Danish University Colleges

Developing a Learning Analytics tool

Wahl, Christian; Belle, Gianna; Clemmensen, Anita Lykke; Ringtved, Ulla Lunde

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ABSTRACT
This poster describes how learning analytics and collective intelligence can be combined to develop a tool for providing support and feedback to learners and teachers regarding students' self-initiated learning activities.

INTRODUCTION
In 2013 the Danish university college sector began the implementation of the Study Activity Model (SAM). SAM should provide all programmes with a single academic tool which can shape the study expectations of the students in relation to study intensity (Denmark, 2014). The model is divided into four categories as shown in figure 1. Based on previous work (Ringtved et al., 2017) we are now designing a tool that support students in reflecting on their study-related learning activities. And also help teachers becoming aware of study-related learning activities and making activities a part of other categories in SAM.

FIGURE 1
The four categories in the Study Activity Model (Denmark, 2014)

METHODOLOGY
The method for our development process is Design & Development Research (DDR). DDR describes the research process for developing information technology products or artifacts (Ellis and Levy, 2010). The DDR process is divided into six steps as shown in fig. 3. Currently our development process is somewhere between step b and c. We have the objectives in place after researching the overall problem. Now we need to get a clear idea about the detailed requirements and the design for the tool. One method we can use in this process is the Learning Analytics Model (LAM).

LAM is a model for describing a systematic approach to analytics into different components (fig. 5) (Siemens, 2013). The process described by LAM is iterative. The actions that are performed at the end (last step) will influence on the collection of new data (see later about feedback).

Developing on top of LAM we will introduce Collective Intelligence (CI) as an important part of our system. CI is the idea that, supported by the technology, people can benefit from the synergy of the collected data. Feedback is an essential construct in our tool and is provided by learning analytics methods back to the learner to maintain the learning analytics cycle as described by Clow (Clow, 2012).

FIGURE 2
The four categories in the Study Activity Model (Denmark, 2014)

ANALYSIS
In the following we will use LAM to analyze our current ideas for the tool. We will leave out components that are not relevant at this point.

Collection & Acquisition From a students perspective the system will support their reflections on study related learning activities. This is done by recording or logging learning activities and connecting these with learning objectives. Activities initiated by the teacher in other categories of SAM will be important. An example could be students recording and reflecting on activities as part of home assignments (category 2) or group work (category 1). Integration: Metadata about users will be imported from SIS and user logs (students and teachers) will be connected to a Single Sign on System, possibly through the Learning Management System.

Analysis: An impotent part of CI is the ability to connect entities that were not connected before. There can be both direct and indirect relations in the data. These relations will be displayed to the users (implicit and explicit feedback).

Representation & Visualization Supporting student reflections on learning activities these should be displayed to the student together with the associated learning objectives. Part of the reflection process is handling these entities and creating new associations. Getting inspiration for new learning activities is done through recommendations. The recommendations are generated from CI as the analysis of student metadata, connections to learning activities and objectives.

Action: Make students aware of possible learning activities that can engage in themselves. This will potentially develop the collective afford when experiences are recorded back to the tool. The tool will make teachers aware of possible connections between learning activities in the third category of SAM and the activities initiated by the teacher.

FIGURE 3
The DDR process (Ellis and Levy, 2010)