

# Institutional Learning Analytics Centres: Contexts, Strategies and Insights

Simon Buckingham Shum

Connected Intelligence Centre  
University of Technology Sydney  
Broadway, Ultimo, NSW 2007, AUS

Simon.BuckinghamShum  
@uts.edu.au

Pete Smith

Office of University Analytics  
University of Texas Arlington  
701 S Nedderman Dr  
Arlington, TX 76019, USA  
pete.smith@g.uta.edu

Kevin Mayles

Learning & Teaching Centre  
The Open University  
Milton Keynes, MK7 6AA, UK

kevin.mayles@open.ac.uk

Brad Wuetherick

Office of the Provost & VP  
(Academic), Dalhousie University,  
Suite G90, Killam Library, 6225  
University Ave  
Halifax, NS, B3H 4R2, CA

brad.wuetherick@dal.ca

Jingjing Zhang

Big Data Center for Technology-Mediated Education  
Beijing Normal University  
Room 1005, Keji-Building, Haidian District, Beijing, CHINA

jingjing.zhang@bnu.edu.cn

Leah P. Macfadyen

Faculty of Arts, The University of  
British Columbia  
Buchanan C110, 1866 Main  
Mall, Vancouver, BC Canada  
V6T 1Z1

leah.macfadyen@ubc.ca

Shane Dawson

Teaching Innovation Unit  
University of South Australia  
Adelaide, SA, AUS  
shane.dawson@unisa.edu.au

## ABSTRACT

An indicator of the maturing field of learning analytics is the creation of new organizational entities dedicated to using learning analytics services to improve the student experience through institutional research. Going beyond traditional Business Intelligence (BI), these groups operate firmly at the intersection of learning and analytics — they can speak the language of pedagogy and assessment with educators, invent/deploy novel analytics tools, while engaging IT and BI colleagues around mainstreaming services. The end-users targeted by these learning analytics centres are educators and learners. In this panel, the leaders of seven differently configured centres, from diverse universities, share insights on issues such providing rapid value from pilots, research-based innovation, ways to engage stakeholders, vendor partnerships, data quality, and alignment with university strategy. Our hope is that attendees will leave with fresh ideas on the options they have to advance learning analytics in their own contexts.

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Learning Analytics, Organizational Strategy, Innovation Diffusion

## 1. UNIV. OF TECHNOLOGY SYDNEY

**Context:** University of Technology Sydney, founded in 1988, is now one of the largest Australian universities with over 37,000 students. It is based in the city's creative precinct, with a growing global ranking in applied research fields, and significant investment in learning spaces to promote practice-oriented learning, creative intelligence and graduate attributes. The focus of teaching and learning is on the student experience on campus augmented by learning technology, including analytics.

**Centre:** The Connected Intelligence Centre (CIC: <http://utscic.edu.au>) was launched Aug. 2014, after a 2 year university consultation on the growing importance of data in the UTS. CIC reports to the DVC (Education & Students). Academic staff bring skills in educational research, human-centered computing, learning technology, text analysis, data mining, and social informatics, supported by a software developer and administrative staff. CIC also coordinates a Master of Data Science & Innovation, and a Learning Analytics PhD program.

**Learning Analytics Tools:** CIC is focusing on analytics to enhance the learning and teaching strategy, which is distinctive in its focus on 21<sup>st</sup> century skills and dispositions, and a move to authentic assessment. Academically developed prototypes include *AWA: Academic Writing Analytics* and *CLARA: Crick Learning for Resilient Agency* for dispositional analytics. CIC has partnerships with data-intensive companies for NLP, enterprise surveys, and social learning. Work is ongoing around collaborative, interactive surfaces, and co-designing analytics with students.

**Key Insights:** When the university leadership makes it clear that analytics is a strategic priority, this sends a very helpful signal. In addition, CIC staff brought new analytics techniques to UTS which have resonated with early-adopter academics. Since academics are under pressure to increase research impact, CIC-collaboration is also designed to be publishable, and has led already to joint internal grants and papers. Some academics are already using data to improve student outcomes, working quietly and often unrecognized to manually gather, curate and analyse data. CIC seeks to increase their capacity, to make their work a more sustainable proposition for their peers to consider adopting. The university has student data that could be analysed more effectively, and we have played the role of broker, connecting data mining and statistics experts to data owners through an internal data challenge model.

**Simon Buckingham Shum** is Professor of Learning Informatics at the University of Technology Sydney, where he directs the Connected Intelligence Centre. His research focuses on learning analytics for higher order competencies such as academic writing, argumentation and social learning.

## 2. THE OPEN UNIVERSITY, UK

**Context:** The Open University (OU) provides distance learning undergraduate and postgraduate education to over 150,000 students through a model of supported open learning. Most of the undergraduate courses offered by the university have no entry requirements and therefore a large proportion of OU students commence their study with lower than the standard entry qualifications for higher education in the UK. Courses are increasingly delivered through digital media complimented by tutorial support offered by OU Associate Lecturers through both online and face to face sessions.

**Centre:** The Learning and Teaching Centre was established in August 2014 to lead the development and monitoring of the university's learning and teaching strategy. One of the key change programmes of work lead by the Centre is to increase the institution's capacity and capability to use learning analytics in driving student success which was identified as a strategic priority for the university in 2013. The Centre has a core team of 12 staff (a mixture of project management and more technical data analysts) leading this work in collaboration with research groups within the university (Institute of Educational Technology and Knowledge Media Institute), plus administrative units with responsibility for data management and reporting to develop and implement a suite of analytics tools and services for the OU's Faculties and Academic Services to use in supporting students.

**Learning Analytics Tools:** Learning analytics strategy and implementation at the OU is focused on the development of both tools and approaches/processes that scaffold the use of those tools for practitioners. At the heart of embedding an institutional approach is the development of an '*Analytics for Action Evaluation Framework*' and an associated toolkit that provides faculty and student support staff the key metrics and prompts to

identify where action to improve students' learning is required, an evidence-based menu of responses along with implementation protocols that enable further evidence of impact to be generated.

The OU is implementing an institution-wide BI visualization solution to deliver learning analytics data at scale. The use of predictive indicators has been integrated into the university's student intervention tool and the advanced *OU Analyse* system is in pilot with a number of modules.

**Key Insights:** Significant effort and resource has been deployed in the project/change management function within the Centre in order to stimulate and start to embed the use of learning analytics tools and approaches into normal practice. Success has been achieved through a bottom-up approach working in partnership with faculty and student support staff to develop new practices, create champions and identify strong case studies to influence further adoption. Fundamental to the strategy has been to fix some underlying data management and availability issues faced by both specialist 'analytics' and student facing units, resulting in a lack of trust in data.

**Kevin Mayles** is Head of Analytics in the Learning and Teaching Centre, where he leads the learning analytics strategic change programme in partnership with expert academic leads drawn from across the institution. Prior to this role he has worked on a number of OU learning and teaching innovation and change projects.

## 3. UNIVERSITY OF BRITISH COLUMBIA

**Context:** The University of British Columbia (UBC) is a large research-intensive university in western Canada, and the Faculty of Arts is the largest of its many faculties and schools. Thus far, UBC has not embraced an institutional learning analytics strategy that could guide LA work 'from above'. (This initiative is being included in the panel as an example of how a team can operate prior to the creation of an institution-wide centre.)

**Centre:** The Faculty of Arts established UBC's only Learning Analytics Program (<http://isit.arts.ubc.ca/learning-analytics>) in 2010. It remains a small team with two core research staff and a team of student research assistants and faculty-based collaborators. An informal partnership with the Vancouver Institute for Visual Analytics has proven fruitful in terms of developing analytics that Arts faculty and instructors can access and interpret.

**Learning Analytics Tools:** *Tableau, Gephi, EventFlow, NetLytic* and others.

**Key Insights:** In UBC Arts, the Learning Analytics team fosters small-scale and localized learning analytics projects and revelations 'by stealth', making use of data visualization and visual analytic approaches. In the absence of an institutional LA strategy, the team instead works at the grass roots level with the goal of developing tools, reports and approaches that can persuade academic decision-makers of the value of mining available teaching and learning data using two particular strategies:

1. Collaboration with departments to apply data analysis to pressing teaching and learning problems.
2. Making heavy use of data visualization and visual analytics tools, based on our experience that visual representations of data are most compelling for this audience.

**Leah Macfadyen** is Program Director for Evaluation and Learning Analytics in the Faculty of Arts. She undertakes a wide range of data visualization and reporting tasks for the Faculty of Arts, with the goal of revealing to Arts colleagues the rich and

valuable information that can be found in available teaching and learning data sets. Her experience of the challenges of implementing learning analytics in her large institution have pushed her to write and think about strategic approaches for implementing learning analytics at scale. Her applied research spans student enrollment pathway analysis, learner social network analysis and testing of student activity models for online learning outcomes.

#### 4. UNIVERSITY OF TEXAS ARLINGTON

**Context:** The University of Texas at Arlington is a growing research institution committed to life-enhancing discovery, innovative instruction, and caring community engagement. An educational leader in the heart of the thriving North Texas region, UT Arlington also boasts more than 20,000 fully online students, as a critical component of its more than 51,000 students total. Faculty members lead students from about 100 countries and in their pursuit of than 180 bachelor's, master's, and doctoral degrees in a broad range of disciplines.

**Centre:** The office of University Analytics (UA) was founded in 2015, with the following goals: to facilitate institutional strategic planning, campus-wide decision making, teaching and learning by developing a campus culture of analytics and toolsets for performing research analyses and predictive modeling of internal and external data; to warehouse and analyze academic, learning, and operational data for internal use as well as state, federal, and external reporting needs, accreditation, compliance, and risk management; to bring the university to national and international prominence in the research and use of learning analytics to promote institutional and student success as well as emerging, complex models of teaching and learning.

**Learning Analytics Tools:** At present, UA makes use of an eclectic mix of tools, including: *Blackboard Analytics*, *Tableau*, and a variety of analytics research toolsets within LINK, including *Coh-Matrix*. The campus also envisions adopting both fundamental infrastructure and more specialized vendor products focused on academic and learning analytics.

**Key Insights:** UTA will strive to pair an operational, university-wide analytics office—University Analytics—with a recognized research lab focusing on learning analytics—the Learning Innovation and Networked Knowledge (LINK) lab, led by George Siemens (<http://linkresearchlab.org>). It is planned that through this symbiosis, the research unit will broaden the horizons of operational analysts and analysis, while UA will allow LINK to remain grounded in the operational challenges of the university. Campus-wide adoption of *Coh-Matrix* for campus-wide use of “big language data,” for example, has its roots in the research within LINK.

**Pete Smith** is Chief Analytics Officer at the University of Texas Arlington (UTA), where he oversees the new office of University Analytics, as well as the Learning Innovation and Networked Knowledge, a learning analytics research laboratory.

#### 5. DALHOUSIE UNIVERSITY

**Context:** Dalhousie University is a medium sized medical-doctoral research university with 15,000 undergraduate and 4000 graduate students. A member of Canada's U15 group of research-intensive universities, and one of Times Higher Education's Top 100 most international universities, Dalhousie is a founding institutional member in the Society for Learning Analytics Research.

**Centre:** The Centre for Learning and Teaching, in partnership with the office of Dalhousie Analytics and others on campus, is helping champion the use of analytics to understand student success and retention, and to support the interpretation and use of analytics data to undertake change at the individual, program, Faculty and institutional levels (<http://www.dal.ca/dept/clt.html>). We have brought together a small team of faculty, data analytics specialists, academic developers, and student services professionals (called Dalhousie's Student Data Team) to work together on understanding our institutional data, and exploring options for data dissemination and support for the interpretation and use of data to make evidence-informed decisions. Our team benefits from the research expertise in Dalhousie's Big Data Institute, an international, multi-disciplinary research institute based in our Faculty of Computer Science. Dalhousie also supports a few individual program or Faculty level learning analytics projects related to social network analysis in online learning, and monitoring/advising students potentially at risk that are only peripherally tied in to the central learning analytics projects.

**Learning Analytics Tools:** Dalhousie's main work related to learning analytics is related to retention modeling, and early alerts for students at risk. In addition to various data analysis tools, we are using tableau for data dissemination and visualization and are in the process of planning our rolling out of D2L's Insights Open Analytics package.

**Key Insights:** As learning analytics work began in earnest at Dalhousie in 2013, we focused on understanding and implementing more effective governance and support processes at each of six levels:

1. Data Stewardship (How do we ensure the best quality data in each of our various data sources?)
2. Data Governance (How do we manage the complexity of institutional data? Who has access to data, including discussions around the ethical implications of learning analytics?)
3. Data Integration (How do we best integrate the multitude of data sources across campus?)
4. Data Analysis (How do we combine various expertise across campus to best ask questions of our data?)
5. Data Visualization and Mobilization (How do we best visualize and mobilize data for the campus community to access data?)
6. Data Interpretation and Support (How do we ensure campus decision-makers, at all levels, have access to support around the interpretation and use of data in evidence-based decision making).

While many at the institution wanted to immediately move to data analysis and mobilization, we quickly realized that there we had to tackle historical challenges around data stewardship, governance and integration that had to be sorted out before we could effectively move forward. As well, given the historical manner in which access to data was restricted on campus, our early pilot projects (which focused primarily on retention modeling) have highlighted the importance of having the appropriate support in place to help academic leaders, faculty and other members of the campus community to interpret and use the data effectively.

**Brad Wuetherick** is the Executive Director, Learning and Teaching in the Office of the Provost and VP Academic and Centre for Learning and Teaching. His research currently focuses on contextualized academic development, curriculum renewal,

and understanding change processes in higher education. Brad has published and presented extensively on projects related to undergraduate research, e-learning (in particular e-portfolios), and faculty attitudes and practices in teaching. He has been involved in learning analytics projects related to retention modeling, early alert monitoring, and supporting the interpretation and use of learning analytics data to change curriculum and teaching practices.

## 6. UNIVERSITY OF SOUTH AUSTRALIA

**Context:** The University of South Australia is a large research oriented organization with more than 35,000 students. The university is South Australia's largest and the youngest Australian institution to be named in the top 50 of 2015.

**Centre:** The Teaching Innovation Unit (TIU) was formed in 2015 (<http://i.unisa.edu.au/Teaching-and-Learning/Home/About-us>). The TIU's core function is to lead and support institutional change through proactive support mechanisms and an evidence-based approach. The Unit is supported by complementary mix of professional and academic staff. The TIU operates through a networked approach drawing on the expertise and skills that resides across the broader institution. This model of operation affords a more adaptable, collaborative and flexible approach in order to build active innovation cycles and bridge the organizational divides that can exist University structures such as between faculties and centralised units. Through an applied and practice-based research approach the TIU can effectively and efficiently address the learning and teaching challenges, questions and issues that confront the university in a process that is both strategically aligned and organizationally collaborative.

**Learning Analytics Tools:** The TIU draws on learning analytics to aid retention efforts across the University, provide opportunities for personalized learning and promote reflection on teaching and curriculum practices.

**Key Insights:** The development and integration of learning analytics into day-to-day practice is a pivotal enabling mechanism to facilitate the achievement of the University's stated strategic aims and targets. However, broad scale adoption, and subsequently, a developed understanding of how such metrics can inform practice is a complex undertaking. The TIU embraces the complexity of analytics through promotion of multi-disciplinary teams, directly funding research into complex institutional problems and the adoption of an innovations framework to target and transition identified research findings into mainstream practice. As such the Unit intertwines research methods and findings with an applied practical approach to demonstrate the potential of learning analytics and to also actively engage staff in institutional research and leadership opportunities to build advocacy and capacity.

**Shane Dawson** is Professor of Learning Analytics and Director of the Teaching Innovation Unit. His research has focused 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 and program chairs of the Learning Analytics and Knowledge conference. He is a co-developer of SNAPP an open source social network visualization tool designed for teaching staff to better understand, identify and evaluate

student learning, engagement, academic performance and creative capacity.

## 7. BEIJING NORMAL UNIVERSITY

**Context:** Beijing Normal University, a key university under the administration of the Ministry of Education, is a renowned for teacher education, education science and basic learning in both the arts and the sciences. The university's predecessor, the Normal College of the Imperial University of Peking, was founded in 1902. BNU is ranked as the top institution in Mainland China in the discipline of education.

**Centre:** Located within the Research Centre for Distance Education, the Big Data Center for Technology-Mediated Education (BDE) (<http://bdata.bnu.edu.cn>) is forging international partnerships to inform theory, policy, teaching, learning and assessment, as well as to improve efficiencies, outcomes and understanding in the broad area of technology-mediated education. The Centre operates as a collaborative milieu and brings together scholars and practitioners to implement learning initiatives and to facilitate and conduct research on big data in education.

**Learning Analytics Tools:** The BDE conducts international collaborative projects on learning analytics to make contributions to the improvements to policy, instructional quality and learning outcomes. Some adopted tools are SIENA and MST. Some methods that are being used include probabilistic graphical models and semantic modeling. As well, our team has designed a prototype "Wisdom Line" to visualize students' behaviors/performance online.

**Key Insights:** Our Centre has been commissioned by the Chinese government to build capacity internally and to subsequently link domestic and international partners. As such, our Centre is being oriented as an important juncture in the research and application of learning analytics in China. We aim to augment methods of learning online as it relates to providing access and improving learning outcomes at scale for higher education and adult education. In concert with computer scientists from industry, we have developed three data tools including *Wisdom Line*, *SERI*, and *LIPS*, each of which addresses unique aspects of learning analytics. At an institution level, we have forged partnerships with the Departments of Computer Science and Statistics. Internationally, the BDE has forged partnerships with eight institutions spanning six countries. The intent is to engage as researchers in these partnerships to broaden understanding of learning analytics as it is implemented and interpreted in varying cultural settings, and in formal and non-formal education. We aim to leverage aspects of learning analytics acquired from these initial projects towards greater capacity building and to serve the interests of varying stakeholders in China.

**Jingjing Zhang** is Associate Professor in Educational Technology at BNU and co-directs the BDE with her colleague, Kirk Perris (Assistant Professor in Educational Technology). She combines a background in machine learning and visualization, with higher degrees in research methods and doctorate in education. Prior positions include the OECD Paris, and the UN New York. Her research interests span open education, learning theory, knowledge media, social network analysis, information visualization and e-research.