UTS UNIVERSITY OF TECHNOLOGY SYDNEY

Engaging stakeholders in the learning analytics design process

by Carlos Gerardo Prieto Alvarez

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under the supervision of Simon Buckingham Shum
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Certificate of Original Authorship

I, Carlos Gerardo Prieto Alvarez declare that this thesis, is submitted in fulfilment of the requirements for the award of Doctor of Philosophy, in the Connected Intelligence Centre at the University of Technology Sydney.

This thesis is wholly my own work unless otherwise reference or acknowledged. In addition, I certify that all information sources and literature used are indicated in the thesis.

This document has not been submitted for qualifications at any other academic institution.

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Workshops

- ☐ Carlos G. Prieto-Alvarez et al (2018). Learning Analytics Design Cards (LA-DECK): Unpacking inter stakeholder co-design through strategic cards. Australian Learning Analytics Summer Institute. Melbourne, Australia. Website: http://ladeck.utscic.edu.au/events.html
- ☐ Carlos G. Prieto-Alvarez et al (2018). Participatory design of learning analytics. International Conference on Learning Analytics and Knowledge LAK'18. Sydney, Australia, ACM. Website: http://pdlak.utscic.edu.au.

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Glossary

LA: Learning Analytics

DBR: Design Based Research

DT: Design Thinking.

UCD: User Centred Design

HCI: Human Computer Interaction

PD: Participatory Design

EdTEch: Educational Technology

MDSI: Master of Data Science and Innovation

GA: Graduate Attribute

UTS: University of Technology Sydney

SP: Surveillance and Privacy

TLX: Teaching and Learning Expertise

LD: Learning Design

DL: Data Literacy

PWR: Power Relationships.

Abstract

Learning Analytics (LA) is a new promising field that is attracting the attention of education providers and a range of stakeholders including teachers, learning designers, academic directors and data scientists. Researchers and practitioners are interested in learning analytics as it can provide insights from student data about learning processes, learners who may need more help, and learners' behaviours and strategies. However, problems such as low educator satisfaction, steep learning curves, misalignment between the analytics and pedagogical approaches, lack of engagement with learning technologies and other barriers to learning analytics development have already been reported. From a human-centred design perspective, these problems can be explained due to the lack of stakeholders' involvement in the design of the LA tools. In particular, learners and teachers are commonly not considered as active agents of the LA design process. Including teachers, learners, developers and other stakeholders as collaborators in the *co-design* of LA innovations can bring promising benefits in democratising the LA design process, aligning analytics and pedagogy, and meeting stakeholders' expectations. Yet, working in collaboration with stakeholders to design LA innovations opens a series of questions that are addressed in this thesis in order to contribute to closing the gap for effective co-design of LA innovations. The questions addressed in this thesis are the following:

1. How can co-design techniques assist in the integration of diverse stakeholders in the LA design process?
2. What are the roles of the co-design practitioner/researcher in the LA design process?
3. What are the challenges in engaging stakeholders in the LA design process?

Based on co-design principles, and following a Design-Based Research process, this thesis explores the critical challenge of engaging educators and students, the non-technical stakeholders who are often neglected, but who should ultimately be the main beneficiaries of LA innovations. In this research work, three case studies have been used to test, analyse and verify various co-design techniques in diverse learning contexts across a university to generate a co-design toolkit and recommendations for other co-design practitioners: i) learners and educators engaged in simulation-based healthcare scenarios,

ii) learners, educators and other stakeholders in a Data Science Masters program , and iii) educators interested in providing personalised feedback at scale.

This thesis presents three contributions to knowledge for effectively collaborating with educational stakeholders in the LA co-design process:

1. Inspired by archetypal challenges reported in classic and contemporary co-design literature, and in current LA research, the thesis identifies, exemplifies and reflects on five key challenges for LA co-design: power relationships, surveillance, learning design dependencies, asymmetric teaching/learning expertise, and data literacy.
2. By adopting and adapting well established co-design techniques, across the three case studies, the thesis provides empirical evidence of how these techniques can be used in LA co-design, reflecting on their affordances, and providing guidance on their usage. These detailed findings are distilled into a *Learning Analytics Co-design Playbook*, published under an open license to assist adoption and improvements.
3. Recognising the importance of the co-design practitioner in ensuring that the design process is participatory, the thesis documents and discusses the key functions and skills that this position requires. The role is further complicated when the practitioner is not only a *facilitator* serving a project, but also a *researcher* of co-design. This motivates guidelines on the role of the co-design practitioner/researcher when working with stakeholders, and simultaneously studying the LA co-design process, tools and methods.