

Scoping Study for a ReCAP Massive Open Online Course (or MOOC series)

Inception Report



Nadya Mundo LTD

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Abstract

The overall aim of ReCAP is to promote safe and sustainable rural access in Africa and Asia through research and knowledge sharing. In consideration of these objectives, there are several topics within the realm of the ReCAP research strategies that would be appropriate for a Massive Open Online Course (MOOC). This scoping study explores technology solutions in support of distance learning and knowledge sharing. The key target groups for the MOOC(s) are Africa- and Asia-based rural road and transport services researchers and students, their institutions, and transport decision makers at national, regional and local levels. The goal of implementing the ReCAP MOOC (or MOOC series) will be the improved understanding of ReCAP research, enhancing the opportunities for uptake and implementation of the research findings by ReCAP target audiences. The outcome of this scoping study is a full implementation plan for a MOOC, or similar technology-driven solution, to facilitate knowledge management and promote learning.

Key words

Distance learning, distance education, mobile learning, Massive Open Online Course, MOOC, capacity building, research uptake, distributed learning, educational technology, online learning, knowledge management

Research for Community Access Partnership (ReCAP)

Safe and sustainable transport for rural communities

ReCAP is a research programme, funded by UK Aid, with the aim of promoting safe and sustainable transport for rural communities in Africa and Asia. ReCAP comprises the Africa Community Access Partnership (AfCAP) and the Asia Community Access Partnership (AsCAP). These partnerships support knowledge sharing between participating countries in order to enhance the uptake of low cost, proven solutions for rural access that maximise the use of local resources. The ReCAP programme is managed by Cardno Emerging Markets (UK) Ltd.

www.research4cap.org

Acronyms, Units and Currencies

\$	United States Dollar (US\$ 1.00 ≈ provide conversion to local currencies)
ADB	Asian Development Bank
AfCAP	Africa Community Access Partnership
AsCAP	Asia Community Access Partnership
CMS	Content Management System
CoP	Community of Practice
F2F	Face to face
FGD	Focus Group Discussion
GPS	Global positioning system
IHMC	Institute for Human and Machine Cognition
ILO	International Labour Organization
IOT	Internet of Things
KII	Key Informant Interview
LMS	Learning Management System
LVRR	Low Volume Rural Road
mLearning	Mobile Learning
MIT	Massachusetts's Institute of Technology
MOOC	Massive Online Open Course
NGO	Non-governmental organisation
OER	Open Educational Resources
PMU	Programme Management Unit
ReCAP	Research for Community Access Partnership
SCORM	Sharable Content Object Reference Model
TOR	Terms of Reference
UAE	United Arab Emirates
UK	United Kingdom (of Great Britain and Northern Ireland)
UKAid	United Kingdom Aid (Department for International Development, UK)
USWDP	University Skills and Workforce Development Program
VLE	Virtual Learning Environment

1 Background

The Research for Community Access Partnership (ReCAP) is a six-year programme of applied research and knowledge dissemination funded by a grant from the UK Government through the Department for International Development (DFID). There are two components under ReCAP: Africa Community Access Partnership (AfCAP) and Asia Community Access Partnership (AsCAP). The overall goal of the programme is to promote safe and sustainable rural access in Africa and Asia through research and knowledge sharing among practitioners in participating countries and within the wider community.

ReCAP programming is based on the three pillars of knowledge transfer, capacity building and research. In support of these pillars, there are several topics within the realm of the ReCAP research strategies that would be appropriate for a Massive Open Online Course (MOOC). The key target end-user groups for the MOOC(s) are Africa- and Asia-based rural road and transport services researchers and students, their institutions and transport decision makers at national, regional and local levels. The goal of implementing the ReCAP MOOC (or MOOC series) will be improved access to ReCAP research, enhancing the opportunities for uptake and embedment of the research evidence by ReCAP target audiences.

2 Purpose and Objectives of Scoping Study

The scoping study purpose is to develop a detailed implementation plan for a ReCAP MOOC or a series of MOOCs, covering the following aspects:

- Target audience and user needs;
- Topic(s), narrative and structure;
- Delivery format and platform;
- Certification/accreditation; and
- Costs and development timescale.

The MOOC implementation plan will be based on a thorough needs assessment with a clear analysis of user needs and preferences, one that includes a scoping of the topics listed above.

The main objective of this study is to explore various options for distance learning and building a virtual community of practice, and propose practical recommendations to support ReCAP projects in their 17 partner nations, and possibly beyond into the wider roads infrastructure sector.

3 Approach and Methodology

3.1 Introduction

Our approach will be highly participatory, involving engagement with ReCAP's Community of Practice (COP), key stakeholders in partner nations, and personnel at affiliated universities and research institutions to determine need and feasible technologies. Based on our experience, we anticipate this primarily qualitative methodology will generate rich narrative data from which we will derive key themes. Content analysis of the narrative data using AtlasTi, a qualitative software tool, will enable in-depth exploration of the data and relationships between emergent themes.

3.2 Data Collection

This needs assessment will necessarily centre on the data collection phase, as at this point the needs of ReCAP's COP are unknown. We plan a data-collection phase of 12 weeks' duration. The feedback from the ReCAP end-user community combined with the literature review will provide a realistic assessment of

preferred courses and content, and will help determine requirements for a platform and/or Learning Management System (LMS).¹

3.2.1 Document Review

This Inception Report includes a brief literature review of MOOC-related literature, with particular focus on Africa and Asia. Phase 2 of the Scoping Study will extend this MOOC literature review to include additional reports and sources of data.

3.2.2 Key-informant interviews

Key-informant interviews of ReCAP COP members and implementing partners, government officials, NGO and donor-community stakeholders, as well as prospective end-users, will be a mix of purposefully and randomly sampled participants from ReCAP's community of practice (CoP). We will consult with ReCAP's project manager to determine specific key informants who would be well positioned to inform the needs analysis, such as Steering Committee members, PMU managers, University partners, and others. The interview approach is designed to be flexible in terms of questioning and respondents, allowing for multiple viewpoints on each issue in order to triangulate the data during the analysis. Interviews will be conducted in English, with the exception of respondents who may be interviewed by our local partners. The questionnaires will be developed in Phase 2, and will be qualitative, using open-ended questions.

3.2.3 Focus-group discussions (FGDs)

Where possible, we will conduct focus-group discussions (FGDs) with ReCAP colleagues and COP (conducted by local national colleagues, where appropriate and available). FGDs will be designed as a means to gather qualitative information from ReCAP colleagues regarding their access to knowledge and skills both inside the ReCAP CoP and outside (external sources of learning and skills development).

3.2.4 Instruments and data collection

The instruments will be developed in Phase 2 of the project. The KIIs and FGDs will rely on a series of semi-structured interview instruments. The primary means for conducting the key informant interviews (KIIs) will be via telephone or Skype calls. All calls will be recorded and transcribed.

Where needed, we will deploy local national colleagues who are experienced data collectors to conduct face to face (F2F) KIIs. The additional rich narrative data obtained from the F2F interviews will also supplement the Skype interviews and online survey.

3.2.4.1 Sampling model and sample size

We propose to gather KII data from a stratified random sample of ReCAP's 2,000-member CoP. In this way, we will obtain narrative data from each strata of the potential user group: policy makers, government ministry officials, PhD/Master's level engineers, researchers, transport experts, road maintenance company owners, etc. Gender, age and nationality will factor into the random sampling to ensure all voices are captured. Gender balance will also be achieved in the sample. We propose to conduct a total of between 35-45 KIIs, and at least 1 FGD, which will generate an abundance of rich narrative data for the needs analysis.

All 2,000 members will be asked to participate in the online survey. We anticipate at least 100 responses.

¹ At this juncture, prior to the needs-assessment, the most appropriate tools and platform are not known by us, and will be determined in Phase 2. Appropriate tools will be based on the needs and capacities of learners and instructors. While MOOC *per se* might be the best and most appropriate tool, it's also possible that a synchronous solution such as a MOOC will prove inconvenient (due to time zones) or inaccessible (due to bandwidth or cost). In any event, we will provide substantial guidance as to the most appropriate delivery modes and the kinds of resources required.

As per ReCAP Procurement responses to Clarification No. 1, Literacy/education level: The practitioners are assumed to have good levels of literacy and education (minimum level: secondary education). We will test this assumption during Phase 2 (Scoping of Target audience and User needs).

It is also assumed that the practitioners have, to varying extents, prior knowledge of, or at least a specific interest in, rural transport and road infrastructure and are primarily located in urban centres. It is also assumed that practitioners may need access to the MOOC while located in rural areas. These assumptions will also be tested during Phase 2.

3.2.4.2 Online survey

In support of the needs analysis, we will conduct an online survey of ReCAP's 2,000 member CoP. The goal for the online survey is to reach a wider audience than is possible with the KIIs and FGDs.

The survey (and eventual reminders) will be disseminated through a dedicated ReCAP mail campaign. The practitioners are assumed to have previous experience in participating in online surveys. Broadcast technical surveys will be in English and French, using translations provided by ReCAP. A draft online survey instrument will be shared with the ReCAP PMU before posting online.

3.3 Data Analysis Methods

Our qualitative data-analysis methodology will use content analysis and constant comparison of narrative data to validate emerging themes (Glaser, B. and Strauss, A. 1967). A codebook will be developed based on the MOOC project objectives. AtlasTi, a qualitative-analysis program, will support coding and analysis.

Concept mapping software will support graphical representation of concepts and relationships. Concept maps are graphical tools for organising and representing knowledge. Novak and Cañas (2008), define *concept as a perceived regularity in events or objects, or records of events or objects, designated by a label*. Concept maps are one of the important strategies in qualitative inquiry as they help researchers focus on meaning and support the interconnection of observed outcomes. We use concept mapping to draw relationships between emergent themes in order to determine the “hows” and “whys” of the findings.

In the case of the ReCAP MOOC scoping study, the maps will aid in examining the relationship between the MOOC design - distributed learning technologies and content – and potential improvements in knowledge sharing and capacity. The open-source program “cMap” will be used to create the concept maps. This free software download also enables collaboration on files through the Institute for Human and Machine Cognition's (IHMC's) central servers. A pictorial representation will be helpful in explaining and verifying findings to stakeholders. In AtlasTi, these maps are called “network diagrams”.

3.3.1 Workshop

For the validation workshop, we will divide the participants into groups/teams based on their expertise to review their relevant sections of the scoping study.

As per the RFP, the requirement for the workshop location is that it should be held in one of the ReCAP partner countries, with easy international access (i.e. manageable visa requirements) for 25 participants of all ReCAP partner countries and the ReCAP Programme Management Unit (PMU). As of September, 2018, Dubai, United Arab Emirates is the favoured location, as the most centrally located venue in which to hold the MOOC workshop in early December. As of the writing of this report, there do not appear to be any restrictions in place regarding visas for members of the 17 partner countries. Given the ongoing political dynamics in the region, the MOOC team will continually monitor the situation for changes in immigration rules.

Two previous ReCAP workshops (Afghanistan Scoping Study) were held in Dubai at the Movenpick Hotel, Jumeriah Lakes Towers. The hotel's rates for rooms and conference room facilities are all well within ReCAP's budget. The hotel is easily accessible from the airport via taxi and Metro. Accordingly, we recommend the same hotel for the MOOC workshop in December.

3.4 Phase 2 Outputs

Outputs from Phase 2 of the project form the central basis for the MOOC implementation plan. Key components of this plan will include a sustainable MOOC platform, relevant and engaging content, and the ability to produce globally recognisable and accepted certifications. Treatment of sustainability will include discussion of operational costs. Training needs will also be determined during Phase 2.

3.4.1 Determining Course/Topic Content

One of the key outcomes of the interviews/survey/workshop will be to determine which topics are of most interest to potential users. MOOC topics could include how to:

1. Plan a road or other transport facilities; plan the upgrading of small rural road networks and identifying projects, including transport facilities.
2. Finance small transport improvements or fleet improvements (This topic would differ considerably from country to country); and manage them through the project cycle.
3. Strengthen small and medium enterprises (SME) participating in the construction and maintenance of rural roads.
4. Planning, managing and executing rural road maintenance.

Course offerings and the technology used to deliver the content could vary across changes in content (e.g., available materials, etc.), andragogical (i.e., adult learning) approach or level (e.g., reliance on social networking, levels of sophistication, etc.) and end-user technology being used (e.g., bandwidth, widely adopted mobile devices, etc.). The Phase 3 plan will identify issues in relation to localisation of content, approach and tools.

We will also include in our user assessment a recommendation for the preferred language(s) for online training throughout ReCAP partner countries.

3.4.2 Teaching Methodologies

Due to the sheer size and scope of MOOC implementations, teaching methodologies are often limited to a passive model of teaching using lectures and notetaking. Low levels of interaction contribute to high drop-out rates. Part of our expanded desk review and needs analysis will include determining more engaging teaching strategies.

3.4.3 Learning Assessment

Inherent in any MOOC — in fact, in any type of online learning environment — is the ease of “cheating” in assessments. In Phase 2 we will assess this potential problem and propose tool-based and/or other solutions as appropriate.

3.4.4 Determining Appropriate MOOC Technologies

A second key outcome from the needs analysis revolves around the appropriate technologies to support the MOOC. Our study will also consider relevant distance learning technology that might fall outside the definition of a MOOC. It may be pertinent to consider distance-learning technology that was designed and developed for smaller or closed audiences, below the typical “1000s of users” threshold for MOOCs, aimed at audiences of less than 1,000-2,000 end users.

We will include an assessment of the preferred devices for accessing online training throughout ReCAP partner countries in the user-needs assessment of Phase 2 of this project.

3.4.5 Visualising Outcomes: Creating Wireframes

To inform the results and make the technology more understandable to participants during the needs-analysis stage we propose to create wireframes of possible online learning environments. The Phase 3 implementation plan will identify international norms and standards for MOOC(s) compliance.

3.4.6 MOOC Support for ReCAP Community of Practice

An integral part of any ReCAP MOOC implementation must look beyond knowledge transference and dissemination, especially in the context of the collectivist cultures of Asia and Africa, which highly value group work and collaboration. An online, well-managed, COP could strengthen and grow the community still further. The needs analysis, combined with workshop input, will direct this essential aspect of MOOC planning.

3.4.7 Limitations of the Methodology

Limitations of the methodology may include a potentially small sample of ReCAP participants who are available for key informant interviews (KIIs). This limitation will be mitigated in part by the online survey, and by close collaboration with the ReCAP PMU to ensure community participants participate in the KIIs and FGDs.

3.5 Team Collaboration and Management

Based on the objectives of this Scoping Study, team members will collaborate with Dr. Kerrin Barrett to provide:

1. In-depth expertise in software development and successful implementation of distance learning technologies in development contexts in Asia and Africa - **Mike Dawson**;
2. Benefits of her substantial experience in integration of educational technologies to support knowledge management systems, bringing perspective as a female Millennial - **Benita Rowe**;
3. Educational technology advisement, with primary responsibility for the target user needs analysis and MOOC administrative issues - **Dr. Edmond Gaible**; and
4. Subject-matter expertise on rural roads and transport content, and the application of technology to distance learning and knowledge management for this specific end-user audience - **Derek Sherman**.

Additionally, Dr. Gaible has a supporting role to:

1. Develop this draft scoping document;
2. Analyse the interview data, related materials, and workshop feedback; and
3. Finalise the scoping document once feedback has been obtained from key stakeholders.

All team members will participate in the workshop as facilitators, with Benita Rowe assisting Dr. Barrett with workshop administration. The project is remotely managed by Dr. Barrett, who is based in the United States.

4 Review of the Literature

4.1 Introduction

The education technology landscape, particularly in developing nations, has benefitted from many well-designed and executed programmes and projects that have dramatically increased access and quality of education for millions of people. At the same time, there are a number of failures across the globe to integrate technology into educational systems and training development programmes. The ReCAP MOOC

scoping study, with its emphasis on user needs analysis, is, therefore, critical for the successful implementation of the programme.

Two of the central issues facing MOOC implementation in Africa and Asia are: 1) culture and 2) connectivity. By definition, MOOCs require learners to interact in an online environment. Hofstede's cultural dimensions model provides insights into the dynamics of learning, both on- and off-line (Hofstede, 1983). Cultures in Asia and Africa are primarily high-context and collectivist, meaning that they highly value F2F communication, often lengthy explanations and commentary, and group work.

The relative isolation of MOOC environments and online learning can be off-putting to prospective learners in these and other cultures. Even in individualist cultures such as the United States, the drop-out rate from MOOCs is so high that different learning models are currently under consideration that posit a radical shift in what is normally termed an outcome, i.e. full course completion with certificate, to merely learning for learning's sake (Huang & Ho, 2016). Moreover, MOOCs do not often provide much more than asynchronous communication, and, with no avenue for establishing relationships, the ability to converse at length, or for engaging in group work, the prospects for an individual learner from these high-context and collectivist cultures to remain engaged in the course and complete it are quite low. Even in well-designed online learning programmes the drop-out rate is quite high because of the requirement to self-discipline without the typical 'bricks and mortar' institutional support (Yang, 2013). Carefully designed course offerings can overcome these cultural restrictions.

At the same time, it is critical to observe that several sources point to the growing importance of MOOCs and, particularly, to the popularity of MOOCs in Asia. First, the World Bank education manager, Harry Patrinos (2018), lists MOOCs as one of the four most-important current education trends. Patrinos suggests that MOOCs are revolutionary purely because of their scale—the fact that they provide access to high-quality courses to tens of millions of people globally. In addition, Wang (2015), also of the World Bank, suggests that MOOCs are very readily accepted in China and in other parts of Asia.

Researchers have investigated causes of high drop-out rates (Jordan, 2015), and ways of predicting levels of attrition (Jiang et al., 2014; and Breslow, et al., 2014). Various ways of increasing retention and completion rates have been proposed or investigated, including increased social interaction (Labarthe et al., 2016) and gamification (Gené et al., 2014).

Adding to the challenge of the cultural aspect of MOOCs and online learning in general is the practical consideration of connectivity in Africa and Asia. Internet connectivity varies dramatically between and within countries depending on telecommunications infrastructure and cost. MOOCs by definition require some sort of connectivity, therefore, careful consideration must be given to the technical infrastructure of the MOOC design itself. Mobile offers one solution for users in areas with little or no Internet connectivity. The learning platform itself, together with the learning management system (LMS) will need to be considered practically as well. The best solution is the pragmatic solution when it comes to education technology. Phase 2 will include consideration of technical and cultural/emotional requirements to ensure optimal participation and learning.

4.2 Definitions

We present below key definitions of terms associated with MOOCs and distributed learning.

MOOC – Massive Open Online Course. They typically include a collection of many of the following learning objects: video lectures, online readings, problem sets, quizzes, and student interaction. MOOCs are intended to reach very large audiences, numbering in the tens of thousands of students per course offering. According to a study conducted in 2014 by Open University in the UK, the average MOOC enrolls 43,000 students (Jordan, 2014).

xMOOC - eXtended Massive Open Online Course. xMOOCs, usually extensions of existing university courses to new audiences, are the most common form of MOOC. They typically are hosted on specific platforms

(e.g. Coursera, EdX, etc.), rely on videotaped lectures and supplementary materials (e.g., readings, presentations), and include discussion spaces that do not heavily emphasise student interactions and inter-relationships.

cMOOC – Connectivist Massive Open Online Course. cMOOCs exist in distinction to xMOOCs, and typically involve connected learners working in self-determined ways and in social networks that typically promote peer-to-peer teaching and learning.

4.2.1 Platforms

FutureLearn - A platform developed by the UK's Open University in 2012 to support MOOCs.

Coursera - A for-profit platform for online courses developed by Stanford University's Andrew Ng and Daphne Koller.

Udacity - A for-profit platform developed by Sebastian Thrun, David Stavens, and Mike Sokolsy that hosts MOOCs.

edX - a non-profit platform with open-source software founded in 2012 by MIT and Harvard University.

4.2.2 Systems

CMS – Content Management System, a tool that can facilitate the development and implementation of MOOCs. CMS, which has been available since the late 1990s, enables content to be published, edited, and organised.

LMS – Learning Management System (also Virtual Learning Environment or VLE), a tool supporting creation and delivery of instructional content, as well as enrolment, course completion and other key activities.

4.2.3 Education concepts, theories and activities

Pedagogy / Andragogy – The science of education, including the design of learning environments and study of their relative effectiveness. In some uses, “Andragogy” is used to distinguish learning by children from learning by adults.

Constructivism – Argues that learning occurs as a dialogue between prior knowledge and new material, thus is bound by the “Zone of Proximal Development.” Constructivism frequently involves approaches in which the learner ‘constructs’ knowledge, and revises and updates knowledge based on new information and experience.

A/B Testing - assessing differential effects of two separate ‘treatment conditions,’ in MOOCs A/B testing frequently involves determining which one of two approaches (or courses, or units) most effectively supports capacity building, learning, or other outcomes.

Blended Learning – A learning environment or approach that provides both interaction, for example, with a Teaching Assistant, and self-paced and whole-class online learning.

Instructional Design - The systematic development of (typically theory-based) andragogical specifications to ensure that courseware achieves desired outcomes in relation to learning.

4.2.4 Standards and Resources

OER – Open Educational Resources, or free and open-licensed resources for teaching and learning that can be modified to improve their success, to address different content or learners with different capacities, or for other reasons.

Creative Commons - A non-profit organisation that promotes the sharing of copyrighted works through free legal licenses.

SCORM - Sharable Content Object Reference Model, a standard that outlines requirements for learning resources to be interoperable (in other words, to be used in different LMSs).

4.3 Existing Learning Management Systems (LMS) that can deliver MOOCs

MOOC courses are delivered using some form of a Learning Management System (LMS) installed on an online server. Some MOOC providers may provide mobile or desktop apps to access courses, others only provide access via a web browser. LMS software suitable for running a MOOC is commonly suitable for more conventional online and distance learning applications. Many MOOC providers are in fact using the same underlying software. ReCAP will need to select an LMS system to use for its MOOC. Though there are hundreds of different LMS systems in use, below are some of the most popular, including one example of an innovative mobile platform, specialised to a context relevant to ReCAP.

4.3.1 Moodle

There are more than 132 million Moodle users (Moodle Statistics, 2018), making it the most widely used learning management system in the world. Moodle is open source; features include student management, discussion boards, videos, and quizzes. The Moodle mobile app for Android and iOS allows for some content to be downloaded offline, however when tested the download functionality can be unreliable. The Moodle app is built using web technologies, rather than a native mobile interface, resulting in sub-optimal performance (particularly on cheaper, low end Android handsets)². Moodle has a large community of users and service providers³.

4.3.2 Blackboard

Blackboard is one of the most popular proprietary LMSs (Feldstein, 2018). It also features student management, discussion boards, videos and quizzes. Blackboard does not provide public pricing, however, its customers (e.g. colleges and universities who use its platform for creating MOOCs) pay annually based on the number of users they have.

4.3.3 Open edX

Open edX is the software that runs the edX distributed learning platform. It was released as open source software by edX, and is now also used by dozens of universities and other MOOC providers (such as Edraak in Jordan)⁴. It's features include student management, discussion boards, videos, peer assessments, and quizzes. The Open edX app for Android and iOS allows users to download video for use offline, however as of this writing, no other functionality (e.g. quizzes, other content) is available offline⁵.

4.3.4 Ustad Mobile

As one example of a distributed learning platform provider that focuses on delivering content in developing nations, Ustad Mobile⁶ is a small startup company based in the UAE. It provides an app that enables learners to download content for use offline, and to share that content with other users offline. The app currently only supports use of video and quiz content; however, is being extended to include other LMS functionality.

2 <https://github.com/moodlehq/moodlemobile2>

3 <https://moodle.com/partners/>

4 <https://openedx.atlassian.net/wiki/spaces/COMM/pages/162245773/Sites+powered+by+Open+edX>

5 <https://open.edx.org/features-roadmap/>

6 Note: Mike Dawson and Benita Rowe are employees of Ustad Mobile.

4.3.5 Canvas LMS

Canvas LMS by Instructure is a major Learning Management System with more than 18 million users.⁷ It has a more modern user interface than Moodle and Blackboard, which is commonly cited as a reason for users to switch to it. Canvas LMS is dual licensed; where most modules are available open source, but some modules are proprietary⁸. The Quizzes 2, Mastery Paths, SCORM Import Tool and Catalog are among the modules that are proprietary, and available only with a paid license from Instructure.

Table 1 Learning Management System Functionalities

Learning Management System	Open-source/ Proprietary	Off-line Functionality	SCORM	xAPI	Discussion	Quizzes	Mobile App
Moodle	Open source	Most – larger courses download unreliable	X	X	X	X	X
Blackboard	Proprietary	Non-interactive content only ⁹	X	X	X	X	X
Open edX	Open source	Videos only	X	X	X	X	X
Ustad Mobile	Open source	All	X	X	--	X	X
Canvas	Dual license; some modules proprietary	Non-interactive content only ¹⁰	X	X	X	X	X

4.4 Summary of relevant MOOC providers

A summary of MOOC providers is informative and gives an overview of what is available¹¹. One key finding relevant to this study: there is only one MOOC provider in Africa (www.elearnafrica.com), while there are several in Asia (India, China, Thailand, and others). Another finding is that most MOOC providers are associated with universities. The courses offered reflect their orientation towards higher education. Searching edX for road engineering and civil engineering does not bring up many courses. Moreover, the courses that are available are not particularly relevant to rural roads and transport (most focused on electric cars). Popular MOOC courses include electronics engineering, computer networking and coding.

The technical course material offered by MOOC providers at universities is often too advanced for learners who do not have at least a high school diploma or engineering degree (Bates, 2015). Content is oriented to professionals, such as those in information technology (IT) who want to be cross- trained to further develop their knowledge base or to those who want to obtain a degree such as a BA, BS, MBA, or MS and are in need of additional study and training in specific areas to facilitate this effort.

On completion of a MOOC course, certificates are awarded, often for a fee (Shah, 2018). Degree courses are offered in MOOC format, but they are not free. MOOCs are frequently affiliated with universities; in

7 <http://info.canvas.net>

8 <https://github.com/instructure/canvas-lms/wiki/FAQ>

9 <https://community.canvaslms.com/docs/DOC-12969-4152476787>

10 <https://community.canvaslms.com/docs/DOC-12969-4152476787>

11 <https://www.class-central.com/report/mooc-providers-list/>

the US these are Harvard, Massachusetts' Institute of Technology (MIT), Stanford or other institutions. The course material reflects their standards. Among the most widely known examples are:

- **Coursera** offers courses given by a variety of universities, American or foreign, and require a good knowledge of English with a few courses in Spanish, Russian and Chinese. It offers only a limited number of civil engineering courses. What is available is not helpful for our intended audience.
- **EdX** is similar to Coursera but more oriented to electronics and the Internet of Things (IOT). There are only a very few civil engineering courses, and they are not oriented to low volume rural roads (LVRR).
- **Udacity** is one of the top 5 MOOCs, offering “nanodegrees” and courses primarily in data science, programming, artificial intelligence and autonomous systems.
- **Future Learn** is aimed at the general public, and not so much at tertiary education. However, this MOOC does not contain any civil engineering courses.
- **Khan Academy** is focused on secondary education training. As such, it provides basic courses in maths, science and programming and can be seen in the context of US college preparatory requirements. This MOOC is not listed in the above tabulation. It actually may be more helpful in meeting ReCAP’s objectives than the other MOOCs.

To take most of the MOOC courses requires a computer (or possibly a large tablet) rather than a mobile phone, and often additional software is needed such as MS Excel. Both these requirements add to the participants’ costs, and thus may factor into accessibility in developing nations in Africa and Asia (Bates, 2015).

There is a financial reason why only a very few “real” engineering courses are taught through a MOOC program. Universities would be giving away a free resource (intellectual capital) with a MOOC when they can easily charge over \$1,000 per credit. Many US universities offer online courses leading to a Master’s degree in engineering; the cost of an online MS degree starts at \$20,000.

4.5 Examples of projects

Below are examples of technology for education projects in low-income areas in Asia and Africa:

4.5.1 Vsomo – Vocational Skills Training in Tanzania

Vsomo is a mobile learning environment that provides access to vocation skills courses in Tanzania. It was produced by the mobile operator Airtel and the Tanzanian Vocation and Training Authority¹². Students are charged the equivalent of approximately \$50 USD per course, and approximately 9,000 students have registered.

4.5.2 Mobile Soft Skills Training in Afghanistan

The University Skills and Workforce Development Program (USWDP), supported by USAID, contracted Ustad Mobile to create a mobile app to teach soft skills via interactive video. The app allows students to download and share content offline, and then synchronises results when a student is reconnected.

¹² <http://www.thecitizen.co.tz/News/Airtel--Veta-offer-vocational-training-through-mobile-phones/1840340-4084626-a95kg7z/index.html>

4.6 Relevance: Vocational Training Courses

Based upon the above review, and pending feedback from ReCAP colleagues, part of the MOOC content may need to include vocational training courses. Experience and skill level in rural areas determines road design options (Cook, 2017). For example, maths and other basic skills may be lacking in some of the potential MOOC participants. Besides technical training, roads and transport specialists often must also know how to plan, finance and manage a construction or maintenance project. The latter set of managerial skills is as important as the former. Depending on the outcome of the needs analysis, course content could include both sets of skills.

Additionally, planning to identify or scope the project should be considered a separate activity from project management (note a different type of planning is part of project management), where a range of different skill sets are needed, to summarise: planning, project management, construction and maintenance. Short courses on topics in rural road construction and maintenance for sustainability that are skills-oriented may be more in demand for ReCAP end-users and their constituents than university-level courses. The needs analysis will shed light on the level of courses most suited for ReCAP's COP.

The needs assessment conducted in Phase 2 will also provide more specifics on end-user capacities, including the need for basic maths (arithmetic, algebra, geometry and trigonometry) and science, as well as reading and writing (e.g. filling in forms). This type of skills training could be linked through another MOOC, such as Khan Academy¹³, which provides course content for free at the secondary education level (e.g. basic courses in maths, science and programming).

4.6.1 Examples of Vocational Training

International Labour Organization (ILO) manuals on labour-based road construction are more appropriate in many instances, and provide a model for the type of training required. The *Technical Manual Labour Based Construction, 1997*, by the ILO is a good example. This manual covers the technical and the administrative and management aspects of successfully completing LVRR projects. Even so, this manual does not incorporate all the information required to build or maintain a rural road; however, it gives a good overview.

4.7 MOOCs and Participatory mLearning

Much of the research on MOOCs in the past seven years focuses on 'drop-off' rates (Huang and Ho, 2016) and on means of framing and increasing interaction either among learners or between learners (Guardia et al, 2013). A review of the literature revealed a dichotomy between "instructionist" approaches (e.g. a lecturer) and "connectivist" approaches that emphasise learner choice and learners' interactions as the primary channel for learning.

DeWaard et al. (2011) consider MOOCs in the context of mLearning, determining that these formats support education in the 21st century via their unmooring of learning from location and their emphasis on participation and reciprocity. Most critically, deWaard and her collaborators state that MOOCs and mLearning link learning, appropriately for the contemporary age, to chaos theory and complexity insofar as they rely on self-organisation and communication as a means of preparing learners for multiple possible futures.

They identify four important conditions:

1. **Internal diversity**

The diversity within the learner community

¹³ <https://www.khanacademy.org>

2. **Internal redundancy**

Duplications, such as ability to communicate in English or a common interest in roads, that enable fruitful course participation

3. **Neighbour interactions**

Ideas, hunches, queries and other “manifestations of representation” that interact via the community’s effort to construct shared knowledge

4. **Decentralised control**

The opening of opportunities for engagement with, creation of and interaction via different forms of communication that promote the development of knowledge both within and outside of the MOOC environment.

The model described by deWaard and her collaborators is essentially Vygotskian (1978) with additional influences of Mikhail Bakhtin (1981) and others who emphasise the social construction of knowledge.

4.7.1 **Connectivist MOOCs**

One strain of inquiry and theory addresses MOOCs as a platform for connectivist education—in which the networked community and the interactions of the members are the primary factors that lead to learning. Downes (2015), who invented the term, ‘connectivism, the cMOOC or connectivist MOOC’ referred to them as “more like an online community than a course.” Downes (op. cit.) frames the community as more important than curriculum or assignments. Gillet (2013) reports on the use of personal learning environments instead of dedicated MOOC platform providers.

4.7.2 **Design principles**

Manalack and Yuriev (2016) outline ten critical principles for designing and developing MOOCs, while Hood and Littlejohn (2016) outline the challenges in measuring MOOC design.

Interaction is key. Cole et al. (2014) report the result of a survey of more than 500 graduate and undergraduates, identifying key factors in their satisfaction with e-learning; respondents suggest that levels of satisfaction were most tightly correlated to interaction, with lower levels of interaction leading to higher levels of dissatisfaction (while the converse also proved true).

Dichotomy in design considerations. Many investigators find a dichotomous aspect in MOOCs, in which striking the proper balance of freedom and instructivism (Anders, 2015) or instructivism and constructivism (Hood and Littlejohn, 2016), instructivism and connectivism (Crosslin, 2016) or facilitation and self-determination (Beaven, et al., 2014) is critical to maintaining engagement and promoting learning.

4.8 **Cost Models**

Over the past 15 years, a variety of cost models have been tried in both developed and developing nations to encourage the maximum number of students to enroll in online learning.

One truth has emerged: free does not assure completion. The needs analysis will provide important feedback from the ReCAP end-user community on the different types of cost models that would be most effective and sustainable, and encourage participation.

5 **Workplan and Level of Effort**

We base our draft Workplan on the ToR, with the scoping study structured into three (3) phases to be carried out over a period of six (6) months, consisting of six (6) weeks of inception, 18 weeks for scoping and workshop, and up to six (6) weeks for drafting and finalising the implementation plan (see Annex 1). The Workplan will be updated and finalised during the Inception period based on feedback from the ReCAP

PMU. The Workshop is planned for early December, 2018. Should this schedule change occur, it would necessitate a contract modification. We are flexible in either case.

Level of effort. The level of effort by team members is as follows:

- Nadya Mundo personnel (includes Barrett, Gaible, Sherman, other local national colleagues in ReCAP Partner countries)
 - 43 days over six months
- Mike Dawson and Benita Rowe
 - 18 days over six months

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Annex 1 Workplan

This section presents the workplan, which details the timing, sequence and duration of the proposed tasks including the number of personnel days proposed by site and activity. We identify major milestones (including deliverables) in executing the project, including an indication of how the achievement of these would be reflected in the required reports.



Nadya Mundo Workplan (Draft)

Project title: Scoping study for a ReCAP Massive Open Online Course (or MOOC series)

Project reference: KMN2140A

ReCAP MOOC Timeline 2018/19

Phase & Activities - Milestones	July		August		September		October		November		December		January		February	
	16-30	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-31	1-15	16-30	1-15	16-31	1-15	16-28	
Phase 1: Inception																
MOOC literature review	□	□														
Finalise Scoping methodology	□	□														
Revise Workplan based on Contract		□														
Milestone 1 - Inception Report: 20 August																
Revisions to Inception Report; Finalise Workplan			□													
Phase 2: Scoping + Workshop																
Needs Analysis			□	□	□	□	□	□								
Design instruments, including online survey			□	□												
Conduct KILs and FGDs				□	□	□	□									
Conduct online survey				□	□	□	□									
Analyse qualitative and quantitative data							□	□	□							
Research/derive topic(s) and narrative (Content)				□	□	□	□									
Determine structure of the MOOC(s),				□	□	□	□									
Determine delivery format, including media use and platform options				□	□	□	□									
Investigate accreditation and certification, compliance with international MOOC development standards				□	□	□	□									
Explore copyright issues				□	□	□	□									
Determine costs and development timescale				□	□	□	□									
Write draft Scoping Report								□	□	□						
Milestone 2: Scoping Report: 26 Nov																
Workshop Planning (circulate Scoping Report)							□	□	□	□	□					
Workshop (2 days): Early December											□					
Debrief Workshop and prepare Report											□					
Milestone 3: Phase 2 Workshop Report: 20 Dec																
Phase 3: Implementation Plan																
Draft Implementation Plan, integrating Workshop outcomes and Scoping Study findings											□	□				
Submit Draft Implementation Plan													□			
Incorporate feedback into final Implementation Plan														□		
Milestone 4: Implementation Plan: 4 Feb 2019																

Major Milestones

As per the RfP, there are three major phases of the project, each of which includes a deliverable, with the addition of a workshop report in Phase 2, for a total of four deliverables over the course of the project.

As per the RfP, the following deliverables will be completed:

1. An **Inception Report** (maximum of 10 pages main text) at the end of Phase 1 outlining the approach, detailed work plan and identification of key issues for the assignment. This will include a MOOC literature review and the scoping methodology, in particular for assessing user needs.
2. A **Scoping Report** (maximum of 30 pages main text), covering the process of knowledge acquisition and any issues therein, how the issues were overcome and/or their impact on the implementation of the assignment.

3. A **Workshop Report** (maximum 15 pages main text), at the end of Phase 2, covering the outcomes of the workshop discussions on the themes in the scoping report.

4. An **Implementation Plan** (maximum 25 pages main text), at the end of Phase 3.

As per the RfP, all reports will be submitted in MS Word in English, using the ReCAP reporting template.

We present in Table 2 Reporting Milestone Achievements an indication of how the achievement of the milestones would be reflected in any reports, particularly those stipulated in the Terms of Reference.

Table 2 Reporting Milestone Achievements

Phase/Milestone	Description
Phase 1:	Inception and Methodology: a. MOOC literature review b. Finalising Scoping methodology, in particular for determining user needs
Reporting Milestone 1	The inception report milestone will include the results of the literature review as it relates to designing and implementing a MOOC in the Asia and Africa context, and the methodology for the user needs assessment.
Phase 2:	Scoping of the following themes (including surveying potential MOOC participants): a. Target audience and user needs; b. Topic(s) and narrative; c. Structure of the MOOC(s), including: learning objectives, teaching methodology, course modules, course length, participant assessment methodologies; d. Delivery format, including media use, and platform options; e. Accreditation and certification, compliance with international MOOC development standards; f. Copyright; g. Costs and development timescale
Reporting Milestone 2	The scoping report milestone will include a draft of the needs analysis and proposed topics, MOOC structure, (delivery format, including media use, and platform options), administrative aspects (accreditation and certification, compliance with international MOOC development standards, copyright), and costs and development timescale.
Phase 2:	Phase 2 will conclude with a stakeholder workshop to validate the outcomes of the scoping exercise.
Reporting Milestone 3	The workshop report will detail participants' views and inputs on the proposed MOOC, and suggest ways forward based on their feedback.
Phase 3:	Preparing of a ReCAP MOOC (or series) Implementation Plan, based on the scoping exercise and workshop outcomes.
Reporting Milestone 4	The implementation plan will be a compilation of the validated scoping study at the intersection of good practice in online learning. Lessons learned from previous attempts at implementing MOOCs in Asia and Africa, along with ReCAP COP inputs, will form a central backdrop for the Plan. Localisation will be informed from the outcomes of Phase 2.

As part of the detailed implementation plan we will determine whether a single or multiple vendor solution is advisable based on the outcomes of the needs analysis. Often, a multi-vendor solution produces the better product as a result of competition. The implementation plan will also address MOOC training. This will include the role of the training development partner in support of the roll out of the MOOC to partner countries, and recommended training software platforms. Additionally, prospective user profiles will be developed based on our detailed needs analysis for use in developing training levels. The Phase 2 needs analysis will inform whether or not requirements will vary by region/country, impacting the degree of localisation for the MOOC.

Annex 2 Ethical safeguards

Our team strives to design all research and evaluations to be maximally participative, respectful of privacy and of cultural differences, and equity-aware. Ethical guidelines apply to all team members, including senior managers, staff, consultants, subcontractors, and anyone working on our behalf. Specific approaches include:

- **Informing** all respondents that interviews and responses to specific questions are optional, and informing respondents about the nature and the objectives of the inquiry, including that their responses may be recorded and transcribed.
- **Ensuring** that interviews are conducted in private, and that respondents are guaranteed confidentiality.
- **Acquiring** written consent of all respondents; consent by respondents who are not literate will be recorded. Respondents will be sent a consent form via email, and asked at the start of the interview if the interviewer has their permission to conduct the interview.
- **Confirming** consent periodically when appropriate to address a respondent's change in understanding over the course of the interview or survey.