Learning Analytics: Assisting Universities with Student Retention

Final Report 2015 (Part 1)

Charles Darwin University
Batchelor Institute of Indigenous Tertiary Education
Griffith University
Murdoch University
The University of Newcastle

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http://www.letstalklearninganalytics.edu.au/
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<table>
<thead>
<tr>
<th>Acronym</th>
<th>Description</th>
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<tbody>
<tr>
<td>ACODE</td>
<td>Australian Council on Open and Distance Education</td>
</tr>
<tr>
<td>ASCILITE</td>
<td>Australian Society for Computers in Learning in Tertiary Education</td>
</tr>
<tr>
<td>CADAD</td>
<td>Council of Australian Directors of Academic Development</td>
</tr>
<tr>
<td>CAUL</td>
<td>Council of Australian University Librarians</td>
</tr>
<tr>
<td>DIICCSRTE</td>
<td>Department of Industry, Innovation, Climate Change, Science, Research and Tertiary Education</td>
</tr>
<tr>
<td>DVCA</td>
<td>Deputy Vice-Chancellor (Academic)</td>
</tr>
<tr>
<td>EDM</td>
<td>Educational Data Mining</td>
</tr>
<tr>
<td>HERDSA</td>
<td>Higher Education Research and Development Society of Australasia</td>
</tr>
<tr>
<td>LMS</td>
<td>Learning Management System</td>
</tr>
<tr>
<td>OLT</td>
<td>Office for Learning and Teaching (Australian Government)</td>
</tr>
<tr>
<td>SIS</td>
<td>Student Information System</td>
</tr>
<tr>
<td>SOLAR</td>
<td>Society for Learning Analytics Research</td>
</tr>
<tr>
<td>UA</td>
<td>Universities Australia</td>
</tr>
<tr>
<td>VET</td>
<td>Vocational Education and Training</td>
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Executive summary

Student success and retention is a crucial aspiration in the Australian higher education context across multiple levels. Broadly, there is an expressed aspiration for widening participation in higher education and a desire for an increased pool of people holding at least a Bachelor level qualification (Bradley, Noonan, Nugent & Scales, 2008). More specifically, improving the participation and success of Aboriginal and Torres Strait Islander people (Universities Australia, 2013; Behrendt, Larkin, Griew & Kelly, 2012), people from regional areas and people of low socio-economic status are important goals (Universities Australia, 2013).

In 2012, the average attrition rate of all commencing bachelor students in universities in Australia was 17.31%, though across individual institutions this ranged between 30.95% at the high end, and 6.74% at the low end (Australian Government Department of Education and Training, 2014). Attrition rates like these have a major impact in a sector that has been dealing with large increases in student numbers, increasing student diversity, and changing modes of delivery over the last 15 years. This is what Clarke, Nelson & Stoodley (2013: 1) refer to as “stress on institutions to maintain or increase student engagement, success and retention in the midst of increasing cohort mass and diversity”.

Learning analytics is most commonly defined 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" (Siemens & Long, 2011) and has emerged in recent times as a topic of great interest in the global higher education space. In the Australian context, if not more broadly, the interest in learning analytics is largely reflective of future potential, rather than generalised or scalable success at this point. This reflects Buckingham Shum & Ferguson’s (2012: 3) observation that “the core proposition is that, as unprecedented amounts of digital data about learners’ activities and interests become available, there is significant potential to make better use of this data to improve learning outcomes”.

Given that many institutions are in the initial stages of their work around learning analytics, this project was focused on the exploration, decision-making and implementation phase as it was felt this would provide the greatest opportunity to learn from the experiences of different institutions and groups within the sector. The project is an exploratory study and as such, it was difficult to predict what themes would emerge during data collection. The following two broad research questions were adopted to provide some flexibility as the project evolved.

1. What factors are relevant or need to be considered where the implementation of learning analytics for student retention purposes is concerned?

2. How do these factors impact on the implementation of learning analytics for student retention purposes?
To explore these questions, and facilitate opportunities for sharing and dissemination, the project utilised a mixed-method research design and had a series of outputs, including:

- Development of a non-technical overview of learning analytics, focusing primarily on linking the fields of student retention and learning analytics;
- An institution level survey focusing on sector readiness and decision making around the use of learning analytics for retention purposes;
- An academic level survey focusing on teaching staff and other academic staff potentially involved with student retention, focusing on their progress, aspirations and support needs where learning analytics are concerned;
- A series of follow-up interviews with academic level survey participants designed to expand on the implications of different activities and experiences with learning analytics to date;
- Development of an evidence-based framework mapping important factors that impact on learning analytics decision making and implementation;
- A suite of five case studies developed by each of the research partner institutions detailing their experiences with learning analytics and demonstrating why elements in the framework are important; and,
- Hosting a national forum where the findings of the project could be shared and institutional leaders of learning analytics could share their own experiences.

Following the data collection phase of the project a number of headline findings emerged relating to progress in the sector with regards to learning analytics. These were:

1. The sector in Australia is at an early stage of development, implementation and understanding around learning analytics.
2. Context is critical and underpins the development, implementation and use of learning analytics for retention.
3. Tensions exist around the extent to which learning analytics can drive actions and behaviours or take the functions of people.
4. Tensions exist between ‘business’ needs, wants and limitations (e.g. costs) and ‘educational’ needs and wants (e.g. academic freedom, and innovation in learning and teaching)
5. People across institutions have a key role to play in leveraging the opportunities of learning analytics, which must take account of the relationships between strategy, planning, policy and action.
6. Establishing relevant business and educational questions is critical.
In addition to the headline findings the data was used more purposefully to develop a discussion framework to help institutions systematically consider factors important in the implementation of learning analytics for student retention and success. The framework is made up of two documents:

1. A one page **high level summary** of the framework which consists of six key domains. The six domains are the areas an institution needs to consider to make progress on learning analytics for retention. They are interconnected and shaped by the primary domain, the institutional context. Continual reflection and adjustment are critical to the process and will require input from across the institution.

2. A set of **discussion questions** to support the use of the framework, organised around the key domains from the concept map. The purpose of the discussion questions is to provide a series of prompts to guide a contextualised discussion.

Another key outcome of the project was the national forum, which was held at Griffith University in Queensland on April 9th and had 162 registrations, with a total of 148 attendees. The format included presentations in the morning on the background, findings and framework, and interactive workshops in the afternoon to allow participants to share their experiences with each other as well as provide feedback on the framework. Following the forum the project team made refinements to the framework and the accompanying resources, based on the feedback gathered in forum sessions.

Overall, engagement with the project from across the sector has been strong and a variety of opportunities for sharing experiences has been incorporated into the project. The following is a summary of the achievements of the project:

- Successful completion of two surveys and a series of interviews;
- Development of the framework, based on the data, and including a rigorous and multi-staged feedback processes;
- The establishment of a project website featuring a range of resources and copies of materials from the national forum, and which provides for ongoing dissemination of follow up work;
- Five case studies that provide insight into different issues impacting on learning analytics implementation in different contexts;
- Workshops with individual universities;
- The national forum; and,
- A range of completed and upcoming conference presentations.

As learning analytics is a rapidly emerging field and the project has compiled multiple data sets it is envisaged that work on the project will continue.
Chapter 1 – Project Context

1.1 Introduction and Scope

Setting the scene – responding to a new set of choices

The higher education system in Australia is continually changing and evolving in response to the broader social and political landscape (Universities Australia, 2013; Beer, Jones & Clark, 2012). In recent years, the introduction and subsequent growth of online learning has given momentum to widespread exploration of the ways in which technology can be leveraged to improve higher education (ACODE, 2014; Wolff, Zdrahal, Nikolov & Pantucek, 2013; Ferguson, 2012; Macfadyen & Dawson, 2010).

Australia has a relatively well-resourced, sophisticated and mature higher education sector, with a strong commitment to the scholarship of learning and teaching (Universities Australia, 2013). Despite this, an increasing range of choices around technology and data presents both challenges and opportunities (Gallagher, 2014; Chaloux & Miller, 2013; Verbert et al., 2013; Hanna, 2000). At present, the sector is wrestling with how to balance attempts to take advantage of all that technology and data analysis have to offer with maintaining a realistic set of boundaries to give clarity of purpose and promote productivity. Every day learners, teachers and other stakeholders grapple with two practical questions:

1. What should our time be spent on doing?
2. How should we allocate our resources?

Throughout the project the connected themes of choice and decision-making were a key point of focus. This is perhaps not surprising given that in many ways learning analytics can be thought of as the exploration, development and refinement of a new set of choices about how learning and teaching data is collected, integrated and used.

As the field of learning analytics matures, the focus of theory and practice is increasingly shifting from traditional post-hoc analysis to exploration of the possibilities that real-time data brings (Fiaidhi, 2014; Raca, Tormey & Dillenbourg, 2014; Norris & Baer, 2013; Dawson, Tan & McWilliam, 2011; Baker & Yacef, 2009; Campbell, DeBlois & Oblinger, 2007). Running alongside is an emerging focus on how computer-assisted personalisation, adaptivity and artificial intelligence might be developed and contextualised to meet higher education objectives (Baer, Norris, Duin & Brodnick, 2013; Chatti, Dyckhoff, Schroeder & Thüs, 2012). Additionally, learning analytics presents new avenues for addressing ongoing themes such as the effectiveness of particular teaching styles or approaches, like gamification (Tsui, Lau & Shieh, 2014; Holman, Aguilar & Fishman, 2013; Camilleri, de Freitas, Montebellow & McDonagh-Smith, 2013) or whether the pedagogical intent of teachers is being realised through the learning process (Kennedy et al. 2014; Mirriahi & Dawson, 2013).
Clearly, learning analytics is a field of richness and multiplicity (van Harmelen & Workman, 2012). Although this is positive, potential exists for such multiplicity to make initial explorations a daunting and confusing experience (van Barneveld, Arnold & Campbell, 2012). Australia’s higher education institutions currently have a variety of promising and novel approaches to sift through when forming their strategic priorities. At the same time, informed learning analytics decision making typically requires a complex blend of pedagogical, data analysis, data infrastructure, project management and leadership expertise (See Gašević, Mirriahi, Long & Dawson, 2014; Clow, 2013; Siemens, Dawson & Lynch, 2013; Norris & Baer, 2013; Ferguson, 2012).

Given such wide potential applications exist it is important to set some boundaries around this project. As such, the project can be thought of as being primarily focused on:

1. The use of learning analytics for student retention purposes.
2. Understanding those factors that impact on the implementation of learning analytics and how these vary across individual institutional contexts.

Next, a literature review brings the focus of learning analytics to student retention, while Chapters 2, 3 and 4 describe the project’s approach, method, outputs and findings. The concluding stages of the report articulate how this exploratory research can be built on over the coming months and years.

1.2 Literature Review

Learning analytics

Learning analytics is most commonly defined 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" (Siemens & Long, 2011). Ferguson (2012) notes that this definition could be taken to cover most educational research, and identifies two additional assumptions: that learning analytics make use of pre-existing, machine-readable data, and that its techniques can be used to handle ‘big data’, large sets of data that are not practicable to deal with manually.

In addition to the rise of online learning and political concerns (e.g. performance management, metrics and quantification), ‘big data’ is an important driver in higher education (Clow, 2013; Ferguson, 2012). Gartner Inc. (2015, webpage) define big data as “high-volume, high-velocity and high-variety information assets that demand cost-effective, innovative forms of information processing for enhanced insight and decision making”. Growth in big data is driving many of the emerging tools and methods of learning analytics.

Ochoa, Suthers, Verbert & Duval (2014: 5) observe that “learning analytics is a new, expanding field that grows at the confluence of learning technologies, educational research, and data science”, before going on to suggest that learning analytics has the potential to address two simple but challenging questions:

Learning analytics: assisting universities with student retention (SP13-3268)
1. How do we measure the important characteristics of the learning process?

2. How do we use those measurements to improve it?

This project was mostly interested in analytics that could be applied to the issue of student retention and therefore took a broad view of the definitions.

As understandings of learning analytics evolve its objectives are subject to ongoing interpretation. One practical summary of prospective learning analytics objectives is offered on the Edutech Wiki (2013):

1. For individual learners to reflect on their achievements and patterns of behaviour in relation to others
2. As predictors of students requiring extra support and attention
3. To help teachers and support staff plan supporting interventions with individuals and groups
4. For functional groups such as course teams seeking to improve current courses or develop new curriculum offerings
5. For institutional administrators taking decisions on matters such as marketing and recruitment or efficiency and effectiveness measures
6. For comparisons between systems (state, regional, national and international)

**Student Retention**

Student retention has become a major focus in the higher education sector over the last 10 years, particularly in response to the Review of Australian Higher Education, better known as the ‘Bradley Review’ (Bradley, Noonan, Nugent & Scales, 2008: xiv), which includes high targets: “the target proposed for higher education is that 40 per cent of 25- to 34-year-olds will have attained at least a bachelor-level qualification by 2020.” Achieving these targets will require not only increasing the rate of enrolment but also, critically, improving student retention. Student retention, either within a unit or a course, can vary significantly across institutions and jurisdictions in Australia. In 2010 student retention averaged 86.6 per cent nationally, with the lowest rate being 71.0 per cent and the highest being 88.8 per cent (DIISCCRTE, 2012a).

Furthermore, “by 2020, 20 per cent of undergraduate enrolments in higher education should be students from low socio-economic backgrounds” (Bradley et al., 2008:xiv). Students from low socio-economic backgrounds are one of a number of official equity groups, which also include students from non-English speaking background, students with a disability, women in non-traditional areas, low SES students, regional and remote students, and Indigenous students (Koshy, 2014; DIICCSRTE, 2012b).
Equity groups have traditionally participated in higher education at a proportionally lower rate than their presence in the broader population. Table 1 is adapted from a recent report by Koshy (2014), which draws on longitudinal data from DIICCSRTE (2013a, 2013b). It illustrates that on top of a 20 per cent increase in overall student enrolments in the five years from 2007 to 2012 there have been specific improvements in the proportional representation of most equity groups, with remote students being the major exception, having only reported about 7 per cent growth in the five year period.

Table 1: Enrolment numbers and overall share of equity groups in Australian higher education (Adapted from Koshy, 2014)

<table>
<thead>
<tr>
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<tr>
<td>National*</td>
<td>634,434</td>
<td>20.0%</td>
<td>n/a</td>
<td>n/a</td>
</tr>
<tr>
<td>Non-English Speaking Background</td>
<td>21,289</td>
<td>27.5%</td>
<td>3.4%</td>
<td>6.3%</td>
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<tr>
<td>Disability</td>
<td>33,220</td>
<td>43.5%</td>
<td>5.2%</td>
<td>13.6%</td>
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<tr>
<td>Indigenous</td>
<td>9,005</td>
<td>31.9%</td>
<td>1.4%</td>
<td>7.7%</td>
</tr>
<tr>
<td>Low SES</td>
<td>109,784</td>
<td>27.8%</td>
<td>17.3%</td>
<td>6.8%</td>
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<tr>
<td>Regional</td>
<td>121,476</td>
<td>20.5%</td>
<td>19.1%</td>
<td>0.0%</td>
</tr>
<tr>
<td>Remote</td>
<td>5,804</td>
<td>6.9%</td>
<td>0.9%</td>
<td>-10.0%</td>
</tr>
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</table>

* 38 Universities representing 93.4% of Australia’s higher education enrolments

In addition equity groups generally have lower rates of retention, with a 76.7 per cent rate of retention nationally in 2010, with the Northern Territory having the lowest rate at 59.9 per cent and the Australian Capital Territory the highest at 80.9 per cent (DIICCSRTE, 2012a).

It is acknowledged that there is much work to be done to increase participation of equity students in higher education. For example, Aboriginal and Torres Strait Islander people comprised 2.2 per cent of the overall population, yet made up only 1.4 per cent of student enrolments in 2010, including only 1.1 per cent of higher degree by research enrolments. Disparity carries over to staffing, with Aboriginal and Torres Strait Islander people representing 0.8 per cent of all full-time equivalent academic staff and 1.2 per cent of general university staff in 2010 (Behrendt et al., 2012).

Behrendt et al., (2012) also recommend ambitious targets, including that the parity target be set to match retention and completion rates of non-Indigenous students. Important factors identified as contributing to Aboriginal and Torres Strait Islander students’ premature withdrawal from studies included financial pressures, social or cultural alienation caused by...
the academic demands of study, and insufficient academic support (Pechenkina & Anderson, 2011).

In addition to recent reviews, patterns of investment and notable strategic initiatives in higher education emphasise the importance of student retention. As described by Universities Australia (2013: 16):

*The Australian Government currently supports the participation of under-represented groups in higher education by funding enabling and foundation programs. These initiatives help prepare students for higher education study and, through the Higher Education Participation and Partnerships Program, assist universities to support students from low SES backgrounds, often in partnership with schools, vocational education providers, other universities, government, and community groups. In addition, each university has a range of programs to encourage people from under-represented groups to enrol in higher education, alternative entry programs, transition programs and study support programs.*

One of the great hopes for learning analytics is that it can impact on multiple levels across the sector. Keeping track of progress requires access to a variety of data, whose reporting often lags significantly behind real time.

**Bringing the learning analytics focus to student retention in the context of success and engagement**

A defining characteristic of this project is that it is a strategic commissioned project which reflects the Australian Government’s interest in the application of learning analytics for student retention. Throughout the project and in the literature (Nelson, Clarke, Stoodley & Creagh, 2014; Willcoxson et al, 2011) it is apparent that student retention is increasingly being subsumed into broader activity and thinking related to student success and student engagement. Thus, there was an inherent tension for the project in conceptualising student retention in the context of success and engagement while staying focused on retention.

A key theme is how analytics can *specifically* facilitate retention, progression and completion across the life-cycle, and this relates firstly to the First Year Experience (FYE) (James, Krause & Jennings, 2010) and secondly to the ways in which analytics can be applied to what Kift, Nelson & Clarke (2010) call ‘transition pedagogy’ (see Nelson, Kift & Clarke, 2012; Kift, 2009). This has been particularly important in response to the Bradley Review (Bradley et al., 2008), which in turn is part of a broader agenda that is sometimes called ‘widening participation’ (Chowdry et al., 2013; Thomas, 2002). Moreover, Willcoxson et al.’s (2011) study concluded that the issue of retention and attrition in later years needs additional attention. One of the key challenges for learning analytics is to create scalable opportunities for expanding the focus from first year to all years, preferably without a concomitant increase in cost.
The academic and non-academic factors that can influence retention are complex and varied (Clarke, et al., 2013); an assertion supported by a study \((n = 7486)\) of business students across six Australian universities, in which Willcoxson et al. (2011:1) reported the following:

\[\text{data strongly indicates that factors related to attrition are generally university-specific and reflect both student characteristics and their responses to the specific institutional culture and environment. The only attrition triggers which span most universities and most years of study are 'lack of a clear reason for being at university' and 'the feeling of having insufficient ability to succeed at university'.}\]

Studies have also shown that online courses have higher attrition rates than traditional face-to-face classrooms (Diaz, 2000). There are conflicting results among studies as to which factor has the biggest impact on student dropout rates (Dekker, Pechenizkiy & Vleeshouwers, 2009; Rivera & Rice, 2002; Diaz, 2000). Possible factors include differences in the student demographic as more students from lower socio-economic backgrounds with less formal educational qualifications tend to be enrolled in online courses. Effective use of technologies, time constraints and academic ‘preparedness’ are other impact factors. Due to lack of face-to-face contact, students can also feel isolated and unsupported by their tutors or online peers (Frankola, 2001).

There are numerous relevant studies, including recent OLT and ALTC projects, on student retention (see Nelson et al., 2014; Willcoxson et al., 2011; Appendix D to this report), and a variety of studies on learning analytics with some connection to student retention, with Signals at Purdue University (Arnold & Pistilli, 2012; Campbell, DeBlois & Oblinger, 2007) a noted example, though many more are emerging (see LAK2015 proceedings for a selection as well as Norris & Baer, 2012).

Thinking more holistically, Tinto (2009) suggests that to be serious about student retention, universities need to recognise that the roots of student attrition lie not only in students and the situation they face, but also in the very character of the educational settings in which students are asked to learn. If one goes back to the learning analytics definitions of "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" (Long & Siemens, 2011:34), it becomes clear that student retention (and success and engagement) have a natural affinity with learning analytics.
Tinto (2009: 3) identifies four conditions of student success:

1. Expectations
2. Support
3. Feedback
4. Involvement (or engagement)

Nelson et al. (2014) take this idea further and add more detail in their Student Engagement Success and Retention Model (SESR-MM), by including the following categories:

- Learning – assessment, curricula, teaching practices, pedagogical styles
- Supporting - information, services, resources, ‘people rich’ advice, advocacy and peer support
- Belonging – interaction, inclusive activities, identity development/formation opportunities
- Integrating – academic literacies, personal literacies
- Resourcing – staff development, evidence base, communication, learning environments

Both Tinto’s (2009) four conditions, and especially Nelson and colleagues’ (2014) categories are potentially measurable, which is where learning analytics becomes particularly relevant.
Chapter 2 – Project Approach

2.1 Objectives and Rationale

The project was carried out during a period in which considerable interest for learning analytics was being expressed both locally and internationally. On the one hand, a steady stream of research studies are focused on novel and evolving methods of measuring and interpreting learning and teaching data (see Ochoa, et al., 2014; Dawson, Gašević, Siemens & Joksimovic, 2014; Verbert et al., 2013; Clow, 2013 for summaries), while on the other there are stakeholders such as LMS vendors bringing new products to market (Siemens, 2012). During this period (and into the foreseeable future) one of the primary challenges for institutions is investigating the variety of learning analytics options and making an assessment of which, if any, to deploy in their context (Arnold, Lonn & Pistilli, 2014; Norris & Baer, 2013).

The original aim of the project was to ‘develop a framework which cross references the tools available through learning management systems and learning analytics with variables and actions to improve retention of at risk students.’ This would ‘be accomplished through a rolling literature review, two national surveys, in depth interviews and case studies’ (West et al., 2013: 1). This aim proved somewhat challenging given the rapidly emerging field and the variation of infrastructure in the sector.

As such, one of the things that would become an ongoing point of reference for the project was institutional decision making around how learning analytics could be implemented for student retention. Thus, the project was underpinned by two flow-on assumptions:

1. Evaluation and decision making around learning analytics is currently, and is expected to remain, an important focus in many institutions.

2. Learning analytics implementation can be a costly investment. Unexpected barriers can add significantly to the cost, whilst early responses to potential issues can prevent costly delays.

These two assumptions underlie the research instruments and specific questions explored. Thus, a key task for the project was to identify issues to consider for learning analytics implementation. Inevitably implementation decisions produce operational imperatives that need to be understood and managed and these were to be explored and documented as well. Another responsibility would be to facilitate ongoing opportunities for institutions and individuals to share effective strategies and discuss circumstances that contributed to delayed progress, increased cost or other problems. As Siemens, Dawson & Lynch (2013: 24) observe, learning analytics is an endeavour in which “Universities need to learn from each other in order to collectively improve productivity of the Australian higher education sector”.

Learning analytics: assisting universities with student retention (SP13-3268)
One of the inherent challenges of an exploratory study in an emerging area is that it can be difficult to predict which themes will be of most interest over the course of the study. Therefore, the jumping off point was two main research questions:

1. What factors are relevant or need to be considered where the implementation of learning analytics for student retention purposes is concerned?

2. How do these factors impact on the implementation of learning analytics for student retention purposes?

It was felt that addressing these broad questions was an appropriate way of proceeding given the observations in the literature that the development and ambiguous nature of learning analytics is a barrier to generalised prescriptions of mature learning analytics practice (e.g. Verbert et al., 2013; Beer et al., 2012; Siemens, 2012).

2.2 Method

The project employed a mixed-method design featuring four distinct data collection and analysis processes:

- Institution level survey
- Academic level survey
- Interviews
- Case studies.

**Institution level survey**

The institution level survey was conducted in July and August, 2014 and targeted senior academic leaders who could give an overview of the institutional strategy around learning analytics. The survey was intended to help build a picture of sector progress with learning analytics itself and in relation to student retention, as well as data infrastructure, human resources and other elements that relate to learning analytics.

It was distributed to Deputy Vice Chancellors (Academic) (DVCAs) at each Australian university via email and promoted via the Universities Australia DVCA forum. Twenty-two Australian institutions participated. The sample was extended to New Zealand following a request from the project reference group which resulted in two NZ institutions participating. The survey was built and hosted using the online Qualtrics application and was set to allow anonymous responses.

The institution level survey instrument and accompanying guidance and information documents as distributed to participants are available in the Project Resources and Outputs tab of the project website.
Academic level survey

The academic level survey conducted between September and November, 2014, was targeted at academic staff (e.g. teachers, student support, academic developers etc.), and focused on how they were thinking about and/or using learning analytics in the context of student retention. The survey employed a purposive, snowball sampling strategy to recruit self-selecting individuals, whose responses were anonymous with invitations circulated via three main avenues:

1. Project team networks (within institutions and disciplinary networks)
2. Professional interest groups (ACODE, CADAD, CAUL, HERDSA)
3. Conferences and workshops (within institutions, nationally, internationally)

To avoid a disproportionate number of learning analytics enthusiasts as respondents, distribution of invitations at conferences and workshops was deliberately more incidental than proactive. The predominant method of survey distribution was through approaching people at high levels in institutions with a request to distribute as widely as policy would allow.

To minimise risk of multiple completions by individuals the software allowed one survey attempt per computer/IP address. Participants could save and return to an incomplete survey. After two inactive weeks an in-progress attempt was automatically closed and placed with completed surveys.

In total 401 people viewed the first question of the survey. Forty-eight people (12%) who answered no questions or only demographic questions were excluded, leaving 353 participants. Appendix C presents a summary of sample demographics in the form of frequency distributions for a range of employment related indicators. While the sample represents a small proportion of the overall population it did produce strong heterogeneity as far as teaching modalities, experience, location and role are concerned.

There were a number of questions in the survey in which participants expressed being unsure what learning analytics is and what it offers to them and/or their institution. With an emerging topic, a tension exists between making people read so much definitional information that very few choose to participate and providing enough guidance around what the questions are asking. In general, the project team tried to minimise this risk by including definitional guidance in a pdf that could be accessed from each webpage of the survey and in the question wording itself.

The academic level survey instrument and accompanying guidance and information documents, as distributed to participants, are available on the project website in the Project Resources and Outputs tab.
**Interviews**

A series of semi-structured interviews were conducted between December 2014 and February 2015 with self-selecting participants who completed the academic level survey. The purpose of the interviews was to expand the narratives around some of the more interesting themes uncovered in the more quantitative aspects of the project. The interviews were also seen as a helpful way of augmenting the presentation of discussion themes in a more personalised way that might resonate with people at different levels in institutions.

Interviews were conducted with 23 people from 15 different universities. Participants held a variety of roles (e.g. teacher, educational developer, student support officer, librarian, learning analytics project leader, tutor, and learning and teaching leader) and spanned different academic levels. Each interview was digitally recorded (audio) and then transcribed verbatim for coding and utilisation in the framework development phase. To facilitate presentation of findings at the national forum (and in other places) the data was manually anonymised (e.g. roles and institution names were removed).

In terms of the ‘structured’ aspect of the interviews the five primary interview questions were:

1. What are learning analytics to you?
2. What do you think learning analytics can be used for?
3. What is your institution currently doing around learning analytics?
4. What do you currently do in your teaching or work role that you see as directly related to student retention and/or success?
5. Do you have any other comments?

**Case Studies**

Each of the five project partners developed an institutional case study focused on describing their institution’s experience in implementing or thinking about learning analytics. The case studies were developed by the project leads in each of the partner institutions and featured input and review from colleagues, and final sign off from the DVCA or equivalent.

The intention of the case studies is to highlight practical ways in which the different domains and elements of the framework can positively and detrimentally impact on learning analytics implementation. Further, the case studies play a key role in uncovering and disseminating the unexpected issues and challenges that have occurred, and might occur, during planning for and implementing learning analytics for student retention.

The case study documents are available on the project website via the following links:

[Introduction and Overview]
Batchelor Institute
Murdoch University
The University of Newcastle
Charles Darwin University
Griffith University
Chapter 3 – Project Results & Outputs

3.1 Results

Space restrictions necessitate that this report focuses on combining data and key messages rather than entirely discrete results and discussion sections. A more detailed selection of raw data is available in the findings presentation from the national forum. There will also be a series of journal articles and other papers to provide more formally structured research reports for the different methods.

Mixed-method design facilitates the triangulation of data and identification of key messages that span different pieces of data. Data analysis revealed a number of headline findings, which come through in multiple data sources:

1. The sector in Australia is at an early stage of development, implementation and understanding around learning analytics.
2. Context is critical and underpins the development, implementation and use of learning analytics for student retention.
3. Tensions exist around the extent to which learning analytics can drive actions and behaviours or take the functions of people.
4. Tensions exist between ‘business’ needs, wants and limitations (e.g. costs) and ‘educational’ needs and wants (e.g. academic freedom, and innovation in learning and teaching)
5. People across institutions have a key role to play in levering the opportunities of learning analytics which must take account of the relationships between strategy, planning, policy and action.
6. Establishing relevant business and educational questions is critical.

The following subsections explore each of the headline findings and illustrate how the data contributes to each of these findings.

The sector in Australia is at an early stage of development, implementation and understanding around learning analytics

Understandings about how learning analytics could be implemented and leveraged towards student retention are quite limited. For the most part learning analytics activity is concentrated centrally (in business intelligence and learning analytics projects and pilots). The implications of this are discussed in Buckingham Shum & Ferguson (2012) and Ferguson (2012). At the academic level (teachers etc.) learning analytics are often not a daily, weekly or even monthly topic of conversation with different colleagues as Table 2 shows. Please note this data shows whether participants discuss learning analytics with people from the
other groups, not whether participants (as teachers for example) discuss learning analytics with anyone else.

Table 2: Absolute frequency with which Academic Level Survey participants engage in learning analytics discussion with selected groups (n varies by variable)

<table>
<thead>
<tr>
<th>Group</th>
<th>Approx. daily</th>
<th>Approx. weekly</th>
<th>Approx. fortnightly</th>
<th>Approx. monthly</th>
<th>Less than monthly</th>
<th>Never</th>
</tr>
</thead>
<tbody>
<tr>
<td>Teaching Staff (n = 319)</td>
<td>7</td>
<td>27</td>
<td>24</td>
<td>45</td>
<td>115</td>
<td>101</td>
</tr>
<tr>
<td>Program or Course Co-ordinator (n = 304)</td>
<td>5</td>
<td>17</td>
<td>15</td>
<td>38</td>
<td>84</td>
<td>145</td>
</tr>
<tr>
<td>School or Faculty Management (n = 306)</td>
<td>3</td>
<td>6</td>
<td>4</td>
<td>33</td>
<td>103</td>
<td>157</td>
</tr>
<tr>
<td>Learning support staff (n = 305)</td>
<td>9</td>
<td>16</td>
<td>18</td>
<td>34</td>
<td>74</td>
<td>154</td>
</tr>
<tr>
<td>Students (n = 307)</td>
<td>3</td>
<td>14</td>
<td>12</td>
<td>19</td>
<td>77</td>
<td>182</td>
</tr>
<tr>
<td>Colleagues in Communities of Practice</td>
<td>5</td>
<td>19</td>
<td>15</td>
<td>33</td>
<td>68</td>
<td>166</td>
</tr>
<tr>
<td>Central L&amp;T Group Staff (n = 302)</td>
<td>12</td>
<td>14</td>
<td>11</td>
<td>22</td>
<td>73</td>
<td>170</td>
</tr>
<tr>
<td>Student Support Staff (n = 296)</td>
<td>5</td>
<td>8</td>
<td>10</td>
<td>24</td>
<td>71</td>
<td>178</td>
</tr>
<tr>
<td>Institutional management (n = 299)</td>
<td>3</td>
<td>11</td>
<td>4</td>
<td>21</td>
<td>58</td>
<td>202</td>
</tr>
</tbody>
</table>

Whilst the study found that the Australian sector is in the early days, data from the different sources helps clarify what that actually means:

- institutions are actively seeking to understand what learning analytics is and how it might be leveraged at their institution;
- institutions are aware that getting their data infrastructure better integrated is probably going to be helpful, even if they are not yet completely sure how;
- most institutions have developed some analytics capacity and experience through centralised business intelligence projects;
- many institutions are currently running pilot projects and/or testing different tools;
- the technical and multi-faceted nature of working with integrated data and advanced analytics means that planned projects often take longer than anticipated or hit roadblocks; and,
- generalisable, scalable successes remain elusive for now.
Context is critical and underpins the development, implementation and use of learning analytics for retention.

There is great variability in learning analytics across institutions in the sector - in terms of preparedness, issues of importance, strategic positioning, executive support, and resourcing. Thus, institutional context represents a set of key variables that are important considerations in how learning analytics might be implemented. This context will drive development and therefore leads to great variability.

Whilst some elements were common across participating institutions - e.g. the presence of a Learning Management System (LMS) and Student Information System (SIS) - many more differences were articulated. Amongst participating individuals and institutions there was wide variation in:

- restrictions around teaching outside the LMS - some institutions have a set of approved tools, some do not restrict at all, some do not allow teaching to take place outside the LMS;
- the location and extent of executive sponsorship of learning analytics – this ranges from centralised to de-centralised and from academic to IT areas;
- prioritisation of student retention as an issue of focus – this is not necessarily the focus for learning analytics development;
- the types of learning analytics being focused on - some institutions are pursuing personalisation, others predictive analytics, whilst others again are focusing on exploring curriculum and teaching improvement;
- the types of data that people can access and are interested in exploring;
- student cohorts – with wide variability depending on the institution; and,
- the degree of centralisation of learning analytics – some institutions are actively involving academic staff, whereas others are focused on more centrally contained projects.

The LMS is considered one of the most important, common, accessible and relevant to learning analytics data sources for retention. The institution level survey asked how institutions used their LMS and found variation in how pervasive usage is across institutions. Notable was that:

- some institutions use the LMS for half of their units while others require a site for all units;
- in the sample (n=24) just over 50% of the institutions indicated that they had an LMS site for all or close to all of their units; and,
- the role of the LMS varies considerably with some using it solely to support face to face teaching, to others with a clearly articulated blended approach, to those fully online.
The data captured by an LMS becomes more useful when it can be paired with that of the SIS. However, not all LMS packages can integrate the SIS data, which then necessitates a data warehouse approach.

At the time of the institutional survey (July and August, 2014) only approximately 30% of the sample had their SIS and LMS integrated or partly integrated but most are planning to do so through LMS packages or plugins and some were underway in their integration. Twelve institutions indicated that they had a data warehouse up and running with another 5 in the process of development. Within the 12 institutions, all had incorporated the SIS into the data warehouse, while six had integrated the LMS, with HR, research and finance also prominent. However, in terms of learning analytics for retention the relatively low level of integration of data systems does not currently provide the appropriate infrastructure in many institutions.

Tensions exist around the extent to which learning analytics can drive actions and behaviours or take the functions of people.

A broad tension was highlighted around the role of people and the role of computers and the implications for workloads, which is discussed in writing around the seminal ‘Signals’ project at Purdue (Arnold & Pistilli, 2012).

Figure 1 (n = 131 participants who indicated they had a systematic response) showed that personal responses using a manual system were still considered important by institutions, while a number of staff in the interviews talked about personal approaches (e.g. telephoning students) having increased, rather than declined in recent times, although this is likely the result of an increased focus on retention interventions rather than learning analytics.

![Figure 1: Absolute frequency of actions taken as part of a systematic response when students meet identified risk thresholds, from the Academic Level Survey](image-url)
Interview participants identified clear benefits of a balance between manual and automatic responses, as indicated in the quotes below:

“Even though you are using automated systems to communicate and provide feedback you still have to make sure that it is personalised and meaningful for students and that takes time and consideration…”

“I suppose the fact that a lot of the things that you have to do at the moment have to be done manually and they all take time. Anything that can automate the process of that information is beneficial. I suppose there also needs to be some ability to modify it to your own requirements because each course and each cohort of students may differ.”

“Statistics can be helpful, but it can also be useful to talk to students directly and see what they actually think they need themselves.”

Tensions exist between ‘business’ needs, wants and limitations (e.g. costs) and ‘educational’ needs and wants (e.g. academic freedom, and innovation in learning and teaching)

One clear message related to variability in how learning analytics might be positioned in a university and the role of academics in it. An underlying element of this was a tension between institutional/business needs and limitations and what academics would like and how this might fit with learning analytics infrastructure. Within this discussion, the idea of centralised versus de-centralised models arose.

Overall, there is strong interest in learning analytics amongst academic level staff. Academics are particularly interested in the following relatively modest or achievable applications:

• better understanding who is in their class (e.g. demographics, prior academic record);
• consolidated information about individual students at the touch of a button (e.g. seeing how their students are doing in other units, what their demographic data is, whether they are using resources etc. all in one place);
• learning analytics being used for justification of directives relating to their teaching (e.g. when academics are told to respond in 24 hours to students, is there evidence for this being useful?); and,
• improving BOTH student (e.g. resource access patterns, socialisation) and teacher (e.g. teaching style, unit design) behaviour with respect to learning.

Academic staff reported that their institution was not really meeting their needs in ways that that would help them get going with learning analytics including access to data, interpretation of data, professional development and how the use of learning analytics would affect them. This then results in further tensions between university policy and academic freedom. For example, academics want the freedom to teach how they feel is most appropriate yet this may mean that data is not available for use in learning analytics.
A common view is that students should be at the centre of analytics thinking and ethical principles should reflect this (Ferguson, 2012), which has the potential to extend criteria for learning success beyond grades and persistence to include motivation, confidence, enjoyment, satisfaction and meeting career goals. It could also lead to a move away from summative assessment towards formative assessment. To achieve this will require transparent methods of reporting on and visualising analytics that are personalised, can be easily understood by learners and are clearly linked with ways of improving and optimising their learning.

**People across institutions have a key role to play in leveraging the opportunities of learning analytics, which must take account of the relationships between strategy, planning, policy and action.**

Even where institutions were largely conducting learning analytics centrally, there was still a crucial role to play for people across the institution, which relates to one of the key requirements of successfully working with large data sets: that data is validated, trustworthy and current. For instance, one institution wanted to work centrally with assessment data across a whole range of courses and units, so they made pieces of early, low-stakes assessment mandatory to facilitate this. In other cases they made using the LMS Grade Centre or Gradebook mandatory. Nevertheless there were still reports of academics not using the LMS to record grades, which affected the ability to utilise the data, as this interview quote illustrates:

“*Within our LMS there are a number of settings that are unhelpful when you are trying to get data out of the system. So, by allowing academics to change a setting on the way grades are displayed for example we* break our ability to predictably extract data for learning analytics.”

Another example is teaching outside the LMS. Table 3 shows a range of teaching activities that take place outside of the LMS, often for assessment purposes:

<table>
<thead>
<tr>
<th>Variable</th>
<th>Category</th>
<th>Absolute Frequency</th>
<th>Relative Frequency</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tools or utilities outside the LMS used for teaching (n = 276)</td>
<td>Does not use tools or utilities to teach outside the LMS*</td>
<td>120</td>
<td>44%</td>
</tr>
<tr>
<td></td>
<td>Website hosted externally</td>
<td>57</td>
<td>21%</td>
</tr>
<tr>
<td></td>
<td>Website hosted by their institution</td>
<td>54</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Others</td>
<td>53</td>
<td>20%</td>
</tr>
<tr>
<td></td>
<td>Social media applications</td>
<td>51</td>
<td>19%</td>
</tr>
<tr>
<td></td>
<td>Mobile apps</td>
<td>22</td>
<td>8%</td>
</tr>
<tr>
<td>Teaching activities conducted outside the LMS (n = 156)**</td>
<td>Provision of access to learning materials</td>
<td>89</td>
<td>63%</td>
</tr>
<tr>
<td></td>
<td>Assessment submission and feedback</td>
<td>75</td>
<td>52%</td>
</tr>
<tr>
<td></td>
<td>Learning focused interactions between lecturers and students</td>
<td>59</td>
<td>41%</td>
</tr>
<tr>
<td></td>
<td>Learning focused interactions between students</td>
<td>48</td>
<td>34%</td>
</tr>
</tbody>
</table>

*mutually exclusive response  ** n excludes participants who do not teach outside the LMS
Of the 55% of universities who indicated that they do not place any restrictions on the use of external systems, only one had a process to capture any data but without the ability to integrate it with any other data set.

Thus, a high level of importance should be placed on designing infrastructure and teaching in a way that will take advantage of learning analytics if this is strategically important.

**Establishing relevant business and educational questions is critical.**

Participants identified an immense variety of data sources and variables that could be of interest and developing a clear focus is important, but the focus is often restricted to infrastructure. However, key questions will assist institutions to develop readily accessible reports for academics with a focus on student success and retention and reduce the load on central services. Thus, relevant questions will allow prioritisation in terms of data integration, implementation and use (Norris & Baer, 2013).

Participants in the academic survey were asked what type of data they would like access to. Most of the 150 respondents indicated what they would like to find out about (rather than the data they wanted). Analysis revealed that while participants came from various main roles (teaching staff, learner support, postgraduate research and management) each group identified key questions or areas of focus that fit under all headings, in line with Kennedy et al. (2014) work.

The following are some example questions from respondents, categorised into three broad themes:

1. **Improving Curriculum/course design and teaching**
   - Is course design effective?
   - Which course(s) are performing well? (within a school, faculty, university)
   - How can I improve my course design and teaching to improve engagement and performance?

2. **Improving retention and performance**
   - What are the indicators?
   - Who are the most at risk?
   - What interventions are more likely to be effective?
   - What effect does intervention with students (based on low results observed through analytics) have?
   - What trends can we see in terms of at risk students?
   - Are there relationships between progression, enrolment status, performance?

3. **Resource/planning at an institutional level**
   - What trends can we observe/measure over time?
   - Can I profile courses and compare with SES results to see best/worst practice patterns?
3.2 Translating data into output - why a discussion framework?

A key output of the project was to develop a framework (see Appendices E and F) to help structure institutional level systematic discussion around the exploration and implementation of learning analytics for student retention purposes.

Learning analytics is an enterprise involving the coming together of multiple disciplines (Balacheff & Lund, 2013; Siemens, Dawson & Lynch, 2013), and dialogue around learning analytics in institutions needs strengthening if the opportunities are to be maximised (Siemens, 2012). Clear and systematic communication is critical to ensuring that staff are conscious of their roles, responsibilities and ability to meaningfully contribute to learning analytics initiatives (Arnold et al., 2014; Norris & Baer, 2013). A number of participants emphasised that inadequate communication where learning analytics implementation is concerned is liable to cost time and money.

Furthermore, many people (even at higher levels) in the sector have had limited practical exposure to learning analytics and therefore do not always recognise tangible implications that impact on implementation. Finally, learning analytics implementation necessitates collaboration between people with vastly different roles and expertise (Arnold et al., 2014; Mirriahi, Gašević, Long & Dawson, 2014; Balacheff & Lund, 2013). A discussion framework can facilitate discussion and help form common understandings about what is required for success, ideally leading to interdisciplinary approaches (see Ochoa, et al., 2014; Mirriahi et al., 2014; Suthers & Verbert, 2013), or productive multi-vocality (Balacheff & Lund, 2013).

Overall, the vision for the framework is for an accessible tool, that helps stakeholders map and categorise a range of factors that people across the sector (in the surveys, interviews and literature) have identified as being significant in the implementation of learning analytics for student retention.

The framework documents

The ‘framework’ is comprised of two primary documents:

1. A one page high level summary of the framework, which consists of six key domains. The six domains are the areas an institution needs to consider to make progress on learning analytics for retention. They are interconnected and shaped by the primary domain, the institutional context. Continual reflection and adjustment are critical to the process and will require input from across the institution.

2. A set of discussion questions to support the use of the framework, organised around the key domains from the concept map. The purpose of the discussion questions is to provide a series of prompts to guide a contextualised discussion.
Iterative refinement of the framework

The initial version of this framework was developed during a multi-day face-to-face workshop where project team members considered the issues and themes identified in the data collection and analysis phase. The first draft was presented to the project reference group and their feedback incorporated. In the meantime, the project partners utilised the framework to develop case studies and to inform their own institutional thinking.

The next step was to present the framework at the National Forum for feedback. This took place in April 2015, where 148 people came together at Griffith University to discuss the findings, explore the framework and share examples from their own experiences with learning analytics.

The morning session of the forum focused firstly on broad presentation of the project findings followed by a specific introduction to the framework (videos of both sessions are available on the project website). Explicit links were drawn between the data and the framework itself, showing how the data gathered during the project informed the elements and domains of the framework.

In the afternoon, workshops were held with forum participants to explore the framework in the context of forum participants’ own institutions and roles. Participants were invited to provide feedback on the framework and the discussion questions. The following represents a summary of common observations:

- institutional context would be better represented as spanning across all domains;
- organisational culture to be included as an element;
- the concept of ‘sustainability’ should be included in the framework;
- ‘time’ to be added for training and support for academics to use analytics;
- student retention being seen a potentially limiting concept that should be replaced by a broader heading of student success and engagement1; and,
- a suggestion that rather than reflection, the framework include systematic discussion as an interface, as this would help develop impact amongst senior leaders who would then be more likely see this process as constructive and purposeful.

Following the forum the project team refined the original version of the framework based on feedback from participants (including some feedback on the graphics) and developed an

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1 The project was primarily funded to look at student retention. Nevertheless, this feedback echoes Siemens (2012, p. 4) assertion that “a second needed transition is one that moves LA research and implementation from at-risk identification to an emphasis on learner success and optimization”.
updated version. Refinement generally reflected the consensus. Next, the framework was presented to the reference group and some further changes were made to arrive at the version presented here, and on the next page, as Figure 2.

The consensus levels of the feedback varied significantly, reflecting one of the major current challenges within the sector: that different individuals, work groups and institutions often have quite different perceptions about what learning analytics is and where its main focus or applications lie (Verbert et al., 2013). Therefore, a more prescriptive maturity model was deemed inappropriate at this point in time.

This project has found that many institutions are still working on understanding how learning analytics might be utilised and implemented in their own unique context. With this in mind, the discussion framework has been developed as a practical tool that can help inform the implementation of learning analytics in specific institutional contexts, by providing a set of discussion questions and reinforcing the importance of a whole-of-institution approach.

Figure 2 (Page 27): High Level Framework Summary
A FRAMEWORK OF FACTORS RELEVANT TO INSTITUTION LEVEL IMPLEMENTATION OF LEARNING ANALYTICS FOR STUDENT RETENTION

This framework organises a range of factors relating to learning analytics implementation into six key domains, shown in green. These domains share a systematic discussion interface, shown in yellow, which articulates the institution level focus of the framework and its intended engagement process.

### INSTITUTIONAL CONTEXT

Institutional context provides the parameters for what is feasible/appropriate and includes:
- Location
- Student demographics and characteristics
- Staff demographics and characteristics
- Size and structure
- Strategic positioning of the institution

### SYSTEMATIC DISCUSSION OF THE SIX DOMAINS

This discussion interface recognises that successfully coping with the complexity of learning analytics requires a collaborative, systematic approach because:

- Expertise relating to the six different domains is distributed across institutions
- Learning analytics projects typically exert broad impact across an institution

#### TRANSITIONAL INSTITUTIONAL ELEMENTS

Transitional institutional elements provide the parameters for the implementation of learning analytics. They include:
- Culture
- Positioning of learning analytics within the institution
- Level of sponsorship
- Governance arrangements
- Alignment with institutional strategy
- Sustainability

#### LEARNING ANALYTICS INFRASTRUCTURE

Learning analytics infrastructure is concerned with three main factors: system reliability, system sophistication and relevant expertise. This includes:
- Digital availability and integrity of data
- Integration, continuity and availability of data systems
- Technical, pedagogical, statistics, and project management expertise
- Data stewardship
- Policy and procedures

#### TRANSITIONAL RETENTION ELEMENTS

Transitional retention elements provide the parameters to enable more effective deployment of learning analytics for retention purposes. These include:
- Retention planning
- Retention strategy and implementation
- Governance arrangements related to student retention

#### LEARNING ANALYTICS FOR RETENTION

Learning analytics for retention factors are focussed on the use of learning analytics for retention and include:
- Educational and business questions from various stakeholders
- The ability of the system to address the questions
- Accessibility, ease of use of system, tools and reports for various stakeholders
- Consideration and resolution of the ethical issues which may arise from the implementation and use of learning analytics

#### INTERVENTION AND REFLECTION

Intervention and reflection are critical to improving retention. Consideration needs to be given to:
- Training, support and time for staff and students to use systems, interpret data and reports and act on them
- Endorsed processes around actions or interventions arising from the data
- Modification of relevant elements, systems, factors and interventions
The domain structure of the framework

As the framework introduction presented at the national forum provides a comprehensive summary of the framework, the focus here is on the domains of the framework.

Institutional Context

One of the strongest messages to come out of the data was that Institutional Context plays a crucial role in providing the broad agenda and impetus for learning analytics, and traverses the other five domains of the framework as it has a profound interface with each.

The Institutional Context domain is the element which offers the least agility, in that a number of the elements are either fairly fixed or are likely to require significant bureaucratic processes to change direction.

Transitional Institutional Elements

The Transitional Institutional Elements domain is focused on how learning analytics transition to becoming an explicit and embedded part of an institution’s strategic agenda.

For example, progress can be hindered by a shortage of executive support, which plays a key role in sanctioning and resourcing the exploration of learning analytics (see Arnold et al., 2014). Few institutions make substantial progress in elevating the importance of analytics-supported student success initiatives without executive commitment to investing in new tools, solutions, and practices and especially in changing the culture and behaviours (Norris & Baer, 2012: 45).

This domain is also strongly concerned with laying the foundation for a consistent and congruent approach to learning analytics across the various parts of the institution that might be involved, as opposed to a siloed approach.

Learning Analytics Infrastructure

The Learning Analytics Infrastructure domain is a representation of the importance of data systems and infrastructure to the use of learning analytics.

Whilst many institutions have been collecting and storing copious amounts of data for years (Educause, 2010; Heathcote & Dawson, 2005), the systems containing these data have often had limitations restricting their practical use (Siemens, Dawson & Lynch, 2013). Project participants cited numerous examples of data systems they can access, but where for their purposes the interface is not user-friendly, the data is incomplete, data integration is inadequate, or the time taken to obtain a report or visualisation is too long.
This domain allows institutions to rigorously question how data systems can be configured, optimised and governed to facilitate increasingly complex analytical tasks.

**Transitional Retention Elements**

The Transitional Retention Elements domain points to a need for institutions to consider learning analytics in light of broader strategy, planning and practice around student retention and success, however this is conceptualised. Retaining students is a vastly different proposition across institutions, depending on institutional contexts and student demographics.

Given that many institutions have a raft of student services and amenities with links to student retention, it is important to clearly consider and articulate the role of learning analytics in the context of other student retention initiatives.

**Learning Analytics for Retention**

Learning itself is not the only focus area for analytics in a number of institutions, but sits alongside business intelligence (Buckingham Shum & Ferguson, 2012), action analytics (Norris, Baer & Offerman, 2009), educational data mining (Romero & Ventura, 2007; Zaïane, 2001), academic analytics (Campbell & Oblinger, 2007; Goldstein & Katz, 2005), social learning analytics (Buckingham Shum & Ferguson, 2012) and a range of other data science informed methods (see van Barneveld et al., 2012; Chatti, 2012) that might be directed toward retention by higher education institutions.

Ultimately, this domain is about narrowing the focus of learning analytics to the specific institutional questions and aspirations around student retention.

**Intervention & Reflection**

The Intervention and Reflection domain has strong links to the data gathered throughout the project. In a number of participating universities a variety of learning analytics activities are taking place, often in a pilot or small project form, involving a limited group of people at the institution. The presence of a project approach is not surprising given the exploratory nature of much of the work being carried out in institutions.

The Intervention and Reflection domain reinforces that one of the key considerations for institutions in implementing learning analytics is questioning how iterative development will be catered for so that learning from both successful and less successful initiatives is systematically reflected on and deployed toward continuous improvement.
**Systematic Discussion**

The six domains and the elements within them provide a framework for systematic discussion about the implementation of learning analytics. A comprehensive and well-thought out implementation of learning analytics hinges on bringing distributed expertise together. Therefore, a systematic discussion or dialogue is seen as a useful way of binding the various domains together into a purposeful, action-oriented, and contextualised process that can be carried out in individual institutions.

As Siemens (2012: 4) observes: “A transition in analytics from a technical orientation to one that emphasizes sense-making, decision-making, and action is required to increase interest among educators and administrators. This transition in no way minimizes the technical roots of analytics; instead, it recasts the discussion to target problems that are relevant to practitioners instead of researchers”.
Chapter 4 – Project Impact, Dissemination and Evaluation

One of the more positive aspects of the project was the level of interest in learning analytics across the sector. Credit must go to organisations like SoLAR and the OLT for facilitating a welcoming and engaging community around this emerging area. Throughout the project it has also been clear that learning analytics is a topic of interest more broadly, with conferences and organisations like ASCILITE, ACODE and HERDSA making learning analytics a big part of their recent and upcoming conferences. Clearly there is an appetite to find out how data can better be utilised to impact longstanding issues like student retention.

This section presents a summary of the project outputs, and reports on how these have been disseminated – as well as ways in which ongoing dissemination is planned. The original funding agreement describes how this project was intended to produce the following five demonstrable outputs:

1. **A non-technical overview of the use/potential use and limitations of learning analytics**
   
   This work was carried out via the literature review and data collection. It has been reported in a variety of forms including conference presentations, workshops, seminars, national forum and within this report. Further refinement and dissemination of this will take place in future journal articles.

2. **Data on LMS, and the use of analytics in the sector at various levels.**
   
   Information gathered via the two surveys and the interviews serves multiple purposes. On one hand the data provide a baseline measure of the infrastructure available in the sector and on another it was used to inform the development of the framework. More generally the data provides a good reference point for understanding the various concerns and issues faced by people at different levels in the sector. The data was presented at the forum and in this report and has been accepted as the subject for multiple Australian and international conferences over the coming months.

3. **Framework for critically evaluating the use of analytics for student retention based on list of retention variables, cross referenced to LMS, SIS and learning analytics and related issues (e.g. application, training, ethics etc.)**
   
   The framework was presented and workshopped at the national forum and further refined based on that feedback. The framework includes consideration of all of the elements listed in the project proposal, and provides a dialogical discussion tool for implementation of learning analytics for retention.
4. **Case studies on the use of the framework to evaluate analytics in the five project institutions and measurement of the impact on student retention**

Five case studies that are linked to key domains in the framework were produced and disseminated at the national forum. The case studies are intended to bring the framework to life as well as highlight the key lessons that the partner institutions have learnt on their respective journeys. The inclusion of partner institutions that are at various stages in their implementation of learning analytics has meant that the case studies (and national forum) have been the catalyst for many informal discussions and advice around the complex dynamics of learning analytics implementation.

5. **Organisation of a national forum for dissemination of the findings and providing space for critical reflection on learning analytics to enhance retention.**

The National Forum was held at Griffith University in Queensland on April 9th and had 162 registrations, with a total of 148 attendees, representing 43 institutions. The format included presentations in the morning on the background, findings and framework, and interactive workshops in the afternoon.

The impact of the project operates on two main levels of influence: student engagement for retention, which ideally should and, at least is partially under the stewardship of academics, and institutional development of learning analytics, which is under the stewardship of senior executive.

Broader impact includes:

- increasing understanding of learning analytics and its potential applications;

- stimulating thinking in institutions about how learning analytics can be used to assist in retention; and,

- providing a tool to progress development of learning analytics for retention at an institutional level.

The first two elements were expected to be influenced via engagement in the survey, and through dissemination activities, including conference papers, seminars and workshops. The third element was intended to be impacted by engagement with the framework, which is seen as an institutional level tool for considering the elements that need to be addressed to leverage the power of learning analytics for student retention purposes.

Due to the relatively early stages of development of learning analytics infrastructure in the sector, direct impact on students is limited at this stage but work in this field has the potential to impact students systemically once systems come on board.
There was clearly a climate of readiness in the sector for work on learning analytics which was demonstrated by a high attendance at any session run throughout the project. In several cases (OLT Conference & First Year Experience Conference) this resulted in over-subscription to sessions with people standing or sitting on the floor during presentations. This high level of interest has also provided unanticipated opportunities for dissemination with the project leader being invited to run workshops or presentations at several institutions during the project time frame.

Ultimately, the framework is seen as the most likely output to have an ongoing impact in the sector. There has been a reasonably high level of engagement from people in the sector at the senior executive level via the institutional survey with 22 Australian and 2 New Zealand institutions responding. Additionally, many senior executives attended the national forum and other presentations. An Impact Plan which summarises the impact to date and projections for future impact is included in Appendix E.

In order to put in place the elements necessary, engagement is required from across the institution by people in various roles and at different levels. The academic level survey allowed for dissemination at the broader academic level with 353 respondents. The flow on dissemination however has also reached academics who play a critical role in applying learning analytics to retention. Their use cases (or business questions) drive the development of learning analytics reports and data that will feed into systems. Such use cases need to come from academics in order to have an impact on the student experience, and as a subset, on retention. The workshops at 3 institutions and 1 conference have focussed on this element of gathering use cases from academics and other stakeholders to feed into institutional decision making.

Ongoing dissemination activities will allow for continued impact after the project is completed. Currently scheduled activities include several conference papers both within in Australia (HERDSA, Blackboard Teaching and Learning Conference) and internationally (10th eLearning Forum Asia, International Society for the Scholarship of Teaching and Learning Conference, Society for Teaching and Learning in Higher Education). There are also several journal articles in progress and it is anticipated that there will be ongoing publication over the next year. The project website which was developed for the forum has been updated to include the forum materials for future access and further dissemination. A full list of dissemination activities can be found in Appendix F.

Additionally, the project will continue to evolve as funding has been secured via the Innovative Research University Network (IRU) to extend work in this field into Malaysia in partnership with the Universiti Teknologi Malaysia and the Universiti Kebangsaan Malaysia with Charles Darwin, Griffith and Flinders Universities.
Mechanisms for ongoing input and evaluation throughout the project included:

- Team reflections
- Reference Group input and reflections on key outputs, process and impact
- Formal evaluation team input

The project team held 3 face-to-face workshops and fortnightly teleconferences. The evaluator was invited to all meetings. The reference group met bi-monthly and included representation from key stakeholders across the sector. They provided formative feedback on all outputs including the two surveys, interview questions, framework and forum program. See Appendix J for the Evaluator’s Report.