TEKNOLOGI

DEVELOPING A LEARNING ANALYTICS TOOL

Christian Wahl,[1] Gianna Bellè,[1] Anita Lykke Clemmensen,[1] Ulla Ringtved[1]

[1]University College of Northern Denmark, Aalborg, Denmark

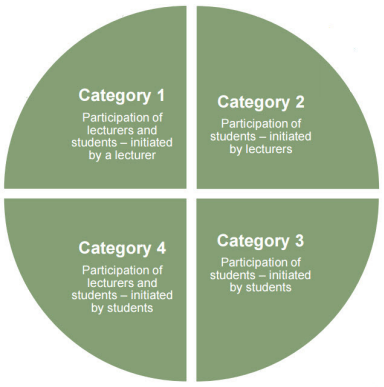
ABSTRACT

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

INTRODUCTION

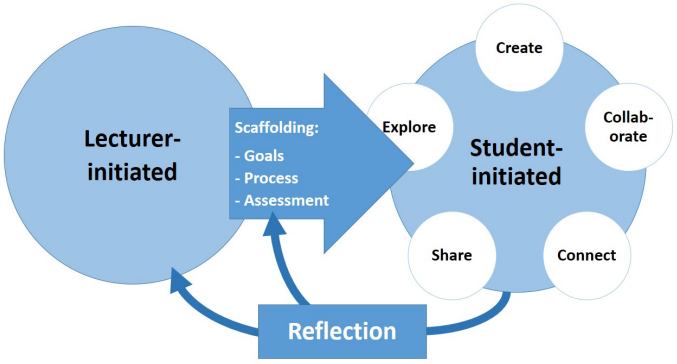
In 2013 the Danish university college sector began the implementation of the Study Activity Model (SAM). SAM should "provide for all programmes a single academic tool which can shape the study expectations of the students in relation to study intensity" (Denmark, 2014). The model is divided into four categories as shown in figure 1. Based on previews work (fig. 2) (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)

FIGURE 2



Framework for enhanced use of students' self- initiated study activities.

METHOLOGY

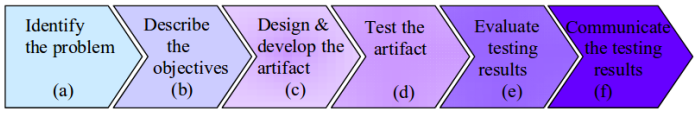
The method for our development process is Design & Development Research (DDR). DDR describes the research process for developing information technology products or artifacts (Ellis and Levy, 2010).

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 is 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 the from the synergy of the collected effort (Lévy, 1997).

FIGURE 3

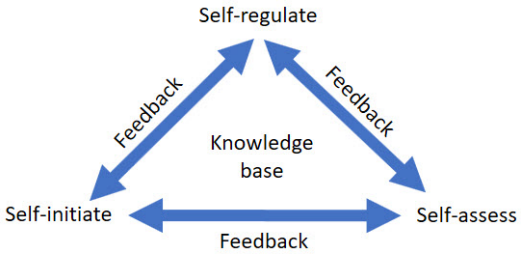


DDR process (Ellis and Levy, 2010)

THEORETICAL MODEL

Our model (figure 4) shows how students can use their self-initiated study activities to construct and enhance their learning capabilities and professional capabilities throughout their education. The model constitutes of a learning triangle consisting of the three concepts *self-initiating learning, self-regulating learning and self-assessing learning* in each corner of the triangle. These three concepts are interdependent and feedback is given and taken in a continuous process across all three concepts. 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 4



Model for self-initiated, self-regulated and self-assessed activities

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 an activities as part of home assignments (category 2) or group work (category 1).

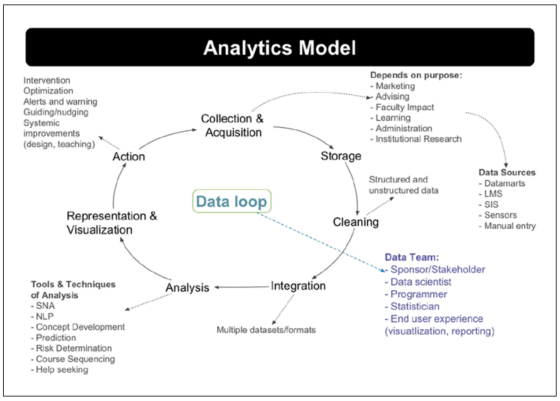
Integration Metadata about users will be imported from SIS and user login (students and teachers) will be connected to a Single Sign on System, possibly through the Learning Management System.

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 display 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 as part of the CI – the analysis of student metadata, connections to learning activities and objectives.

Action Make students aware of possible learning activities that they 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 5



Learning Analytics Model (Siemens, 2013)

REFERENCES

Clow, Doug (2012). "The learning analytics cycle: closing the loop effectively". en. In: ACM Press, p. 134. ISBN: 978-1-4503-1111-3. DOI: 10.1145/2330601.2330636. URL: http://dl.acm.org/citation.cfm?doid=2330601.2330636 (visited on 01/26/2016).

Denmark, University Colleges (2014). *Study Activity Model*. URL: http://xn--danskeprofessionshjskoler-xtc.dk/en/organisational-structure/study-activity-model/ (visited on 03/09/2017).

Ellis, Timothy and Yair Levy (2010). "A guide for novice researchers: Design and development research methods". In: *Proceeding of the Informing Science Information Technology Education Conference 2010*, pp. 107–118.

Lévy, Pierre (1997). "Education and training: New technologies and collective intelligence". en. In: *Prospects* 27.2, pp. 248–263. ISSN: 0033-1538, 1573-9090. DOI: 10.1007/BF02737169. URL: http://link.springer.com/article/10.1007/BF02737169 (visited on 02/10/2017).

Ringtved, Ulla et al. (2017). "Development of Students Learning Capabilities and Professional Capabilities". In: Vancouver, BC, Canada.

Siemens, George (2013). "Learning Analytics: The Emergence of a Discipline". en. In: *American Behavioral Scientist* 57.10, pp. 1380–1400. ISSN: 0002-7642, 1552-3381. DOI: 10.1177/0002764213498851. URL: http://journals.sagepub.com/doi/10.1177/0002764213498851 (visited on 08/21/2017).