Using Learning Analytics

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An IFIP SELECT paper for IT-professionals based on the research paper:


This paper presents the results of research on learning analytics, which is gaining importance in the educational sector. IT professionals with an interest in this field can read the paper to gain inspiration for collaborating with representatives of educational institutions.

Introduction

In educational institutions in Denmark, the process of digitisation has almost been completed, meaning that there is little left for IT professionals to convert to binary representation. Due to rapid changes in technology and the previous efforts of IT professionals, textbooks and other learning materials have now been transformed into multimodal and easily updated digital materials that can keep track of students’ progression. Tools for word, voice and video processing have been digitised, and the students use computer algebra systems and spreadsheets to handle numbers and mathematical problems. In addition, communication between teachers and students often takes place using digital sharing tools and e-learning systems.

This has been part of a strategic plan encouraging all students to use their tablets, laptops and mobile phones in the classroom. Denmark was the first country to implement the ‘Bring Your Own Device’ (BYOD) principle in K-12 education and higher education. In 1:1 learning environments, there is a growing need for IT professionals to engage in the datafication of learning and learning analytics.

The term ‘datafication of learning’ can be defined as the transformation of important aspects of the students’ learning efforts into computerised data
that is analysed, interpreted and used to support teachers and students in various circumstances (Webb et al. 2018). And the term ‘learning analytics’ can be defined as the collection, analysis and reporting of data on students and their contexts for the purpose of optimising learning and the environments in which it occurs (Long and Siemens 2011).

These broad concepts cover the majority of approaches to generating and analysing actual educational data of varying scope and from various origins. The term ‘big data’ means data of a broad scope: relatively large data sets regarding whole schools, regions or nations. By contrast, the term ‘teacher-driven learning analytics’ implies a context-specific scope: the scope of a particular teacher and particular students.

This type of analytics transforms the role of teachers from being end-users of big data to being analysts of specific learning data. The paper deals with the following research question: How can teachers generate and analyse data to improve their practice and the process of learning?

Teacher-driven learning analytics

In general, teachers do not demand results of analyses of big data including statistics regarding previous generations of students. In general, the results of examinations at lower-secondary schools or summative evaluations from previous years at upper-secondary schools are of relatively little interest to upper-secondary teachers. Learning analytics referring to current learning activities is of greater interest because this form of real-time analytics reflects the efforts, persistence and behaviour of present students.

With appropriate support from IT professionals, proactive teachers can thus generate and analyse small sets of digital data regarding students’ motivation, well-being and learning processes. The paper presents findings regarding the implementation of this type of teacher-driven learning analytics in upper-secondary schools in Denmark.

These findings are based on more than 500 focus group interviews with representatives of 32,000 teachers who participated in the largest research and development programme ever to have been conducted in Denmark. Moreover, the research findings are based on three surveys involving 205 innovative teachers regarding their application of digital technology in 1:1 learning environments at upper-secondary schools. The findings are also
based on surveys involving 798 students engaged in upper-secondary education regarding their learning experiences.

In particular, the paper presents research findings regarding teacher-driven learning analytics focusing on students’ perceptions of their ability to complete their learning tasks, that is, students’ perceived self-efficacy. This self-efficacy represents the confidence with which students approach their tasks. The higher their self-efficacy, the less they fear to fail.

Supported by IT professionals, teachers can generate and analyse self-reported data reflecting the students’ beliefs as to whether they can complete tasks successfully. In particular, teachers can ask students to state the degree to which they believe themselves to be capable of performing new tasks. Future development in this area may lead to improvements of digital tools and procedures tailored to achieve these purposes.

References