First 'Global Flipped Classroom in One Health': From MOOCs to research on real world challenges

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ABSTRACT

In 2016 and 2017 the first three MOOCs (Massive Online Open Course) addressing One Health were released, two of them by University of Geneva and University of Basel (Switzerland). With the support of Swiss School of Public Health and using these two highly interdisciplinary MOOCs, the first 'Global Flipped Classroom in One Health' was organized in Geneva and Basel in July 2017. This innovative event gathered 12 Swiss and international MOOC learners to work on specific public/global health challenges at the human-animal-ecosystem interface in interdisciplinary teams supported by experts from academia and international organisations (e.g. World Health Organization) based in Geneva, Basel and internationally. According to the final survey, the level of satisfaction by learners was high and they benefited from the experience in different ways: reinforcement of their knowledge and capacity to perform innovative research in One Health (e.g. using digital epidemiology), visits and meetings with experts in Global Health (e.g. World Health Organization and Institute of Global Health in Geneva, Swiss Tropical and Public Health Institute in Basel) and emerging research collaborations etc. A novel project-based learning and research model arising from MOOCs was successfully created, which offers opportunities for global education and research addressing real world challenges utilising a One Health approach.
the aim of promoting this new global educative and research model based on MOOCs and active problem-based learning.

Twelve learners were selected, including six from the MOOC Global health at the Human-Animal- Ecosystem Interface (UNIGE and partners) and six from One health: Connecting humans, animals and the environment (UniBasel, described above), and awarded with a SSPH+ (Swiss School of Public Health) travel grant to Geneva and Basel (Switzerland) from the 10-14th July 2017. To be selected by UNIGE, students had to complete the MOOC respecting a certain deadline and video-pitch, in 3 min, a relevant public/global health challenge and their innovative approach. They also reviewed other learner’s campaigns to evaluate learners planned a dog rabies elimination campaign for their own country. They also reviewed other learner’s campaigns to evaluate learners’ campaigns, as well as quality of their peer reviews. Winners then submitted video-pitches with similar guidelines as for UNIGE learners. The final group of selected learners ranged from undergraduate students to senior researchers from a diversity of fields and interests (e.g. veterinary epidemiology, conservation, herpetology, human medicine and healthcare, public health), and origins (Bhutan, Canada, France, Kenya, Nepal, Romania, Spain, Switzerland, and United States). The event was conducted in English.

The five-day programme (10-14th July 2017) in Geneva and Basel included:

1. Project pitching by the 12 learners and discussion on the interest, relevance, feasibility and potential impact of each project with peers and experts at the Institute of Global Health (UNIGE). These projects were open to any public/global health issue at the human-animal-ecosystem interface.
2. Visit to WHO (World Health Organization) and presentation of projects to Dr. S. de la Rocque (One Health Unit, Emergency Preparedness and Response Team).
3. Lecture by Dr. S. de la Rocque and discussion on the role of One Health in WHO-International Health Regulations.
4. Vote by learners and selection of 4 out of 12 projects and team building. The projects selected addressed:
   a. “A global map of online primate trade and its implications on conservation and public health”
   b. “Re-inventing protective boots to prevent snakebite in field workers in Nepal”
   c. “Using urban wildlife photographs from MOOC participants to indicate One health risks”
   d. “One Health communication campaign for safe and responsible consumption of antimicrobials in Kenya”

5. Visit to Swiss TPH (UniBasel) including a lecture on One Health Economics by Prof. J. Zinsstag and discussion on selected projects.
6. Collaborative research and development of projects by learners during a 2-day hands-on workshop involving onsite and online interactions with experts from academia (e.g. UNIGE, Swiss TPH, UdeM, École Polytechnique Fédérale de Lausanne (EPFL), University of Melbourne) and international organisations (e.g. WHO, Foundation for Innovative New Diagnostics). Teams of learners were highly interdisciplinary and complementary in interests and expertise, and they worked intensively following a Hackathon-like approach. They produced specific research outputs/deliverables, for example, a pre-design of a protective boot against snake-bite including a basic cost-analysis, a preliminary interactive map illustrating over 700 selling points of monkeys around the world etc. Expert tutors brought expertise in: human and animal medicine, biology, epidemiology, public/global health, disease ecology, environmental health, herpetology, social sciences and anthropology, computer sciences (e.g. digital epidemiology, medical informatics, citizen science), biostatistics, communication and graphic design etc.

7. Final presentation of project results and feedback from an interdisciplinary panel of experts from academia and WHO.

After the event, all 12 learners completed a short, anonymous (7 questions, see supplementary material) online satisfaction survey giving feedback on their experience. The overall level of satisfaction was positive (average rating = 4.58/5) with the majority of learners highlighting the benefits from working collaboratively in interdisciplinary teams of learners and experts. Contributions by experts were “helpful” and “very helpful” for 7 and 5 out of 12 learners, respectively. The role of invited computer scientists was key for projects a and c, where they contributed with web parsing, data retrieval, data mining, citizen science, mapping etc. MOOCs gave learners a knowledge base (5 out of 12) and inspired them for innovative and interdisciplinary approaches to their projects (2 out of 12). Eight out of 12 learners plan to keep working on their projects after this event. Organization was “very good” according to 9 out of 12 learners but one learner would have preferred experts, rather than peers, to select the four projects, while three were concerned about limited pitching times.

To our knowledge, this is the first MOOC-based, blended-learning and research-oriented educative event on One Health bringing together an interdisciplinary group of learners and experts from a range of institutions and geographical origins. Although “flipping the classroom” is pedagogically not new and has been increasingly used with MOOCs [6], we go one step further here by proposing an open and global approach through gathering in Switzerland 12 national and international MOOC learners to work collaboratively face to face. This encourages us to rethink the potential application of MOOCs in general and particularly in One Health for a more direct and practical impact in research and problem-solving using interdisciplinary collaborations and available expertise within potentially massive and global communities online.

According to the results from the survey and to our experience as organisers, learners benefited from this event in several ways. First, it allowed for reinforcement and extension of their One Health knowledge previously gained online through the MOOCs, as well as enhanced their capacity to perform innovative, collaborative, and interdisciplinary research as part of international and multi-cultural teams. The small number of learners made personalised interactions with experts in One Health and other areas possible. Computer scientists brought in innovative methods and approaches that learners applied to their projects (e.g. big data and social media analysis). The research outcomes were of considerable interest and opened opportunities for further research with subsequent potential for publication (e.g. the group working on project a has continued collaborating and intends to publish its potential results) and/or product development (e.g. project c has been followed-up by a group of students from UNIGE’s Master in Global Health, who further explored manufacturing challenges with material engineers from EPFL). Most of the students plan to continue working on their projects and, as part of a scientific collaboration, we, as organising experts, will continue to guide and support learners.

More generally, we believe that learners developed useful skills through both their project selection and defence of their work in front of a panel of experts. They were exposed to notable time constraints (e.g. 3 min pitch), which seemed to frustrate some, but also, we believe, pushed them to collaborate effectively. Given the international diversity of learners and experts and the compressed work over an intense, short, time period, the connections and possibility for professional networking was a tangible advantage. Some learners, particularly those whose original projects were selected, took a leading role and applied team management skills.
This event has reinforced inter-institutional links between Swiss research groups working on One Health and Global Health, as well as with international institutions such as UdeM, University of Tsinghua, and University of Melbourne. At the local level, it illustrates the positive interactions between the Institute of Global Health and organisations from International Geneva, particularly with WHO and their One Health Unit. This event offers an innovative blended-learning model based on MOOCs that could be replicated and/or further improved in other parts of the world targeting context-specific health problems at the human-animal-ecosystem interface. Although this type of event can make the impact of the MOOCs more tangible and potentially attract new learners, the support by Universities for them is still limited and they tend to focus more on developing new MOOCs and disseminating them passively online.

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Appendix A. Supplementary data

Supplementary data to this article can be found online at https://doi.org/10.1016/j.onehlt.2018.02.001.

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