The logic of numbers - How numeric data reveals the processes of learning and teaching

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1. ABSTRACT

In our presentation we would like to share our views and reflections on Learning Analytics in higher education. We therefore start by examining the future integration of Learning Analytics at the University of Duisburg-Essen, specifically in the context of the recently introduced E-Learning strategy. We proceed by attempting to define the terminology and describe the understanding and aim of Learning Analytics. Following, we present first opportunities to put Learning Analytics into action, especially in the environment of the learning management system moodle, which will also include authentic evaluations of moodle courses. Finally, we will present first attempts for the future work with, the realization and the incorporation of Learning Analytics at the University and beyond.

2. EXTENDED ABSTRACT

2.1. Background and strategic directon

The University of Duisburg-Essen (UDE) is one of the ten largest universities in Germany and offers about 42,000 students a broad academic spectrum with an international orientation and a bride expertise in implementation of E-Learning formats. E-Learning has turned into an everyday feature of teaching and learning and has to prove its worth in helping universities to cope with the growing number of students, their increasing diversity and requirements. To promote E-learning at the UDE the university management decided to establish a university-wide E-learning strategy in 2014. The aim is to incorporate E-Learning across all departments. This includes the aspiration to permanently improve courses of study and adjust them flexibly. The new strategy 2.0 is newly revised with new objectives and goals und current challenges in studying and teaching. Some of these are the development of E-Learning competences as well as the evaluation of how digital media technologies are used within this framework. Due to digitalization, more and more aspects of learning processes take place online and could therefore be accessed by using analytical means to understand such. The UDE is still at an early stage of first attempts of using Learning Analytics.

In this paper the described method will rely on research predominantly in moodle, as it has been defined as the strategic learning platform at the UDE and has been in regularly use throughout all departments. The data we collected in moodle are intended to improve courses of studies and teaching as well as individual feedbacks for students and teaching staff. Students get the opportunity to relate their own achievements with those of reference groups and to reflect on their own learning development. In order to foster learner autonomy, the UDE will promote the scientific research on Learning Analytics.

2.2. Definition of Learning Analytics

Learning Analytics and respectively the approach behind it has no general definition. You find definitions like „Learning analytics is the use of intelligent data, learner-produced data, and analysis models to discover information and social connections, and to predict and advise on learning“ (Siemens, 2010) and „Learning analytics is the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs“ (LAK11, 2010). The main focus of Learning Analytics is the understanding as well as the optimization of learning as a whole, including the specific learning context and its participants. To achieve this goal the relevant data of the learning environment are used with the help of intelligent methods. Big Data, Online Learning and political efforts to increase educational performance on a national and international level can therefore be understood as driving forces of Learning Analytics. Furthermore, one can identify different movements in the aforementioned areas (Educational Data Mining, Learning Analytics und Academic Analytics). It should be noted, however, that those areas show partial commonalities in their realization (Ferguson, 2012). The successful implementation of Learning Analytics calls for an interdisciplinary merging of various experts, because of the fact that different perspectives and layers have to be considered in order to meet the complex and multilayered requirements in this context (Ifenthaler & Schumacher, 2016).

The UDE understands Learning Analytics and the potential that is connected with it, as a chance to permanently improve the conditions of teaching and learning and to respond sensibly to the individual needs of its students. It can be viewed as one among several means to continually improve the quality of service and to increase the likelyhood of individual success in the students' respective courses of studies. To achieve those goals in the future, it is intended to use the implementation of adaptive learning, user data of various E-Learning tools with the help of advanced methods of data analysis to utilize those accordingly.

2.3. Fist approaches on the integration of Learning Analytics

Offering Learning Analytics as a service within a conventional university, as opposed to an Open University, with heterogeneous faculties mainly concerned with face-to-face study programmes, requires to adapt Learning Analytics to heterogeneous kinds of online and offline learning. Often models of technology enhanced learning draw on a too narrow and specific understanding of learning. As an example therefore, the Community of Inquiry (CoI) approach conceptualizes learning as an inquiry process (Garrison & Arbaugh 2007; Garrison, Anderson & Archer 1999). Nevertheless, there are learning situations within the different scopes of science and teaching in which technology enhanced learning basically supports the distribution of content while collaboration and construction happens outside digital learning environments – offline. Therefore, introducing Learning Analytics needs a model of learning compatible with different situations of learning. The 3C model of digital learning offers a wider and more open understanding of digital learning. It states three dimensions of digitally supported learning environments (Kerres, de Witt 2003):

- Content: distribution of documents, videos etc.
- Communication: interacting and discussing
- Construction: self-directed or social knowledge construction

Following this model, the current approach of implementing Learning Analytics at the UDE aims at visualizing activities and content according to these dimensions in order to offer an instrument for reflecting the didactical profile of teachers and students.

2.4. Outlook

In order to achieve the aforementioned goals of permanent improvement of conditions of teaching and learning and the consideration of the students' individual needs, the UDE initializes an autonomous work group for Learning Analytics. An interdisciplinary team, consisting of representitives of different faculties as well as central institutions accellerate an evidence-based, hands-on and sustainable realization of Learning Analytics. Furthermore, the initialization of cooporations with other insitutions of higher education in Northrhine Westphalia is intended to accellerate the implementation of Learning Analytics even further on a regional level.

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