An Innovative approach for Pharmacists' Continue Education: Massive Open Online Courses, A Lesson Learnt

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ABSTRACT

Objective: To develop a massive open online course (MOOC) for pharmacists as an innovative continue education. **Design:** A MOOC titled "Special Topics in Clinical Pharmacy" for pharmacists as a professional continue education program was developed and evaluated. It was implemented with case-based lecture videos and interactive quizzes. Content was delivered in weekly base. A Pre-course survey, a post-course survey, and a learner-driven final assessment were conducted accordingly. **Results:** The primary outcomes of the MOOCs in effectively engaging learners and motivating targeted learners from massive online learner were assessed. The satisfactory of MOOCs production from learners was evaluated as well. There were 407 participants signed in for this MOOC. 95% of certificate earners were pharmacists. 88% were willing to take the next professional MOOC. MOOCs might be an innovative, effective and efficient approach to deliver professional continue education. The study also shows that more efforts on implementing online communities should be made to engage more learners.

Key words: Profession-Pharmacist, Innovative educational interventions, Online/computer-based education, Self-directed learning, MOOCs.

INTRODUCTION

New York Times had named 2012 as the year of MOOCs. It was resulted from the great success of 3 MOOCs initiatives, Coursera, EdX and Udacity.[1] 2013 Horizon report of NMC had listed significant technologies that would affect higher education. MOOCs is one of the technology that will be adapted frequently in higher education settings in one year or less.[2] Many prestige universities have their MOOCs channel on either Coursera or EdX. Other than these 2 platforms, there are at least 28 identified MOOC platforms providing MOOCs-hosting services in 2013.[3] There were millions of reregisters and thousands of courses provided in these platforms. Some featured courses, such as "Artificial Intelligence" on Udacity, "Machine learning" on Coursera, and "Circuits and Electronics" on EdX, had attracted more than 100 thousands registers. Although the average passing rate was about 7%[4] or 7.5%[5], there were only less than 10 thousands students earned the certificates in the end for these courses. In the MIT's "Circuits and Electronics" course, only 7% of registers were counted as "certificate earner."[6] In 2013, a research reviewed 225 MOOCs related to health and medicine, and 98 MOOCs were fit the category after data analysis. Most health and medicine related courses were offered by Coursera and Open 2 Study. 63 of 98 health and medicine related MOOCs were offered by North American universities. Moreover, it revealed that a number of MOOCs offered credits toward continuing education in nurses, dentists, and medical doctors.[3]

MOOCs are not only offered English-speaking courses, but also offered in various languages including Chinese,

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Arabic, Spanish, and French.[3] Experimenting with new instructional delivery systems have benefitted higher education systems across much of Asia.[7] The population of Chinese-speaking race has made Chinese the second most frequently used language in the world, other than English. Coursera had invited National Taiwan University (NTU) from Taiwan, Peking University from China, and several other universities from China and Hong Kong to be their partners in Asia to provide Chinese-speaking MOOCs. The first Chinese speaking MOOC provided by NTU was "Probability," which had attracted more than 20 thousand registers. In May 2014, the Minister of Education (MOE) in Taiwan had announced the Taiwan MOOCs Project (TMP). There were 99 courses from 47 universities funded by the MOE.Besides these 99 courses funded by the MOE in Taiwan, more courses were produced by universities themselves. Presently, most universities in Taiwan are using EWant or ShareCourse as their MOOCs platforms. In TMP of 2014, there were 10 health-related courses. All of these courses were introductory-like courses.[8]

In the systematic review from Prof. Car, it's concluded that online learning is equivalent to traditional learning for undergraduates in health professions.[9] In the US, online learning is integrated into pharmacy education as well. There are many universities providing online PharmD programs. Continue education (CE) credits of pharmacists are required by state laws, while online credits are counted in. For example, in Florida, state law requires pharmacists to complete 30 hours of CE biennially. Two-third of CE hours could be online. In the report of the 2013-2014 Academic Affairs Committee of American Association of Colleges of Pharmacy (AACP), it had stated 3 of the major educational technologies, the MOOCs, gamifaction, and learning analytics.[10] From AACP's research, it mentioned that MOOCs and other open source educational modules would affect pharmacy education. It concluded a suggestion of seeking cooperation with platforms and content providers.

From the research of MIT's "Circuits" course, it concluded that shorter video is much more engaging. Moreover, talking head with PPT or tablet drawing tutorials are more engaging than traditional lecture videos.[11] The length of health and medicine related MOOCs varied from 3 weeks to 20 weeks and average length of 6.7 weeks.[3] MOOCs are fairly new approach for health workers and pharmacists to gather new information either on professional knowledge or on innovative learning methods.[12,13] MOOCs could be considered a viable method more professional specific, effective, convenient and ubiquitous for postgraduate medical training.[14] Most of all, there are possibilities of having feedback loop between learners and lecturers.[15] A research had shown that well-design discussion activities could raise the participation rate of a MOOC.[16]

There are about 20 thousands registered pharmacists in Taiwan. By law, every registered pharmacist is required 150 continue education credits in 6 years. In the regulation, e-learning type of CE credits up to 20%, which is 30 credits in total, are allowed. Unlike the US, pharmacy curriculums in Taiwan have no e-learning courses due to national education regulations. Generally speaking, pharmacists in Taiwan have limited experience of online learning. Thus, there are few e-learning CE selections in Taiwan. Most of them are lectures by using PPT or PDF slides with synchronized audio.[17,18] In this study, a professional MOOC was developed for Taiwan pharmacists. With better content production and learning activity design, we would like to assess its effectiveness of engaging learners, motivation of targeted learners, and satisfactory of MOOCs production.

METHODS

The course of "Special Topics in Clinical Pharmacy" is including 3 topics, asthma, stroke and pneumonia. Topics are opened one by one every week. Total length of each topic is about 50 minutes. Videos are divided into small pieces, about 10 to 15 minutes each. Thus, every topic includes several short video clips. The videos follow traditional lecture-based format, with slides and lecturers' explanation. Between clips, there are small quizzes delivered by using the functionality of in-video quiz tool provided by the MOOCs platform. After viewing the videos, there are weekly tests. Finally, a final examination and a survey are taken.

Videos are recoded in a virtual studio. Shooting time for each week is about 2 hours. Besides of that, post-production time for each week video is about 6 hours done by professional MOOCs technicians. The workflow of course content production follows the ADDIE model, which is, analysis, design, development, implementation, and evaluation. In the analysis and design stage, course designer would discuss the syllabus of the course with the instructors, and set up the format of videos. Then, in the development stage, teachers arrive the studio as scheduled. They will bring their teaching materials and record the video. In the implementation stage, teaching file modification and post-production of videos are done at this stage. In the evaluation phase,

MOOCs crews review the videos as well as set up in-video quizzed and weekly tests and make sure that weekly blocks are setting correct on the platforms. Evaluation comes from assessment results of learners, learning logs and course surveys. Learning logs, such as viewing frequency of videos or in-video quizzes, are collected by the MOOCs platform automatically.

Weekly tests are delivered by using the function of the MOOCs platform. They are multiple-choice questionnaires; usually designed as a case scenario. Scores are counted automatically by the system. The final assessment requires learners to write their own multiple-choice questions and answers. Teaching assistants manually score them.

There are 2 surveys for registers, pre-course survey and post-course survey. The pre-course survey is asking about the age group, educational background, and e-learning experiences. The post-course survey is asking about the satisfaction of the course, and self-evaluation on the effectiveness of the course.

RESULTS

The first MOOC, "Special Topics in Clinical Pharmacy", was conducted in a 4 weeks period starting Oct. 1, 2014. The first week was the introductory video, followed by 3 case studies each week. Majority format of the videos in this course were lectures and slides. There were totally 12 videos, 8 in-video quizzes, 3 weekly tests, and 1 final exam.

By the last sign-in dates of this MOOC, the total registers were 407 participants. There were about 231 replies of pre-course survey. All responders were from Taiwan. The major age group was 31~40 years old, followed by 41~50 years old. There were nearly 20% of responders were older than 51. Only 3.5% of responders had taken other MOOCs before. Most learners were the first-time users of MOOCs. About 40% of responders don't familiar with any educational technologies.

There were more than 5,258 total viewings from 20 videos and in-video quizzes. One-fifth of the total viewings were come from the introductory video, as shown in Figure 1. After the first 2 videos, the viewing dropped to about 200 viewings per activities and slightly decreased week by week. As Shown in Figure 2, the first video of each week had the most views among that week. Since the MOOCs platform allowed learners to skip in-video quizzes, viewings of in-video quizzes were about 70% of viewings of videos in average.

There were 51 (14%) registerspassing the course and getting the certificates. 43 (84%) certificate earners had replied the post-course survey. Most responders had known the information regarding this MOOC through professional information channel, such as pharmacist weekly magazine and pharmacist associations' websites. The major age group was 23~30 years old, followed by age older than 51. Overall, 79% of responders satisfied with the MOOC. It scored 4.22 by using Likert scale. Among the satisfactory evaluation of the course design, 93% responders were satisfied with the short-length videos. 88% responders were satisfied with the quality of videos. 89% of responders liked the lectures of instructors, and 84% like the slides.

There was 23% of responders think there were too many quizzes, tests and examination.

Clinical Pharmacist Association in Taiwan approved the course for 3 credits of Taiwan pharmacists CE in advance. 41 (95.3%) of responders had pharmacist licenses. 83% think the MOOC facilitating their professional abilities. 80% of responders considered the major goal of taking this course to get the pharmacy CE credits. 88% of responders would consider taking another professional MOOCs.

DISCUSSION

In the fields of healthcare, learning designs using new technologies, such as on-line textbook, email, or video conferencing has been adapted.[19] Interactive activities usually elevate learning experience.[20] Professional practice, even healthcare outcomes can be effected through interactive CE programs.[21] MOOCs focus on "massive" and "open". Discussion forums and peer review are two major functions used for designing interactive course activities. In MOOCs, large number of learners may lead to a learner-driven learning ecosystem where group intelligence might become part of knowledge source.[16] In this study, most participates revealed the MOOC was useful toward their professional works. As shown in Table 1, certificate earners tend to think the most effective learning outcome camefrom short videos and in-video quizzes. In another word, weekly videos with in-video quizzes might motivate learners as well.

There was only 38% of responders think it was easy to post a discussion online. Discussing online seems more difficult than other learning activities. On the other hand, few posts in the forums revealed the phenomenon. It might due to that most learners had limited experiences of online learning. Further studies could be made to explore the rationale.

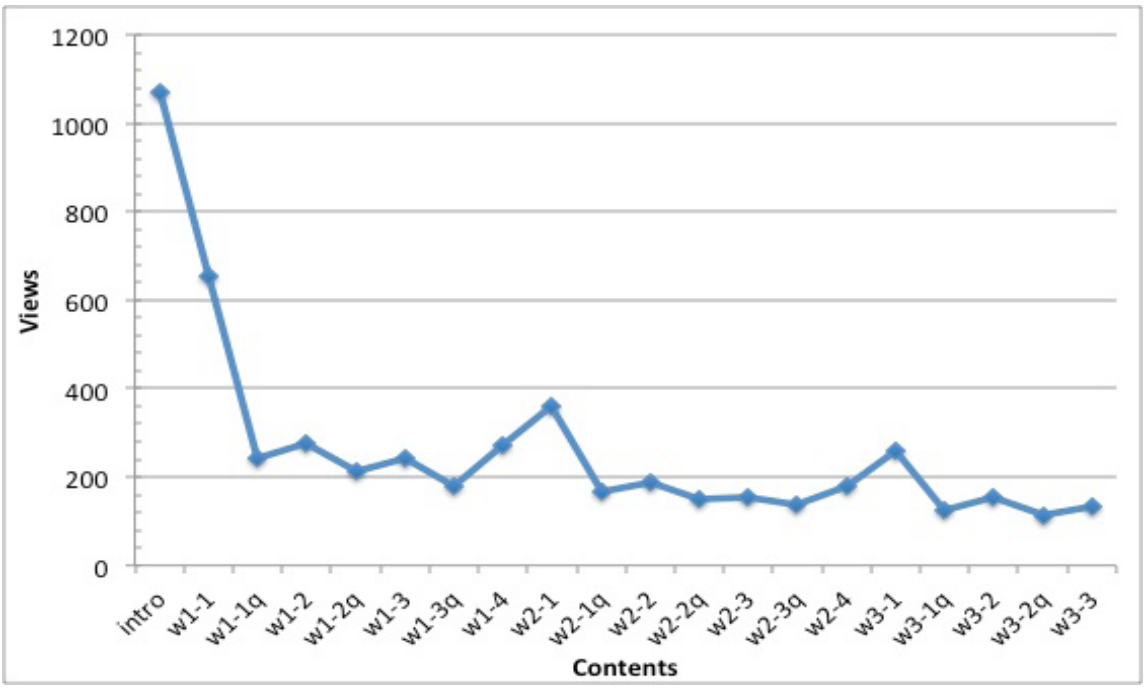

Figure 1. Registers viewings of each video and in-video quizzes in the MOOC course "Special Topics in Clinical Pharmacy".

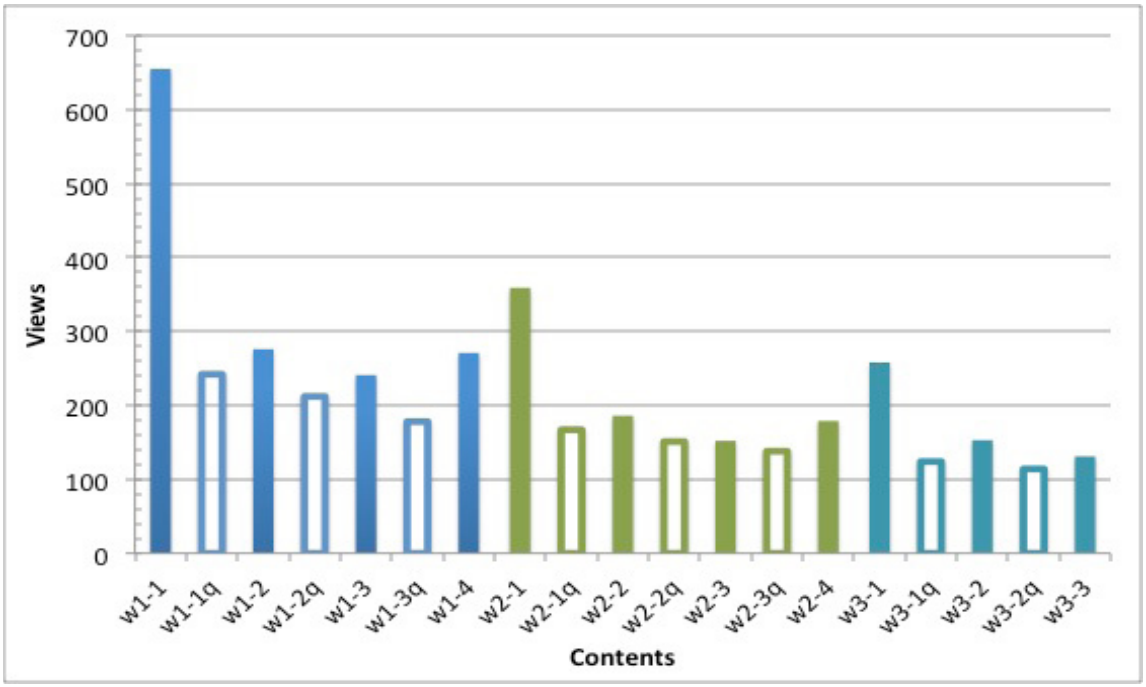

Figure 2. Viewings of each video and in-video quizzes from week 1 to week 3 in "Special Topics in Clinical Pharmacy".

Table 1. Self-evaluated effectiveness of learning outcomes from various course activities in the case of "Special Topics in Clinical Pharmacy" (n=43)

Course activities	Lowest score	Highest score	Score of effectiveness*
Short videos	3	5	4.42
In-video quizzes	3	5	4.42
Weekly tests	3	5	4.30
Final examination	1	5	4.02
Discussion forums	1	5	3.49
Instructor bulletin board	1	5	3.95

*Scores counted by using Likert scale, where 5 is the highest score, and 1 is the lowest score.

In this study, the total passing rate (14%) of the MOOC is twice higher than regular MOOCs (7%). Continue education credits are required by laws for most types of healthcare professionals, from medical doctors to nurses, and from pharmacists to nutritionists. Connecting CE credits might be one of the major reasons. Due to the regulation of pharmacist continue education (CE), learners who want to get CE credits must submit photocopies of their license through the system upload function. The credit check is done manually. In this study, 41 certificate earners were pharmacists. Only 25 (61%) had applied for CE credits.Unfamiliar with the upload function might be one of the reasons. Unwilling to provide personal identification might be another reason. Further observation might be needed.

Learner-generated multiple-choice questions induce the engagement of the learners with the learning materials. However, it becomes a more difficult task.[22] In this study, only 76.7% of learners had expressed the appreciation of the final assessment in the survey. It was rated 4.02. There were 2 learners made negative feedback, and 1 had specifically stated her frustration.

In MIT's first MOOC, the "Circuits and Electronics", 76% of participants were browsers who collectively accounted for only 8% of time spent in the course, whereas, the 7% of certificate-earning participants averaged 100 hours each and collectively accounted for 60% of total time.[6] In this study, there were more than 5,258 viewing logs from videos and in-video quizzes. These data can be used to make learners' learning timelines and to evaluate the effectiveness of this course. It had shown Learners' adherence was decrease week by week. Keeping a MOOC short should be an important strategy in developing a professional MOOC.

CONCLUSION

As MOOCs become an innovative format of e-learning, MOOCs in Pharmacy context might be another learning selection. Short videos and course term make the training more attractive. Interactive activities may elevate the learning experience. Finally, combination of MOOC and CEs may have the potential to raise passing rate of MOOCs. From the massive behavior data collected by MOOCs platforms, more objective indicators could be analyzed and developed in the future.

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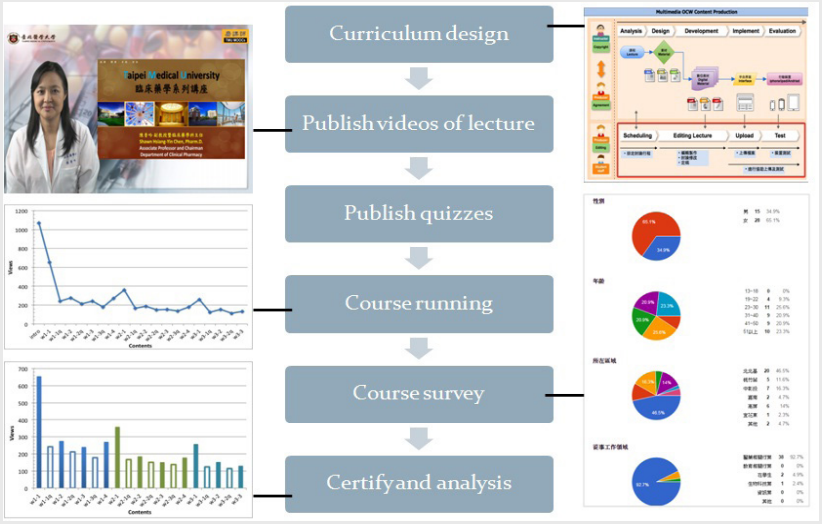
SUMMARY

- Using MOOCs for pharmacist continue education was fairly innovative.
- Short videos and interactive activitieswere effective in professional pharmacyeducation.
- The needs for professional continue education might raise the passing rate of MOOCs.

Pictorial Abstract



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CONFILCT OF INTEREST

There is no conflict of interest regarding this paper.

ABBREVIATION USED

MOOC: Massive Open Online Course; MIT: Massachusetts Institute of Technology; NTU: National Taiwan University; MOE: Minister of Education; TMP: Taiwan MOOCs Project; CE: Continue Education; AACP: American Association of Colleges of Pharmacy; PPT: Microsoft Power Point.

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