MOOCs for Higher Education in Nepal

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TABLES AND FIGURES

ACRONYMS

ADB	Asian Development Bank
HeNN	Help Nepal Network
HSEB	Higher Secondary Education Board
IIE	Institute of International Education
KOICA	Korean International Cooperation Agency
MOOCs	Massive Open Online Courses
OLE Nepal	Open Learning Exchange Nepal
SASEC	South Asian Sub-Regional Economic Cooperation
UGC	University Grants Commission

CONTENTS

PREFACE

Higher education institutions (HEIs) were first engaged in the development and implementation of massive open online courses (MOOCs) in 2006 and the development started to gain momentum in 2012. MOOCs offer opportunities for quality access in a cost-effective way. HEIs are able to open up their courses to learners beyond their institutions, especially those from marginalized and displaced communities. Many institutions around the world have already been using MOOCs in an effort to offer quality education to all. This sub-project examines how MOOCs could be designed and developed by HEIs in Nepal to leverage upon the potential of MOOCs for quality access to education.

A MOOC on "Fundamental Concepts of C Programming" was designed and developed as part of the sub-project. Over 500 participants from all over the country enrolled in the course. This report discusses the opportunities and challenges that MOOCs have brought to the learners in Nepal. More importantly, this report informs HEI leaders and course coordinators in Nepal of how MOOCs could be developed and implemented successfully.

The report does not provide step-by-step instructions in designing, developing and implementing MOOCs, but it offers information about teachers' and learners' perceptions of MOOCs and how learners learn in the first ever MOOC offered by Kathmandu University in Nepal.

This study was conducted under the Digital Learning for Development (DL4D) project of the Foundation for Information Technology Education and Development (FIT-ED) of the Philippines. As part of the Information Networks in Asia and Sub-Saharan Africa (INASSA) program of the International Development Research Centre (IDRC) of Canada and the Department for International Development (DFID) of the United Kingdom, DL4D aims to improve educational systems in developing countries in Asia through testing digital learning innovations and scaling proven ones.

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ABSTRACT

Massive Open Online Courses (MOOCs) have become a global phenomenon, with universities around the world collaborating to provide MOOCs on a wide variety of subjects. Universities from developed countries like America and Australia have been offering MOOCs for various reasons. For developing countries like Nepal, however, it is a challenge to join the MOOC movement. Learners in developing countries have to cope with problems related to technology infrastructure, financial support, policy support, and technical skills which serve as barriers to enrollment in MOOCs, as well as delivery of local MOOCs. This study explores the prospects and challenges of offering MOOCs in Nepal through piloting a MOOC on basic programming. The course, which was offered by Kathmandu University, is the first locally developed MOOC in the country.

Based on interviews with education administrators and a survey of teachers and college students in four regions in Nepal, the study found that digital literacy among students and teachers is high. Although they were not aware of MOOCs, students and teachers expressed a strong willingness to participate in digital learning in general, and MOOCs in particular. Administrators were also positive about implementing and supporting the MOOC movement in their respective institutions, noting that the lack of expertise to teach specific courses can be addressed with the help of MOOCs. However, the data collected from participants in two pilot offerings of the MOOC on basic programming revealed that slow Internet access and lack of time are constraints to MOOC participation and completion.

Keywords: *MOOC, open online course, higher education, Nepal*

I. INTRODUCTION

Since 2012, over 25 million people from around the world have enrolled in the massive open online courses (MOOCs) offered on Coursera, edX, and other well-known MOOC platforms (Zhenghao, Alcorn, Christensen, Eriksson, Koller, & Emaluel, 2015). According to Masters (2011), MOOCs are a stage in the evolution of online education. Daradoumis, Bassi, Xhafa and Caballe (2013) believe that MOOCs offer a remarkable opportunity to train thousands of participants distributed all over the world, allowing online access to quality education through a new way of learning. MOOCs are contributing new business models and pedagogic approaches to improve the quality and accessibility of online and on-campus teaching and learning in higher education (Yuan, Stephen, & Bill, 2014), and they are enabling various modes of learner engagement (Bali, 2014).

China and India, the two "Asian giants" flanking Nepal, have started implementing their own MOOCs (Devgun, 2013). However, in Nepal, no university nor institution was offering MOOCs as yet. Education in Nepal from primary school to university level is modeled on the Indian system, which in turn is the legacy of the old British Raj. Hence, until the recent past, Nepal followed the traditional three-tier 16-year education system, with 10 years of school education, four years of college level studies (i.e., two years each for the intermediate and bachelor program), and two years of university level studies (EducateNepal, 2010). Higher education in Nepal, administered by universities, refers to Bachelor, Master (M. Phil), and Ph.D. level education (UGC, 2014). According to the 2011 EMIS report of the University Grants Commission (UGC), Nepal has nine universities of which four offer IT-related courses; namely, Tribhuvan University, Kathmandu University, Purbanchal University, and Pokhara University. Tribhuvan University, established in 1959, is the oldest university in Nepal. It has more than 61 institutes and 191 affiliated colleges offering programs in the Humanities and Social Sciences, Management, Health, Agriculture Engineering, and Science and Technology. Additionally, Kathmandu University was established in 1991 and has a few affiliated colleges that offer Management and Medical

degrees. Meanwhile, Purbanchal University was established in 1995 and has more than 72 affiliated colleges. Finally, Pokhara University, also established in 1995, has more than 29 affiliated colleges throughout Nepal.

Although no institution or organization in Nepal has started offering MOOCs, online learning is not new to the country. Open Learning Exchange Nepal (OLE Nepal), a non-profit organization established in 2007, has been developing educational digital learning content for primary education and distributing this free of charge. Similarly, MiDas Education Pvt. Ltd, a for-profit company, produces e-content for primary education. Moreover, the Kathmandu University School of Education has an e-learning site, and it offers several courses online. However, these online courses do not work like MOOCs, as interaction with teachers is mandatory. In 2012, with the help of the Korean International Cooperation Agency (KOICA), Kathmandu University established the e-Learning Centre and started offering e-content (in the form of slides, videos, quizzes, and assignments) for its undergraduate level courses through Moodle, an open source learning management system. The Help Nepal Network (HeNN), the largest charitable network in Nepal, also supports online learning by donating computers and open source applications to rural schools in the country. Students from Kathmandu University have volunteered in many projects supported by HeNN. In addition, a group of students from the Kathmandu University Department of Computer Science and Engineering recently deployed an e-library system in one of the community schools in Charikot, Dolakha. Additionally, in 2009, the Asian Development Bank (ADB) provided USD 9 million for the South Asian Sub-Regional Economic Cooperation (SASEC) Information Highway Project, under which Kathmandu University developed e-content suitable for rural villages in Nepal. The e-content, which is related to agriculture, basic computing skills, organic farming, and farm management, is available through Moodle. Kathmandu University plans to establish 30 different e-Centers through which this e-content will be deployed in different parts of Nepal (SASEC Distance Learning).

In light of these developments in online learning in Nepal and the need to make education more accessible to a greater number of learners including non-traditional learners, the project team initiated the MOOC movement in Nepal. This idea was inspired by research findings whereby, among non-student MOOC completers, people with lower socioeconomic status, people with lower levels of education, and people from developing countries, are more likely to report educational benefits (Zhenghao, Alcorn, Christensen, Eriksson, Koller, & Emaluel, 2015). Although no university in Nepal is currently offering MOOCs, many Nepalese participate in MOOCs offered by top universities in the US, UK, and elsewhere (Mason, 2017; Murugesan, Nobes, & Wild, 2017). It is important to study the opportunities as well as the challenges of offering MOOCs in Nepal, a developing country that is committed to making quality education accessible to all.

On the basis of the above background, the following research questions were formulated:

1. What opportunities do MOOCs represent for the higher education sector in Nepal and how can MOOCs be leveraged in Nepal?
2. What challenges are faced by Nepalese students when participating in MOOCs?
3. What factors need to be considered in the design and implementation of MOOCs in Nepal?

Photo Credit: Manoj Shakya

II. OBJECTIVES

The main objective of the project was to design, deliver, and evaluate a MOOC on "Fundamental Concepts of C Programming" for university and college students across Nepal. C programming was selected because it is a course that is common to all fields of engineering, and it is taught as a mandatory subject in all engineering programs, which are in high demand in Nepal. For example, every year, around 2,000 students apply for admission to the School of Engineering of Kathmandu University, and around 15,000 students apply to the Institute of Engineering, a constituent campus of Tribhuvan University. However, many students fail this subject every year. Since the course in programming using C needs high learner-content interaction and more engagement on the part of learners through practice exercises and the like, it was thought that offering the course as a MOOC was worth exploring. MOOCs on programming have been offered elsewhere. For example, FutureLearn has offered an online programming course (Liyanagunawardena, Lundqvist, Micallef, & S.A.,

2014). However, it is necessary to design and offer a MOOC on programming using C that takes into account the needs of Nepalese students, in particular, as well as other relevant conditions in Nepal.

The study also aimed to:

* gauge awareness of MOOCs among students, teachers, and education administrators in Nepal;
* share knowledge about existing digital learning technologies and provide access to these technologies;
* explore the opportunities posed by MOOCs for higher education in Nepal;
* examine the learning behavior of Nepalese students who are MOOC participants; and
* identify the challenges faced by Nepalese students when participating in MOOCs.

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III. REVIEW OF LITERATURE

MOOCs are changing teaching and learning in higher education throughout the world (North, 2016). Many universities in developed countries are leveraging the potential of MOOCs and offering MOOCs using different platforms. Dewar (2014) posed the question of how MOOCs can be leveraged in the developing world. She argued that funding could be the greatest barrier to MOOC development in less economically developed countries. Indeed, it is the more developed countries in Asia like China, Japan, Korea, and India that are ahead in exploiting the potential of MOOCs in the region (Kim, 2015).

According to Nath, A. Karmakar and T. Karmakar (2014), the six major goals of MOOC initiatives in India are: 1) extending the reach of the institution and access to education, 2) building and maintaining the institutional brand, 3) improving economics by lowering costs or increasing revenues, 4) improving educational outcomes for both MOOC participants and on-campus students, 5) innovating teaching and learning, and 6) conducting research on teaching and learning. MOOCs are also transforming the concept of digital education in India by restructuring lectures into short, self-contained segments and enabling high interactivity to engage students more effectively (Nath et al., 2014). MOOCs are popular in India. Data from Coursera showed that there were more than 250,000 users from India among the 2.9 million registered users in March 2013, and that students from India comprised the second largest group of enrollees after those from the US (Agrawal, 2013).

For Malaysia, Fadzil, Latif and Munira (2015) identified three benefits from MOOCs based on a local case study, namely: 1) more international collaboration; 2) global visibility, and 3) opportunity for Malaysian higher education institutions to showcase their best programs. In Sri Lanka, Warusavitarana, Dona, Piyathilake, Epitawela and Edirisinghe (2014) reported that 86% of higher education professionals have started using MOOCs to engage in professional development. This report also mentioned that low Internet bandwidth delays the learning process in Sri Lanka, and many professional staff who have joined MOOCs complain that they lack time for skill development.

In a feasibility study conducted on the use of MOOCs and other digital learning content in higher education institutions in Tajikistan, Imaizumi (2015) found that while there is capacity and infrastructure to create online courses, most of these courses are IT-related and more non-IT courses are needed. Moreover, language is a barrier for enrollment in existing online courses, with students and teachers preferring Russian-based online course materials. In addition, students were more motivated to take online courses when a recognized certificate is issued, but including online courses in the curriculum is still challenging due to accreditation issues. According to the teachers and students in Imaizumi's study, the top three advantages of digital learning are self-learning opportunities, availability of professional development through lifelong learning, and potential reduction of the urban-rural gap, while the top three disadvantages are lack of skills and inability to use new technologies, low motivation of trainees for self-learning, and the lack of quality assurance of educational content. Imaizumi also mentioned that one limitation of MOOCs is that people do need to have prerequisite skills, such as English literacy and prior knowledge about the subjects, as well as sufficient broadband connectivity.

Exploring the opportunities and challenges posed by MOOCs from an Asian perspective, Chen (2013) identified the following opportunities from MOOCs, stating that MOOCs can:

- address the need for more universities, and create a level playing field in higher education.
- develop the literacy of people in developing Asian countries.
- help to realize the dream of lifelong learning.
- provide a chance for courses discovery by other countries.

Some challenges posed by MOOCs that were cited by Chen are:

- decrease in enrollment at Asian universities;
- increasing the burden of running universities;
- need for teachers to acquire competence in digital instruction and technologies;
- language proficiency and cultural background that impacts learning; and
- possible loss of native culture.

In exploring the opportunities arising from MOOCs, developing countries can ask themselves five key questions:[1]

1. Does the infrastructure exist for MOOCs to succeed in the developing world?
2. Can MOOCs play a role in providing non-formal education?
3. Can MOOCs help close the gender gap in education?
4. Will MOOCs transform the role of the teacher?
5. Can MOOCs be globally accessible yet locally relevant?

Daniel (2012) pointed out that there are several myths and paradoxes in delivering MOOCs in terms of quality and completion rates, certification, pedagogy, and purpose. MOOCs are considered superior to face-to-face courses in terms of flexible delivery and availability (Nkuyubwatsi, 2013), but student retention rates and completion rates in MOOCs are very low. Koller, Ng, Jennings and Chen (2013), who are also MOOC educators, found that more than 50% of participants do not continue after registration in a MOOC. They argued that observing how students participate in online classes can give a clue to their intentions. Based on their learning behaviors, MOOC participants can fall into different categories reflecting differences in learner motivation and intention (Kizilcec, Piech, & Schneider, 2013). When these are taken into account in the design of MOOCs, it is possible to minimize course dropout. For example, Cisel (2014) analyzed the completion rates in the first French xMOOC offered in early 2013 by the Grande EcoleCentrale Lille, a competitive higher education institution, and found that 71.2% of the 615 registered users obtained the advanced certificate at the end of the course. The author argued that completion rates depend on many factors like the design of the course, learners' aims and objectives, and participants' background.

Although MOOCs can potentially provide educational opportunities to everyone around the globe, Liyanagunawardena (2015) discovered that the majority of MOOC participants are graduates and have already received a university education. In addition, most MOOC enrollees are male (Francis, 2015; Breslow, Pritchard, DeBoer, Stump, Ho & Seaton, 2013). On the other hand, a recent study in Colombia, the Philippines, and South Africa, by Garrido, Koepke, Andersen, Mena, Macapagal and Dalvit (2016), found that the MOOC completion rate in developing countries is significantly higher than that of developed countries. They also found that women are more likely than men to complete a MOOC and obtain a certificate.

The opportunities cited by Chen (2013) are very much relevant in the context of Nepal. MOOCs can be a means of increasing access to higher education for more people in Nepal. In addition, lifelong learning is possible through MOOCs as there can be fewer restrictions in terms of basic academic qualifications and age requirements. With regard to the key questions posed by IIE (2014) to be considered in exploring MOOCs in the Nepalese context, MOOCs can be a means of providing non-formal education, as well as equal access to education for women and girls (Nepal, 2007). In addition, MOOCs can help to transform the role of the teacher from being the sole source of knowledge to being a facilitator of learning, as students interact with content resources and their peers in guided online learning activities. MOOCs can also be a means for Nepal to participate in and contribute to the global education movement, specifically through courses that consider the needs of Nepalese learners and which are informed by an understanding of Nepalese culture.

At the same time, the following challenges, coupled with participation in the MOOC movement, cited in the literature are present in the Nepal context: (1) decrease in enrollment in colleges and universities; (2) increased burden of running universities; (3) the need for teachers to acquire competence in digital instruction and technologies; (4) language proficiency and cultural background that impact learning; and (5) possible loss of native culture. In this study, these challenges were taken into account with regard to the choice of the topic for the pilot MOOC, the identification of target participants in the MOOC, and in the MOOC design. C programming was chosen as the topic of the MOOC because it was a course that students from different departments needed. Since the failure rate in this course was high, the MOOC can be taken as a supplement for improving the students' programming skills and getting a good grade. Also, since the materials were easy to understand, students were expected to learn the course on their own, with minimal interaction with a teacher.

IV. METHODOLOGY

To meet the project objectives and address the research questions, a combination of qualitative and quantitative research methods were implemented. A key component of the project was developing and piloting a four-week MOOC on "Fundamental Concepts of Structured Programming" for college and university students in Nepal. As part of the MOOC development process, a survey of the target MOOC learners was undertaken. Data from this baseline survey as well as from interviews with teachers, school coordinators, and education administrators also provided insights into the opportunities that MOOCs pose for higher education in Nepal (i.e., the first research question).

To address the second and third research questions, a survey of the participants in the pilot offering of the MOOC was conducted. The learning behaviors of the MOOC participants were also studied through an analysis of Moodle clickstream data and quiz scores. The methods of data collection and analysis are described in more detail below.

4.1 Baseline Survey and Interviews

A survey of college and university students, teachers, and school coordinators was undertaken in four of the five regions of Nepal: the Eastern, the Central, the Western, and the Far Western regions, which have schools offering Computer Science and IT courses. The region that was not included was the Midwestern region. In each region, two major cities where the majority of the IT colleges are located were identified and most of the colleges offering IT programs in these cities were visited for the baseline survey, which was intended for undergraduate students who are studying computer science and IT degrees. A total of 1,750 students in 24 colleges participated in the survey. Three hundred seventy-seven (21.54 %) of the survey participants were female. Table 1 shows the distribution of participants by region and gender.

Photo Credit: Manoj Shakya

Table 1. Baseline Survey Participants (Students)

Region	Gender	
	Male	Female
Eastern Region	222	48
Central Region	605	198
Western Region	375	84
Far Western Region	180	47

There were three parts to the survey questionnaire for students. The first part dealt with the demographic profile (including age, gender, and year level) of the respondents; the second part included questions related to digital literacy skills, access to the Internet, and use of digital tools and online resources; and the third part included questions related to awareness of and willingness to participate in MOOCs, including the proposed MOOC on computer programming. In general, the questions took into account factors that might impact on the participation of Nepalese students in MOOCs.

A survey of teachers was also conducted at the same universities as the student survey. Table 2 shows the geographic and gender distribution of teachers who participated in the survey.

Table 2. Baseline Survey Participants (Teachers)

Region	Gender	
	Male	Female
Eastern Region	29	2
Central Region	72	2
Western Region	34	2
Far Western Region	21	0

The questionnaire for teachers was similar to the questionnaire for students, with the first section covering demographic information, including designation, subjects taught, and number of years of teaching; the second containing questions focusing on how frequently they use computers and various digital tools, and online resources; and the third section containing items focusing on their awareness of and familiarity with MOOCs and their perceptions of the advantages and disadvantages of MOOCs for learning.

During the field visit to the colleges as part of the survey, interviews with the heads of the colleges were undertaken. The objective of the interview was to find out the school administrators' views on digital learning, including MOOCs. A total of 31 administrators or heads of colleges were interviewed. All were male, reflecting the fact that in Nepal, a female head teacher is very rare (Acharya, 2015). The average length of the interview was 15 minutes. The MOOC team started each interview by giving a brief introduction to the MOOC project. The interviewees were asked to share their thoughts on the role of ICT in education in Nepal, the availability of IT infrastructure in their respective institutions, as well as plans for and/or actual use of ICT in teaching and learning in their respective institutions. All interviews were videotaped.

4.2 MOOC Design and Development

The results of the baseline survey were analyzed to identify the target learners for the MOOC on C programming and to plan how to motivate them to enroll in the MOOC. The baseline survey results were also taken into account in the design of particular features of the MOOC, such as the length of the course, the length of video lectures and use of subtitles, the use of other media, and the types of learning activities.

In addition, experts from Kathmandu University School of Engineering, Tribhuvan University, Kathmandu University School of Education, and the Higher Secondary Education Board (HSEB) of government were consulted about the proposed scope and instructional design features of the MOOC.

The MOOC on "Fundamental Concepts of C Programming" was designed for completion in four weeks. It covered four sub-topics of C programming language (Basics, Operators & Expressions, Branching Statements, and Loop Statements), each of which was to be studied in one week. For each topic, there were text and video materials, a quiz, and a discussion forum. Most of the MOOC content was adopted from a website called "Programming in C".[2] The average length of the text materials per week was six pages, while the average number of videos was three per week. The videos, which featured lectures and program demonstrations, ranged from 2:31 minutes to 22:00 minutes in length.

Participants were required to answer a 10-item multiple choice online quiz at the end of each week. A maximum of three attempts per quiz was allowed. The quiz questions were shuffled with each attempt and the highest score among the three attempts was considered for grading.

Discussion forums were introduced to facilitate collaboration amongst the participants in the course. Specifically, the discussion forum was a means for participants to share problems that they encountered while going through the course, as well as a means to share solutions to these problems. Forums were moderated for any content that was not related to the course.

The MOOC was offered twice. The first offering started 20 November 2016 and ended 17 December 2016, and the second offering ran from 5 January 2017 to 1 February 2017. The two offerings were the same except for the quiz questions. That is, while the number of questions per quiz was the same, the actual questions were different.

To recruit participants, an email was sent to the 1,750 students who participated in the baseline survey and a Facebook page was launched as well. Emails were also sent to teachers at different colleges. Interested participants were asked to register on the website[3] to enroll in the MOOC. Table 3 shows the total enrollment from the two MOOC offerings. A total of 375 students enrolled in the first offering, and 176 students enrolled in the second offering. Most enrollees were from Kathmandu Valley.

Table 3. Total Enrollment in the Two MOOC Offerings

Offering	Gender	
	Male	Female
First	323	52
Second	158	18

4.3 Data Collection During the MOOC

To address the research questions on challenges faced by Nepalese students participating in MOOCs, the two pilot offerings of the MOOC were closely monitored and data was collected from the MOOC participants through a pre-course survey and a post-course survey. The participants' behavior within the MOOC was also observed through the analysis of the clickstream data and quiz scores.

Precourse survey: Before starting the MOOC, registrants were requested to complete a short online survey that included questions about their gender, age, schooling, and current employment status, as well as their awareness of MOOCs, their learning style, and their motivations and intentions for enrolling in the MOOC.

Postcourse survey: This survey was done to find out the learners' reactions to specific features of the MOOC, their perception of the quality of the MOOC, and their level of satisfaction with the MOOC.

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[3] http://mooc.ku.edu.np

Photo Credit: Manoj Shakya

Table 4. Number of Participants who Responded to the Precourse and Postcourse Surveys

Offering	Total Enrollment	Responses to Precourse Survey		Responses to Postcourse Survey	
		Male	Female	Male	Female
First	375	120	18	29	1
Second	176	59	9	7	1

Table 4 shows the response rate to the precourse and postcourse surveys in the two offerings.

Moodle log data: As stated, the MOOC was delivered via Moodle. Thus the research team had access to the MOOC participants' log data, including login times, the frequency of resource views, and information regarding quiz completion, aside from the quiz scores. These data were analyzed to obtain a picture of the learning behavior of different MOOC participants, including those who completed the course and those who dropped out.

Photo Credit: Manoj Shakya

V. KEY RESEARCH RESULTS AND FINDINGS

This study set out to explore opportunities posed by MOOCs for higher education in Nepal and challenges faced by Nepali students when taking MOOCs. Based on these, the study sought to identify the factors that should be considered in the design and implementation of MOOCs in Nepal. This section presents the findings with regard to these questions. The findings on the opportunities posed by MOOCs for higher education in Nepal (the first research question) were drawn from the baseline survey data and interview data as well as a review of relevant policy documents in Nepal. The findings with regard to challenges faced by Nepalese learners in participating in MOOCs (the second research question) were drawn from the results of the two pilot offerings of the MOOC developed for this project, including the pre-course and post-course survey of participants and analysis of the Moodle log data. The findings concerning the factors to be considered in MOOC design and implementation in Nepal were drawn from the analysis of the baseline survey data and data from the pilot offering of the MOOC.

There was a high dropout rate in each of the two offerings of the MOOC. The two main reasons cited by participants in the postcourse survey are limited access to the Internet and slow Internet connection, and lack of time to complete the course.

5.1 Opportunities for MOOCs in Nepal

Online learning is not new to Nepal. The national ICT policy states that the factors to be considered in MOOC design and implementation in Nepal were drawn from the analysis of the baseline survey data and data from ICT in Education. Specifically, IT Policy 2015 mentions that appropriate measures will be taken to facilitate and promote the integration of ICT in the Nepalese education system, including administration, pedagogy, learning and research, and enhancing access to education. The national IT policy also sets guidelines to ensure effective implementation of the ICT in Education Master Plan formulated by the Ministry of Education.

Both Kathmandu University and Tribhuwan University run distance education programs. Kathmandu University also has a policy allowing students to enroll in a maximum of one online course for crediting in their program of study. However, very few Kathmandu University students enroll in online courses. Implementing policies on online learning in the Nepal context requires engaging various stakeholders. It is also important to understand the awareness of and readiness for online learning, including MOOCs among students, teachers, and education administrators in Nepal.

The baseline survey conducted in the course of this study shows that 30.57% (535) of students were aware of MOOCs. Moreover, 70.4% (1,232 of the total of 1,750 survey participants) indicated an interest in participating in a MOOC on C programming. The top four reasons for wanting to join the MOOC on C programming were: 1) they would like to improve their programming skills; 2) they would like to learn about C programming; 3) they want to experience MOOCs, and 4) they want to meet or interact with other students.

The baseline survey also showed that 95.14% (1,665) of those surveyed have an email address, and 65.82% (1,152) always use desktop computers or laptops for various purposes. The survey also showed that 93.1% (1,397) use smart phones, while 80.53% (1,183) and 90.85% (1,312) have Internet access at home and in school, respectively. Also, 80.8% (1227) reported that they use the Internet daily and only 0.5% (7) of students said they have never used the Internet.

More than three quarters (78% or 1,365) of the students said they are very familiar with Facebook and 75.37% (1,319) said they are familiar with YouTube. Only 1.02% (18) of students said that they were not at all familiar with social network apps like Facebook. However, 69.42% (1,215) of the students surveyed indicated that they have not heard of Khan Academy. Table 5 and 6 present information regarding the digital literacy of the survey participants.

Table 5. Frequency of Use of Applications by Survey Participants

Items	Total Respondents	Always	Often	Sometimes	Never
Desktop and laptop computer	1,658	1,152 (69.48%)	190 (11.46%)	250 (15.08%)	66 (3.98%)
Word processing software	1,469	407 (27.71%)	554 (37.71%)	464 (31.59%)	44 (3%)
Web browser	1,479	1,066 (72.08%)	218 (14.74%)	172 (11.63%)	23 (1.56%)
Search engine	1,468	972 (66.21%)	228 (15.53%)	242 (16.49%)	26 (1.77%)
Scanner	1,376	50 (3.63%)	142 (10.32%)	593 (43.1%)	591 (42.95%)
Printer	1,378	71 (5.15%)	225 (16.33%)	725 (52.61%)	357 (25.91%)
Multimedia projector	1,362	124 (9.1%)	248 (18.21%)	708 (51.98%)	282 (20.7%)
Presentation software	1,423	334 (23.47%)	470 (33.03%)	536 (37.67%)	83 (5.83%)
Spreadsheet programs	1,402	238 (16.98%)	352 (25.11%)	670 (47.79%)	142 (10.13%)
Photo/image editing tools	1,413	302 (21.37%)	369 (26.11%)	622 (44.02%)	120 (8.49%)
Audio editing tools	1,401	127 (9.06%)	198 (14.13%)	659 (47.04%)	417 (29.76%)
Video editing tools	1,394	110 (7.89%)	208 (14.92%)	629 (45.12%)	447 (32.07%)
Translation tools	1,373	115 (8.38%)	220 (16.02%)	538 (39.18%)	538 (39.18%)

Table 6. Familiarity of Survey Participants with Applications

Applications	Total Respondents	Very Familiar	Familiar	Not familiar
Facebook	1,679	1,365 (81.3%)	296 (17.63%)	18 (1.07%)
YouTube	1,679	1,319 (78.56%)	328 (19.54%)	32 (8.99%)
Google	1,665	846 (50.81%)	720 (43.24%)	99 (5.95%)
Instagram	1,639	151 (9.21%)	273 (16.66%)	1,215 (74.13%)
Twitter	1,451	479 (33.01%)	658 (45.35%)	314 (21.64%)
Vimeo	1,421	79 (5.56%)	246 (17.31%)	1,096 (77.13%)
Flickr	1,430	73 (5.1%)	341 (23.85%)	1,016 (71.05%)
Khan Academy	1,434	84 (5.86%)	195 (13.6%)	1,155 (80.54%)

The education administrators, coordinators, and heads of colleges interviewed, likewise expressed positive views of digital learning and MOOCs. Although the heads of institutions were not familiar with online learning technology, they expressed openness to implementing this concept in their respective institutions. The principal from one college commented on the usefulness of MOOCs as follows: "For… students who missed the class lectures and for additional learning, [a] MOOC is very useful." The principal from another college made this comment on how MOOCs can benefit students:

> "In [the] present situation, we can see that students do not spend most of their time in [the] library with books. They read and get… contents through the Internet. By the use of internet, they can easily download books and keep them in their device and use it according to their time. I think it really helps them. I do not have much knowledge on how it works but from what you said, I like the concept. With this, the students can utilize their spare time in study. It is indeed beneficial for them. I have already talked with my teaching staff about building a digital library, but they said it would be quite time consuming."

A principal from another college was very confident that the use of ICT in education will improve teaching and learning. He said: "In order to make our teaching and learning process easy and to give our students modern skills, we are running an ICT in education project… Another important objective is to make our classrooms, labs, library and offices 'paperless'. The funds supporting [the] project [are from the] Nepal Ministry of Education."

5.2 Challenges Facing MOOC Participants in Nepal

As mentioned, the four-week MOOC on "Fundamental Concepts of C Programming" was offered twice. The expected enrollment based on the baseline survey was 1,500, but the total enrollment — 375 in the first offering and 176 in the second offering — was much less than anticipated. Moreover, the completion rate was only 5.33 % (n=20) in the first offering and 6.45% (n=12) in the second offering. Figure 1 shows the decline in the number of participants per week.
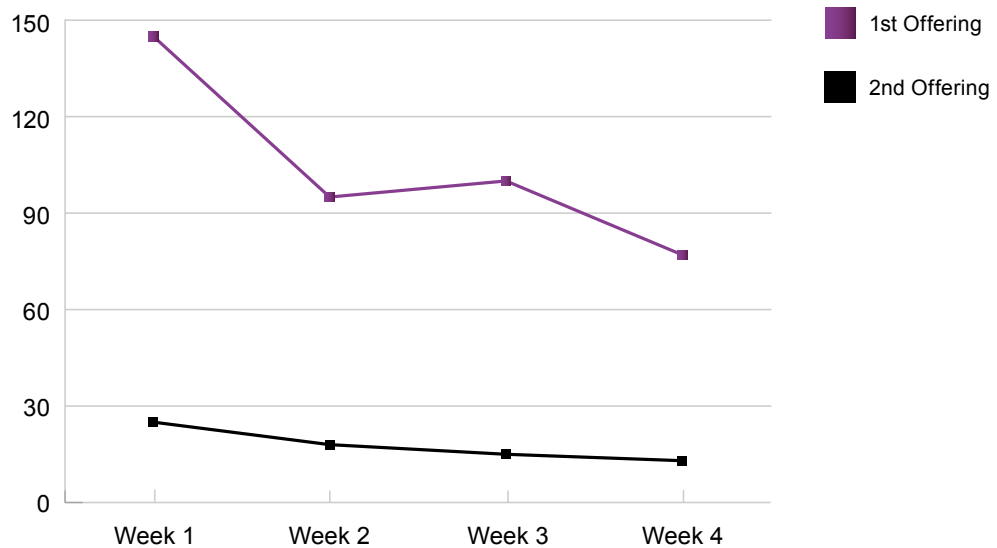
Figure 1. Number of Participants in Each Quiz

In the first offering, 82 (21.86%) of the 375 enrollees never showed up. Similarly, in the second offering, 67 of the 176 enrollees (38.06%) did not show up.

A total of 138 participants in the first offering and 68 participants in the second offering completed the pre-course survey. In the first offering the most frequently cited motivations for enrolling in the MOOC were the usefulness of the course, earning a certificate for free, and the fact that the MOOC is being offered by a University. In the second offering, the most frequently cited reasons for enrolling in the MOOC were the fact that the course was offered by a University, getting a certificate for free, the usefulness of the course, and the quality of course materials (see Figure 2).
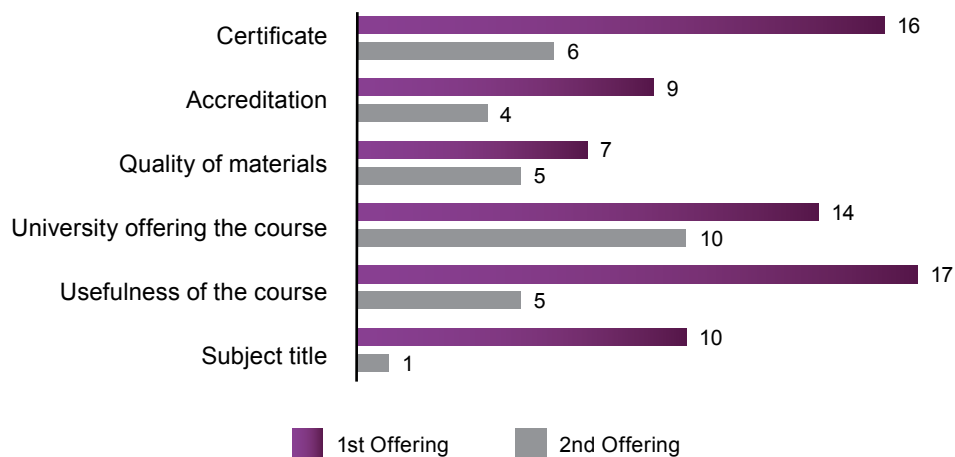

Figure 2. Motivation Factors for Enrolling in the MOOC

It was also found that some enrollees joined the MOOC to learn and not necessarily to earn a certificate. In the first offering, 24 (6.40%) participants accessed different resources but never took any of the quizzes, and in the second offering, there were 22 (12.5%) such participants. Figures 3 and 4 show how many participants in each offering accessed the text and video materials and took the quiz each week. Interestingly, in the first offering, there were more students who viewed the text materials and took the quiz than those who watched the videos. Also, it appears that in the first offering more students took the quiz on Weeks 3 and 4 than those who viewed the text and video materials. In the second offering, a bigger proportion of students viewed the video materials, and a smaller proportion took the quizzes.
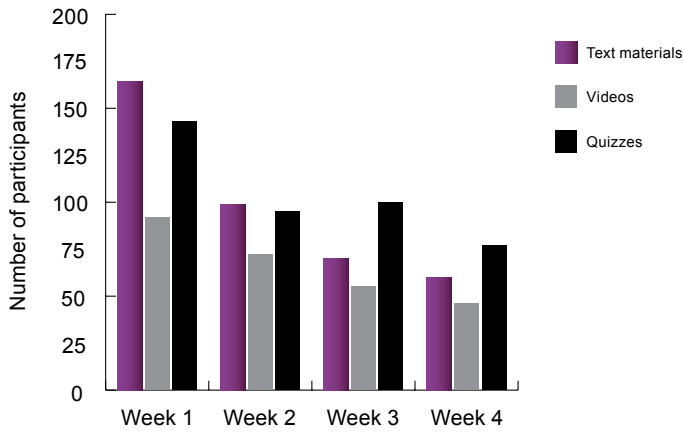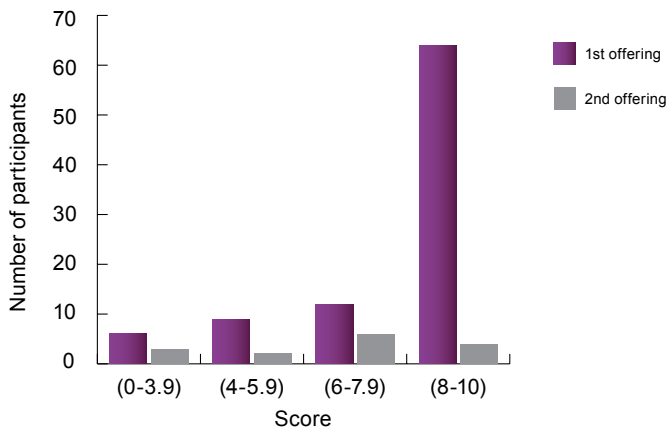
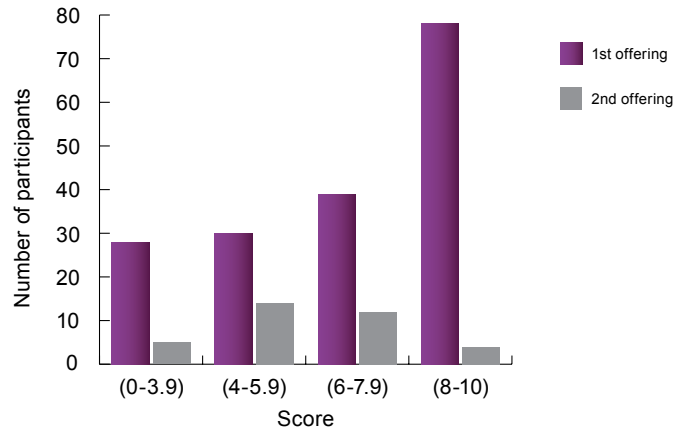**Figure 3.** Use of Resources and Quizzes in the First Offering
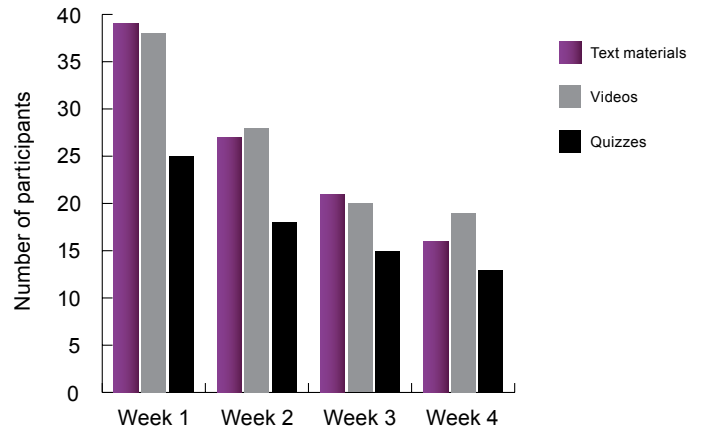
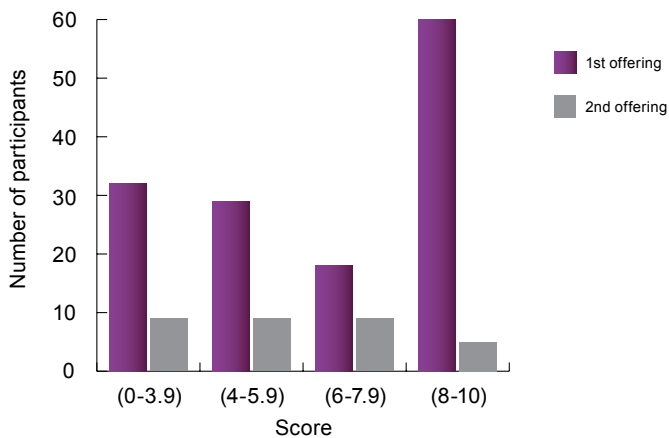**Figure 4.** Use of Resources and Quizzes in the Second Offering

Quiz scores in the first offering were generally higher than quiz scores in the second offering, as shown in Figures 5-8.
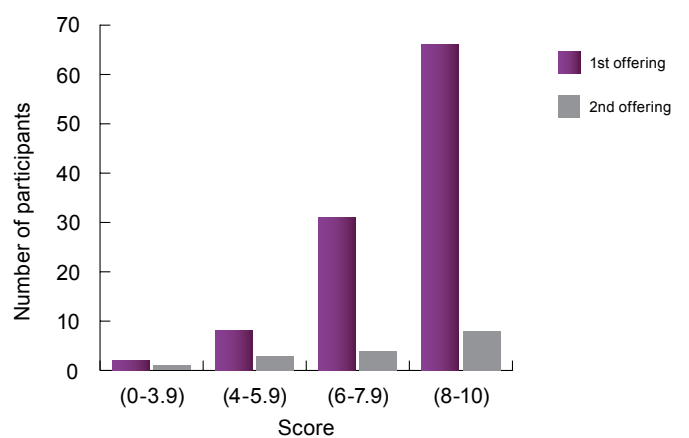

Figure 5. Score in Quiz 1

Figure 6. Score in Quiz 2

Figure 7. Score in Quiz 3

Figure 8. Score in Quiz 4

As shown, there was a high dropout rate in each of the two offerings of the MOOC. The two main reasons cited by participants in the post-course survey are limited access to the Internet, slow Internet connection, and lack of time to complete the course. The first two reasons are consistent with what education administrators said during the interview regarding the state of IT infrastructure in their institutions. (The principal of one college said, "…we have around 1,600 students but the Internet bandwidth we are using is only 1Mbps.")

5.3 Factors that Need to Be Considered in the Design and Implementation of MOOCs in Nepal

Based on the results of the baseline survey, the following factors were considered in the design and implementation of the MOOC:

- Since the participants are very new to MOOCs, an orientation and clear instructions must be given.
- Participants have basic IT knowledge but are not familiar with online learning systems.
- The medium of instruction does not need to be the native language. Rather, English is preferred.

Based on the results of the two pilot runs of the MOOC, including responses to the pre- and post-course surveys and analysis of the MOOC participants' learning behavior, the following also need to be considered in designing and implementing MOOCs in Nepal:

- Both text and video materials should be provided as participants have different preferences with regard to the type of course materials.
- Since the Internet connection is slow and expensive, shorter and lower-resolution videos should be used.
- The participants were not active in discussion forums but they took advantage of the opportunity to take the quizzes multiple times and they appreciated that scores can be seen right away. In addition to quizzes, other interactive learning activities can be provided. Moreover, there may be more participation in discussion forums where there is active facilitation by the teacher.
- Since lack of time was cited by many as a reason for not completing the course, providing guidance on time management and other study skills is necessary.
- Student participation and performance, especially around course milestones (such as the end of each unit or after an assessment activity), should be closely monitored, and efforts to reach out to students who drop out at these points initiated.

VI. IMPLICATIONS AND RECOMMENDATIONS

This study showed that students in Nepal are interested in online learning but have very limited experience of online learning. Their awareness of MOOCs is almost nil but they are open to enrolling in MOOCs. Many of the participants in the MOOC piloted in this study were taking a MOOC for the first time.

MOOC participants in Nepal, on the other hand, should include reliable and affordable Internet access and recognition for what they have learned through MOOCs and through relevant certification policies and procedures.

> *Their awareness of MOOCs is almost nil but they are open to enrolling in MOOCs. Many of the participants in the MOOC piloted in this study were taking a MOOC for the first time.*

However, the study also showed that willingness to participate in online learning and MOOCs is not enough. Although many of the students who participated in the baseline survey said that they will enroll in the MOOC designed for this project, they did not actually enroll. This indicates that there must also be readiness for this mode of learning on the part of learners, as well as support for learners to be able to overcome challenges in this mode of learning. Readiness includes having the necessary digital skills and a sufficient level of motivation to learn online, including the motivation to devote time to study. Support for

It should also be pointed out that the study involved only one MOOC on a specific topic (programming). The subject matter as well the lack of choice in this regard might also have been a reason for the low enrollment. Developing MOOCs on other topics that are relevant to Nepalese students would be worth exploring. It is also necessary to engage higher education policymakers, administrators, and faculty in Nepal in a systematic discussion of how online learning and MOOCs, in particular, can be leveraged to meet the needs of teachers and learners, educational institutions, and the higher education system, as a whole.

Photo Credit: Manoj Shakya

VII. CONCLUSION

This project increased awareness of online learning, and MOOCs in particular, among the university students and teachers and education administrators in Nepal. By piloting a MOOC in C programming, the project has provided proof that MOOCs can be implemented in the Nepalese context to address specific education needs. While the number of MOOC participants was lower than expected, the observed pattern of learner behavior in the MOOC, including dropout rates, was not different from that observed in MOOCs elsewhere, and the participants considered the MOOC relevant and useful. This initial experience in developing and implementing a MOOC provides lessons learned and insights into how MOOCs for Nepalese learners should be designed and delivered. Moreover, the project has prepared the groundwork for further networking and collaboration in the field of online learning in Nepal in the future.

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Photo Credit: Manoj Shakya

VIII. PROJECT INFORMATION AND OUTPUTS

The one-year project was successfully completed, and the main research questions were answered. The first ever MOOC in Nepal was delivered by Kathmandu University to more than 400 students of which 32 received certificates of completion.

In addition, through the baseline survey, 1,750 students and 162 teachers in four different regions of Nepal were made aware of online learning and MOOCs in particular. Similarly, 31 college administrators were introduced to the concept of MOOCs and they found it relevant to teaching and learning in Nepal.

A website[4] was developed to disseminate information regarding this project. While there are as yet no journal publications from the project, the following conference papers were produced:

- "Awareness of MOOCs among college students: A study of Far Western Region of Nepal." Presented at the 3rd International Conference on Information Technology for Development, 30 July–1 August 2016, Kathmandu, Nepal.

- "Initiation of MOOC in Nepal." Presented at the National Conference on ICT Integrated Pedagogy for Effective and Meaningful Learning, Kathmandu, Nepal
- "MOOCs: From Nepal perspective." Accepted for presentation at the 4th International Conference on Information Technology for Development, 28–30 July 2017, Kathmandu, Nepal.
- "Reflections on first MOOC of Nepal: From learner's perspectives." Presented at the International Conference on Open and Innovative Education, 12–14 July 2017, Hong Kong.
- "MOOC: Opportunities and challenges in context of Nepal." Presented at the Doctoral Student Forum on MOOC Research, 12-14 July 2017, Peking University, China.
- "MOOC: From business perspective." LIVE Interview by a TV show called "ARTHASAROKAR" in TV Today, 19 September 2017.

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Photo Credit: Manoj Shakya

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