

A Toolkit for Instructors of Common Core Courses at HKU

A) Background

Being part of a project titled “Improving Teaching and Learning of Common Core Courses through Learning Analytics”, funded by the Teaching Development Grant, this toolkit hopes to fulfil the following purposes:

- (1) To introduce to instructors a learning analytic tool designed and developed for the monitoring of outcome-based learning progress
- (2) To give suggestions on the best practices of using Moodle to facilitate the teaching and learning of CCCs, and how these can improve the effectiveness of using the learning analytic tool

B) Common Core Courses and Learning Analytics

Common Core Courses (CCCs) are designed to provide significant exposure to ideas, issues, skills, and values, outside of the core discipline of students, through leveraging the expertise and exemplary teaching quality across different faculties in the University. Outcome-based learning (OBL) is also an important pedagogical strategy being emphasized by the University, highly related to CCCs. Nonetheless, various challenges including a huge class size, students' diverse background, reliance on non-traditional course activities (e.g., group projects, tutorial participation, etc.) all present challenges to both instructors and students.

Learning analytics (LA) is an emerging field related to utilizing information technology in education in recent years. It measures, collects, analyzes and reports data collected in a learning environment, with automated means. These help obtain knowledge about student learning in near real time, and thereby help improve teaching and learning in classrooms. Subsequently, a learning analytic tool has been developed for instructors and learners to visualize the learning progression as reflected by the analyzed online behavior data, and to serve as a basis for

- (1) learners to carry out self-monitoring of outcome-linked learning progress with clearly visualized and easily comprehensible information, and
- (2) teachers to monitor student progress and decide on possible interventions for at-risk students after judicious interpretation of data.

Following the predominance of blended learning, instructors have opted for conducting learning activities and administering coursework on Learning Management Systems (LMS). Moodle, one of the best known LMS, is an open-source LMS adopted by a majority of courses in the University as a platform for resource repository, interactions, collaboration, etc. CCCs are no exception, largely owing to its tendency for non-traditional course activities. A few other LMSs (e.g., Open edX, especially for MOOCs) have also been used by the University, while Moodle serves as the most commonplace interactive e-learning platform for facilitating university-wide teaching and learning. Particularly, such LMSs as Moodle and Open edX function as a mediator integrating CCCs with learning analytics. Students' interactions with these LMSs, including but not limited to their frequency and timespan of accessing certain learning activities (e.g., online

quizzes, forum participation) are all recorded and tracked, thereby computed and visualized by this LA tool.

C) Development of A Pioneering Learning Analytic Tool

During the TDG project, the Learning Analytic Tool was installed on the Moodle installation in the Faculty of Education, as a testbed for trials and evaluation. To learn about the basic information of this LA tool being implemented on Moodle, please visit the following webpage publicized by the E-learning Team of the Faculty of Education.

<http://elearning.edu.hku.hk/2017/01/23/student-learning-analysis/>

D) Multimedia Resources for instructors and students

We have produced two instructional videos on using this Moodle LA tool, one for the instructors and another for the students. In general, instructors have access to more functions of the tool.

For instructors: <https://www.youtube.com/watch?v=KogOO6DZO50>

For students: <https://www.youtube.com/watch?v=NfurMluFC6k&t>

E) Cases of Moodle Usage for CCCs

In the TDG project, our project team has been collaborating with four Common Core Courses, each from one Area of Inquiry (AoI):

<u>Area of Inquiry</u>	<u>Course Code</u>	<u>Course Title</u>	<u>LMS</u>
China: Culture, State and Society	CCCH9042	Corruption and Anticorruption in China	EDU Moodle
Global Issues	CCGL9005	Poverty, Development, and the Next Generation: Challenges for a Global World	
Humanities	CCHU9022	Journey into Madness: Conceptions of Mental Health and Mental Illness	
Scientific and Technological Literacy	CCST9003	Everyday Computing and the Internet	Open edX

Throughout the Fall semester of the academic year 2016-2017, the LA tool was implemented into the respective LMS pages of these four participating courses. EDU Moodle, the Moodle adaptation developed by the Faculty of Education, served as the LMS used by the first three CCCs in the above, since it allows for a greater flexibility of system configuration. CCST9003 marked a special case as it had switched to another LMS (i.e., Open edX). The current toolkit focuses mainly on the Moodle LA tool, while the Open edX tool has similar functions.

To measure the effects of learning analytics implemented in the CCCs, we conducted two rounds of surveys with students, inclusive of a pre-implementation one at the beginning of the

semester and a post-implementation one towards the end of the semester. Individual interviews were also done with individual students to gauge their experience and opinions on using the LMS (Moodle, Open edX) and the LA tool. Meetings were also organized between the project team and instructors (i.e., course coordinators and Teaching Assistants) for the discussion of implementation details and a preliminary evaluation of the effectiveness of the LA tool. The following presents the major findings.

LMS Activities and Learning Analytics

In a nutshell, the participating CCCs used LMS (i.e., Moodle and Open edX) mainly for resource repository, online quizzes, interaction, and assignment administration:

Repository of Resources

Overview: One of the most common uses of LMS is to host resources for students' easy retrieval. Lecture slides, readings, and instructional video, be it *required* or *suggested*, were uploaded to the Moodle or Open edX of all the courses. Instructors of CCHU9022 also posted various documents such as the form for reimbursing travelling expenses on site visits (a common learning activity of CCCs). Upon uploading learning-related materials, the mapping between each component (e.g., lecture slide, reading, video) and the corresponding course learning outcome(s) (LOs) was carried out, followed by assigning a weight of this course component contributing to the specific LOs in percentage.

Interviews with instructors indicate that centralizing the repository of all learning-related materials to a single platform was one of the biggest merits of using a LMS. This usage has been especially beneficial to CCCs, since the class sizes were large and with a diverse background of students from different majors and years of studies. The mapping of a learning material (as a course component) with a course learning outcome was helpful to instructors. When an instructor observed that the progression of a certain learning outcome was comparatively slower than other LOs, he could look into which linked material components were less frequently accessed or downloaded by students, thereby further investigating reasons behind such a trend, e.g., majority of students not feeling interested in a certain topic, etc. Particularly for video materials on Open edX (CCST9003), instructors could take a glance into whether and why a video regarding a certain topic was repeatedly viewed by students.

The students generally perceived the main function of LMS as a platform for directly depositing learning materials. They were able to conveniently access such materials as lecture slides, instructional videos and required readings in mainly three circumstances: (1) for preparation before class, (2) for in-class direct reference, and (3) for reference when working on assignments. Since the materials were selected by the course instructors, the tool enabled students to be aware of whether they had viewed certain important materials. Nonetheless, some students expressed that their interactions with these material components might not necessarily reflect a full picture of their learning progress, as downloading a reading does not always mean truly studying it. One suggestion from students for tackling this issue is to create short quizzes on the LMS containing questions related to each reading, where statistics (e.g., number, duration of attempts, scores, etc.) can be incorporated for informing learning progress.

This suggestion is actually consistent with the instructional design of CCST9003 (materials immediately followed by quizzes on the LMS) and further details will be discussed in the next section.

Online Quizzes

Overview: Another useful feature of LMS is the online quizzes. Despite that CCCs are inclined to non-traditional learning activities (e.g., group projects) rather than traditional assessments (e.g., exams), quizzes can still act as a relatively standardizing form of assessment task for instructors to grasp the overall performance of students from different academic backgrounds. In CCGL9005, a short quiz was created each week and the total score of all quizzes accounted for 10% of the course grade. Each quiz consisted of a maximum of three multiple-choice and open-ended text questions related to the delivered course content in each lecture. Students were required to attempt each quiz within the class time. In CCST9003, a short quiz containing several multiple-choice questions was created for every topic. A notable element of the instructional design in this course was so called “flipped classroom” where students were encouraged to first view the instructional videos and then attempt the questions, while the performance in any attempt(s) was not counted into the course grade but only for students’ review of main concepts and the like being delivered by the videos. Similar to resources, each quiz (as a course component) was mapped to one or more learning outcomes, so that students’ progresses on the quizzes contributed to their overall progress towards each learning outcome.

Interviews with instructors and students revealed online quizzes were regarded as a very helpful learning activity for CCCs. Instructors felt particularly satisfied with the compulsory in-class completion of the score-bearing quizzes, so that a large pool of students would be prompted to raise questions in case of encountering any difficulties or misconception. It was also perceived that with such online quizzes these learner difficulties could be identified and resolved as timely and progressively as possible, rather than having these being accumulated and emerging towards the end of the course when students worked on their “major” assignments. In relation to the LA tool, both instructors and students treated the corresponding visualizations as an indicator of whether a/the student has completed a quiz or not. A suggestion is to also consider the time spent on and the score of a quiz apart from the number of attempts, in order to yield a better indicator of learning progress from these online quizzes.

Interaction

Overview: Interaction among instructors and students is inevitably prominent to facilitating the teaching and learning of CCCs. The first and foremost LMS activity for interaction is the Discussion Forums, implemented in all the courses. In CCCH9042, there were two forums. One was titled “Student Online Participation” and it was used for all students to discuss with each other on the weekly topics and issues. Any contributions to this forum would be counted into the 15% of Class Participation, one of the assessment components. Another forum was “Tutorial Forum”, exclusive to each tutorial group. This forum was mainly for students to share their tutorial presentation slides and other relevant supplementary information. The default course forum, one each on the Moodle of CCHU9022 and CCGL9005, served the same purposes as the “Student Online Participation” in CCCH9042 albeit not being considered into course

assessments. In CCST9003, Discussion Forum was utilized as a channel to make announcements and also to give general feedback and “solutions” to assignments and quizzes. In terms of the LA tool implementation, calculations of forum participation were different from those of material and quiz access. Participation in discussion forums was divided into three actions, including *viewing*, *replying*, and *posting* a thread with different weights. An additional feature of the LA tool is the visualization of student interaction network, which can clearly illustrate the interactions among students to both the instructors and students. For example, who often joined discussions and who were isolated could be seen effortlessly. Another interactive Moodle activity is a less known function named Feedback. It is basically a feature for online anonymous polling on Moodle. Before each weekly lecture of CCCH9042, the instructors set up a poll using Feedback, generating a QR Code for the poll which was then placed on the lecture slides. Students attending the class could use their Smartphones to scan the QR Code in order to access and participate in the poll.

Interviews with instructors revealed that forum-based discussion was perceived to be largely conducive to the teaching and learning of CCCs, attributable to a large number of different students that enhances the diversity and quality of ideas being produced initially and re-produced through exchanges. Since there were about 120 students in each CCC, leading to a comparatively much larger class size, these Forums encouraged students to conveniently interact with other students whom they did not have a chance to talk to in lectures, or simply those not in the same tutorial group. As for the LA tool, instructors were highly supportive towards the visualized student network as it straightforwardly showed whether students really interacted with each other or simply initiated discussion posts, without needing instructors to manually count each student’s participation in these large-sized courses. Instructors also complimented using Feedback on Moodle for in-class polling, as these anonymous polls prompted students to give their honest opinions, whereas an immediate in-class follow-up discussion among students was also observed.

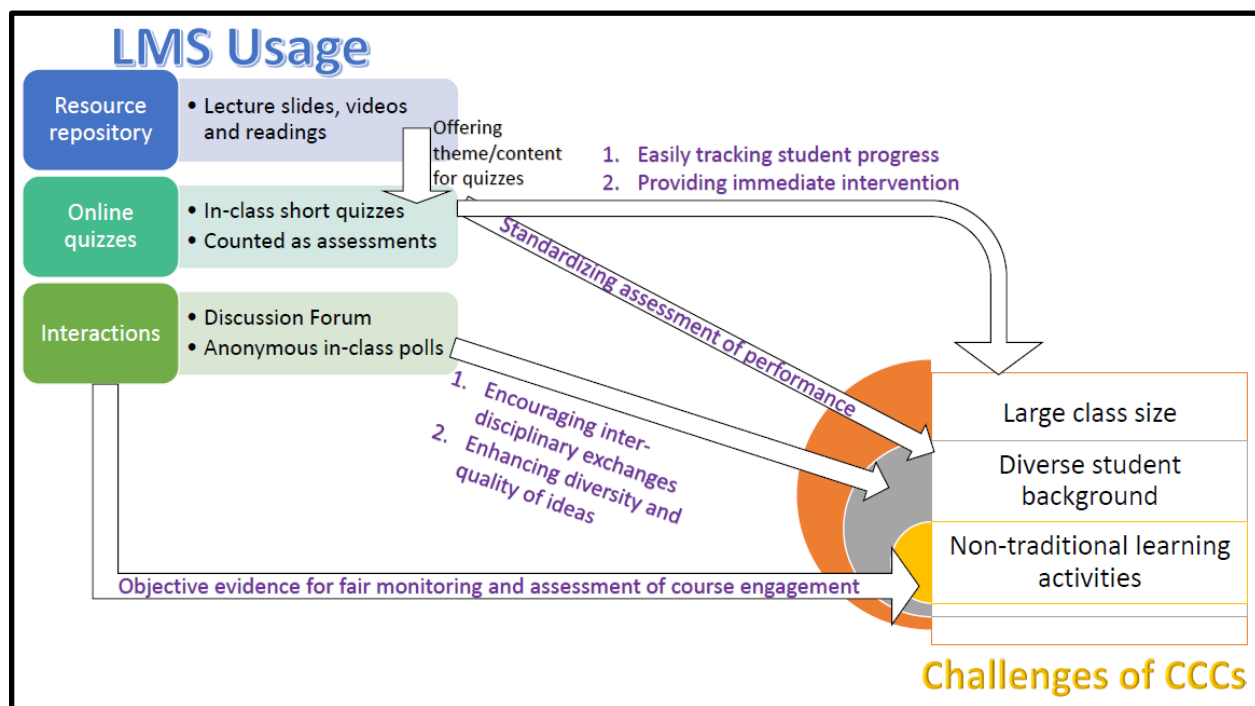
Students held largely positive attitudes towards the consideration of forum participation into assessment components (e.g., online participation) and indicators of learning progress as visualized in the LA tool. The main reason lies in the objectivity of these progress-indicating statistics (e.g., number of threads posted) that could serve as evidence for a student’s course engagement. Some students also mentioned preferring this method over the typical way of “impression marking” when instructors assessed students’ course participation.

Administration of Assignments

Like other courses, instructors of the participating CCCs handled the administration of all course assignments on LMS, including submission, originality check (using Turnitin on Moodle), and grading. The types of assignment ranged from written reflective journals and reports to group presentation video. As a usual and consistent practice, neither did instructors nor students had any positive or negative opinions on using LMS for administering assignments. With regard to the LA tool, assignment reading and submissions were counted towards learning progress, which was regarded as natural, acceptable, and useful.

F) A Summary of Best Practices on Utilizing LMS and the LA tool for CCCs

The flowchart below summarizes the best practices on utilizing Moodle and Open EdX for Common Core Courses, facilitated by the use of our LA tool. Each attribute of the LMS usage can be linked to the issues of CCCs that present challenges to instructors, through the mediation of our LA tool (represented by the white arrows), similar to how each course component can be mapped with each learning outcome through the tool.



G) Concluding Remarks

Teaching and learning of Common Core Courses is still constantly under improvement. It is our hope that learning analytics can make its contributions that will in turn benefit instructors and students. We hope this toolkit is helpful and insightful for all teachers, regardless of whether or not you have taught/will be teaching CCCs. If you have any thoughts and suggestions, please do not hesitate to contact Dr. Xiao Hu at xiaoxhu@hku.hk. We welcome comments and collaboration of any kinds!

H) Acknowledgements

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