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Learning Analytics

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A consensual hallucination experienced daily
 by billions of legitimate operators, in every nation,
 by children being taught mathematical concepts...
 A graphic representation of data abstracted from the banks
 of every computer in the human system.
 Unthinkable complexity.

(William Gibson, 1984)

A fundamental premise for the School of the Future is that technology can play an indispensable deepening and accelerating role across all education processes. Students use technology to produce work; teachers use it as part of learning activity design, incorporating multiple digital resources and strategies (from video lectures to social media to gaming to expert inquiry). New assessments use technology in a myriad of ways and schools and systems use it for collaboration, data sharing, and learning analytics.

Learning analytics is an educational application of “big data,” a statistical approach that was originally leveraged by businesses to analyse commercial activities, identify spending trends, and predict consumer behaviour. The rise of the Internet, as well as the proliferation of web tracking tools, drove research into big data and metrics, enabling companies to build vast reserves of information they could study and utilize to personalize their marketing efforts. Education is embarking on a similar pursuit into data science with the aim of improving student retention, delivering automatic and immediate feedback to educational service providers, and providing a high quality, personalized experience for learners.

The Society for Learning Analytics Research (SOLAR)

(<http://www.solaresearch.org/mission/about/>) defines learning analytics as “the measurement, collection, analysis and reporting of data about learners and their contexts, for purposes of understanding and optimizing learning and the environments in which it occurs”. Knowledge analytics is the utilization of advanced approaches (e.g., text/data mining, information retrieval machine learning, or linked data) for processing data to provide representations in forms from which conclusions can be drawn in an automated and domain-aware way. When integrated, learning and knowledge analytics form the foundation for adaptive and personal learning by providing learners with relevant learning choices to address gaps between existing knowledge and knowledge needed within a field or domain. Through the use of analytics, organizations

also stand to gain new insights into how the work of individuals contributes to organizational capacity for change and innovation.

When students use digital learning resources or net-based services, they leave usage traces. This data can demonstrate social activity, learning preferences, and understanding, also it can be used to pinpoint progress and identify individual problem areas. By aggregating such user data one can have more knowledge about which learning patterns and activities promote learning, and what might be seen as an indication of school retention. Analysing such data can also give invaluable feedback on the quality of digital learning resources.

Learning analytics research uses data analysis to support inform decisions made on every tier of the educational system. Whereas analysts in business use consumer data to target potential customers and personalize advertising, learning analysts harness student data to build better pedagogies, target at-risk student populations, and assess whether programs designed to improve retention have been effective and should be sustained — outcomes that have profound impact for legislators and administrators. Learning analytics has given educators and researchers crucial insights about student interaction with online texts and courseware. Students are beginning to experience the benefits of learning analytics as they engage with mobile and online platforms that track data to create responsive, personalized learning experiences.¹

If used effectively, learning analytics can help surface early signals that indicate a student is struggling, allowing teachers and schools to address issues quickly. When correctly applied and interpreted, learning analytics will enable teachers to identify student learning-needs and subsequently tailor instruction appropriately and precisely. Learning analytics don't just measure students' progress – they can shape it.

Analytics can potentially help transform education from a standard “one-size-fits-all” delivery system into a responsive and flexible framework, crafted to meet student academic needs and interests. For many years, these ideas have been a central component of adaptive software programs that make carefully calculated adjustments to keep learners motivated as they master concepts or encounter stumbling blocks.

1. Competency Map go.nmc.org/capel

The competency map at Capella University helps students own their learning by constantly showing them where they are in each course, how much is ahead of them, and where they need to concentrate their efforts to be successful.

Gradecraft go.nmc.org/grade

The University of Michigan uses Gradecraft, which encourages risk-taking and multiple pathways towards mastery as learners progress through course material. The analytics employed guide students throughout the process and inform instructors of their progress (The NMC Horizon Report: 2014 Higher Education Edition).

In the future, the challenges for learning analytics will be to build ever-stronger links between data and learning and to maintain a focus on developing the skills and competence that we value as a society.

“...we also need to initiate and fund more research, both on the new provisions of learning opportunities and the large amounts of data produced by these systems. Next year we (my ministry) will discuss alternatives for an initiative on inter-disciplinary research in the fields learning science and learning analytics.” (from The Norwegian Minister of Education and Research Torbjørn Røe Isaksens speech to the Council of the European Union, 25. November 2013 in Brussel).

REFERENCES

<http://www.solaresearch.org>