



RESEARCH NOTE

REVISED Utility of massive open online courses (MOOCs) concerning outbreaks of emerging and reemerging diseases [version 2; peer review: 2 approved]

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Abstract

The emergence and re-emergence of infectious diseases such as Ebola, chikungunya, and Zika increase the necessity of knowledgeable and skilled health professionals. Massive open online courses (MOOCs) arise as opportunities that allow people around the world to participate in higher education courses. A search was conducted on specialized MOOC platforms to find courses related to outbreaks, using terms included in the list of the WHO disease outbreaks from January 1st to December 31st, 2016. We found seven courses about Ebola, two about Zika, three about the dynamics of epidemics and pandemics, and only one course about dengue, chikungunya, and malaria. Most of the courses were conducted in English. The courses on Ebola, Zika and chikungunya were released after their last outbreak. MOOCs could be used to learn about health issues of global relevance, and with the necessity of fast divulgation of knowledge and skills. Translating the courses into more languages could give these courses more traction, and allow participation of professionals in regions affected by these outbreaks.

Keywords

education, public health professional, education, distance, health education, education, medical, continuing; disease outbreaks, hemorrhagic fever, Ebola, Zika virus, chikungunya fever

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report



report

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Any reports and responses or comments on the article can be found at the end of the article.

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REVISED Amendments from Version 1

This new version adds information on the methods, mentioning that MOOC aggregator platforms were used when information about the courses was not available on the platforms that offered that courses before. In the results, now there is a clarification that notes that all the courses founded about MOOCs and outbreaks had been made for health-related professionals.

See referee reports

Introduction

The emergence and re-emergence of infectious diseases is partly due to the climate change, more specifically due to the rise in global temperature, as well as the increased migration and unplanned urbanization¹. These events of great relevance to global health have turned these unknown diseases into realities many health professionals have to face daily.

Ebola virus causes an acute and severe disease that is usually fatal if left untreated. Its last outbreak in March 2014 was the largest in history, causing a dramatic number of more than 11,000 deaths and 28,000 new infections worldwide. It affected several countries in West Africa, generating much concern worldwide due to its estimated 50% mortality rate. Similarly, diseases such as chikungunya² and Zika³ have shown several reasons to be considered serious infectious diseases.

Given the pandemic potential of these viral diseases, it is important to assess the knowledge and awareness of our health professionals regarding the mode of transmission of these diseases. In this era of globalization and technology, one of the main impacts of the Internet and the web 2.0 have been the acceleration of the process of sharing information, allowing health professionals to have quick and easy access to the latest research in medicine and health⁴.

Massive open online courses (MOOCs) are online classes or lectures accessible for people all around the world that want to participate in higher education courses. MOOCs material includes videos, slideshows, discussion boards, quizzes, audios or any combination thereof. Usually, participants do not pay any fee to take a course. The topics in MOOCs vary widely and include science, engineering, and arts; and are usually developed by well-known figures in the study area⁵.

Methods

From 1st May to 31st May, 2017, we conducted a manual search on several learning platforms that offer MOOCs, including Coursera, edX, FutureLearn, Udacity, Miríada X, Alison, FUN. MOOC, Canvas Network, and Iversity to find courses about disease outbreaks using the terms included in the list of WHO

disease outbreaks from January 1st to December 31st, 2016 (Box 1). Information about the learning platform, institution, course length, time required per week, language and subtitles availability for every course were collected and reported using frequencies in the case of categorical data and ranges for numerical data. If the information about the course was not available on the learning platform that originally offered it, we use the information provided by MOOC aggregator platforms such as Class Central and MOOC List

Box 1. List of terms included in the manual search for MOOCs about disease outbreaks, 2016

epidemic(s), pandemic(s), outbreak(s), emerging diseases, re-emerging diseases, Ebola virus disease, Ebola virus, Ebola, ébola, EVD, viral hemorrhagic fevers, hemorrhagic fever syndrome, Zika, Zika virus, Chikungunya, Chikungunya virus, Lassa, Lassa Virus, MERS-CoV, Middle East respiratory syndrome coronavirus, Yellow fever, Lassa fever, Human infection with avian influenza, Oropouche virus, Rift Valley fever and Wild polio and vaccine derived polio

Source: WHO, Emergencies preparedness, response. Diseases outbreaks by year, 2016. <http://www.who.int/csr/don/archive/year/2016/en/>

Results

We found seven courses about Ebola, two about Zika, three about the dynamics of epidemics and pandemics, and only one course about dengue, chikungunya, and malaria. The duration of the courses ranged from 2 to 10 weeks. 11 out of 13 courses were held only in English, with the possibility to select subtitles in English or other languages; there was one in English and Chinese, and only one exclusively in Spanish. Most courses (5 out of 13) originated from to USA centers including Emory University, University of Pittsburgh, The Pennsylvania State University, Harvard University and University System of Maryland. The information provided with the courses included audiovisual material, papers, and self-assessments. All the courses were made for health-related professionals and presented information about epidemiology and lessons about the outbreaks and prevention activities for a possible new scenario of transmission of infectious diseases. The courses on Ebola, Zika and chikungunya were released after the last outbreaks of these diseases, respectively (Table 1).

Dataset 1. Data on 2016 massive open online courses about disease outbreaks, offered on learning platforms, retrieved from manual searches

<http://dx.doi.org/10.5256/f1000research.12639.d177854>

The dataset contains information on the learning platform, institution, course length, time required per week, language and availability of subtitles.

Table 1. Characteristics of the massive open online courses (MOOCs) about disease outbreaks of 2016, offered by learning platforms.

Platform	Title	Institution (Country)	Duration in weeks	Hours per week	Language (Subtitles)
FutureLearn	Ebola in Context: Understanding Transmission, Response and Control	London School of Hygiene and Tropical Medicine (United Kingdom)	2	Self-paced	English (English)
FutureLearn	Ebola: Symptoms, History and Origins	Lancaster University (United Kingdom)	2	3	English (English)
FutureLearn	Preventing the Zika Virus: Understanding and Controlling the Aedes Mosquito	London School of Hygiene and Tropical Medicine (United Kingdom)	3	4	English (English)
Coursera	Ebola: an evolving epidemic	Emory University (USA)	6	Self-paced	English (English)
Coursera	Ebola: Vaincre ensemble!	University of Geneva (Switzerland)	5	Self-paced	French (French, English)
Coursera	Ebola: Essential Knowledge for Health Professionals	University of Amsterdam (Netherlands)	9	Self-paced	English (English, Arabic)
Coursera	In the footsteps of Zika... approaching the unknown	University of Geneva (Switzerland)	8	5	English (English, French, Portuguese, Spanish)
Coursera	Epidemics, Pandemics and Outbreaks	University of Pittsburgh (USA)	4	3-4	English (English)
Coursera	Epidemics - the Dynamics of Infectious Diseases	The Pennsylvania State University (USA)	8	2-3	English (English)
edX	Lessons from Ebola: Preventing the Next Pandemic	Harvard University (USA)	4	3-4	English (English)
edX	Global Health – The Lessons of Ebola	University System of Maryland (USA)	6	2-3	English (English)
edX	Epidemics	The University of Hong Kong (Hong Kong)	10	2-3	English, Chinese (English, Chinese)
edX	ETV: Paludismo, Dengue y Chikungunya	The Ministry of Education of Mexico (Mexico)	2	10	Spanish (Spanish)

Discussion

Finding MOOCs about Ebola, chikungunya, and Zika after the start of their last outbreaks demonstrates the interest of institutions in offering information to the public. The vast majority of courses are offered in English, with a few having subtitles in other languages. MOOCs offer a recent and emerging form of education. There is a continuous increase in the number of

courses offered in this format and, by 2015, a total of 35 million participants in 4.200 MOOCs were counted, with 8.27% of these courses corresponding to health and medicine.

The spread of diseases makes it necessary to invest in alternative methods of spreading knowledge, to improve the capabilities of health professionals in topics that affect people worldwide.

MOOCs could be used to learn about health issues of global relevance, and with the necessity of fast divulgation of knowledge and skills. Because the countries most affected by these diseases do not have English as the native language, promoting the translation of content into more languages could give these courses more traction, and allow participation of professionals in regions affected by these outbreaks.

Data availability

Dataset 1: Data on 2016 massive open online courses about disease outbreaks, offered on learning platforms, retrieved from manual searches. The dataset contains information on the learning

platform, institution, course length, time required per week, language and availability of subtitles. DOI, [10.5256/f1000research.12639.d177854](https://doi.org/10.5256/f1000research.12639.d177854)⁶.

Competing interests

No competing interests were disclosed.

Grant information

The author(s) declared that no grants were involved in supporting this work.

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[Data Source](#)

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Shirley Ann Williams 

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Tharindu Liyanagunawardena

University College of Estate Management, Reading, UK

This is an interesting research note identifying MOOCs relating to emerging and re-emerging diseases. The work in its current form is acceptable as a research note, and the conclusion that such MOOCs need to be available in more languages is an important point.

If the authors are to extend their work there is scope for improvement:

1. The search window was very limited, it is possible that MOOCs that had completed would not be found. Adding MOOC aggregators (such as Class Central) to the search areas could have identified more courses, than those on offer in May 2017.
2. There are many barriers to accessing MOOCs, especially in developing countries, for example access to computers, connectivity, digital skills, as well as fluency in international languages. Consideration of all potential barriers will be important in future work.
3. The target audience of the MOOCs is not clear in this report, and there may be benefit in classifying courses that are aimed at health professionals and those aimed at the general public. Then considering whether there is benefit in a direct linguistic translation for particular MOOCs.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Not applicable

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Learning technologies, MOOCs

We have read this submission. We believe that we have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 19 Dec 2017

Akram Hernández-Vásquez, Universidad Nacional de Ingeniería, Lima, Peru

Dear Dr. Williams and Dr. Liyanagunawardena

Thank you very much for your response. Regarding your comments:

1. About the use of MOOC aggregators, the authors used Class Central and MOOC List for both obtain the list of MOOC websites and for obtaining information about MOOCs completed before our time frame. Now, that information is included in methods:
From 1st May to 31st May 2017, we conducted a manual search on several learning platforms that offer MOOCs, including Coursera, edX, FutureLearn, Udacity, Miriada X, Alison, FUN.MOOC, Canvas Network, and University to find courses about disease outbreaks using the terms included in the list of WHO disease outbreaks from January 1st to December 31st, 2016 (Box 1). ***If the information about the course was not available on the learning platform that originally offered it, we use the information provided by MOOC aggregator platforms such as Class Central and MOOC List*** because Information about the learning platform, institution, course length, time required per week, language and subtitles availability for every course were collected and reported using frequencies in the case of categorical data and ranges for numerical data.
2. Thank you for your recommendation. Our study group is developing a survey to measure barriers to accessing and using MOOCs produced locally.
3. About the target population, all the courses were aimed at health professionals. Considering this, we have included this information in the results section:
We found seven courses about Ebola, two about Zika, three about the dynamics of epidemics and pandemics, and only one course about dengue, chikungunya, and malaria. The duration of the courses ranged from 2 to 10 weeks. 11 out of 13 courses were held only in English, with the possibility to select subtitles in English or other languages; there was one in English and Chinese and only one exclusively in Spanish. Most courses (5 out of 13) originated from to USA centers including Emory University, University of Pittsburgh, The Pennsylvania State University, Harvard University and University System of Maryland. The information provided with the courses included audiovisual material, papers, and self-assessments. ***All the courses were made for health-related professionals*** and presented information about epidemiology and lessons about

the outbreaks and prevention activities for a possible new scenario of transmission of infectious diseases. The courses on Ebola, Zika, and chikungunya were released after the last outbreaks of these diseases, respectively.

Competing Interests: No competing interests were disclosed.

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Mohamed A Gouda

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This is a nice short report from the study conducted by Bendezu-Quispe G *et al.* about the existence of MOOCs with focus on emerging and re-emerging diseases. The idea is simple, and so is the methodology. However, I have concern regarding the time frame selected for the study which was limited to the year 2016. Some of the outbreaks highlighted in the background started in earlier years and were terminated in 2016. I think that more valid and strong data could have been provided if there were no time limits thus allowing for exploration of MOOCs presented at the time of epidemics. Otherwise, authors have properly presented their data. I believe their work would be a good start for further exploration of this area.

Is the work clearly and accurately presented and does it cite the current literature?

Yes

Is the study design appropriate and is the work technically sound?

Yes

Are sufficient details of methods and analysis provided to allow replication by others?

Yes

If applicable, is the statistical analysis and its interpretation appropriate?

Yes

Are all the source data underlying the results available to ensure full reproducibility?

Yes

Are the conclusions drawn adequately supported by the results?

Yes

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: Medical education, oncology

I have read this submission. I believe that I have an appropriate level of expertise to confirm that it is of an acceptable scientific standard.

Author Response 19 Dec 2017

Akram Hernández-Vásquez, Universidad Nacional de Ingeniería, Lima, Peru

Dear Dr. Gouda

Thank you for your comments regarding our Research note on MOOCs on emerging and reemerging diseases. About the time frame, in February 2016, WHO declared Zika's outbreak a public health emergency of international concern. Based on that announcement, we conducted a search about MOOCs of Zika. We expected that both public and academia concern about this disease will impact the number of MOOCs developed about this topic. However, the presence of outbreaks of diseases such as chikungunya and Oropuche during 2016, expanded our research scope. The 2016 WHO's list of diseases outbreaks included: Ebola, viral hemorrhagic fevers, hemorrhagic fever syndrome, Zika, Chikungunya, Lassa, MERS-CoV, Middle East respiratory syndrome coronavirus, Yellow fever, Human infection with avian influenza, Oropouche virus, Rift Valley fever and Wild polio and vaccine derived polio. This list includes a vast number of diseases that were also included in the annual lists of outbreaks published by WHO before 2016. Hence, it is not expected that a significant increase in the number of MOOCs after increasing the list of outbreaks before 2016.

Competing Interests: No competing interests were disclosed.

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