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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.

Massive Open Online Courses (MOOCs) and new educational technologies have changed teaching and learning by offering free and open-access high quality learning materials and the opportunity to join a global community of learners and experts [1]. Although the number of MOOCs in the public/global health domains are growing rapidly [2], it was only in 2016 and 2017 that three MOOCs addressing One Health were released: 1) *One Health, One Medicine: A Global Health Approach* by St George's University (SGU, Grenada) on its *SGU Online* platform; 2) *One health: Connecting humans, animals and the environment* by Swiss Tropical and Public Health Institute (Swiss TPH) and University of Basel (UniBasel) on *FutureLearn* (Open University, Milton Keynes, UK); 3) *Global Health at the Human-Animal-Ecosystem Interface* by University of Geneva (UNIGE), Institute Pasteur, University of Montreal (UdeM) and Centre Virchow-Villermé on *Coursera* (Mountain View, California, USA). These MOOCs provide a valuable online platform for raising public awareness about the interlinkages between human, animal, and ecosystem health, and for supporting scientists, health professionals and decision-makers with continued and specialized education.

The pedagogic value and cost-effectiveness of MOOCs is still under debate [3]. They provide online self-study models for very large numbers of learners with some interaction, mainly via discussion forums, generally relying on the contributions and interactions of a limited number of highly motivated learners [4]. Other new pedagogical approaches based on blended-learning, such as “flipped classrooms”, promote more active learning through combining the online experience with face-to-face interactions with expert tutors on campus. MOOC video-lectures introduce learners to specific topics preparing them for more advanced and practical activities with experts, which have already shown significant impact for learning in the health domain and others [5].

UNIGE and UdeM cooperatively organized with UniBasel the first 'Global Flipped Classroom on One Health' which gathered learners from their MOOCs (described above) in Switzerland, giving them a face to face opportunity to learn from and work with interdisciplinary experts and peers on public/global health challenges at the human-animal-ecosystem interface. We describe here this event and its outputs with

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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 One Health solution. Guidelines for video-pitching were provided and videos were evaluated by two UNIGE experts and by one pedagogue, based on the relevance and clarity of the presentation. For UniBasel, learners planned a dog rabies elimination campaign for their own country. They also reviewed other learner's campaigns to evaluate technical, financial and community engagement aspects. The course educators selected top candidates by considering the feasibility, applicability and description of community engagement for learner's 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 snakebite 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/or 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 re-think 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.

References

[1] T.R. Liyanagunawardena, S.A. Williams, Massive open online courses on health and medicine: review, J. Med. Internet Res. 16 (8) (2014), http://dx.doi.org/10.2196/jmir.3439.
[2] I. Gooding, B. Klaas, J.D. Yager, S. Kanchanaraksa, Massive open online courses in public health, Front. Public Health 1 (2013), http://dx.doi.org/10.3389/fpubh.2013.00059.
[3] D. Clow, MOOCs and the funnel of participation, Proceedings of the Third International Conference on Learning Analytics and Knowledge, ACM, New York, NY, USA, 2013, pp. 185–189, , http://dx.doi.org/10.1145/2460296.2460332.
[4] C. Milligan, A. Littlejohn, How health professionals regulate their learning in massive open online courses, Internet High. Educ. 31 (2016) 113–121, http://dx.doi.org/10.1016/j.iheduc.2016.07.005.
[5] N.B. Mehta, A.L. Hull, J.B. Young, J.K. Stoller, Just imagine: new paradigms for medical education, Acad. Med. 88 (10) (2013) 1418–1423, http://dx.doi.org/10.1097/ACM.0b013e3182a36a07.
[6] H. Lucas, J. Kinsman, Distance- and blended-learning in global health research: potentials and challenges, Glob. Health Action 9 (2016), http://dx.doi.org/10.3402/gha.v9.33429.