The learning analytics challenge: Culture of data or culture of evidence?

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FROM SHELTERED GROVE TO PRESSURE COOKER

Post-secondary institutions have been described as "amiable, anarchic self-correcting collectives of scholars with a small contingent of dignified caretakers at the unavoidable business edge,"[Keller, 1983]. Moreover, institutions are known for "problematic goals, unclear technology, and fluid participation," [Cohen and March, 1974]. While these observations may ring with a truthful, if nostalgic tone, they no longer characterize today's political and economic climate, our leaders, or our obligations.

Today's post-secondary institutions operate on tight budgets and under a microscope. The watchwords are accessibility, affordability, and accountability. Our funding is no longer a given. Institutions have become complex and subject to myriad regulations. Our students are empowered adults who seek knowledge, qualifications, jobs and, yes, value for money.

In today's complex world, post-secondary institutions are under competitive, customer, and regulatory pressures to account for business performance, contribution to the communities served, research productivity, and most important, students' success. We are justifiably proud in Canada to sit near the very top of the 70 developed countries in the OECD rankings in the academic performance of our 15-year olds [CBC News, December 2010]. This success rightly raises the bar for those charged with responsibility for the next steps in the educational journey. As well, institutions now operate in a world in which people can expect to change careers as many as seven times. The post-secondary education sector must now be accountable for the re-skilling and re-training of much of the workforce as citizens and graduates move from one career to the next.

A DATA DELUGE

While the funding, regulatory, and political climate has changed in post- secondary education, so has information technology. Using sophisticated data mining, profiling, analytics, and predictive modeling techniques, companies from Amazon, to LL Bean, to Google, to banks are using data about their customers and prospective customers to help them tailor solicitations to their taste. Amazon can recommend books based on past sales. Others will recommend the port wine to accompany cigars, or the shoes that best accessorize our cars! In the near future, radio- frequency identification (RFID) chips will allow store devices to recognize us, remember our preferences, and inform us on the fly about store specials that are tailor-made to our tastes! Commercial businesses are also using data from disparate information systems to help them better understand critical process flows, the effectiveness of their business models or strategies, or the availability of talents and skills in their work forces. These capabilities allow them to dynamically allocate people, space, equipment and other resources, making it possible for large scale organizations to sense and respond to changes in conditions.

Where the changes in the post-secondary sector's external climate and IT intersect most compellingly is an area that is now called learning analytics. Learning analytics has been defined by the organizers of the first international conference on learning analytics and knowledge as "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," (See https://tekri.athabascau. ca/analytics/). This intersection represents the logical application of these maturing technologies to the educational context. In its most simple terms, learners are customers, and their knowledge and capacity to learn are products. The difference between what a learner knew before entering a classroom and what she knows now is the educational value that instructors, classrooms, computer labs, libraries, and communities have added. The impulse for institutions to wish to develop a learning analytics capability is as natural as the commercial firm's impulse to understand its customers and the performance of its core processes.

A NATURAL FIT

Post-secondary institutions ought to have a natural advantage where it comes to learning analytics. They are, after all, analytical organizations by nature. They subject everything around us to critical inquiry. They have an insatiable appetite for data, a widespread capacity for rigorous analysis, and a reverence for knowledge and the truth. It would seem that learning analytics was custom made for post-secondary education.

Or was it?

Of course, the reality of post-secondary education is nearly always more complex than those outside the academy often see. So while it is true that institutions revere and reward a culture of evidence, it is precisely this culture that breeds skepticism of everything, including learning analytics. Several factors conspire to make learning analytics a challenge:

1. Data is not knowledge

Educators understand this insight deeply. The vendor community that promotes learning analytics either does not understand this, or more likely, chooses not to worry about it. The failure among many current providers of learning analytics "solutions" to make this distinction is to risk leaving post- secondary institutions awash in data while thirsting for knowledge. Knowledge, in the case of learning, involves, at a minimum, clarity and disciplinary congruence around things as basic as definitions of what constitutes a unit of subject knowledge or a level of mastery. Outside of very focused and externally accountable disciplines like accounting or engineering, shared standards for expressing the attainment academic knowledge are rudimentary, or non-existent. This is why it is so difficult today for institutions to create equivalencies that facilitate the exchange of course credits between and among themselves.

2. Learning is complex

Standards for expressing academic knowledge are rudimentary simply because the content is complex Learning is also complex. And while one can create a culture of testing, the data is quite equivocal about the instructional or learning efficacy or testing cultures such as the No Child Left Behind protocol in the U.S. Understanding learning demands a deep understanding of the learning context, the learner context, and the context of the discipline to be learned. These contexts are, to a very great extent, cultural and behavioral. Today's learning analytics solutions are largely technical solutions. They generate dis-embodied data. To have meaning, teachers need learning frameworks and models.

3. Instruction is an art

And moreover, a teacher's classroom is hers, thank you! Where the research domain has scientific method, rigorous standards of peer review, and centuries of agreement on how evidence may be used or limited, how chains of evidence are to be constructed, how primary and secondary sourced can be used, the classroom is an individual expression of an instructor's style, rather than something socially constructed by an academic discipline. Professional education such law, business, and medicine are exceptions to this general rule. It is also rare at the post-secondary level to teach teaching. The net effect of the individualized artisanal craft approach coupled with the absence of formal transmission of pedagogical technique in many academic disciplines, leads most to describe the classroom as a cottage industry. The artisanal nature of post- secondary instruction makes it hard to drop into place standardised techniques from a learning analytics play book. In a nutshell, many teachers will disbelieve them, and will be loathe to adopt them. Few will have the pedagogical frameworks and rubrics that will be needed to provide the context for assessing learning progress and outcomes with data.

4. Learners are individuals

The use of data to construct complex models to predict learning success is in its infancy. The theory behind this movement or intention is sound, but every teacher will tell you that learners are individuals. Student success depends on so many variables outside the scope of what teachers and institutions can possibly collect and make sense of. Did the student fall in love? Did the student get or lose a job? Did she have to work a lot of overtime hours this week? Was there a death in the family? All of these things can and do affect student learning and academic performance. While variables such as absenteeism and quiz scores certainly can and do serve as reliable descriptors of mastery and predictors of future success, they are today rather blunt instruments.

5. Who has the time?

The movement toward adoption of learning analytics was germinated by industry, fertilized by philanthropic foundations and government agencies, and is being planted by sincere institutional researchers, assessment and quality officials, instructional technologists and designers, and occasional early faculty adopters. Learning analytics, in sum, has some traction outside of those bodies that mobilize academic disciplines, outside the decanal level of academic management where the power of academic incentives is the strongest, and outside the classroom. It is a technology that demands both an academic disciplinary context, and a behavior change among our teachers. These are tall orders at any time, but we must be mindful that these times are not ordinary. Survey data demonstrate that faculty workloads have risen over time and that faculty satisfaction levels are unsettled at best (Welch, 2005). In short, the lives of teachers have been consumed with increasing responsibilities for teaching, counseling, research, and committee service. The effective use of learning analytics will depend on teachers "on the ground." Who has the time? Who will reward teachers for using data this way?

6. Students Get the Benefit at the expense of Privacy

The impacts of business analytics are dazzling and we experience them subtly or bluntly every day. Search engines comb search patterns to mimic modes of inquiry. They scan mail and track web site visits to ascertain tastes in food, travel destinations, hobbies and reading. When applied to academic pursuits, learning analytics will yield a treasure trove of insight regarding students' study patterns, learning styles, cognitive strengths and challenges, and capacity for advancement and success. Learning analytics should, and will, open an important institutional and public policy debate about the governance and use of this information. Admissions officers will want this information, employers will want this information, and so forth. The validity of the underlying analytical engines will merit close scrutiny, and important decisions will need to be made about access to analytics data, appropriate uses of analytics data, and student rights in analytics data.

THE WAY FORWARD

Learning analytics is real. It is a genuine breakthrough. It very likely is a breakthrough for learners. Post-secondary educators are now sitting on mountains of data. Data live in student information systems, learning management systems, web and email logs, and elsewhere. Mature technologies and techniques exist for mining and extracting data from disparate (including external) sources, for analyzing this data, and for using this data to identify students who are at risk, students who are budding stars, and students who might benefit from an intervention. Institutions also have the capacity to use this new knowledge to alert teachers, counselors, and students when students exhibit promise or risk. This is powerful.

We need to contextualize the data.

Learning analytics organizes information for action. Learning analytics does not prescribe actions or prepare instructors, counselors or others to response to the data presented in a consistent and institutionally- sanctioned fashion. How institutions use this new information is the cultural and behavioral aspect of a culture of evidence. Data alone is not worth a lot. Contextualized data in a framework is worth more. Contextualized data placed in the hands of students, instructors, and academic advisers is valuable. Placing such a resource in the hands of those who have been trained and are rewarded for using it effectively is priceless. The way forward to reap the benefit of learning analytics is steep and uphill.

We need to Stop blaming technology or the data. The challenge is behaviour.

Like most changes in practice that first come to post-secondary education as changes in technology, the devil is in the adoption; that is, in the behaviour change. Too often we re-live an old drama. A new shiny technology is created and is subject to all manner of hype. Well intentioned technologists, designers, institutional researchers, teaching excellence staff, and others who are moved sincerely to transform educational delivery on behalf of students bring these technologies forward. With considerable effort and often expense, new technologies are acquired, installed, and offered freely. In some cases, with great struggle, much protest, and time, new technologies like learning management systems, do in fact redefine the landscape – often after a decade of effort. In other cases, new technologies are ignored. Software maintenance fees are paid, but the software is rarely lit up and then, too often, under protest. We blame technology or we blame data, when the challenge has always been behaviour.

We need to recognize the additional time that these new practices require.

Those who wish to exploit the potential of learning analytics will need to understand these tools and techniques will be used first and foremost by faculty, instructors, counsellors, and students. Secondarily, they willbe used by deans, provosts, academic planners, registrars, and others for revenue planning, relationship management, and student retention management. Faculty/instructor buy in is paramount. Buy in, in turn, will be linked to: (1) incentives; (2) impact of faculty/instructor time; and (3) the credibility of the tools and techniques themselves. Implementation success therefore will depend on the incorporation of learning analytics' effective use into faculty rewards. Success will also depend on recognition of the additional time that these tools and new practices consume and making good faith efforts to offset adverse impacts on our teaching staff. Success, too, will depend on launching discussions with faculty/instructors for the purposes of subjecting learning analytics tools and techniques to proper review. If tools and techniques do not combine rigor with ease of use, they will likely be rejected.

We need to align the goals of the instructor, department chair, dean, and provost.

A good deal of the benefit of academic analytics is mediated by and realized through academic advising. Whether transacted directly by faculty/instructors or through specially-trained third parties, good information in the hands of bad advisors will not yield good outcomes. Here context is essential. What are the goals of the faculty member/ instructor, department chair, dean, and provost? Are they aligned? Does one student's struggle with Calculus trigger advice to reconsider a technical or scientific pursuit, or does it trigger additional tutoring? Is the institution operating like a pump designed to increase the flow of successful graduates, or like a filter, intended to yield only the cream? There are no right answers here. What is a problem is when information supplied through learning analytics is applied simultaneously for competing purposes. This happens when data and information have no shared institutional context. This is what happens in cultures of data and not in cultures of evidence.

Finally, there is growing evidence to support the notion that learning analytics can be implemented in a remarkably lightweight fashion. This strategy leverages the fact that students themselves, when armed with meaningful and timely information, can either make corrective steps without further intervention, or can invoke the intervention best suited to their situation. A student whose grade performance has dropped because of a death in the family may need additional tutoring. Such a student may, even more, need grief counseling. Operating learning analytics in a quasi self service fashion demands a transparent environment vis-à-vis those services available to our learners. Creating such environments for many would not be difficult.

We need to engage staff and students.

Learning analytics in sum represents a real opportunity to move our institutions from cultures of intuition and caring to real cultures of evidence. As with most promising technological developments, success will depend only partly on the technologies themselves. In this case, there is a significant body of technique as well, and there is the even bigger question of institutional will. Post-secondary education does not need a new layer of well-intentioned bureaucrats armed with volumes of data from learning analytics systems. The power of these new tools and techniques is their power to enable change in the most fundamental institutional process. For learning analytics to influence student success, to enhance the learning experience, to foster improved course performance and persistence, and to lead to greater retention, faculty/instructors, staff and students will need to be engaged. This can be done, but only with the commitment and engagement of our academic leadership.

This is work we must do. Students and institutions may depend on it.

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