

WHAT DO WE DO WITH ALL THE DATA – LEARNING ANALYTICS

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ABSTRACT

Introduction: Learning Management System (LMS) are widely used by higher educational institutions. Users' interactions with the LMS generate considerable amount of data which can be used for LA (Learning Analytics). LA is increasingly incorporating predictive analytics which is dependent on large and rich datasets for accuracy. Research has shown that there are several identified potential benefits of LA, however, there is still little evidence to back up this claim (Viberg et al., 2018). A prerequisite for potential benefits to be realized is that LA is accepted and adopted by its users. For this reason, it is important to understand stakeholders' attitudes and acceptance of the use of their data and methods to facilitate transparency into what, how and why the data is analyzed (Arrieta et al, 2020) and how the use of the data can enhance and improve learning (Klein et al. 2019). The present study seeks to involve stakeholders in the design of LA making use of data from different educational technologies. Although fine grained data is gathered by multiple educational technologies utilizing said data to benefit learning and teaching is hampered by both practical issues such as data interoperability as well as ethical aspects of data processing. Previous research has shown that methods for eliciting stakeholder attitudes and acceptance towards their data being used for analysis is highly context sensitive i.e., the level of acceptance is dependent on what data is used, for what purpose it is used and with whom it is shared, this has also been referred to as contextual privacy (Nissenbaum, 2004; Velander et al., 2021). Therefore, a current effort of involving stakeholders in the design of LA to support teachers and students at electro engineering courses at KTH seeks to develop a LAD involving stakeholders in the design of the dashboard by presenting them with a dashboard plugin allowing them to reflect on and provide feedback on their own data in practice (Velandar., 2020).

Motivation and study setting: The ongoing study is based on 1) experiences of two electro undergraduate courses designed to use Möbius CW integrated with Canvas LMS thus gathering rich and detailed data that is currently not utilized fully and 2) a previous study that involved stakeholders in Value Sensitive Design process reflecting on their data gathered by the LMS Moodle (Velandar, 2020). Möbius CW enable a high degree of interactive and self-correcting online exercises. The selected electro courses already have an established working method with three different optional exercises and two mandatory tasks. Data gathered by course evaluations and workshops show potential value for students and teachers in using this approach however several limitations were also highlighted. Moving forward towards the goal of involving stakeholders in the design and development process of LA using data from multiple sources this study aims to answer two Research Questions: **RQ1:** What affordances and limitations are identified by stakeholders using online interactive methods in undergraduate electro courses? **RQ2:** What data can be useful for teachers and learners in these courses and what are stakeholders' attitudes and views on their data being used in different contexts?

Tentative results: Feedback from students participating in the courses highlighted important considerations for LA design. Students mention the limitation of online communication if these are replaced by online forums and discussions. Another frequent comment was the lack of coherence of material since there were so much material available it became overwhelming. Positive comments highlight the usefulness of instant feedback and the flexibility in approach to engage with available content. Teachers' reflections were similar however also related to the data that became available for keeping an eye on how the students were doing and that data could provide important and actionable feedback on course design and teaching (Subasic & Johansson, n.d.). Möbius is integrated with Canvas and Canvas has got built in LA support, however, teachers find that this is very limited. A more informative LAD would be able to visualize data that could inform the development of both course material and student staff during the course. Further feedback was gathered during a workshop held at the NordicLASI 2022¹ where participants discussed limitations of assessing and predicting student engagement mainly because of 1) data that might not be truly representative and 2) the value of group work and discussions and the inability to reflect this in the data gathered. Discussions revealed that data driven LA was best used in good orchestration and as a complement to student and teacher interaction. Teacher's experience revealed that to make use of the data it was necessary for the teacher to also know the student, only relying on the information from the data was too limited. One important finding from the ongoing study is that although opportunities for transforming teaching practices many teachers remain skeptical to investing the time of learning to use educational technologies often since the rewards in terms of time saving is only apparent after prolonged use and considerable initial investments of time initially.

Next steps: In the next steps of the study, we want to enhance an existing Moodle plugin (Velander, 2020) to integrate with Canvas and Möbius to be able to use and develop existing visualizations in this plugin to help answer our RQ2. Further questions that we anticipate the study to be able to answer is "Which opportunities and challenges with data driven Learning Analytics were met during digitalization of engineering education?".

Keywords: Learning Analytics Dashboard (LAD), Learning Management Systems (LMS), Student Information Systems (SIS), Clean Architecture

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¹ <https://www.kth.se/en/eecs/om-oss/konferenser-och-event/nordic-learning-analytics-summer-institute-2022/program-nlasi-1.1169114>

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