

Si Fan, Si.Fan@utas.edu.au

School of Education, University of Tasmania, Australia

## Introduction

In recent years, there has also been an increase in the use of Big Data analytics for educational purposes, driven and facilitated by various reasons. First, educational institutions are facing more pressure towards performance management, metrics and quantification. Secondly, learning tends to generate large data sets, especially in Learning Management Systems (LMSs) and Massively Open Online Courses (MOOCs).

One most common form of Big Data analytics in higher education is learning analytics. Through the analysis of educational data, learning analytics applications enable educational institutions to build predictive models on student outcomes, especially to identify at-risk students (students will potentially drop out or fail) and to provide early warnings so that interventions can be made (Rienties et al., 2016; Timms, 2015). This project is the early stage of a frontier research to explore the use of Big Data Analytics to identify such patterns for Australian higher education.

## Aim

The project examines university lecturers' and tutors' pedagogical approaches and student engagement in online learning, through the use of Big Data and learning analytics, using one Australian university as a starting point.

## Methods

The project extracted learning data from a learning management system, which is based on the Brightspace platform, used at one Australian university.

The data were analysed through Excel, R and Python, and models were developed to detect factors that can be used as predictors and measurements for student engagement and performance, for instance, the length of time spent by students in online discussion boards, and for accessing online lectures and reading materials, as well as lecturer and tutor input.

## Results & Discussion

The initial results confirmed positive correlations between student engagement and participation and:

- lecturers' and tutors' pedagogical support;
- types of teaching materials and resources uploaded by lecturers and tutors; and
- level of student evaluation and satisfaction.

Further analysis will continue to investigate:

- How signs could be picked up at earlier stages during the semester, to provide earlier warnings to prevent student disengagement and dropout.

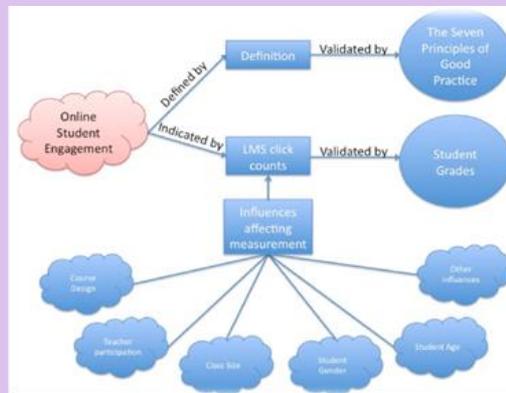


Figure 1: Overview on online student engagement (Beer, 2010)

## References

- Beer, C. (2010). *Online student engagement: New measures for new methods*. Unpublished Masters dissertation, CQUniversity, Rockhampton, Qld, Australia.
- Rienties, B., Boroowa, A., Cross, S., Kubiak, C., Mayles, K., & Murphy, S. (2016). Analytics4Action evaluation framework: A review of evidence-based learning analytics interventions at the Open University UK. *Journal of Interactive Media in Education* (1), 1-11.
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## Conclusion

While Big Data analytics is having a wide impact on other areas, such as public health and businesses' commercialisation and marketing, its application remains limited in the field of education.

Even within the few emerging studies on Big Data and learning analytics, the majority of them are carried out in America and Canada.

As an early exploration in the research field, this project demonstrates one example of how learning analytics can be used to support decision making in Australian higher education.

## Key lessons and challenges

As at this stage, the data provided by the chosen LMS have limitations. Due to the following factors:

- The system only contains information on student activities that lecturers set up to record in their units. Therefore, there is missing information which could be critical in identifying student disengagement.

- There are significant differences in the way how units are set up and used in different courses and disciplines. This adds challenges to the data extraction and management.

To obtain more effective data sets and more effective use of the data, deliberate planning to include parameters to record student engagement is essential.

## Acknowledgement

This study was funded by the University of Tasmania Research Enhancement Grant Scheme (REGS).