Massive Open Online Course (MOOC) Opportunities in Health Education (HE) in a mandatory social isolation context

Gandy Dolores-Maldonado1,2, Jorge L. Cañari-Casaño3, Rosalia Montero-Romainville1,4, German Malaga1

1Unidad de Conocimiento y Evidencia (CONEVID), Universidad Peruana Cayetano Heredia, Lima, Peru
2Núcleo de Investigación en Alimentación y Nutrición, Universidad Nacional Mayor de San Marcos, Lima, Peru
3Emerge, Emerging Diseases and Climate Change Research Unit, School of Public Health and Administration, Universidad Peruana Cayetano Heredia, Lima, Peru
4Unidad de Ciudadanía Intercultural y Salud Indígena. Facultad de Salud Pública y Administración. Universidad Peruana Cayetano Heredia, Lima, Peru

Abstract

Background: Routine care for prevention and health promotion has reduced significantly due to the Covid-19 pandemic and mandatory social isolation measures. In this context, it is necessary to identify and describe Massive Open Online Courses (MOOCs) that provide opportunities for health education, promotion, and prevention aimed at the general population. The study is a systematic review of MOOCs on health education, health promotion, and prevention for the general population in a pandemic context.

Methods: We developed a search for MOOC courses aimed at the general population on health education, health promotion, and prevention in different available MOOC platforms. We executed a descriptive analysis of the main characteristics of the selected MOOCs.

Results: There were 117 MOOCs chosen on health education, promotion, and prevention for the general population. Coursera (40.3%) was the platform that offered the highest quantity of MOOCs; more than half of the MOOCs were in English (52.9%). The median (interquartile range) duration of the selected MOOCs was 11 (6–15) hours. The predominant themes were "Health promotion" (43%) and "Food and nutrition" (31%), and the origin was mainly from Europe (37.8%).

Conclusions: MOOC offerings in health education are diverse, predominantly in English, of European origin, and in health promotion issues. This study opens an opportunity to multiply initiatives in different territories, considering other languages and topics more akin to each territorial reality, allowing it to be a more equitable learning opportunity in times of pandemic and compulsory social isolation.
Introduction

In December 2019, the COVID-19 pandemic was triggered by severe acute respiratory syndrome coronavirus 2 (SARS-CoV-2), revealing the fragility of the health systems of developing countries; as of February 1, 2021, the cases amounted were 134,228,450, with 2,229,565 deaths worldwide (COVID-19 Map - Johns Hopkins Coronavirus Resource Center) and the countries with the highest fatality due to COVID-19 are mostly low-middle-income countries (LMICs) with precarious health systems or those that have already collapsed.22

Primary care service efforts have concentrated on containing the COVID-19 pandemic, for which there is a great concern about what could be neglected (OPS/OMS Perú - OPS/OMS Perú), reduction in access to medical doctors, drugs and growth monitoring during the lockdown period.3 Also, disruptions in drug supply chains are likely associated with defaulters on immunization schedules, which may lead to future outbreaks of preventable diseases such as diphtheria.5 It has been estimated that maternal and child neglect in LMICs could be devastating in a context where maternal deaths could increase up to 60% and infant mortality up to 41%. It the control of endemic infectious diseases, such as malaria,6 as well as chronic non-communicable diseases (NCDs), such as hypertension and diabetes, have been neglected or suspended,7 and there has been an increase in mental illnesses such as anxiety, depression, and suicide.8 Furthermore, there is a concern of the population to visit health systems for their routine care for fear of contagion.9 Against this, some countries implemented remote healthcare systems (teleconsultation)10 and health communication campaigns. However, these strategies have been insufficient to cover the demand for healthcare affected by the pandemic and mandatory social isolation measures.

The pandemic context requires changes and identification of strategies that can help meet the indirect effects of neglect of diseases not related to COVID-19 in health systems. In this scenario, Massive Open Online Courses (MOOCs) could be an educational option to disseminate systematized courses on education, health promotion, and prevention aimed at the general population.

MOOCs, in the past, have been an opportunity for health education for developing countries. Among their advantages are global accessibility, flexible hours, multiple teaching tools, and that they are generally free. MOOCs have been an educational response to emerging and re-emerging disease epidemics.11 However, to access these resources, inequities exist for developing countries, such as language barriers and technological access.12

Methods

For this study, we conducted a digital search on MOOC platforms like Coursera, edX, FutureLearn, XuetangX, Udacity, Miríadax, Alison, Canvas Network, and OpenWHO, among others to identify MOOCs with content related to health education, promotion, and prevention aimed at the general public. Also, the search involved explored topics related to health, well-being, and medicine. We included terms as nutrition, healthy life, physical activity, medical care, healthy nutrition, mental health, and variants.

Three authors conducted the MOOC search manually and independently on the mentioned virtual platforms. The search development was between the months of June and December 2020. Likewise, we had to consult websites on larger platforms available in the world like Class Central and MOOC List. We started the search of each virtual platform and examined MOOC contents with the terms described above. The eligibility criteria for selecting the MOOCs were that they had content related to health education, and were aimed at the general population; further, we considered availability of registration/access at the time of the search.

Subsequently, through a peer review, the researchers excluded MOOCs that showed highly specialized content or requested a prerequisite. MOOCs aimed at professionals or indicated that they were MOOCs for professional certification were also not considered, neither were those only available as paid content. If a conflict or inconsistency existed about our exclusion criteria, it was solved through deliberation peer review. We organized MOOCs by groups according to similar topics for a better description.

The data analysis was about the place of origin, principal language, and duration of the course. We used frequency measures to describe the categorical characteristics and dispersion measures to describe the hours. The analysis was using STATA version 16 (RRID:SCR_012763), Statistical analysis may also be performed using RStudio open source software for Windows, version 4.0.0.

Results

With the established search criteria, a total of 217 MOOC courses were found on the different platforms. After excluding MOOC courses because they were specialized, unavailable, aimed at other target audiences, or without relation to health education, we selected 117 of the total MOOCs to be analyzed (Figure 1).
The 117 MOOCs analyzed were classified into six groups according to their content, with themes such as “health promotion” and “food and nutrition”. These latter two accounted for more than 60% of the total MOOCs included. Regarding the duration of time, the MOOCs had a median (interquartile range) of 11–15 hours and the topics of health promotion and community health and social rights presented higher medians, as well as a minimum of 8.5 hours and a maximum of 16.5 hours (Table 1).

Of the total number of courses on the topics “Health promotion” and “Psychology and mental health”, 21 (50%) and 12 (52.17%) were offered on the Coursera platform. (Table 2). Likewise, all the courses around COVID19 (5 MOOCs) were classified (4 MOOCS) in “Psychology and mental health” and 1 (4 MOOC) in “Health promotion”.

**Table 1. Frequency, median and interquartile range of MOOC duration time.**

<table>
<thead>
<tr>
<th>N°</th>
<th>Topics</th>
<th>N (%)</th>
<th>Median (IR)</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>Health promotion</td>
<td>42 (35.9)</td>
<td>12 (8.5-16.5)</td>
</tr>
<tr>
<td>2</td>
<td>Food and nutrition</td>
<td>31 (26.5)</td>
<td>9 (6-12)</td>
</tr>
<tr>
<td>3</td>
<td>Psychology and mental health</td>
<td>23 (19.7)</td>
<td>11 (5-16)</td>
</tr>
<tr>
<td>4</td>
<td>Health care</td>
<td>13 (11.1)</td>
<td>10 (6-12)</td>
</tr>
<tr>
<td>5</td>
<td>Climate change and health</td>
<td>4 (3.4)</td>
<td>2 (2-5)</td>
</tr>
<tr>
<td>6</td>
<td>Community health/social rights</td>
<td>4 (3.4)</td>
<td>15 (13.5-16)</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>117 (100)</td>
<td>11 (6-15)</td>
</tr>
</tbody>
</table>

IR: Interquartile range.

**Table 2. Distribution of MOOC topics by platform.**

<table>
<thead>
<tr>
<th>Topics</th>
<th>Coursera</th>
<th>Future Learn</th>
<th>Class Central</th>
<th>Edx</th>
<th>Other</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Health promotion</td>
<td>21 (50)</td>
<td>6 (14.3)</td>
<td>8 (19.1)</td>
<td>6 (14.3)</td>
<td>1 (2.3)</td>
<td>42 (100)</td>
</tr>
<tr>
<td>Food and nutrition</td>
<td>9 (29.0)</td>
<td>10 (32.3)</td>
<td>8 (25.8)</td>
<td>1 (3.2)</td>
<td>3 (9.7)</td>
<td>31 (100)</td>
</tr>
<tr>
<td>Psychology and mental health</td>
<td>12 (52.2)</td>
<td>8 (34.8)</td>
<td>1 (4.3)</td>
<td>0 (0.00)</td>
<td>2 (8.7)</td>
<td>23 (100)</td>
</tr>
<tr>
<td>Health care</td>
<td>2 (15.4)</td>
<td>3 (23.0)</td>
<td>2 (15.4)</td>
<td>5 (38.5)</td>
<td>1 (7.7)</td>
<td>13 (100)</td>
</tr>
<tr>
<td>Climate change and health</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (100)</td>
<td>4 (100)</td>
</tr>
<tr>
<td>Community health/social rights</td>
<td>3 (75)</td>
<td>1 (25)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (100)</td>
</tr>
<tr>
<td>Total</td>
<td>3 (75)</td>
<td>1 (25)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>0 (0)</td>
<td>4 (100)</td>
</tr>
</tbody>
</table>

*The rows represent 100%.*
<table>
<thead>
<tr>
<th>Topic</th>
<th>Language</th>
<th>Origin</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>English</td>
<td>Spanish</td>
</tr>
<tr>
<td></td>
<td>n (%)</td>
<td>n (%)</td>
</tr>
<tr>
<td>Health promotion</td>
<td>20 (47.6)</td>
<td>6 (14.3)</td>
</tr>
<tr>
<td>Food and nutrition</td>
<td>16 (51.6)</td>
<td>5 (16.1)</td>
</tr>
<tr>
<td>Psychology and mental health</td>
<td>15 (65.2)</td>
<td>1 (4.4)</td>
</tr>
<tr>
<td>Health care</td>
<td>8 (61.5)</td>
<td>1 (7.7)</td>
</tr>
<tr>
<td>Climate change and health</td>
<td>0 (0.0)</td>
<td>4 (100)</td>
</tr>
<tr>
<td>Community health/social rights Total</td>
<td>3 (75)</td>
<td>1 (25)</td>
</tr>
</tbody>
</table>

*The rows represent 100%.
Regarding the principal language, English was identified in 62 (53%) of the MOOCs the language of preference, followed by Spanish in 18 (15.4%) MOOC courses (data not shown). Likewise, the principal language for all topics was English, with the exception of the climate change and health topics (See Table 3).

Regarding the origin of the MOOC courses, we found that 44 (37.6%) of the MOOCs were from institutions in Europe, followed by America 27 (23.1%) and Asia 26 (22.2%) (Data not shown). In the case of America, 25 (21.4%) were from North America and 2 (1.7%) from South America (data not shown). The topics of health promotion, psychology, and mental health and health care came mainly from universities in Europe; and the food and nutrition topic mainly from Asia (See Table 3).

Discussion
We identified 117 MOOC courses on health promotion. The majority are offered in English and are carried out mainly by institutions in Europe. Most of the courses were on the topics of health promotion and food and nutrition.

From the preliminary search, it was evident that a large number of MOOCs were highly specialized, were aimed at professionals, or offered professional certification, and some are not available without payment. Although we have not included these MOOCs in the study, it is essential to notice that it can be an indicator of the limited supply of MOOCs with a profile aimed at the general public or users of primary level care centers, with the content of free health education and aimed at prevention and healthcare. We consider that this is an extremely important point regarding access to health education in a context of compulsory social isolation.

Regarding the predominant themes of health promotion and food and nutrition, certain similarity was found with another study whose main topics were food, nutrition, your health, and introduction to health nursing, courses were aimed at professionals. MOOCs on health and medicine allow patients to acquire health education on specialized topics. Patients can gain understanding in disease implications, conditions, techniques, and available interventions around their disease, especially in the early stages. Besides, there are some useful topics which are still taboo, such as contraception, drug addiction, and acquired immunodeficiency syndrome (AIDS); courses focused on these topics help people educate themselves without having to visit an office.

The MOOCs found around psychology and mental health turn out to be a learning opportunity for stress management in times of compulsory social isolation. The results end up being part of recommendations to review said web-based interventions in mental health literacy promotion. Because adolescents and young people present more difficulties for decision-making in health often searching for information on the web, it is evident that they do not differentiate between reliable and less reliable information and that they do not know how to translate what they read into healthy behaviors.

Among other issues, community health and social rights take a position in the context of compulsory social isolation since many decisions about health can be taken collectively in the community environment; additionally, many of them can be taken at the family level or by the influence of peers, without considering the repercussions of community leadership in some scenarios. Therefore, individual decisions can be even more relevant; for example, vaccination can affect a significant group of the population and have an impact on a higher incidence of some pathologies at the community level, especially when there is an increase in those who will not be vaccinated even during the COVID-19 pandemic.

Therefore, access to information through a MOOC could empower people who would not otherwise know about the options offered. This study shows that various institutions and organizations worldwide have seen MOOCs as an educational opportunity due to their relatively low cost and whose success depends on the quality of their contents, the teacher’s strategies, and the focused courses.

Similar to previous studies was evidence that the Coursera platform was the one that hosted the largest number of MOOCs. Regarding the origin of the MOOCs, the largest number were from developed countries, from institutions in Europe and North America, similar results were described in other studies, being, by default smaller quantity offered by Latin American countries. This predominant origin could be because more than half of the MOOCs were offered and developed in English and only 22% in Spanish. Proof of this is that of the 23, 13, and four MOOCs on psychology and mental health, health care, community health and social rights, respectively, only one MOOC for each topic was in Spanish.

Because the majority of MOOCs are in English, it may be a limitation for access and learning opportunities in times of pandemic for the Latin American population. As well as language, aspects such as the absence of a computer and internet, or educational level may also limit access to MOOCs in times of compulsory social isolation.
Considering the fact that these courses were offered by developed countries, this could limit the topics addressed to being oriented with a different health reality from that of developing countries, where diseases such as anemia, malnutrition, or infectious diseases are the most frequent. This scenario could explain the high level of MOOCs from North America and Europe (Heather Miller and Martin Odersky. Functional Programming Principles in Scala: Impressions and Statistics | Scala Documentation) compared with South America, Africa, and Oceania. It is known that courses are built based on a context and socioeconomic condition for a target population, and participation levels were higher when considered these variables. MOOCs with an approach based on the reality of LMICs could be an opportunity, addressing issues such as chronic malnutrition, anemia, among frequent health problems that this population suffers, even more so in times of pandemic due to the restricted care of primary health centers to provide services on these issues.

Among the limitations were that the chosen courses are based exclusively on the authors' criteria. The possibility of including studies that did not meet the inclusion criteria was lowered by performing the peer review. Courses classified into topics related to health education considered when compiling MOOCs for the review. However, if a MOOC has an incorrect classification, it would not have been identified for review. In cases for which MOOCs were offered in languages different than English, we used Google Translate for content translation. Finally, the study aimed not to evaluate the quality of the contents in the MOOCs; however, almost all the MOOCs declared their institutional origin, which was predominantly universities.

Finally, the study showed most of the MOOC courses in health education aimed at the general population or users of health systems were framed mainly in the themes of health promotion and food and nutrition, originating from European institutions and North America and with a higher predominance of the English language.

MOOCs are shown as key tools to empower people, so in a pandemic context, the need to invest in alternative methods of dissemination of knowledge for knowledge-based empowerment would arise, covering the capacities of the general public that at present it is affected by not having access to care in health services of the first level of care. In addition to this, a critical shortage of human resources in health and healthcare, comprising a limited number of medical professors and limitations in physical infrastructures are reasons that increase the need to access online courses in health education of the level primary. Although the MOOCs’ origin was mainly from university institutions a future analysis of the quality of the contents must be addressed for greater comprehensiveness.

Data availability
Underlying data
Open Science Framework: Underlying data for ‘Massive Open Online Course (MOOC) Opportunities on in Health Education (HE) during of mandatory social isolation context’, https://doi.org/10.17605/OSF.IO/5UJ3V.

This project contains the following underlying data:

A database with information from the MOOCS, institutions, platform and language.

Data are available under the terms of the Creative Commons Zero “No rights reserved” data waiver (CC0 1.0 Public domain dedication).

Acknowledgements
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References
Open Peer Review

Current Peer Review Status: ✗

Version 1

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Waleed Mugahed Al-Rahmi
School of Education, Faculty of Social Sciences and Humanities, Universiti Teknologi Malaysia, Johor Bahru, Malaysia

1. The aim of this research not clear. The authors should clarify the aims.

2. The research problems are not clear. Therefore, the authors should address the research gap first, and I suggest adding new section to explain about the real problems.

3. I suggest adding research model, and test this model by Structural Equation Modeling (SEM), Why? Because we need to see the validation of theories applied in this research.

4. I suggest for authors to read and cite the following references:
   - A. The use of Massive Open Online Courses (MOOCs) in blended learning courses and the functional value perceived by students
   - B. Integrating innovation diffusion theory with technology acceptance model: Supporting students' attitude towards using a massive open online courses (MOOCs) systems.
   - C. Massive Open Online Courses: enhancing caregiver education and support about dementia care towards and at end of life.
   - D. Massive Open Online Courses (MOOCs): Data on Higher Education.
   - E. Perceived user satisfaction and intention to use massive open online courses (MOOCs).
   - F. Predicting user perceived satisfaction and reuse intentions toward Massive Open Online Courses (MOOCs) in the Covid-19 pandemic: An application of the UTAUT model and quality factors.

5. The research methodology is not clear, the authors should explain more and add some references.

6. The results analysis is not enough to show the research contributions. Therefore, the authors should add more analysis.
7. The authors should explain more what is the difference between this research with prior experimental results, and related research.

8. The authors should add new section about the limitations of this research, as well as what is the future research?

References

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

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

Are sufficient details of methods and analysis provided to allow replication by others?
No

If applicable, is the statistical analysis and its interpretation appropriate?
No

Are all the source data underlying the results available to ensure full reproducibility?
No source data required

Are the conclusions drawn adequately supported by the results?
Partly

Competing Interests: No competing interests were disclosed.

Reviewer Expertise: computer and education
I confirm that I have read this submission and believe that I have an appropriate level of expertise to state that I do not consider it to be of an acceptable scientific standard, for reasons outlined above.

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