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Massive Open Online Courses (MOOCs) and Green Economy Transition: Feasibility Assessment for African Higher Education

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Abstract

Massive Open Online Courses (MOOCs) are a new phenomenon globally and in Africa. MOOCS have attracted student registration in hundreds of thousands per course in certain instances, as well as gaining acceptance across different societies. MOOCs present opportunities for learning in general and specifically learning towards green economy transition in Africa. Many MOOCs are currently hosted by institutions of higher education in the USA, with the first MOOC breakthrough entitled "Artificial Intelligence" having 'exploded' at Stanford University in California (USA) in summer 2011. The "Artificial Intelligence" enrolled 160,000 students, 23,000 of which graduated after 10 weeks. The question then is: are MOOCs feasible in educating African masses in the field of green economy transition? Born in 2008 and popularised throughout the years following the global financial crisis, world leaders confirmed from Rio+20 that green economy transition is the way to go if humanity is to remain sustainable on planet earth. This paper presents MOOCs as an emerging area with opportunities to enhance learning for green economy transition in general and specifically for Africa. The twin phenomena under discussion require massive roll outs of: firstly, learning management systems like MOOCs, and, secondly, the dissemination of massive appropriate content, knowledge and skills related to green economy transition that current formal education systems will not manage given the demand and urgency. The answer to the question raised is therefore a qualified 'yes' mainly due to limited e-readiness in the continent.

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Résumé

Les Formations en Ligne Ouvertes à Tous (MOOC)/ [FLOT] sont un nouveau phénomène en Afrique et dans le monde. Dans certains cas, des centaines de milliers d'étudiants se sont inscrits à des MOOC qui sont de plus en plus acceptées à travers le monde. En général, les MOOC offrent des opportunités d'apprentissage et des formations spécifiquement axées sur la transition vers l'économie verte en Afrique. Aujourd'hui, de nombreuses institutions d'enseignement supérieur aux Etats-Unis d'Amérique abritent des MOOC, et la première MOOC intitulée « Intelligence Artificielle » a connu une avancée remarquable après son « explosion » à l'Université de Stanford en Californie (Etats-Unis d'Amérique) à l'été 2011. Cent soixante mille (160 000) étudiants se sont inscrits au cours d'« Intelligence Artificielle », parmi lesquels 23 000 ont obtenu leurs diplômes après 10 semaines de formation. Il convient alors de se poser la question suivante : les MOOC permettront-elles de contribuer à l'éducation des masses populaires africaines dans le domaine de la transition vers l'économie verte ? Créée en 2008 et vulgarisée dans les années qui ont suivi la crise financière mondiale, lors du sommet Rio+20 les dirigeants du monde ont confirmé que la transition vers l'économie verte est la voie à suivre, si tant est que l'humanité entend vivre de façon durable sur la planète terre. Cet article présente les MOOC comme un domaine émergent porteur d'opportunités pour améliorer l'enseignement dans le domaine de la transition vers l'économie verte en général et en particulier pour l'Afrique. Le double-phénomène objet de notre analyse dans cet article nécessite des déploiements massifs, d'une part, de systèmes de gestion de l'apprentissage tels que les MOOC et, d'autre part, la diffusion de l'immense contenu, des connaissances et compétences appropriés relatifs à la transition vers l'économie verte que les systèmes d'éducation formelle actuels ne parviendront pas à réaliser en vase clos, compte tenu de la demande et de l'urgence. Il est donc de bon aloi de répondre par l'affirmative à la question posée, principalement en raison du faible niveau de cyber-préparation du continent.

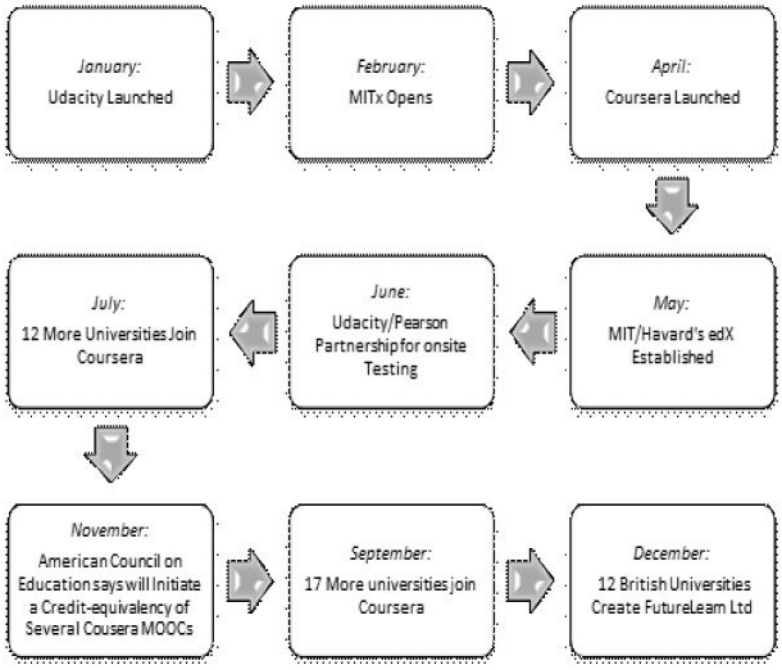
Introduction

Although it may share in some of the conventions of an ordinary course, such as a predefined timeline and weekly topics for consideration, a MOOC generally carries no fees, no prerequisites other than Internet access and interest, no predefined expectations for participation, and no formal accreditation (McAuley *et al.* 2010:4).

Since the advent of MOOCs in late 2011, a number of service providers have emerged including Coursera, MIT's MITx and Havard's edX (Martin 2012). Martin concludes that there has been a significant impact from MOOCs, particularly their positive and likely future use in technical majors like computer science within universities. This observation gives Africa hope with regards to having massive rollouts in green economy transition learning. Although the first known MOOCs came into life in 2008 (Fini 2009; Mahraj 2012) the bubble burst came in 2012. George Siemens of the Canadian Open University,

Athabasca and a colleague, Stephen Downes from the National Research Council of Canada broke the ground with their course entitled "Connectivism and Connective Knowledge – CCK08 (Welsh and Dragusin 2013). Pappanao (2012) wrote in the New York Times that 2012 was the 'The Year of the MOOC'. Figures of 370,000 students were reported enrolled in the edX with Coursera established in January 2011, reaching 1.7 million registered students by October 2012, and thereafter rising to over 3 million in February 2013 according to Welsh and Dragusin (2013). The authors emphasise that through this landmark, Coursera grew faster than Facebook. A timeline for MOOCs is presented in Figure 1.

Figure 1: 2012 MOOCs timeline



Source: Author (data from Watters, http://hackeducation.com/2012/12/03/top-ed-tech-trends-of-2012-moocs/ - 10 September 2013)

Russell *et al.* (2013) maintain that MOOCs will become the next generation education technology. They arrive at this conclusion by drawing lessons from past education technological breakthroughs that have failed to fulfill their promises. In addressing the question: will MOOCs make a difference in education

technology, the authors answered 'yes', especially given the context that a wide range of topics are addressed. In fact, Boven (2013) posits that MOOCs are the next game changer in education technology. Although not yet widespread in terms of universities offering MOOCs, Gaebel (2013) records an increasing trend with a 2012 US survey showing 2.6 per cent of universities having a MOOC whilst 9.4 per cent were reported as having MOOCs in planning stages.

Boven (2013) traces the origin of MOOCs from the open distance and e-learning movements of the late twentieth Century. In the same vein, MOOCs are viewed as opening up the education space for all as this is a "low-cost, meritocratic way to educate many people who have previously been left out" (Ibid:5). In a world that has identified green economy transition as one of the platforms for attaining sustainable development and poverty reduction, opportunities are awash to educate global citizens, particularly those in Africa through MOOCs. Although new, MOOCs are a model calling for action from policy makers and other related stakeholders. Nhamo (2013), presents a green economy growth readiness framework made up of six linked stages, among them: institutional and individual capacity building; high level leadership (political buy in and championing); as well as research, development and innovation. All these areas could be enhanced through the emerging and growing MOOCs. Nhamo further proclaims that at the centre of green economy transition are challenges of climate change, energy security, water security, wars and rumors of wars, overconsumption, poverty, inequality, joblessness and lack of skills, ill health and many more issues that remain thorns in Africa's fresh.

In as much as this paper is auditing the feasibility of a possible marriage between MOOCs and green economy transition, the research findings revealed that the marriage could have happened already even if that marriage is still young. Some 15 green economy related MOOCs were identified from a total of 435 available from the most popular MOOCs platform, the Coursera.

This paper has seven major parts, beginning with the introduction. Section 2, which is the next section focuses on the methodology of data collection. Section 3 looks at theoretical underpinnings on MOOCs and Section 4 deliberates on green economy transition. Section 5 discusses MOOCs and the green economy in African higher education, while Section 6 highlights policy issues on the subject matter. The last section is the concluding part of the paper.

Methodological Orientation

The field of MOOCs is almost brand new, having been popularised only in 2012. To this end, many research questions are emerging and will still continue to emerge. For this paper, the author asks and attempts to address the question: are MOOCs feasible in educating African masses in the field of green economy transition? Based on the said question, twin objectives are spelt out namely: (1) to determine the extent to which MOOCs are being embraced globally and possibly

in Africa and (2) to establish the potential of existing MOOCs in addressing knowledge, skills and content gaps regarding another relatively new phenomenon, the green economy transition agenda both globally and, more specifically, in Africa. The second objective compelled the researcher to visit some of the MOOCs platforms and examine the existence and/or offerings on green economy transition related courses including those on general ecology and environmental issues, population growth, climate change, low carbon development, good governance and corruption, energy efficiency and security, water, biodiversity, sustainable development and other topics related to the subject matter.

As part of the methodology, a number of MOOCs service providers including Coursera that is run for profit purposes (https://www.coursera.org/), MIT's MITx (http://www.mitx.org/) and Havard's edX, not for profit purposes (https://www.edx.org/), Udacity that is run for profit (https://www.udacity.com) were visited drawing from Martin's (2012) list. The Futurelearn (http://www.futurelearn.com/about/careers/) from the United Kingdom is a direct response to USA MOOC platforms. Other MOOC platforms include OpenUpEd (www.openuped.eu) of the Pan European MOOC Initiative and the Open2Study (https://www.open2study.com) an Australian MOOC platform. The author was interested in viewing the availability of green economy transition related course. Coursera is the most common MOOC platform running a partnership with 66 universities and business schools (Coursera 2013a). The number of courses recorded on some of the MOOCs platforms were as follows: Coursera (435 courses), OpenupEd (71), edX (67), Udacity (28) and Open2Study (27).

Following searches on selected MOOCs platforms, a host of green economy transition related courses emerged. A visit to the Coursera website was done (www.coursera.org/courses – 8 September 2013). The website hosts 435 MOOCs in seven languages, including English which had the majority of courses with 402 out of the 435. This was followed by Spanish with 12 courses, French with 11 courses, Chinese with 6 courses, German with 2 courses and both Arabic and Italian with a course each. All the 435 courses available were audited to determine their suitability to be placed under the green economy category with the environment-ecology interface being a dominant selection criterion. Details of the audit are presented in the findings section.

Theoretical Underpinnings of Moocs

It will be difficult to discuss MOOCs without considering 'e-', digital and networked readiness. As early as in 2003, the World Economic Forum and the Africa Union had become worried about the low levels of e-readiness in Africa (McPhie 2003). This was 8 years before the first MOOC emerged at Stanford University in California (USA). To address this concern, a project to assess the continent's e-readiness was implemented with three categories (1, 2 and 3) created to place countries according to their readiness based on certain criteria.

Those countries falling under category '1' were much advanced relative to their African peers and those in '2' and '3' also reflected their levels of readiness. Seven key criteria were set namely: "(1) Human Development Index (HDI) Score and related socio-economic factors, (2) Teledensity (fixed and mobile), (3) Level of telecom deregulation and state of progress, (4) Internet penetration, bandwidth availability, and cost, (5) Conducive legal, regulatory, and fiscal frameworks, (6) Infrastructure (communications and others), and (7) Economic development" (Ibid 11). A summary of the ranking is presented in Table 1. The three e-readiness categories are not fixed. A country can move up or down depending on progress (or lack of it). Out of the 54 countries studied, only five fell in the first category while 19 countries fell in the middle category.

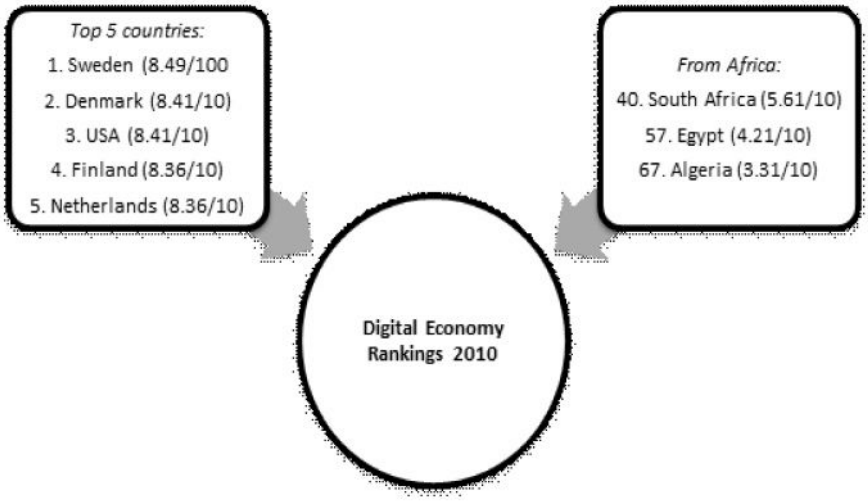
Table 1: African Countries E-readiness Ratings and Categories

Category	*Countries*	*Total*
One (1)	Botswana, Egypt, Mauritius, South Africa and Tunisia.	5
Two (2)	Algeria, Cameroun, Ivory Coast, Ethiopia, Gabon, Ghana, Kenya, Libya, Malawi, Morocco, Mozambique, Namibia, Senegal, Seychelles, Nigeria, Tanzania, Uganda, Zambia and Zimbabwe.	19
Three (3)	Angola, Benin, Burkina Faso, Burundi, Cape Verde, Central African Republic, Chad, Comoros, Congo Republic, DRC, Djibouti, Equatorial Guinea, Eritrea, Gambia, Guinea, Guinea-Bissau, Lesotho, Liberia, Madagascar, Mali, Mauritania, Niger, Rwanda, Sao Tome and Principe, Sierra Leone, Somalia, Sudan[1], Swaziland, Togo, and Western Sahara.	30
Total		54

Source: Author (data from McPhie 2003:12)

In 2011, *The Economist* published a report entitled "Digital economy rankings 2010: Beyond e-readiness" (*The Economist* 2011). The digital economy was measured through six (6) weighted parameters namely: (1) connectivity and technology infrastructure (weighted 20%); business environment (15%); social and cultural environment (15%); legal environment (10%); government policy and vision (15%) and consumer and business adoption (25%). A total of 70 countries carried over from the 2009 survey were involved. Figure 2 presents a re-analysis of the rankings. What is striking from Figure 3 is the gap between Africa's purported best with the world's best. South Africa, the highest ranked, comes in at number 40 globally with a score of 5.61 out of 10 compared to the world's best (Sweden) with a score of 8.49 out of 10. This implies that in the digital economy, the continent still lags far behind and needs to play catch up.

Figure 2: Digital Economy Rankings and Scores (out of 10)



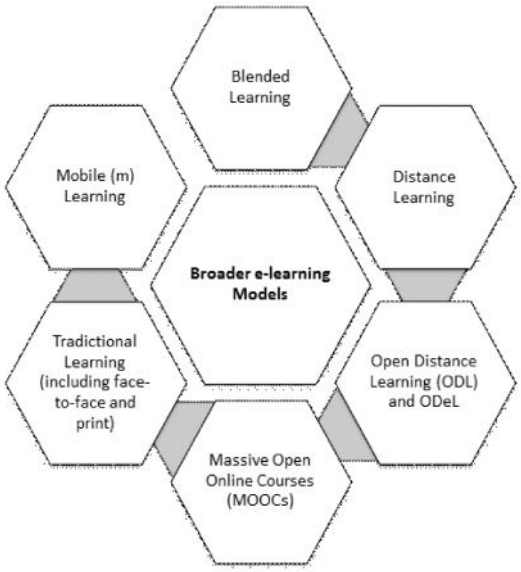
Source: Author (data from *The Economist* 2011:4)

A 2013 report on "The Global Information Technology Report 2013: Growth and Jobs in Hyperconnected World" by Bilbao-Osori et al (2013) reveals much more. In the report, the authors use The Networked Readiness Index Ranking applied to 144 countries worldwide. The Networked Readiness Index Framework identifies an environment made up of readiness and usage factors (drivers) on one hand, and the impacts on the environment on the other hand. The environment is made up of the political and regulatory environment as well as the business and innovation surroundings. The readiness parameters include infrastructure, affordability and skills. All these parameters have a strong bearing on the application of MOOCs in the green (economy) growth transition. From the impacts perspectives, the relationship and outcomes addressing economic and social sides are looked at.

According to The Networked Readiness Index 2013 (Bilbao-Osori at el 2013) the top five countries are: Finland (1st), Singapore (2nd), Sweden (3rd), Netherlands (4th) and Norway (5th). From Africa, the top five countries include: South Africa which is ranked 1st (but 70th globally), Seychelles (2nd) and 79th globally, Egypt (3rd) and 80th globally, Cape Verde (4th) and 81st globally, and Rwanda (5th) yet, 88th globally. What is even more depressing is that of the bottom half countries (72 of them), Africa represent 50 per cent (36 countries) with only one country (South Africa) in the top half.

In answering the question: What is a MOOC, Gaebel (2013) finds himself listing the features and/or characteristics of MOOCs. Five characteristics emerged namely: they are online, with no formal entry requirements, no participation limit, they are free of charge and lastly, they do not earn credits. Even though no credits are awarded for completing a MOOC, a number of universities issue statements of accomplishment or a certificate of successful completion. Although 2012 is heralded as the birth year for MOOCs, multiple tipping points having been happening since 2008 in order to provide more learning opportunities and improve the quality of educational experience. From Gaebel's description, MOOCs fits very well into a framework that addresses blended learning (Figure 3).

Figure 3: MOOC's in blended learning environment



Source: Author.

Siemens (cited in Gaebel 2013:4) identifies two MOOCs models namely: the cMOOC and xMOOC. From the explanations, the 'c' stands for connectivity. In this model therefore, emphasis is placed on "creation, creativity, autonomy and social networking learning and focus on knowledge creation and generation". On the other side, the 'xMOOC' places more emphasis on traditional face to face (F2F) learning models that embed video presentations and short quizzes and tests. xMOOCs also look at knowledge duplication. Partnerships between

either for profit or not for profit companies and universities delineate responsibility as follows: universities or individual academics develop content and the companies do the production and technical facilitation.

Assessing MOOCs opportunities and risks

MOOCs present a number of opportunities and risks, among them, issues to do with technology, numbers and the collapsing of boundaries. In his study at Stanford University, Martin (2012) observed that MOOCs present real risks in F2F. From the Artificial Intelligence course, he noted that F2F attendance dropped drastically during the fall from 200 registered students to only 30 after a few weeks. The shift, Martins reckons, could be linked to carefully designed online courses. Table 2 highlights additional opportunities and risks associated with MOOCs that African higher education should take note of in the interest of engaging the green economy agenda moving forward.

Table 2: Opportunities and risks associated with MOOCs

MOOCs Opportunities	*MOOCs Risks*
• Remarkable ability to attract large numbers of students to a vigorous online learning community. • Easily transcend national boundaries, with many MOOCs drawing students from 100 – 200 countries at a time. • Available anywhere/anytime in small digestible components that allow students to learn easily and under a wide variety of places, times, and situations. • Successful MOOCS have engaged and socially active communities of students that pose problems, resolve questions, add additional material to the class, and support other students' learning. • Brings the notion of educational freedom – no structural authority for MOOCs.	• Have potential to put 3rd tier universities out of business. Third tier universities are those ranked last in a three cohort/tier system. Usually there are first (elitist), second (middle) and third tier (lowest ranked) universities. • Since MOOCS are a relatively new kind of online learning, there are relatively few studies written about them. • Massive online cheating (remedial measures now including an online code of ethics prior to taking classes). • Countries and organisations with low e-readiness will find it difficult to participate, particularly those in sub-Saharan Africa. • Africa still has issues with electricity availability and e-learning in general is difficult. • Other hinterlands of Africa are still not covered with network providers. • Peace and stability still remains a challenge with countries like Egypt, Libya and several in the Arab window still recovering from the Arab Spring (wave of political uprising). • Profit motives that lead to education being expensive and exclusive to the rich. • Generic in nature, not addressing a particular issue from a region or country.

Source: Author based on Russell *et al*. (2013:2396), Boven (2013) and Welsh and Dragusin 2013:57).

Selected MOOCs case studies

Although a new phenomenon, MOOCs have taken the world by storm. One of the commonly cited breakthroughs in MOOCs is the Artificial Intelligence (AI) course offered by Stanford University of California in summer of 2011 by two lecturers: Sebastian Thrun and Peter Norvig (Martin 2012). The AI course attracted 160,000 student registrations, out of which 23,000 graduated in the 10 weeks long course. This course took 10 weeks with two or three, 45 minute topics per week. The delivery methods included 15 to 20 short videos that had embedded questions, mainly multiple choice or fill-in-the-value. The success rate regarding graduated students was 14.4 per cent.

The high numbers in MOOCs enrolments is not common only in the USA. The numbers at Edinburgh University, United Kingdom show similar trends. Data recorded by Almpanis (2013) from the MOOCs at Edinburgh on Coursera platform revealed a total of 165,158 participants at peak enrolment. These figures covered six MOOCs. The data reveals that 54 percent of the participants were engaged in conversations. The course Equine Nutrition had the highest participation rate at 81 per cent and Critical Thinking recorded the lowest participation rate at 46 per cent. The remaining courses recorded conversation rates of between 52-54 per cent. Technologies including Facebook, the student Google+, tweets, blogs and Coursera forums all contributed to the mix (Almpanis 2013).

In deliberating further on MOOCs and the sustainability agenda, Almpanis (2013) observed that offering MOOCs for free was not sustainable for the future. The conclusion was reached based on the fact that there are costs associated with managing the platform, course designs and delivery. If MOOCs are planning to provide academic credits in the future, the ball game might have to change altogether. Almpanis ended by raising the following questions in line with MOOCs in the United Kingdom universities: What are the aims of engaging with MOOCs? What organisational change do new online models of education require? Further rhetoric questions were recorded from the MOOCs themselves. These include the following, among others: (1) How can learning in MOOCs be measured and/or quality assured? (2) Can we trust the future of higher education to venture capitalists? (3) Are employers globally going to become interested in MOOCs statements of completion? (4) If recorded video lectures are as effective as F2F lectures, how is that going to affect learning on campuses? (5) Will MOOCs have an impact on the paid for, generic, online distance learning courses? (Ibid).

MOOCs funding and nature of participants

Whether they are 'free' or for profit, MOOCs require substantial financial investments. Paul Fain (cited in Gaebel 2013: 6) makes a case for funding. He indicates that MOOCs production requires large teams. Some of the costs

related to Coursera are presented in Box 1. It was estimated that the few months from January to September 2013 witnessed amount of up to $100 million. Coursera is estimated to have attracted $22 million in venture capital. Harvard and MIT have pumped in $60 million (on 50/50 basis) into edX.

Box 1: Coursera related costs (business strategy)

- certification (students pay for a badge or certificate)
- secure assessments (students pay to have their examinations invigilated, i.e. proctored)
- employee recruitment (companies pay for access to student performance records)
- applicant screening (employers/universities pay for access to records to screen applicants)
- human tutoring (as opposed to automated) or assignment marking (for which students pay)
- selling the MOOC platform to enterprises to use in their own training courses
- sponsorships (third-party sponsors of courses)
- tuition fees.

Source: Gaebel 2013:7

Gaebel (2013) mentions that half of MOOCs participants are working professionals that are also enrolled elsewhere for education. School pupils and the unemployed comprised a small number. Up to 40 per cent of the participants signed up due to curiosity, whilst 30 per cent wanted to enhance their skills in a specific subject matter. Only 18 per cent wanted to move to a better job or post. In terms of geographic location, Coursera has up to 74 per cent of its participants residing outside the USA. edX highlights that at one stage, its 150,000 participants were from more than 160 countries. Companies including Google, Facebook and others have vested interests in MOOCs, and questions are always raised regarding their motives and motivation.

Advent of the Green Economy

The advent of modern day green economy has its roots in the need to address multiple global crises. However, at the centre of green economy transition is: financial, general environmental, climate change, energy, water, loss of biodiversity and other global crises. From the emerging work addressing green economy transition (UNEP 2011; UNCSD 2012; UNDP 2012; UNECA 2012; Nhamo 2013), I will summarise the main components of green economy to include the following key issues: the need to conserve the environment as life supporting rather than for economic development and growth, quest for renewable energy and energy efficiency, bringing all stakeholders to the table, wealth creation and poverty eradication, natural resources conservation, building climate resilient cities and infrastructure, involvement with climate smart agriculture, inclusiveness regarding all societal classes and countries, greening the mining sector and other energy intensive sectors, reducing the emission of harmful greenhouse gases that cause global warming which, in turn, leads to

climate change, understanding the needs of the weak at national and individual levels, working towards holistic sustainable development goals by 2016, and many more. In addition, the green economy transition is viewed as a supporting platform whereby global and local leaders can implement the sustainable development concept in different areas of governance such as, economic, social and the environment. To this end, it will be difficult to think of green economy as a product that is generic and that could easily be sold to everybody. Different nations and individuals relate differently to the green economy transition agenda. All nations should have the same understanding with regards to the fact that we are pressed to save our ecosystems. Given the challenge at hand, it is my conviction that MOOCs present yet another opportunity to educate masses 'freely' as I strongly believe that sustainability education (inclusive of green economy transition) must be offered free of charge irrespective of the costs involved in generating and delivering content. Therefore, if MOOCs can truly manage to give this green economy transition education for free, the world will be on the right path to global, national and local environmental and ecosystems recovery.

Moocs And Green Economy In African Higher Education

A total of 16 courses closely linked to the green (economy) growth transition agenda were retrieved from the auditing process as described under the methodology section. The details are further presented in Table 3. Some selected courses reflected interesting insights regarding the course content. For example, the Introduction to Sustainability course offered at University of Illinois at Urbana-Champaign is made up of the following fundamental green economy transition topics: population; ecosystems, extinction and tragedy of the commons; climate change; energy; agriculture and water; environmental economics and policy; and lastly measuring sustainability ethics and culture (Tomkin 2013). The Climate Literacy course offered at the University of British Columbia (Burch and Harris 2013) address the following major topics in the discipline: climate in the public sphere; introduction to the climate system; earth's energy budget; the carbon cycle; climate models; future climate; climate change impacts; climate change mitigation; climate change adaptation; policy tools for mitigation and adaptation.

Critical questions arise in this paper. For example, what is the role of education in promoting green economy? Is it knowledge generation, skills development or changing values? I argue that for now, it may be knowledge generation. However, in the long run, the other aspects of education covering skills development and changes in values could also be realised. This implies a combination of all the three facets of education highlighted herein. This may need further research after three or more years of MOOCs implementation.

Table 3: Green (economy) growth related courses from Coursera

Institution	*Course*	*Resource Person(s)*	*Month, Year and Duration*
University of Illinois at Urbana-Champaign	Introduction to Sustainability	Jonathan Tomkin	August 2013: 8 weeks
University of North Carolina at Chape Hill	Introduction to Environmental Law	Don Hornstein	September 2013: 6 weeks
University of British Columbia	Climate Literacy: Navigating climate Change	Sarah Burch and Sara Harris	September 2013: 10 weeks
University of Florida	Sustainable Agricultural Land Management	Goerge J. Hochmuth	October 2013: 9 weeks
University of Pennsylvania	Designing cities	Gary Hack, Jonathan Barnett and Stefan Al	October 2013: 10weeks
Pennsylvania State University	Energy, the Environment and Our Future	Richard B. Alley	January 2014: 8 weeks
Technion – Israel Institute of Technology	Nanotechnology and Nanosensors	Hossam Haik	January 2014: 10 weeks
The University of Edinburgh	Critical Thinking in Global Challenges	Mayank Dunia and Celine Caquineau	January 2014: 5 weeks
University of Wisconsin - Madison	Human Evolution: Past and Future	John Hawks	January 2014: 10 weeks
University of Florida	Global sustainable Energy: Past, Present and Future	Wendell A. Porter	March 2013: 15 weeks
University of Melbourne	Climate Change	Jon Barnett, John Freebairn, David Jamieson, Maurio Toscano, Rachel Webster and David Karoly	August 2013: 13 weeks
University of Illinois at Urbana-Champaign	Planet Earth	Stephen Marshak	Completed
Georgea Institute of Technology	Energy 101	Sam Shelton	Completed
University of Minnesota	Sustainability of Food Systems: A Global Life Cycle Perspectives	Jason Hill	Completed
Northwest University	How Green is that Product? An Introduction to Environmental Life Cycle Assessment	Eric Masanet	Completed
The University of Chicago	Global Warming: Understanding the Forecast	Paul D. Miller	Completed

Source: Author (data from Coursera 2013b)

From edX MOOCs platform, there were 67 courses reported (edX 2013). Of the 67 MOOCs, the seven closely linked to the green (economy) growth agenda included: Energy 101 (also available on Coursera), Solar Energy, Introduction to Water Treatment, Introduction to Human Evolution, Our Energetic Earth, Human Health and Global Environmental Change, and Challenges of Global Poverty. Udacity MOOCs platform was also visited and out of the 28 MOOCs, none addressed the green (economy) growth transition. OpenUpEd (2013)

had 71 MOOCs. Of the 71 courses, only one was identified as addressing the green (economy) growth. It is entitled: Climate Change – Context of Life Experiences. From the Open2Study (2013) MOOCs platform, 27 courses were available and only one addressed the green (economy) growth transition field entitled "Climate Change".

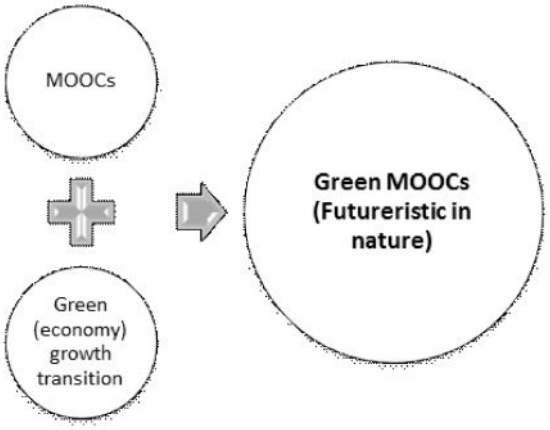
From the work presented herein, there is no doubt that MOOCs are for big (at times exclusive) universities and partners. Whether for and not for profit, big capital outlays are needed as well as big partnerships. MOOCs require high levels of e-readiness, digital upkeep and networked technologies. Questions then arise. Who are the big universities and potential private, donor and public funding partners in Africa? Which countries on the continent have high levels of e-readiness and associated digital and networked technologies?

Suggestions for Policy Makers and Higher Education

A number of policy pointers can be identified based on the emerging findings from this research and in line with the original question presented: are MOOCs feasible in educating African masses in the field of green economy transition? The answer is qualified 'yes'. I present and briefly discuss six policy suggestions namely: (1) the need for Green MOOCs; (2) MOOCs as corporate social responsibility; (3) MOOCs as community engagement/engaged scholarship; (4) Better performance compared to traditional face-to-face; (5) access to MOOCs infrastructure (both soft and hardware); and (6) Open questions for the future.

Towards Green MOOCs: The emerging findings reveal some compatibility between MOOCs and the green economy agenda (Figure 4) that could result in what I call Green MOOCs. However, Africa still needs to be aware that MOOCs may promote yet another economy contrary to the green economy that may result in yet further environmental decay as global governments face challenges in terms of employment creation and stagnation in growth. Hence for policy makers, business, higher education, NGOs, donors and other stakeholders, I proclaim a message for a Green MOOCs business case that requires a precautionary approach. The two areas under deliberation in this paper have a lot of similarities, among them: the fact that they are new areas (having both been popularised more in 2012); require massive resource investment; require learning, knowledge generation, innovation and skills development; involve huge volumes of people and materials; and the fact that the global population is learning by doing. We are going to be all learners and educators in the process as we shape, The Future We Want.

Figure 4: Towards Green MOOCs



Source: Author

MOOCs as corporate social responsibility: The arguments for corporate social responsibility (including responsible investment) are overwhelming. Companies are moving from common spaces of social responsibility like sponsoring anything that kicks the ball, to education, infrastructure, health and environmental stewardship (Nhamo and Swart 2012). In this case MOOCs and, specifically, Green MOOCs could be a vehicle where the corporate world can make this required difference and save our planet. The corporate world could partner with African universities and assist them to design and set-up learning platforms that can host MOOCS courses. This could probably present a win-win (rather satisfy-satisfy) scenario to the partners from both the university and corporate perspectives.

MOOCs as community engagement/engaged scholarship: The point highlighting the win-win scenario between the corporate sector and institutions of higher learning is best embedded in community engagement. Universities the world over are battling with issues relating to community engagement (Nhamo 2012). In other words, having universities whose research and innovation as well as teaching and learning agenda is informed by what communities (our stakeholders) wish, want and need is both desirable and helpful. A classic example could be having universities address national development visions, many of which now incorporate the green (economy) growth transition agenda.

Better performance compared to traditional face-to-face: A 'Meta-Analysis and Review of Online Learning Studies' done by the USA Department of Education in 2010 concluded that "students learning online performed, on average, modestly better than those learning the same material through traditional face-to-face instruction, further enhancing online learning development" (Welsh and Dragusin 2013:54). However, the face-to-face approach is also on the rise in Africa. This should be taken on-board as a positive for green economy especially drawing from the fact that many African countries are still not e-ready. Hence for Africa, pushing both MOOCs and face-to-face education approaches remain fundamental.

Access to MOOCs infrastructure (both soft and hardware): It is common knowledge that many African countries suffer from basic MOOCs readiness components deficits including lack of adequate and reliable: electricity, internet service providers, cell phone network providers, modern computers, buildings and other necessities. E-readiness therefore is a key game changer in the manner in which African countries migrate to the proposed Green MOOCs.

Open questions for the future: Gaebel (2013) teases out the idea of what to learn from MOOCs. He then raises a number of questions that need further clarity into the future, particularly as they relate to African higher education. Are MOOCs a new model? Why have MOOCs been successful in the USA, but not elsewhere? What about language diversity? Are MOOCs signalling the death of universities? Are MOOCs paving the way for new means of knowledge dissemination? Can any university have a MOOC?

I will not attempt to address all the pointers presented by Gaebel when he responded to the questions raised but only two points will be addressed: one referring to the potential death of universities, and the other on whether it is possible for any university to offer MOOCs. Citing some responses from Professor Clayton Christensen of the Harvard Business School and Sebastian Thrun, Gaebel (2013:12) pointed out the possible indication of "wholesome bankruptcies" in the next decade among standard universities and highlights the possibility that we may have not more than a dozen universities by the year 2063. On the latter question, Gaebel (Ibid) notes that not every university may be in a position to offer MOOCs. He points out that current MOOCs are being offered by top notch and exclusive global universities and institutions like Harvard and MIT. Welsh and Dragusin (2013) concur with the challenges raised through the questions adding that with decreasing budgets; (lowly ranked) universities need to fine tune their online and classroom based education strategies, particularly those in developing countries such as those in Africa.

Apart from the questions raised herein, there are further issues concerning foreign versus domestic services and course providers. History has taught us

that in Africa, foreign interests usually come first in many deals. Hence there will be a need for further research in terms of the content and services being provided by these MOOCs and the manner in which African interests will be addressed.

Conclusion

There is no doubt that MOOCs are by their nature revolutionary. In a revolution there are certainly causalities, but before such a war, no one really knows the causalities. With the massive figures being cited (more than 3 million for Coursera alone) and the ever increasing MOOCs platforms and courses, the writing on the wall is becoming clearer daily that change can be expected, in terms of the traditional face-to-face, distance learning and e-learning platforms. MOOCs present both risks and opportunities for Africa, and in the context of this paper, Africa's green economy transition agenda. The audit informing this paper shows that there are already more than two dozen MOOCs focusing on green economy transition. The common MOOCs in this space are those addressing climate change, sustainability, energy and water issues. As time moves forward, there is no doubt that more courses in this space will emerge presenting further learning opportunities for Africa. Even though MOOCs are not yet accredited for degree and other awards, there is a global movement towards addressing this, particularly from the American Council of Education. There are big players sponsoring MOOCs, with investments of more than $80 million having been invested into the system from only three hosts (Coursera, MIT and Harvard). As the big university players get into the space as well as big corporates like Microsoft and Facebook, the future is unpredictable because the journey is still long.. This is apparently the time for Africa to join the MOOCs revolution. The future we want demands a knowledge economy highway focusing on multiple challenges facing the earth today, among them climate change, poverty, environmental and ecosystems degradation, loss of biodiversity, energy insecurity, water crisis, financial meltdown etc. Who knows, the MOOCs might just present Africa with that needed space for freedom in education. The questions we need to continue asking, however are, who will pay for the services? Where are the hidden costs? What about Africa's e-readiness? We want to be there!

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Note

1. Now two countries (Sudan and South Sudan)

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