. Twenty-four of those readings were available via the *Harvard Business Review* and had to be purchased at different costs. Thirteen of them cost $8.95 per copy and the copyright permission cost the same amount per copy. Five others cost $8.95 and no price for the copyright permission was indicated. Two other readings cost $8.95 and the copyright permission costs $6.95 per copy. For another one, the price for both a copy and the copyright was $6.95. Another one cost $6.00 and the copyright permission was $4.50 while for another, the prices are $4.50 and $3.50 respectively. The final article among those found via the *Harvard Business Review* cost $14 and no price for copyright permission was indicated. Two other readings could be found on Amazon via Google search and two others on external website, but access to full-text required a paid registration. As for the last one, the full text could be accessed as a PDF file that could be downloaded and saved. However, licence on this reading was not clarified. Ten links to lecture notes were provided and all of them were active. The lecture notes were PowerPoint slides saved in PDF format. Three links to different components of the course assignments as well as a link to software and accompanying files which were required in assignment 2 were also provided. All the links were active. Assignments were available as PDF files that could be downloaded and saved, but licence on these files was not clarified. The course syllabus, calendar, lecture notes, assignments, list of readings and tools were copyrighted under CC BY-NC-SA.

8. ***The Challenge of World Poverty (available from http://ocw.mit.edu/courses/economics/14-73-the-challenge-of-world-poverty-spring-2011/, last accessed 10 November 2015)***

In this unit, learning materials consist of videos and readings. Video materials consist of 22 lectures and seven other recordings uploaded on external websites such as YouTube. All the links to these video materials were active. Lecture videos had their transcripts in PDF files. Both the videos and transcripts were copyrighted under CC BY-NC-SA. A total of 35 reading materials were assigned and required. Seven of these readings are books that had to be purchased from *Amazon* and fourteen others are chapters in one of the books that students had to buy from the same vender. Fifteen links to the readings were provided and all of them were active. Ten of these links led to the readings available on various websites as web materials. Five of them were copyrighted under *all rights reserved* while licence was not clarified for five others. Two other links led directly to downloaded PDF files that could be saved. The licence on these PDF materials was not clarified. Another link led to an article in the JSTOR repository which could be read online. It could also be downloaded and saved from the JSTOR after agreeing to the terms of conditions that stated that the user has to be affiliated with an institution licencee. Another link led to an article that required subscription for having access to it. The final link led to the URL of a PDF file that could also be downloaded and saved. The licence of this PDF file was not clarified. Twenty five links to lecture notes were also provided and all of them were active. Most of these notes were PowerPoint slides saved in PDF format. Four other slides were included in the list of lecture notes, but they contained a note that the slides were not available. A link to writing materials was also provided and four readings were suggested. All of them had to be purchased from Amazon. In addition, ten links to assignments were provided and all of them were active. Finally, eight links to pop-up quiz answer keys and three links to the final exam were provided and all of them were active. The pop-up quizzes contributed 30 percent of the final grade, the final exam 40 per cent and written assignments 30 percent. Similar to the video lectures and their transcripts, the course information, syllabus, calendar, list of readings, lecture notes, writing advice, assignments and exams were copyrighted under CC BY-NC-SA.

9. *Working in a Global Economy (available from http://ocw.mit.edu/courses/political-science/17-199j-working-in-a-global-economy-fall-2005/, last accessed 10 November 2015)*

This unit intended to foster an understanding of the global economy and its impact on different sectors and careers. According to heuristic information of the unit, effort was made to ensure readings and lectures made by guest speakers reflect the diversity of participants' backgrounds. Some acronyms used in this unit were not previously defined. Thirty-four reading materials and one movie were assigned. Fourteen of these materials, including the movie, had to be purchased from *Amazon*. In addition to links to the *Amazon* page where various materials could be purchased, ten links to other reading materials were provided. One of those links was broken while nine others were active. Two of the active links led to the *Harvard Business School* web page where the abstracts of the reading materials were available. Full PDF copies could be purchased for $8.95 per copy and the copyright permission for each of the two readings cost $6.95 per copy. Another link led to a web page where an abstract of the reading was available. A link that led to a full text PDF file was also provided. The file could be downloaded and saved, but it was copyrighted under *All rights reserved* with a note that extracts of two paragraphs or less could be quoted without permission as long as full credit was given and the copyright notice was included. Two other links led to full text PDF files that could be downloaded and saved, but the licence on the files was not clarified. The remaining four links led to web materials, two of which were Wikipedia articles copyrighted under CC BY-SA and the licence was not clarified for the other two. No links were provided to ten reading materials. Eight of them could be found via Google search while two others could not be found. For one of the eight readings that could be found via Google search, only abstract was accessible for free. A full PDF file of this reading cost $8.95, the same for the copyright permission. Two other links led to full text PDF files whose licences were not clarified. As for the remaining five readings, they led to web materials, two of which were copyrighted under *All rights reserved* and licence was not clarified for the three others. Three aspects of the class were assessed: participation which contributed 30 percent of the grade, PowerPoint presentation which contributed 20 percent and two assignments which contributed 50 percent. In

addition to the links to the reading materials, links to four samples of assignments donated by students who previously took the course were provided. All these links were active. In assignment 1, students were given freedom to make choice from three alternative topics provided. As for assignment 2, students were given full freedom to choose topic as long as it addressed their experience abroad or related to globalisation and was informed by class readings and discussion. The course information, syllabus, calendar, list of readings and assignments, including sample assignments, were copyrighted under CC BY-NC-SA.

10. Technologies for Creative Learning (available from http://ocw.mit.edu/courses/media-arts-and-sciences/mas-714j-technologies-for-creative-learning-fall-2009/, last accessed 10 November 2015)

The class focused on designing innovative educational technologies and creative learning environment. It consists of weekly reading materials and activities which included contributing to the class blog, participating in the class discussion, facilitating discussion and coordinating group activities in at least one class session. The grade was distributed evenly between class participation, contribution to the class blog and the final project. Twenty-nine reading materials were assigned: 14 required and 15 optional. Six of the required readings had to be purchased from *Amazon* and links to seven other reading were provided. Six links were active and four of them led to full text PDF articles whose licence was not clarified. Two other links led to full versions of articles in format of web materials that could be copied and saved as MS Word file. Permission to reprint the materials was granted for one article while licence was not clarified for the other. The seventh link was dead, but the article could be found via Google search. Licence on this article was not clarified. No link to one required reading was provided but the article could be found via Google search. Permission to make a digital or hard copy of the article for personal or classroom use was granted as long as copies were not distributed for profit and held the same notice. Links to 12 optional readings were provided. Three of those links led to the *Amazon* page where the reading had to be purchased, five led to full text PDF articles for which licence was not clarified, and two links led to web materials for which licence was

not clarified. One link led to the abstract of a book and a link to the full PDF version was provided at this abstract web page. Permission to use the article for research, teaching and private study purposes was provided. The last link was dead, but the article could be found via Google search as a full PDF article that could be downloaded and saved. However, licence was not clarified on this article. No links to three optional readings were provided, but all of them could be found via Google search. One of them was available for purchase from the *Amazon* website, and a full-text version in PDF format was available for two others. Licence was not clarified for one of these two resources and permission to copy from the printed version was granted as long as each copy was done without alteration and the journal reference and the copyright notice were included on the first page. In addition to assigned readings, nine links to the students' reading responses were provided and all these links were active. The responses were available at the MIT OCW website and were copyrighted under CC BY-NC-SA. Moreover, 72 links to various resources, including samples of assignments and projects submitted by students in previous years were provided. All these links were active and most of the materials were copyrighted under CC BY-NC-SA, the same licence for the course information, syllabus, list of readings, assignments and projects.

University of Leicester

Appendix 5: Email questionnaire addressed to academics at the University of Rwanda

Participant Information

Dear Participant,

Thank you for your invaluable contribution to this study. You have been invited to take part in the research project: *Opening up higher education in Rwanda: The potential contribution of extension Massive Open Online Courses (xMOOCs), Open Educational Resources (OER) units in the MIT Open Courseware and different stakeholders* because you are one of important stakeholders in Rwandan higher education. It is important that you understand who I am, what my research is about, your level of involvement and your right to withdraw from the research.

Details about the researcher and the research

My name is Bernard Nkuyubwatsi. I am a third year PhD student based in The School of Education at the University of Leicester. My doctoral research focuses on the potential contribution of extension Massive Open Online Courses (xMOOCs), Open Educational Resources (OER) units and different stakeholders to opening up higher education in Rwanda. I am doing this research with the support of Commonwealth Award. My research approach is having all stakeholders' voices heard in the investigation of how their effort can be synergised for opening up higher education in Rwanda. Your input is therefore highly valued and your contribution to this research may have influence on or inform Open, Distance and eLearning policies and practices. The study aims to explore how you, your colleagues and other stakeholders can contribute to opening up higher education in a way that is beneficial and cost-effective to all categories of stakeholders.

Bernard Nkuyubwatsi

Your commitment to this study

You are invited to complete a questionnaire that will take between 15 and 30 minutes. By completing and returning the questionnaire, you voluntarily consent to participate in this study and therefore give me permission to use the information you provided in the questionnaire in my study. This information will be used in accordance with ethical guidelines provided by University of Leicester Research Ethics Committee, The University of Rwanda's Research Ethics Committee and the Directorate General of Science, Technology and Research in the Ministry of Education. There is no correct or wrong answer to the questions below. For that reason, please kindly provide answers that reflect most what you believe in and what you think your potential contribution to opening up higher education would be.

Participation period

You may complete and return the questionnaire anytime between May and June 2015. The sooner it is completed and returned, the better.

Anonymity

Neither your names nor personal details will be needed on the questionnaire. Completed and returned questionnaires will simply be numbered and no personal details of the senders will be put on the file. All information collected will be kept anonymous and confidential. The returned questionnaires will be protected with a password to keep them securely. My academic supervisors may have access to the anonymous completed and returned questionnaires but they will not have access to personal details of any participants who completed the questionnaire.

Withdrawal

You are under no obligation to participate in this study. You have the right to withdraw from the study any time during the completion of the questionnaire.

Further Information

I am more than happy to discuss any concerns or questions you may have regarding the questionnaire and/or my research. If you have questions, please contact me, Bernard, by email at bn30@le.ac.uk

Further details on my position and research are available at: https://www2.le.ac.uk/departments/education/postgraduate-study/research-degrees/phd-research/phd/bernard-nkuyubwatsi

The results of this research will be used in my PhD thesis. This thesis and any other related publications will be copyrighted under an appropriate open licence that will grant you freedom to access them, reuse them, redistribute them and create a derivative work from them.

My Supervisor

Dr Rogerson-Revell, Pamela is my first supervisor, and should you have any further queries about my research, please get in touch with her at pmrr1@leicester.ac.uk. Thank you for reading this participant information and I very much look forward to your contribution.

Kind Regards

Bernard Nkuyubwatsi
University of Rwanda College of Medicine and Health Sciences
PhD Candidate
The School of Education
University of Leicester.

Research questionnaire

Section 1

Question	**Answer**
Which college do you belong to?	
What is your field of speciality?	
What is you highest educational attainment (Post-doctoral, PhD or equivalent, Master's Degree, Bachelor's Degree, etc)?	
What is your academic position (Professor, Associate Professor, Senior Lecturer, Lecturer, Assistant Lecturer, Tutorial Assistant, etc)	
What is your field of education/research?	

Section 2

1. Have you heard of the concept of open up higher education?

   ……

2. If the answer to question 1 is yes, how did you learn this concept (tick all appropriate answers in the table below)

From colleagues at the University of Rwanda	
In academic literature I read	
At a conference I attended	
Via social media	

Others (please specify)	

3. On the scale from 1 to 5 (1 being the least reasonable and 5 being the most reasonable), to what extent do you agree with the following statements (tick the relevant column and provide comment if any)?

Statement	**Reasonableness of the statement**					**Comment**
	1	2	3	4	5	
Competencies to be developed by higher education students should be made publically available.						
Both formal students and non-formal learners who developed required competences can be awarded same qualifications after assessment						
Opening content and assessment of open learning accomplishment can help open up higher education if they are supported by institutional policy and strategy						
Opening content and assessment of open learning accomplishment can help open up higher education if they are supported by a national policy and strategy.						
Without attending higher education face-to-face, learners cannot develop competencies required for academic credit and qualification						

Due to the nature of the field of study and courses, learners in my department can develop competencies needed for qualification via only face-to-face mode.						
There is no way the concept of opening up higher education in Rwanda can be applied without undermining quality						

4. Under which terms would you be interested in undertaking the emerging academic open education roles and practices reflected in the following statements (tick all relevant cells)?

Role statement	**Conditions for participation**				
	If I am paid for it	**If it leads to my promotion**	**If it is supported by policies**	**If I have extra-time**	**I'd never do it**
Finding and evaluating the quality of openly licensed educational resources					
Participation in and evaluation of open courses					
Aggregation (collection) of openly licenced educational content					

Adaptation of openly licensed educational content or courses based on such content					
Assessing non-formal learners who learned from openly licensed content or open courses					
Designing an open course based on openly licensed learning materials					
Tutor a course that is open to anyone who want to learn free of charge and pay a fraction of tuition fee for assessment and credentialisation					
Assist a tutor in a course that is open to anyone who want to learn free of charge and pay a fraction of tuition fee for assessment and credentialisation					

5. How do the following statements apply to you as academic? Please tick the relevant column (*1* being the least applicable to you and *5* being the most applicable) and add any relevant comments to the *comment* column.

Statement	**Application of the statement to me**					**Comment**
	1	**2**	**3**	**4**	**5**	
I think opening up higher education cannot be successfully implemented in Rwanda because there are not technologies to make it happen						
I think opening up higher education can be successfully implemented in Rwanda if the Ministry of Education, the University of Rwanda, academics and learners are all involved and develop ownership						
I have published content under an open licence						
I cannot publish content under an open licence because this would lead to losing some benefits (please specify which benefits in the *comment* column if this applies to you)						
I don't get anything on the work I publish. So, I would not lose anything if the content were published under an open licence						
I am willing to have educational content I develop published under an						

open licence to contribute to opening up higher education if my institution is OK with this						
I am willing to have my journal articles published under open licences if no extra-cost is imposed to me and the articles contribute to my academic promotion						
I have hands-on experience with Massive Open Online Courses (MOOCs) and I have completed at least one MOOC (if true please provide the name of the MOOC, platform and other relevant detail in the *comment* column)						
I have started a Massive Open Online Courses (MOOC) but I could not complete it (If true, please provide the MOOC, Platform and other relevant detail)						
I have not taken any MOOC but I have heard of these course						
I have never heard of MOOCs						
I think MOOCs can contribute to opening up higher education in Rwanda (if true, please explain how)						

I think MOOCs cannot contribute to opening up higher education in Rwanda, but their model can inform opening up higher education in Rwanda (if true, please explain how)						
I think neither MOOCs nor their model can contribute anything to opening up higher education in Rwanda (if true please explain why).						

6. How would you use the following social media to support learners who learn off-campus (tick all relevant cells in the following table)

Social Media	**to disseminate relevant information to learners**	**to discuss the learning content with the learners**	**to mentor learners in their learning process**	**to organise group and collaborative assignments**	**I would never use it**
Facebook					
Blog					
Twitter					
Wiki					
LinkedIn					
Google docs					

Skype					
WhatsApp					
Viber					

7. Is there anything else you would like to add?

   ……

   ……

Returning the completed questionnaire

Please kindly email the completed questionnaire to bn30@le.ac.uk

Gratitude and closing statement

I am profoundly grateful for your time and contribution to this study. You made an invaluable contribution to effort to understand the issue of access to higher education in Rwanda and how this level of education can be opened up collaboratively to benefit all involved. I will share the finding of this research with you and feel free to contact me any time you have a question or any comments. I wish you all the best and success in your professional practices.

Appendix 6: English version of the printed questionnaire addressed to learners at the University of Rwanda

Participant Information Sheet

Researcher: Bernard Nkuyubwatsi, University of Leicester.

Dear Participant,

Thank you for your help with my study. You have been invited to take part in the research project: *Opening up higher education in Rwanda: The potential contribution of extension Massive Open Online Courses (xMOOCs), Open Educational Resources (OER) in the MIT Open Courseware and different stakeholders* because you are one of important stakeholders in Rwandan higher education. It is important that you understand who I am, what my research is about, your level of involvement and your right to withdraw from the research.

Details about this study

My name is Bernard Nkuyubwatsi. I am a third year PhD in eLearning and Learning Technologies student based in The School of Education at the University of Leicester. My doctoral research focuses on the potential contribution of extension Massive Open Online Courses (xMOOCs), Open Educational Resources (OER) and different stakeholders to opening up higher education in Rwanda. I am doing this research with the support of the Commonwealth Award. My research approach is having all stakeholders' voices heard. Your input is therefore highly valued and your contribution to this research may have influence or inform future open education policies and practices. The study aims to explore how you, your colleagues and other stakeholders can adopt open learning and education practices to develop competencies needed for higher education credit and different

qualifications. It is intended to explore different alternatives of opening up higher education in a way that is beneficial and cost-effective to all categories of stakeholders.

Your commitment to this study

You are invited to complete a questionnaire that will take about 30 minutes. Participation in this study is completely voluntary. If you want to participate in the study, I will need you to also complete and sign an informed consent form to grant me permission to use the information you will provide in my research. This information will be used in accordance with ethical guidelines provided by the University of Leicester's Research Ethics Committee, the University of Rwanda's Research Ethics Committee and the Directorate General of Science, Technology and Research in the Ministry of Education. There is no correct or wrong answer on the questions below. For that reason, please kindly provide answers that reflect most how you are dedicated in your learning and your belief on how you would be dedicated to learning independently.

Anonymity and confidentiality

Neither your names nor personal details will be needed on the questionnaire. Questionnaires returned will simply be numbered and no personal details of the senders will be put on the file. The signed informed consent forms will NOT be matched with the completed and returned questionnaires in any way. They will simply be used as proof that I have your permission to use the information you filled in the questionnaire in my research. All information collected on questionnaires will be kept strictly anonymous. My academic supervisor may have access to the anonymous completed questionnaires but she will not have access to personal details of any participants who completed the questionnaire.

Withdrawal

You are under no obligation to participate in this study. Participation in the survey is completely voluntary and will not influence your course grade.

Further Information

I am more than happy to discuss any concerns or questions you may have regarding the questionnaire and/or my research. If you have any questions, please ask it before

completing the questionnaire or any time during the process of completing the questionnaire. You may also ask any questions after you have completed the questionnaire by sending me an email at bn30@le.ac.uk

Further details on my position and research are available at: https://www2.le.ac.uk/departments/education/postgraduate-study/research-degrees/phd-research/phd/bernard-nkuyubwatsi

The results of this research will be used in my PhD thesis. This thesis and any other related publications will be copyrighted under an appropriate open licence that will grant you freedom to access them, redistribute them and create a derivative work from them.

My Supervisor

Dr Rogerson-Revell, Pamela is my supervisor, and should you have any queries regarding my research you want to address to her, please get in touch at pmrr1@leicester.ac.uk . Thank you for reading this participant information sheet and I very much look forward to your contribution.

Kind Regards

Bernard Nkuyubwatsi

PhD Candidate
The School of Education
University of Leicester.

Data collection questions

Section 1

- Which higher education institution are you studying with (or are you supposed to study with)?

……

- Which college do you belong to (if you learn or are supposed to learn with the University of Rwanda)?

……

- What is your field of study?

……..

- What level are you in your programme (e.g year 1, year 2, year 3, year 4, etc.)?

……

- What is your expected qualification after completing your current programme (Undergraduate diploma, bachelor's degree, etc)?

……

Section 2

1. There has recently been an increasing challenge in provision of student loans and government sponsorship,

➢ Has this issue been affecting you as a student or learner? (Please tick yes or no as applicable)

Yes ☐ **No** ☐

If yes, please briefly explain

……
……
……
……

➢ Have you adopted any strategies to manage consequences of this issue? (Please tick yes or no as applicable)

Yes ☐ **No** ☐

If yes, please briefly explain

……
……
……
……

2. How would you rank your current ability to use the following social media and mobile applications?

Social media	I don't know what it is	Never used	Somewhat competent	competent	Very competent
Facebook					
Blog					
Twitter					
Wiki					

LinkedIn					
Google Docs					
Skype					
WhatsApp					
Viber					

3. On a scale of 1 to 5 (1 being the least applicable and 5 being the most applicable) indicate how the following statements apply to your learning.

Statement	**How the statement reflects my learning**					**comment**
	1	**2**	**3**	**4**	**5**	
I only access learning materials when I am on campus						
I access most of learning materials on campus but I also access some materials off campus						
I only learn when I am on campus						
I have a good balance between on-campus learning and off-campus learning						
I access learning materials on-campus but most of my learning takes place off-campus						
I find journal articles online to						

supplement the content provided by teachers						
I use journal articles I find online to write my assignments						
I evaluate journal articles I find online before using them in my assignments						
Most of my learning is based on teachers' notes						
Most of my learning is based on materials I get from the library						
Most of my learning is based on journal articles I find online						
I have access to all materials I need for my learning						
I plan my learning and competency development and I respect my plan						
I regularly evaluate myself on how I learn and progress I make toward achieving my goals						
I write reflection on my learning and progress towards achieving my goals						
I share my written reflection on my learning and progress for constructive feedback						
I have used Facebook for social interaction with my classmates						

I have used Facebook for discussing learning content with my classmates						
I have used Wiki to work on group assignments						
I have used Google Docs to work on group assignments						

4. Considering your current learning and living conditions, to what extent do you agree or disagree with the following statements?

If learning materials are made available,

Statement	**Strongly agree**	**Agree**	**Neither agree nor disagree**	**Disagree**	**Strongly disagree**
I would not be able to learn on my own using the materials. So, I would need direct instruction from teacher to learn meaningfully					
I would learn independently and only need teachers to assess my learning achievement					
I would learn using the resources only if I am					

assessed and get credit for my achievement					
I would use the resources even if I am not assessed for credit					
I would learn on my own and develop same competencies as I currently do from teachers					
I would learn much better than I currently do from teachers					
I would learn better from home since living expenses would go down					
I would only learn better if off-campus learning is combined with on-campus learning					
I would not need to go to campus for my learning: I would read the content independently and discuss it with teachers and my classmates via Facebook, WhatsApp,					

Viber or other social media or mobile application					
I would evaluate my progress in achieving required competencies					
I would write reflection on my learning and progress toward achieving required competencies					
I would share my reflection on my learning progress as blog posts for constructive feedback					
I would use Google Docs or Wiki to work on group assignments					

5. If learning resources are made available and there is way to take invigilated exams and other form of assessment for credit or qualification, are there things you would give up to dedicate enough time on learning?

Yes ☐ **No** ☐

If yes, please list some of them

……..

……

……..

6. Please list courses in your programme in the table below based on where you feel you can learn them.

Completely off-campus	Combination of off-campus learning and face-to-face sessions	Only face-to-face sessions

7. Is there anything else you would like to add?

……

……

……

…….

Gratitude and closing statement

I am profoundly grateful for your time and contribution to this study. You made an invaluable contribution to effort to understand how higher education in Rwanda can be made more accessible and affordable. I will openly share the findings of this research and feel free to contact me any time you have a question or any comments. I wish you all the best and success in your studies.

Bernard Nkuyubwatsi

University of Leicester

Appendix 7: A protocol for interview with an institutional leader

Date: ……

Venue: ……..

Researcher: ……

Informant (s): ……..

Instruction:

- Introduce myself
- Briefly Explain what the research is about
- Briefly explain how and the purpose for which the interview recording will be used
- Give time to ask questions
- Handing in and collect the consent form
- Interview

Icebreaker

I would like to start this session with expression of my gratitude for you accepting to have this conversation with me.

Can you briefly tell me your position/professional title at the University of Rwanda?

……
……
……

In the last two year, you and other UR Officials have been working on the implementation of the University of Rwanda, can you briefly tell me what have been accomplished so far?

……
……
…….....

Data collection questions

1. Could you tell me briefly how institutional policies and regulation related to research, publication and the promotion of academics are made here at the University of Rwanda?

……
……
…….

2. The practiced of **open access publishing** emerged after the Budapest Open Access declaration, in effort to contribute to opening up access to research and academic materials and reduce imbalance in access to scholarly and educational materials between well-resourced and under-sourced societies. What is your familiarity with open access publishing?

……
……
……

3. What is your directorate's position vis-à-vis raising awareness of open access publishing and encouraging UR academics to publish within the open access publishing routes that do not require UR academics or UR to pay publication fees?

……
……
……
……
…….

4. What is your directorate position vis-à-vis policy and strategy that would possibly require open licences and public availability of educational and research content that have been developed with public funds?

……..
……
……
…….

5. With the growing availability of openly licensed educational and research materials and open courses, including Massive Open Online Courses, new academic open educational practices such as evaluation and aggregation of open educational resources and open course as well as assessment of open learning accomplishment are emerging. What is your Directorate's position on the contribution of those practices to academics' promotion?

……
……
……
……
……

6. Is there anything else you would like to add to the conversation we had?

……
……
……
……..
……..

Gratitude and closing statement

I am profoundly grateful for your time and contribution to this study. You made an invaluable contribution to effort to understand the niche within which different stakeholders in Rwandan higher education would collaborate to open up this level of education. I will share the finding of this research with you and feel free to contact me any time you have a question or any comments.

Post Interview observation

Data collected:

……..

……

……

What went well:

…….

……

……

……..

What could be improved:

…….....

……

……

Preliminary Analysis:

……

……

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