

DOCTORAL THESIS

Training Data Citizen and Citizen Data Scientist: A Study of a Role-based Certification Programme in Mainland and Hong Kong

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ABSTRACT

Data Science education is becoming more and more important in modern skill acquisition. Yet research examining such skill education programmes' effectiveness is scarce. This study examined Case-Based Learning (CBL) coupled with two Open-Source Projects (OSPs) in a Mainland and Hong Kong certification programme. The study's focus was on pedagogical innovations.

In this study, the introduction of CBL was intended to enhance students' interest and motivates them to engage in active learning tasks. Moreover, by introducing two OSPs, students can have more significant and easier accessibility to these free tools. In addition, students can continue their learning and exploration with the OSP even after completion of the programme. The research study included 270 students (142 from Hong Kong and 128 from Mainland, 159 males, 111 females, ages 20-60) from five courses in an IT Training Centre (a pseudonym). A mixed-method approach was used for the study. Online surveys, post-class assessments, log files from the learning management system, OSP practical sites, CBL courses, and examination result marks were quantitative data sources. Moreover, six trainers conducted individual face-to-face and online interviews in the qualitative part, and a focus group study of twelve selected students was carried out. The students were recruited via convenience sampling. They were divided into three groups: two students completed the course but didn't attempt the examinations, two completed the courses but failed the examinations, and two completed the courses and passed the examinations.

Three research questions were addressed by analysing the results collected. Firstly, how trainers support CBL using OSP as pedagogical resources and their challenges in conducting the training. The key findings were that vivid presentations and discussions enhanced the CBL training, and OSP enhanced students' programming skills. Secondly, students' perception of the usefulness of CBL was positively correlated with students' attitudes toward using the LMS

and CBL, behavioural intention, actual system use and performance in the certification examinations. Students' learning mode was positively correlated with the perceived usefulness of CBL. Thirdly, there were differences between the learning modes in Mainland and Hong Kong. In Hong Kong, most students enjoyed blended learning in corporate training schemes. Still, they preferred the self-learning online learning mode in the public examination scheme in the focus group study. Quantitative analysis results also showed that the mode of learning was not correlated with students' perception of ease of use in the LMS and CBL in the path analysis model. In both Mainland and Hong Kong, students used the LMS to download notes and read the CBL course contents by self-study in an online learning mode. In addition, quantitative results showed that both learning modes were positively associated with students' perceived usefulness of CBL and performance in the certification examinations.

This study's findings provide an empirical basis to demonstrate the effectiveness of using CBL coupled with OSP in a data science education programme. It also provides insights into the further development of innovative pedagogies pertinent to using CBL coupled with OSP.

Keywords: Case-Based Learning, Open-Source Projects, blended learning, online learning, data science education, innovative pedagogy