Transforming education with big data

Patricia Kim Chooi Lim

Big data or data analytics involves the collection and analysis of large datasets to reveal patterns and trends. The healthcare industry historically, has generated large amounts of data which can potentially support a wide range of medical and healthcare functions such as clinical decision support, disease surveillance and population health management.[1] Big data in education, however, needs to focus on how we can improve student learning and learning environments. This is particularly so with more and more online education and the development of MOOC's. Big data will create more exciting paradigms of teaching and learning and will revolutionise how students learn and how teachers teach.[2]

Currently, universities all over the world have started the data gold rush by establishing learning analytics research groups and co-opting the services of business intelligence teams to mine their data reserves.[3] What are the goals of big data in education? It is undeniable that the overall goal of big data within the educational system should be to improve student results as good students are an asset to society and organisations including teaching and learning institutions. With big data, it is possible to generate unique data trails of every student as well as determine their strengths and weaknesses through various algorithms, thus allowing the creation of more homogenous groups of students with a more optimal learning environment.

Some universities have reported the successful application of big data in their activities. Since building a system in 2011 and tracking thousands of decisions made daily by their students, Georgia State University in the US has seen fewer students dropping out and improved graduation rates. Tufts University in Boston uses data analytics to track research productivity and to look at student evaluations of teaching to better understand staff performance.[4]

Big data will also facilitate the development of mass-customised programmes for individual students and improve the learning experience in real-time.[2] These efforts will inevitably help to improve student results and perhaps reduce student dropout rates in colleges and universities. In addition, predictive analytics can provide educational insights in future student outcomes which will enable universities to develop more relevant programmes to meet market demands.

One key measurement of a successful training programme is reflected by how successful the graduates perform in the job market. Big data can collate information on students after graduation and how they are performing in the job market; such information will be of immense value and help to future students in their decisions to choose the right university and the right programmes.

Like all new technological tools, there are challenges that need to be addressed to ensure that big data is being used in the most efficient and beneficial manner. The cost of implementing systems for the use of big data is immense, for example, the US Department of Education joined a host of agencies to share a USD200 million initiative to begin applying big data analytics in their respective functions.[2] So universities will need to determine their priorities for using big data and ensure that their approach in this will help support students, manage staff effectively and make strategic management decisions. The ethical use of big data is yet another challenge and student's awareness and consent will need to be considered when designing analytics algorithms, particularly how and when we intervene in the learning analytics. The biggest challenge in using big data is not to overlook the cognitive element of improving student learning and this will require a significant effort from educators as well as support from strong analytics frameworks.

As we move forward into the 21st century, change is inevitable. As universities, we need to address the technological revolution and ensure that our products (graduates) are adaptable to not only survive but thrive in a technology-driven environment. Big data is a way forward to provide us with the necessary information

Pathology Department, School of Medicine, International Medical University, Kuala Lumpur, MALAYSIA

Address for Correspondence:

Prof Dr Patricia Lim Kim Chooi, Pathology Department, School of Medicine, International Medical University, Kuala Lumpur, MALAYSIA
Email: kimchooi_lim@imu.edu.my

to change and adapt so that we can survive and stay relevant to meet the future demands of education and the job market. At the International Medical University, the establishment of a learning analytics research group could serve as an impetus towards our use of big data in transforming our education to meet 21st century needs.

Key words: Big data, learning analytics, education

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