Virtual Patients in a Behavioral Medicine MOOC:
Meeting the challenge of ensuring technical capacity and analyzing user navigation patterns

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Abstract

Background: Massive Open Online Courses (MOOCs) have been criticized for focusing on passive forms of learning. A potential way of vitalizing these educational activities in the health sciences is to introduce virtual patients. Experiences from such extensions in MOOCs have not previously been reported in the literature.

Objective: This study analyzes technical challenges and solutions for offering virtual patients in health-related MOOCs, and describes patterns of virtual patient use in one such course. Our aims are to reduce the technical uncertainty related to these extensions, point to aspects that could be optimized for a better learner experience, and also to raise prospective research questions by describing indicators of virtual patient use at massive scale.

Methods: The Behavioral Medicine MOOC was offered by Karolinska Institutet, a medical university, on the EdX platform in the autumn of 2014. Course content was enhanced by two virtual patient scenarios presented in the OpenLabyrinth system and hosted on the VPH-Share cloud infrastructure. We analyzed web server and session logs and a participant satisfaction survey. Navigation pathways were summarized using a visual analytics tool developed for the purpose of this study.

Results: The number of course enrollments reached 19,236. At the official closing date, 2,317 participants (12.1% of the total enrolment rate) had declared completing the first virtual patient assignment and 1,640 (8.5%) participants confirmed completion of the second virtual patient assignment. Peak activity involved 359 user sessions per day. The OpenLabyrinth system, deployed on four virtual servers, coped well with the workload. Participant survey respondents (n = 479) were generally satisfied with the activity (83.1%). Technical challenges reported involved poor or restricted access to videos in certain regions of the world and occasional problems with lost sessions. The visual analyses of user pathways display the parts of virtual patient scenarios that elicited less interest and may have been perceived as non-challenging options. Analyzing the user navigation pathways allowed us to detect indications of both surface and deep approaches to the content material among the MOOC participants.

Conclusions: This study reported on first inclusion of virtual patients in a MOOC. It adds to the body of knowledge by demonstrating how a biomedical cloud provider service can ensure technical capacity and flexible design of a virtual patient platform at a massive scale. The study also presents a new way of analyzing the use of branched virtual patients by visualization of user navigation pathways. Suggestions are offered on improvements to the design of virtual patients in MOOCs.