Project Title :	Developing and Evaluating a Learning Analytics Platform to Support University Teachers for Pedagogical Decision-making in Fostering Reflective Engagement of Students
Leading University :	The Education University of Hong Kong
Participating UGC-funded University(ies) :	Hong Kong Baptist University, Lingnan University, The Chinese University of Hong Kong
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Layman Summary of Proposal

This project aims to develop a learning analytics platform to enhance the capacity of teachers in promoting students' reflective engagement in higher education sector. The advocacy of students' reflective learning and the trend of digital classrooms using various learning management systems (LMSs) and social network platforms (SNPs) place new demands on teachers for transforming pedagogical practices. Paralleled to it is a gigantic amount of accessible learning data that are produced and captured in the LMSs and SNPs across formal and informal learning spaces. These student-generated data footprints document what is actually happening in the learning process.

Learning analytics refers to the collection, organisation, analysis and reporting of a wide range of data produced by students on LMSs and SNPs in the learning context in

order to generate information and identify potential issues for prediction and pedagogical decision-making. The goal of conducting learning analytics is to provide opportunities for teachers to facilitate and guide students in the learning process with the ultimate goal of optimising their learning outcomes.

This project, adopting the design-based approach, will conduct a three-year research on adaptive teaching practices in digital classrooms by co-designing and co-developing a learning analytics platform with teachers. The research foci are:

1. To develop a learning analytics platform conducive to data-oriented decision-making;
2. To evaluate the impact of a learning analytics platform on facilitating reflective engagement of students in the learning process; and
3. To evaluate the impact of a learning analytics platform on teachers' pedagogical decision making.

This project will invite teachers to help co-design, co-develop, use and evaluate the learning analytics platform in teacher professional development program. Evaluations from both teachers and students on the use of this learning analytics platform will be conducted. The significance of this project for enhancing the quality of learning and teaching in higher education institutes lies in three aspects. Firstly, teachers will benefit from using the learning analytics platform to gain a better understanding of students' learning process, and identify learning issues to predict learning patterns and make corresponding pedagogical decision-making, hence optimising the learning environment. Secondly, by focusing on students' learning needs and learning trails, the adoption of the learning analytics platform will help teachers to move away from summative assessment to formative assessment; students will be able to respond to the results of analytics, thus evidence-based improvement can be achieved. Thirdly, the learning analytics platform can be scaled up to different subjects and universities to transform teaching and learning in higher education.

Layman Summary of Final Report

The advocacy of students' reflective learning and the trend of using various LMSs place new demands on teachers for transforming pedagogical practices. Large amount of student-generated learning data that are recorded in the LMSs provide valuable information about their learning process. A learning analytics platform was developed in the project for the collection, analysis and reporting of these learning data in order

to enhance the capacity of teachers in promoting students' reflective engagement in higher education sector. With a bilingual taxonomy consisting of bilingual keywords of a topic designed by teachers, the learning analytics platform identified and counted the matching keywords of student-generated text in the LMSs automatically. Hierarchical visualisation of these results provided by the learning analytics platform enhanced students to reflect their learning progress and facilitated teachers for their pedagogical decision-making in order to optimise students' learning outcomes. Further, students' browsing history of learning materials in the LMSs was examined to align their learning outcomes owing to different background knowledge, from which various progression patterns were summarised. Both the design of the learning activities and materials can be improved based on progression pattern comparison. This Education University of Hong Kong (EdUHK)-leading project has conducted a three-year research on adaptive pedagogical practices by co-designing and co-developing the learning analytics platform with teachers from EdUHK, Hong Kong Baptist University, The Chinese University of Hong Kong and Lingnan University. Evaluations from both students and teachers indicated a positive perception towards the learning analytics platform in enhancing their learning and teaching in LMSs. The major achievements are as follows:

1. A learning analytics platform has been developed conducive to data-oriented decision-making. This learning analytics platform has scaled up to different subjects and universities to transform learning and teaching in higher education.

2. The impact of the learning platform on facilitating reflective engagement of students in the learning process has been evaluated. Both students and teachers generally agreed that the learning analytics platform enabled them to gain a better understanding of students' learning process with useful information from a whole class of students and stimulated the development of their individual intellectual ideas.

3. The impact of the learning platform on teachers' pedagogical decision-making has been evaluated. Teachers positively perceived the learning analytics platform for identifying students' learning progress including their strengths and inadequacies so that predicting learning patterns and improving learning environments can be achieved.

4. Students' learning progression patterns have been extracted so that recommendations can be made on how to improve the design of the learning activities and materials through progression pattern comparison using artificial neural network.

In conclusion, our findings provided evidence-based support for the significance of this learning analytics platform in enhancing the quality of learning and teaching in higher education institutes. This has undoubtedly encouraged the future development of learning analytics platforms for students to track the learning progress of their learning peers and for teachers to move away from summative assessment to formative assessment.