

Feature

Perspectives on Learning Analytics: Issues and challenges. Observations from Shane Dawson and Phil Long

John Clarke and Karen Nelson

Abstract

Analytics is a field of research and practice that aims to reveal new patterns of information through the aggregation of large sets of data held in previously distinct sources drawing on a number of informing disciplines. This Feature details observations sought on learning analytics from two specialists in the field. Shane Dawson, Deputy Director, Academic Learning Services, University of South Australia, along with Phil Long, Director, Centre for Educational Innovation and Technology, University of Queensland have contributed to a wide-ranging discussion on some of the issues and challenges related to Learning Analytics in higher education in general, and also in relation to its application to first year students and their staff.

Please cite this article as:

Clarke, J., & Nelson, K. (2013). Perspectives on Learning Analytics: Issues and challenges. Observations from Shane Dawson and Phil Long. *The International Journal of the First Year in Higher Education*, 4(1). 1-8. doi: 10.5204/intjfyhe.v4i1.166

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Biographies

Associate Professor Shane Dawson

Shane Dawson is the Deputy Director, Academic Learning Services in the Learning and Teaching Unit at the University of South Australia, Adelaide, Australia. Shane's research focuses on the use of social network analysis and learner ICT interaction data to inform and benchmark teaching and learning quality. Shane is a founding executive member of the [Society for Learning Analytics Research](#) and past conference chair of the International Learning Analytics and Knowledge Conference. He is a co-developer of [SNAPP](#), an open source social network visualisation tool designed for teaching staff to better understand, identify and evaluate student learning, engagement, academic performance and creative capacity. He has also authored and co-authored numerous publications, including journal articles, book chapters and conference papers.

Shane Dawson's biographical information extracted from:
<http://www.unisanet.unisa.edu.au/staff/Homepage.asp?Name=Shane.Dawson>

Professor Phil Long

Phil Long is the Director of the Centre for Educational Innovation and Technology (CEIT) at the University of Queensland, Brisbane, Australia. As the Centre's Director, Professor Long is dedicated to CEIT's research on environments that have the potential to innovate teaching, learning and creativity. This includes research, development, and dissemination of educational innovation through the strategic use of physical and virtual spaces and technology. Professor Long's current research interests focus on designing built pedagogies, both physical and virtual, to support active learning and research collaboration. Professor Long's professional activities include serving on the boards of the [New Media Consortium](#), [AAEEBL](#) and Campus Technology. He has numerous publications, book chapters and webinars around technology and learning.

Phil Long's biographical information extracted from
<http://ceit.uq.edu.au/users/uqplong1>

Introduction

Analytics is a field of research and practice that aims to provide answers to big questions by revealing new patterns of information through the aggregation of large sets of data held in previously distinct sources. It draws on a number of informing disciplines. Its roots are in the disciplines of information systems and computer science, where it is known as data mining and process mining; and in the disciplines related to organisational information management and intelligent organisations, where it is aligned with knowledge management. Analytics applied to the collection and analysis of data sets in higher educational institutions, is often known as institutional research.

In the context of this Journal, we are interested in how analytics can be used to proactively create and manage the institutional conditions that promote learning engagement—a branch of analytics called *learning analytics*. In particular, how learning analytics can be used to enhance the first year experience in higher education. Given that a large proportion of data used in learning analytics has been supplied by students as part of their learning activities, it is important that we do not lose sight of the associated ethical and social justice issues that naturally arise in discussions about using and combining, what were previously, disparate sources of data.

There has been a growing interest in the application of learning analytics to higher education, with new conferences and journals arising to disseminate research and practice in the area. *The Third International Learning Analytics and Knowledge Conference* has recently been held with contributions in multiple research disciplines and participants from

throughout the world. Australia is well represented in this space and has a growing number of active learning analytics researchers and practitioners. Our *Feature* in this issue of the Journal showcases two of those, Professor Phil Long (University of Queensland) and Associate Professor Shane Dawson (University of South Australia) who share their views about the issues and challenges associated with learning analytics.

A series of interview questions about *Learning Analytics* were prepared by the Editors and data was collected by a telephone interview with Shane and a written response from Phil. The resultant raw data was reorganised by the Editors into a discussion of a series of *Issues* and *Challenges* with comments attributed to either Phil Long (**PL:**) or Shane Dawson (**SD:**).¹ Phil and Shane were provided with the opportunity to verify the format and attributions with the final outcome shown below. The discussion begins with some thoughts on what *Learning Analytics* is before moving into the *Issues* and *Challenges*.

Learning analytics: What is it?

SD: Learning analytics provides the potential to enhance understanding of the learning process by both teacher and student – what’s working and what’s not working. Interest in learning analytics has recently gained momentum due to an increased focus on addressing challenges associated with student retention and institutional auditing. Learning analytics is about using data to inform the process and practices of higher education.

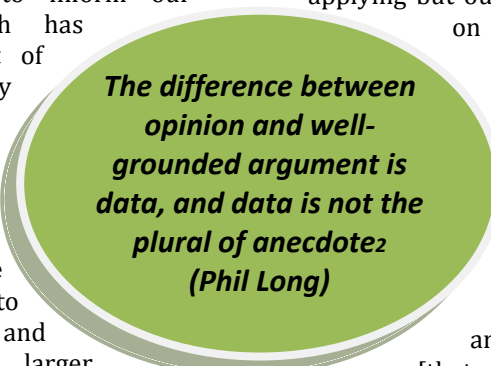
¹ The introduction, conclusion and the material in brackets [...] has been added by the editors.

PL: I like the formal definition offered on the SoLAR website, “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.”

<http://www.solaresearch.org/mission/about/>

SD: Using data to inform our teaching approach has been a core part of education for many years.

2PL: The difference now is that we have for the first time the opportunity to capture efficiently and inexpensively larger amounts of data than we could have imagined even 10 years ago; and the acceleration in the capacity of computational systems, networks, and methodologies for analysing this data offers us insights previously unavailable,



The difference between opinion and well-grounded argument is data, and data is not the plural of anecdote²
(Phil Long)

and even the opportunity to ask questions we would never have even thought to ask.

Issues and Challenges

Issue 1: Knowing and doing

SD: We’re moving very quickly in terms of being able to analyse the data and be very sophisticated in the types of models we’re applying but our actions and following up on those actions are still in their infancy. [While] we can now predict those students who will most likely withdraw from or fail a particular course, our methods for analysing are outpacing our reasons for analysing and there are ethics and privacy issues [that we need to address.]

PL: A real issue for universities in the future is that we’ll come to “know” more and more about what influences and inhibits successful learning. We’ll find that there are data sources that can deepen our understanding and make our learning analytic models better and more robust.

PL: The potential for radical disruption is real. It’s comforting to some to think that they are in organisations that have existed in their current form for 50 or 100 years, but this is mistaken comfort. The pressures of the cost of higher education, the rapidly changing workforce needs, the accessibility of opportunities for higher education through the proliferation of online choices from anywhere on the planet, all of these things generate data and demands for better analysis of it to improve and change teaching and learning practice.

² For history and academic trivia buffs, Phil has provided the following:

PL: There is an interesting historical twist that has occurred in the dismissal of anecdote as reliable information. Fred Shapiro, editor of the YALE DICTIONARY OF QUOTATIONS wrote that Raymond Wolfinger [RW] is attributed to the origin of this phrase, but he actually said the opposite. **RW:** “I said ‘The plural of anecdote is data’ sometime in the 1969-70 academic year while teaching a graduate seminar at Stanford. The occasion was a student’s dismissal of a simple factual statement--by another student or me--as a mere anecdote. The quotation was my rejoinder” (<http://listserv.linguistlist.org/cgi-bin/wa?A2=ind0407a&L=ads-1&P=8874>).

PL: I prefer the morph used commonly today as it refers to the intentional and designed collection of information that is sought rather than unstructured information that is offered.

The challenges

SD: The challenge is then what do we do about it?

PL: Are we willing to follow through on what the analytics tell us would potentially make the learning experience better, more effective, and cheaper?

Will we socially and culturally give ourselves the access to these data to speed this development?

Will we take the time and effort to keep the learner squarely in sight as the beneficiary of this work to justify the cost and effort to make disparate data sets both accessible and aligned in their definition of elements so that we can aggregate them together?

And when we get findings that tell us that particular ways of teaching work better than others, will we act on this?

Our track record isn't that good on these issues.

Issue 2: Learning analytics and the first year experience

SD: Learning analytics are absolutely critical in influencing how rapidly we can transition students into a new environment.

PL: The first year experience sets the stage for the learners' affective experience in later years.

SD: Analytics actually gives us an opportunity to understand the impact of all

the different support processes we apply and to indicate what is working, what's not and where the investment of resources should be for the future.

PL: We need to weigh the benefit/cost risk ratio and look at how we use our increasingly sophisticated understanding of the students' learning activities to apply, redesign, and otherwise use the resources we do have more effectively to improve both retention and engagement of students during their critical first year.

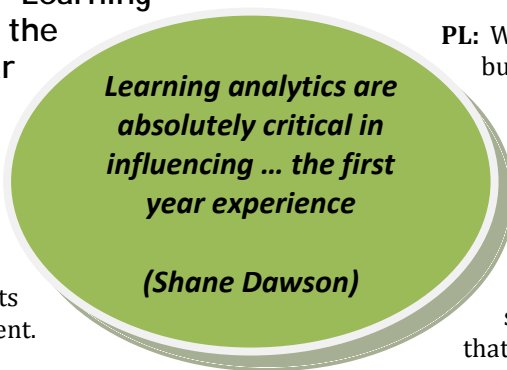
The challenge

[Can learning analytics generate new patterns of knowledge about the first year experience?]

SD: At the moment our data collection is largely limited to our first introduction to the student plus some very basic demographic characteristics. As the student commences and progresses, we have available many different sources of data owned by the institution but the aggregation of those different datasets remains difficult.

PL: We have the potential to build models that draw from the data characterising the students pre-university learning experience, and refine those models with data from other sources, as well as tests that are taken immediately prior to entry or during the first weeks of the university experience.

PL: [However], the pre-requisite for being able to take advantage of data sharing is



having comparable definitions of the data themselves.

SD: As long as they're linked in that way, and the data that's associated with them is commonly tagged, the actual metadata that sits behind them will facilitate broader access.

Issue 3: Learning analytics is not a passing fad.

SD: I'm yet to discover a university that's not looking at some form of analytics. Our use of technology is by no means going to decrease in higher education.

PL: In the same way that new technologies are changing the way we do business, these are new realities of our landscape. It's how we deal with them that is the issue.

The challenges

[In three to five years:]

SD: Will we achieve greater embedding and consolidation of current methods and models? There's a slow adoption process and institutions are struggling with how we tie together the data from the disparate learning systems. But I think there'll be a greater acceptance and consolidation of it.

Will the visualisation of the data increase really quickly? Visualisations lend themselves to interpretation of data and then action.

Can some of the conversations around the sharing of data and having a process by

which we can share data and make it accessible be realised in three to five years?

It's well underway. We're just really touching on what will be a very rapid incline in terms of sophistication around the analytics and how they're applied.

PL: We're on a steep upward trajectory and it's going to take much more than three to five years to discern the real shape of this curve. What I do think is that in three to

five years we'll be having a

conversation about the

new insights into

learning processes

and ways to give

learners new

opportunities to

see for

themselves not

only where they are

in their learning

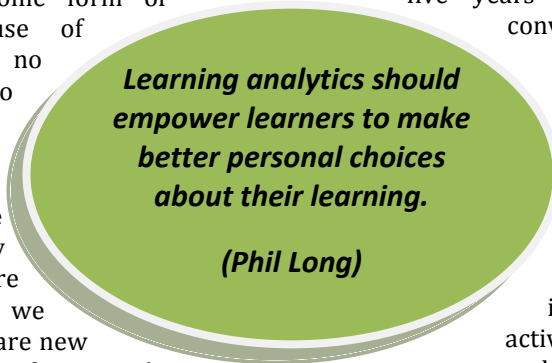
activities but also

suggested pathways they might

wish to consider to achieve a variety of possible outcomes.

[Can we ensure greater empowering of students and teachers in the process?]

PL: A major goal of the current movement toward learning analytics is really focusing on empowering the learner to make better personal choices about their learning. What's new and I think unique here is that we can bring the potential of learning analytics directly to the learners so they can make better decisions about their learning activities, from how and where they spend their time on the course content and assignments, to how they interact with their teammates in a project to where they will invest their efforts in



international study options to bring a different perspective to their programs.

SD: While we need to be mindful of how the data is applied, students need to be empowered with that data and know what it means so that they can work through what works for them and what doesn't.

Issue 4: Learning analytics and ethics, morals and privacy

PL: The ethical issues are enormous, ranging from who really owns the data, to what are the institutions' stewardship responsibilities toward it, to moral considerations about what kinds of research questions are appropriate to study.

The challenge

SD: I think the only way we're going to go through these issues is to be collaborative, open and discursive about it.

PL: The most significant thing we can do is use this interest in and potential from learning analytics to talk more directly about openness and sharing.

SD: The data itself is student data derived from their interactions with our system. It should be accessible by each student so that they can understand and help themselves. The students need to see a benefit in data collection. Why are we collecting it? It is their data. Why not give it to them?

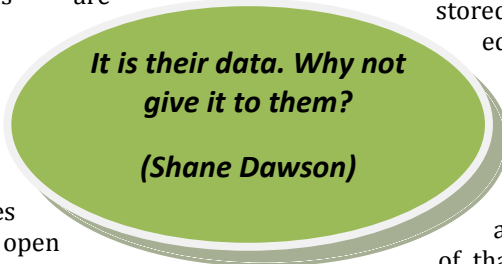
Issue 5: Learning analytics has the potential to generate "big" data

PL: One of the things that is shaking up the world of learning analytics is the sheer size of data sets that are emerging from large open classes, the so-called MOOCs (massively open online courses). With data of this volume, we can do analyses we simply couldn't think of doing before. Similarly there is the potential for aggregating data across our university sector. "Big" in front of data because we have for the first time the opportunity to capture efficiently and inexpensively larger amounts of data than ever before.

SD: There are a plethora of datasets to which we don't have access but I imagine will eventually become accessible in the near future. All the different data systems stored around a student's education profile from kindergarten to higher education will become available and accessible to give us a better understanding of that individual and their learning profile. This will enable full personalisation of the learning experience.

The challenge

PL: There is the challenge of building a framework for sharing institutional data. Of course there would have to be the proper attention to privacy, possibly anonymising data to protect individual identities, etc. But the payoff could be huge. We don't have that many institutions in Australia, so we have a real advantage that we could really achieve this. That would be a powerful national asset and distinguish us from many other parts of the world. And it would advance the research and study of learning in immeasurably positive ways.



SD: We do our university experience surveys, our CEQs etc. We have all this data. Where is the sharing of that data, or at least the accessibility? Are we actually getting full value for the work that we put in on data collection? I would like to see people uploading their learning analytics datasets, in a manner that ensures privacy, draws on established and agreed definitions and are reusable.

Conclusion

The issues and challenges identified by Shane and Phil and expressed in this Feature have provided us with an opportunity to consider learning analytics in the context of the first year in higher education. Clearly the issues and challenges of learning analytics transcend interests in first year, however, the potential for making a real difference to students, and those who educate them, is surely the greatest during their first year in higher education. As our contributors have discussed, it is during the first year that learning analytics has the power and potential to provide maximum benefit to our students and our institutions. Equally, it is in the context of our first year students that learning analytics will need to be activated in ways that ensure students are participants in the production, access and use of new information to assist them identify and achieve their individual learning goals. In turn, researchers and practitioners will have responsibility to be diligent in the use of this information to ensure that the power and potential of any new information produced as a result of learning analytics is used to benefit those students who are the most vulnerable to disengagement and disenfranchisement, our first year in higher education students.