Learning Analytics: Assisting Universities with Student Retention

Project Outcome: Institutional Analytics Case Studies

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

Deborah West
Charles Darwin University

http://www.letstalklearninganalytics.edu.au/
Learning Analytics: Assisting Universities with Student Retention

Institutional Analytics Case Studies

Lead institution
Charles Darwin University

Partner institutions
Batchelor Institute of Indigenous Tertiary Education
Griffith University
Murdoch University
The University of Newcastle

Project leader
Associate Professor Deborah West, Charles Darwin University

Project manager
David Heath, Charles Darwin University

Project team
Dr Henk Huijser, Batchelor Institute of Indigenous Tertiary Education
Professor Alfred Lizzio, Griffith University
Danny Toohey, Murdoch University
Professor Carol Miles, The University of Newcastle
Bill Searle, Charles Darwin University
Dr Jürg Bronnimann, Batchelor Institute of Indigenous Tertiary Education

Evaluators
Dr Grace Lynch, Dr Garry Allan and Geoffrey Edlund, RMIT University

Website
http://www.letstalklearninganalytics.edu.au/
Learning Analytics: Assisting Universities with Student Retention

Table of Contents

Figures ................................................................................................................................. 5
Tables ................................................................................................................................. 6
Introduction .......................................................................................................................... 7

Case Study 1: Batchelor Institute of Indigenous Tertiary Education ................................ 9
   Institutional Background ................................................................................................. 10
   Batchelor Institute students ........................................................................................... 10
   Higher Education courses ............................................................................................... 10
   Analytics: Current State of Play at Batchelor Institute ................................................. 11
   Data collection and student retention ............................................................................. 12
   Key Lessons and Findings .............................................................................................. 14

Case Study 2: Murdoch University ..................................................................................... 15
   Institutional Background ................................................................................................. 16
   Learning Analytics at Murdoch ......................................................................................... 16
   1. Establishment of links between the in-development University retention strategy and learning analytics ................................................................. 17
   2. Exploration of the range of learning analytics tools available in Moodle ................. 18
   3. Student journey mapping ............................................................................................ 18
   4. Exploration of existing data sets .................................................................................. 19
   5. Establishment of a set of piloted units during Semester 1, 2015 ................................. 19
   6. Participation in the Open Universities Australia (OUA) LA pilot project ................. 19
   Key Lessons and Findings .............................................................................................. 19

Case Study 3: The University of Newcastle ....................................................................... 20
   Institutional Context ......................................................................................................... 21
   Learning Analytics Initiative ............................................................................................. 22
   Key Lessons ....................................................................................................................... 26

Case Study 4: Charles Darwin University ......................................................................... 27
   Institutional Background ................................................................................................. 28
   Technical systems ............................................................................................................. 28
   Progress on Analytics (including all systems across the institution) ............................ 29
   How it fits with overall institutional strategy ................................................................. 29
   The Goal: Improving Retention via Analytics for Learn ............................................... 30
   Stage 1: Preparation ........................................................................................................ 30
   Stage 2: Orientation ......................................................................................................... 31
Learning Analytics: Assisting Universities with Student Retention

Stage 3: Rollout preparation ................................................................................................... 33
Stage 4: Deployment ............................................................................................................... 33
Stage 5: Ongoing- support/consultation/training/ System Admin ......................................... 34
Some Challenges and Follow-up .......................................................................................... 34
How does this link to student retention? .............................................................................. 35
Key Lessons .......................................................................................................................... 36

Case Study 5: Griffith University .......................................................................................... 37
Institutional Background ....................................................................................................... 38
Analytics Strategy .................................................................................................................. 38
  Predictive Analytics ............................................................................................................. 40
Academic Milestones Analytics and Interventions ................................................................ 46
  Orientation .......................................................................................................................... 48
  Non-submission of early assessment .................................................................................. 48
  Early Assessment Failure ...................................................................................................... 48
  Course Failure ..................................................................................................................... 49
  Enrolment Call Campaigns .................................................................................................. 49
Self-Report Analytics to Scaffold Student Help-Seeking ......................................................... 49
Academic Analytics to Enhance Course Design and Delivery .............................................. 51
Key Lessons and Findings ..................................................................................................... 52
  Mutual responsibility .......................................................................................................... 52
  Transparency ....................................................................................................................... 53
  Authentic Culture ............................................................................................................... 53
  Local ownership .................................................................................................................. 54
  University-wide coordination and partnership ..................................................................... 54
  Information management .................................................................................................... 55
  Monitoring of effectiveness ............................................................................................... 55
  Sustainability ....................................................................................................................... 55
The Griffith Team ................................................................................................................... 55
  Learning Futures ............................................................................................................... 55
  Office of Planning Services ............................................................................................... 56
  Student Success Unit ......................................................................................................... 56
  Blackboard LMS Team ...................................................................................................... 56
  Faculty Staff ........................................................................................................................ 56
Figures

Figure 1: Illustration of the case study links to the domains of the framework (Page 8)

Figure 2: Illustration of the Batchelor case study focus (Page 9)

Figure 3: Illustration of the Murdoch case study focus (Page 15)

Figure 4: Illustration of the Newcastle case study focus (Page 21)

Figure 5: Illustration of the Charles Darwin case study focus (Page 28)

Figure 6: Five stages of implementation (Page 31)

Figure 7: Illustration of the Griffith case study focus (Page 39)

Figure 8: Levels of analytics and intervention with various student risk populations (Page 41)

Figure 9: The predictive analytics cycle at Griffith University (Page 43)
Tables

Table 1: Business questions across different levels (Page 24)

Table 2: Summary of some of the main factors influencing the attrition of Griffith commencing students (Pages 45-47)

Table 3: Within semester student attrition risk and protective markers (Pages 49-50)
**Introduction**

To complement the more quantitative data collected during the project each of the five partner institutions has developed a case study that explores their individual journey (or a specific aspect of their journey) with learning analytics to date. The case studies play an important role in providing a practical and narrative-driven insight into the decision making processes, challenges faced, and impacts of learning analytics.

Each case study was developed by the institutional lead in the project partner institutions. The case studies typically reflect consultation with relevant staff members involved in implementing learning analytics at the institution. It is acknowledged that the case studies present a subjective viewpoint, which may not be representative of broader views at the institution. The study has found that paths with learning analytics vary significantly across institutions and contexts, so the case studies are intended more as a reflective guide, rather than definitive narrative. In relatively simple terms their objectives are twofold: 1.) illustrate why the domains in the framework are important; and, 2.) discuss key challenges and lessons learned to date with a view to raising awareness around potentially costly challenges and barriers. The case studies were authored between March and April, 2015.

Each case study is comprised of an:

1. **Abstract:** which describes how that case study fits with the *Let’s Talk Learning Analytics and Retention* framework that has been developed to help guide discussion about implementing learning analytics for retention purposes. The figure below summarises where the case studies are intended to fit;

2. **Body:** which describes institutional progress with using learning analytics to assist with retention. In some cases this is more holistic whereas in others a particular aspect of implementation is covered in more detail; and,

3. **Conclusion:** Which summarises the key lessons learned to this point.

The project has found that variation exists amongst institutional approaches to implementing learning analytics for retention purposes. This necessitated the development of a framework with sufficient flexibility to cope with cross-institutional differences. Practically speaking, the framework has some generic elements and some which are more directly connected to the use of learning analytics for retention. For example, institutional context is a relevant consideration across many areas of interest and is thus more abstract (open to interpretation) in this context. In contrast, the relevance of including learning analytics in a retention plan is more self-evident.

Ultimately, there are some aspects of implementing learning analytics for retention where stronger consensus and evidence exists, allowing for more prescriptiveness in terms of what good practice is. However, there are other factors or dimensions where notions of good practice
are debated and/or contingent upon context. There are a range of factors which can impact on the implementation of learning analytics, but in many cases the sector is still figuring out how those factors can be optimised. In these situations of uncertainty the case studies can assist because they:

- Present practical examples of how concrete learning analytics concepts and methods relate to the more generic framework dimensions;
- Explore the practical reflection and action processes that real institutions have undertaken and the contexts in which these processes have occurred; and,
- Leave room for readers to make inferences about how the lessons might be adapted to their own context.

The figure below illustrates the intention for the case studies to collectively discuss all of the domains of the Let’s Talk Learning Analytics Framework. In general the case studies can each be seen to have a primary focus on one or two of the domains, although it should be noted that the Griffith case study includes a more integrated discussion of all of the framework domains.

![Figure 1: Illustration of case study links to the domains of the framework](image-url)
Case Study 1: Batchelor Institute of Indigenous Tertiary Education

This case study presents an overview of the use of learning analytics for retention purposes at the Batchelor Institute of Indigenous Tertiary Education. With reference to the framework it primarily illustrates how factors relating to the Institutional Context play a central role in approaches to retention and subsequently in shaping thinking about how learning analytics might be used. Batchelor Institute holds a ‘both-ways’ philosophy that recognises the right of Aboriginal and Torres Strait Islanders to determine the nature of their engagement with various knowledge systems, in particular their own intellectual and social traditions and practices in the past, the present, and into the future. In and of itself, this has implications for how learning analytics and student data might be owned, managed and used.

In a more practical sense, Batchelor Institute has a relatively small cohort of Higher Education students and the vast majority of these are part of the Australian Centre for Indigenous Knowledge and Education (ACIKE), which is a partnership with Charles Darwin University. Many of these students utilise a face-to-face workshop format and class sizes are typically small enough to ensure relationships can be built between students themselves and between the teacher and each student. Relationship building is explicitly seen as a key element of retaining students at the Batchelor Institute. Ultimately this means that some of the key functions of learning analytics such as identifying patterns in large data and personalising learning at scale, for example, are not as applicable or valuable as they might be in other contexts.

Overall, the Batchelor Institute case study explores how institutional factors play a key role in how retention issues are framed and addressed. It also explores the idea that learning analytics is one of a range of tools that institutions can use to try and address retention and thus is of more value in some contexts than others.

The figure below illustrates where the Batchelor Institute case study fits in relation to the Let’s Talk Learning Analytics and Retention framework.

---

**Figure 2: Illustration of the Batchelor case study focus**
Institutional Background

Batchelor Institute of Indigenous Tertiary Education, a dual sector provider, exists to serve the education needs of Aboriginal and Torres Strait Islander people across Australia. The Institute has a 40 year long history of providing education and training to Aboriginal and Torres Strait Islander people. Engagement with Indigenous Australians is fundamental to the vision, values, governance, operations and delivery functions at Batchelor Institute. The delivery of services is guided by a series of culturally specific strategies, plans, policies, procedures and frameworks of engagement with Indigenous peoples. Pathways to Higher Education and Higher Degrees by Research, and specialist research in Indigenous perspectives, are primary focus areas of Batchelor Institute. Batchelor Institute is a partner in The Australian Centre for Indigenous Knowledges and Education (ACIKE), through which higher education degrees are offered to its students. Batchelor’s higher education students study their units online through ACIKE, but also have face-to-face workshops at Batchelor Campus and the Desert Peoples Centre in Alice Springs. Batchelor Institute also offers a large VET program, which is not included in this project and therefore not discussed in this case study.

At the heart of Batchelor Institute’s ‘both-ways’ philosophy lies the recognition of the legitimate right of Aboriginal and Torres Strait Islanders to determine the nature of their engagement with various knowledge systems, in particular their own intellectual and social traditions and practices in the past, the present, and into the future. An important element in this process has been the use of e-learning, mobile and social media technologies to make the learning relevant and to develop digital literacy skills.

Batchelor Institute students

Of the just over 3900 students enrolled at Batchelor Institute only 7.7% are studying in Higher Education and Research area. Almost 50% the HE students reside in the Northern Territory and most of them live in remote communities. 78% of Batchelor’s HE students are female. The average age across the HE section for both male and female is 38 years. With the exception of 2 Higher Degree by Research students, all Batchelor Institute students are Aboriginal or Torres Strait Islander students.

Higher Education courses

Batchelor Institute students participate in higher education through the ACIKE partnership (between CDU and Batchelor Institute), and they have access to the following fields of study:

- Within ACIKE, two enabling courses are offered, called Preparation for Tertiary Success (PTS), and in 2014 they had an overall enrolment of 67. These courses are offered in a combination of face-to-face workshops and online.

- Education courses include a Batchelor of Education (Primary Teaching) (39 Batchelor Institute students enrolled, with an overall student load of 24.75), and a Batchelor of
Learning and Teaching (Early Childhood) (28 Batchelor Institute students enrolled, with an overall student load of 16.625). Education courses are offered as face-to-face workshops (for Batchelor Institute students) & online, mixed mode (internal & external).

- Health courses include a Bachelor of Health Science (16 Batchelor Institute students enrolled, with an overall student load of 7), and a Bachelor of Nursing Pre-registration (93 Batchelor Institute students enrolled, with an overall student load of 42.125). Health courses are offered as face-to-face workshops & online, or external.

- A number of courses are offered through ACIKE that specifically address Aboriginal and Torres Strait Islander Knowledges. These include Diploma of Aboriginal and Torres Strait Islander Knowledges (5 enrolled students), Diploma of Creative and Indigenous Writing (7 enrolled students), Bachelor of Aboriginal and Torres Strait Islander Advocacy (23 student enrolled), Bachelor of Indigenous Languages and Linguistics (16 students enrolled), Bachelor of Aboriginal and Torres Strait Islander Knowledges (Honours) (1 student enrolled), Graduate Certificate in Sustainable Indigenous Partnerships (new unit; no numbers available), Graduate Diploma in Indigenous Policy Development (5 students enrolled), and Graduate Certificate in Yolngu Studies (1 student enrolled). Various combinations of face-to-face workshops (for Batchelor Institute students) & online, and mixed mode (internal & external) apply to each of these courses.

- The postgraduate program is a Batchelor Institute only program and includes a Masters of Indigenous Perspectives by Research (8 students enrolled) and a Doctor of Philosophy Indigenous Perspectives (6 students enrolled). The postgraduate program is offered in a combination of face-to-face workshops, self-study, supported by a Moodle-based learning space.

**Analytics: Current State of Play at Batchelor Institute**

There is currently no clear strategy in place at Batchelor Institute with regards to Learning Analytics. This is due to a number of factors. Firstly, there are very low numbers of higher education students who are directly under Batchelor Institute’s administrative control. Only those in the Higher Degrees by Research (HDR) program are under Batchelor Institute’s direct administrative control, and these are currently 14 students. ACIKE students are administratively speaking CDU students, which means that data is collected from within CDU’s systems. In other words, these students are enrolled through CDU’s student information system (Callista), and the online units they study are in CDU’s Learnline (Blackboard) system. Thus, data collected about these students are collected via Blackboard Analytics. This tool has recently been made available to ACIKE lecturers (including lecturers employed by Batchelor Institute) to be used in the units they teach, but apart from an initial information session, which not all lecturers attended, Batchelor Institute lecturers have not yet been trained in how to use this tool. Further training sessions will be available in March 2015.
The HDR students have two or three face-to-face workshops per year, and while there is a MyLearn site (Moodle) with resources and a discussion forum, only very few of them make regular use of this, and some never do. In addition, we use a number of ‘secret’ Facebook groups, but again, the use of these is voluntary and not directly linked to the program. Other digital tools that are used by some of our HDR students include Dropbox, Academia.edu, Researchgate.net, Mendeley, Skype, and a range of Google apps. In each case, there are ‘analytics’ that can be drawn from these sites, but this is currently not being done, at least not in a coherent and consistent manner.

Beyond Learnline (Blackboard), the PTS program also uses a ‘secret’ Facebook group, as well as a course blog where students share their stories about being in the program (http://tertiarysuccess.wordpress.com/). In the case of the Facebook group, this creates a community of learners, which includes PTS graduates who stay involved in this group beyond their enrolment in the program. It is also often the most efficient way for PTS lecturers to stay in touch with students who go home to their communities after the face-to-face workshops. While some students frequently change phone numbers, and even sim cards, they do consistently check their Facebook accounts. Again, some data are being used selectively from this engagement in digital environments, but not in a coherent and consistent manner at this stage. Lecturers in other programs (e.g. Batchelor of Nursing Pre-Registration) have recently also begun to use ‘secret’ Facebook groups for similar reasons.

At Batchelor Institute, different systems, such as the Learning Management System (MyLearn/Moodle), the Student Information System (Callista), the Batchelor Institute website (Wordpress), the research repository (ePrints), and the intranet (MyShare/Sharepoint) are currently not integrated in any way. The Institute is in the planning phase of transitioning to Sharepoint 2013, and the expectation is that this will ultimately lead to integration of at least some of these systems, but this is still some way off. While each of these systems is capable of collecting data, there is currently no consistent or coherent approach to collecting such data, nor a coherent strategy around doing so (apart from enrolment and resulting data for reporting purposes via Callista). Batchelor Institute currently does not use specific Learning Analytics software.

**Data collection and student retention**

At Batchelor Institute, retention strategies are almost exclusively based on building relationships. Relationships are central to the way students engage with each other, with their communities, and with their lecturers. Thus, relationships are crucial to every part of the student learning journey, whether in the recruitment phase (which is in many ways dependent on word-of-mouth), the PTS program, in ACIKE courses, or in Batchelor Institute’s HDR program. In the recruitment phase students are actively and personally supported by an Academic Advisor, who actively helps them through the enrolment process. This initial relationship building mostly occurs over the phone. Thereafter much of the relationship building occurs in face-to-face contexts, and thus happens when the students are on campus for workshops. This is currently
still very much the dominant mode, and it involves a range of support and administration staff as well e.g. student travel, student services, residential and kitchen staff. When students are off campus the relationship building and maintenance happens through continuous extensive telephone conversations. In this way, students become part of the ‘Batchelor family’. The sense of belonging to “a family” is the most powerful element of retention for Aboriginal and Torres Strait Island students, because it happens in a culturally safe and respectful manner. This is particularly important because many Batchelor Institute students are firstly away from their community, and secondly often are the first in their families to go to university. Lecturers play a crucial part in developing this sense of community and belonging. Batchelor lecturers often play roles (friends, counsellors, mentors, etc.) that go well beyond what is usually in the job description of academics.

Students have further access to designated student mentors within the ACIKE environment. These mentors provide pastoral and counselling services, to support student through difficult times in their learning journey, thus retaining them in their program of study. The sense of community has long been the way in which students are monitored and students at risk of dropping out are identified immediately. While social media are increasingly becoming part of this relationship development and maintenance, much of it still happens largely in a face-to-face workshop context. It is important to note that outside the workshop environment Batchelor Institute lecturers are in regular phone and email contact with students.

If students who are enrolled in various units do not engage with Learnline within the first few weeks of semester, staff are alerted via Learnline, and they make contact with the students to find out the reason of absenteeism. During this stage staff actively provide students with academic advice and guide them through the initial stage of their learning journey.

As noted, the idea of learning analytics, the consistent use of data to improve learning and teaching and/or the student learning journey at Batchelor Institute is currently very much in its infancy. Of course all of Batchelor Institute’s undergraduate students study through ACIKE, and their lecturers and administrators can therefore access CDU’s Learnline analytics tool. This is currently not yet happening in a consistent manner, and it will take some professional development to engage teaching staff with the potential of this tool, especially for student retention. This will be particularly relevant in programs such as the Bachelor of Education (Primary Teaching) and the Bachelor of Teaching and Learning Early Childhood, where the online materials are developed for ‘mainstream’ CDU students (both internal and external), and where it is important for Batchelor’s lecturers to be able to analyse how Batchelor’s students are doing in the online environment, and then respond appropriately. Batchelor Institute has developed a new professional development framework, based on a Communities of Practice model, and the implementation will be rolled out in 2015. Developing a consistent approach to making use of opportunities that learning analytics provide, especially with regards to retention and progression of Batchelor Institute students, will be incorporated into professional development planning for 2015.
Key Lessons and Findings

The key findings at Batchelor Institute are that learning analytics, and its potential, are not yet on the radar in a consistent manner beyond a few isolated individuals with a particular interest in it. This includes the two Batchelor Institute participants in this project. Data are being collected at Batchelor Institute, for example about enrolments and results, and about student engagement via various online environments, but this is currently done in a relatively ad hoc manner, and none of the data from different systems is being integrated and aligned in a coherent and consistent manner. This situation is complicated further by the fact that almost all Batchelor Institute higher education students (apart from the postgraduate cohort) are ACIKE (and therefore administratively CDU) students. However, this does create a good opportunity for Batchelor Institute to ‘piggyback’ on CDU’s learning analytics tools, and leverage this opportunity to achieve better student engagement, and therefore better retention and progression. This requires a shift in current practice, and some targeted professional development, which will be a challenge. However, Batchelor Institute’s higher education lecturers are a relatively small group, which makes the process of familiarising them with the potential of integrating analytics data into their everyday practice a realistic proposition that can be achieved relatively fast.
Case Study 2: Murdoch University

This case study presents an overview of the current learning analytics planning and development processes at Murdoch University. With reference to the framework the case study sits at the Transitional Institutional Elements point between Institutional Context and the Learning Analytics Infrastructure sections. It also relates strongly to the Transitional Retention Elements section. Whilst Murdoch uses analytics to support student retention in some ways, the case study describes how learning analytics use might become more integrated across the institution through a conscious planning process that takes into account existing strategies and infrastructure and institutional need and aspirations in relation to retention. As part of this process Murdoch is using the framework itself to shape discussions and identify key issues that might arise.

In a practical sense, the Murdoch case study illustrates one of the key learnings from the surveys and interviews conducted during the project, which is that learning analytics use in many institutions presently takes the form of centralised projects underpinned by institutional sponsorship and/or localised projects driven by motivated and interested individuals and teams. Current activities described in the case study highlight that these projects often have quite different points of focus. This suggests a major challenge with learning analytics is helping different stakeholders understand how learning analytics might be used at the institution, especially in light of the chosen investments in data infrastructure and analytics tools.

Overall, the Murdoch case study illustrates that because learning analytics methods and concepts are still being defined one of the key challenges for institutions is to explicitly incorporate a rapidly evolving field coherently into their forward planning.

The figure below illustrates where the Murdoch case study fits in relation to the Let’s Talk Learning Analytics and Retention framework.

**Figure 3: Illustration of the Murdoch case study focus**
Institutional Background

Murdoch University is located in Perth, Western Australia with campuses located south of Perth at Rockingham and Peel. Murdoch also has a strong involvement in international education, with campuses in Singapore and Dubai. Currently in its fortieth year, Murdoch has approximately 26,000 students, of who approximately 6,000 are located offshore and 1,600 international onshore students. Murdoch also has 1,500 online Open Universities Australia students. Murdoch has approximately 2,000 staff, of which about 800 are academic.

Murdoch has a long history of quality teaching, with a particular focus on interdisciplinary studies and a strong commitment to access and equity. Murdoch has a number of alternative entry pathways, including some that focus on students returning to study later in life. It has consistently delivered high quality learning and teaching.

There are eight Schools, those being; Engineering and Information Technology, Veterinary and Life Sciences, Management and Governance, Arts, Health Professions, Psychology and Exercise Science, Education, and Law. Following major curriculum reform in 2012-13, Murdoch now has 7 undergraduate degrees with more than 80 majors and approximately 100 postgraduate degrees. Each of the undergraduate degrees includes a transition to university study unit, research skills units in the second and third years, and inter-disciplinary units in each year.

Currently, Murdoch uses a hosted Moodle solution for its Learning Management System (LMS), having migrated from Blackboard in 2013, and uses Callista as its Student Information System (SIS). The LMS and SIS are integrated to the extent that student enrolment data in the LMS is populated from the SIS; including the student’s enrolment type (on-off campus) and tutorial/workshop allocations. The current Business Intelligence (BI) environment focuses on management and analytical reports. Student data are presented as aggregated load figures.

Learning Analytics at Murdoch

Until mid-2014, Learning Analytics at Murdoch had been relatively ad-hoc. Some strategies aimed at student retention, and based on data collected in first year units, had been instituted. In many cases these data were collected and reported manually by tutors and academic staff and students who had exhibited “at-risk” behaviours. These at-risk indicators included:

- Non-attendance at tutorials
- Missing multiple classes
- Non-submission of an early assessment item
- Non-engagement in online tutorials.
First Year Advisors, located in each of the Schools, were then able to access the data and frame appropriate follow up strategies including emails, telephone calls and invitations to face-to-face meetings.

In late 2014 the new Pro Vice Chancellor Learning and Teaching established a “Learning Analytics Group” (LAG). This group consisted of stakeholders from the academy, the Learning Management System (LMS) support and implementation teams, the Business Intelligence (BI) team, the student advisor network, the Centre for Teaching and Learning (CUTL) and the Quality Assurance group (QA).

This group has since focused on six aspects of LA:

1. Establishment of links between the in-development University retention strategy and learning analytics

The university is currently developing an updated retention strategy of which one of the central elements is “data and analytics”. The four main themes of this strategy are:

**Improved analysis and use of systems data**

- This recognises that there is currently little analysis of student-related data with the exception of unit and teaching surveys

- For this to be useful, there needs to be investment in resources and staff in order to gain significant insight into the student community and to allow for potential identification of unique factors affecting retention, facilitate better identification of at-risk students and allow for better evaluation of strategies and actions

- Better integration of the SIS and LMS in order to provide rich data linking a range of factors with a history of students’ engagement with the university to allow for better personalization, identification of critical timings and broader student behaviours.

**Student retention and at-risk dashboard**

- Currently, data on student retention is available through the management-reporting environment but is not consistently used, or found to be useful, for support staff particularly in day-to-day operations

- At-risk factors (as described above) are reliant upon manual reporting, which is in part being driven on student engagement with LMS, enrolment and other system, integration within a dashboard and reporting environment may assist in shifting some of the work from academic staff along with giving staff greater visibility of student behaviours at an institution, School and course level.
• Creation of a Student Retention and At-Risk dashboard would be very useful in assisting staff to provide a timely response to students and cohorts at-risk, provide meaningful feedback on intervention activities and greatly improve planning for student retention.

Improved and consistent surveying

• One of the significant data gaps is any qualitative or quantitative data linked to the factors affecting student retention. Much of this data could be gleaned from existing surveys but there is limited awareness of surveying activities or sharing of the data, particularly to connecting it to retention.

• Some survey work has been undertaken to gather information on attrition, however this has been inconsistently applied and varied annually making it difficult to compare or respond to the findings.

• Surveying activity needs to be owned centrally with suitably qualified staff able to construct useful tools, analyse the data or advise on alternate resources.

Improved international student data analysis and reporting

• The National Code and Streamlined Visa Program (SVP) either mandate or strongly recommend greater analysis of retention and the student experience broadly alongside the argument for a stronger student experience as a marketing tool.

• Better analysis of international student retention will assist in identifying cohorts at-risk and preparing cohort-specific pre-departure, transition and monitoring tools. This information could also be used in a recruitment and admission context to evaluate pathways and agents to assist with managing risk and operational efficiency.

2. Exploration of the range of learning analytics tools available in Moodle

The university’s LMS is currently Moodle. It has a number of built-in tools for analysing and presenting data from access logs that can be useful in developing intervention strategies by the individual academic at unit level. There are also a number of learning analytics add-ins that are being progressively made available to teaching staff, including GISMO¹ and a learning engagement dashboard currently being developed in-house.

3. Student journey mapping

The student journey has multiple points of interaction between the student and various university systems. Understanding the journey, the interactions, and the hot spots that impact on student retention will be an important aspect of learning analytics at the university.

¹ Graphical Interactive Student Monitoring Tool for Moodle: http://gismo.sourceforge.net
4. Exploration of existing data sets

The university currently collects and holds a wide variety of data on students and their interactions with the university. There is currently a project aimed at mapping these systems in order to better understand the breadth of data that is available and what impact it might have in the context of student retention.

5. Establishment of a set of piloted units during Semester 1, 2015

A number of unit coordinators have been approached to participate in a pilot of some of the tools available in the LMS during Semester 1, 2015. These academic staff will be provided with assistance in the use of the tools and asked to comment on how they use them as the semester progresses, and their perception of the impact of these tools at unit level.

6. Participation in the Open Universities Australia (OUA) LA pilot project

OUA is currently rolling out a LA project, of which the first deliverable is a Unit Coordinator/Tutor dashboard. This will be trialled in larger OUA units offered through Murdoch in the first study period of 2015. The implementation plan is for a student dashboard to be trialled in the second study period.

Key Lessons and Findings

It has become apparent at Murdoch that for LA to be viable, there must be senior leadership sponsorship. This is particularly important when trying to integrate data from multiple systems. Without senior leadership sponsorship, the default response from business owners of systems is to not allow access to data.

Involvement of a wide range of stakeholders will allow the multiple perspectives and experiences that are characteristic of a university environment to be involved and have ownership of LA. To view LA as only relevant to the learning and teaching academics, or to the LMS, or to the SIS, is to ignore the valuable input that can be provided. In Murdoch’s case, input from the management reporting (BI) team was invaluable in terms of their knowledge of the current reporting environment and what was possible. Similarly, input from academics, as well as colleagues involved in learning support and student support, has been able to provide some idea as to the questions that LA can be setting out to answer.

For LA to be more widely used in the academic community, there needs to be champions at school/discipline/programme-level who can produce case studies relevant to colleagues that can clearly outline the benefits to both the academic and the students.
This case study presents a more focused discussion of themes and issues relating to the implementation of vendor-provided learning analytics software that links the LMS and SIS. In the context of the framework this case study is principally focused on the Learning Analytics Infrastructure section. One of the key messages throughout the project has been that there is considerable variation in the approaches that institutions are taking with the development of infrastructure to support learning analytics. Some institutions emphasise in-house development and hosting of data and analytics systems, whilst others work more closely with vendors. The Newcastle case study explores challenges and opportunities that relate to implementing a vendor provided product in a self-hosted environment.

One of the central learnings from the project is that each institution will have very different priorities and requirements when it comes to learning analytics. In practice, making decisions about what infrastructure to invest in and how it will need to be customised and refined is exceptionally complex – and even more so where an institution is a first adopter. This case study shows how factors within the Learning Analytics Infrastructure section of the framework, like existing systems and expertise, executive sponsorship, and alignment with institutional strategy have a key impact when issues arise in the implementation phase. It also shows that periods of testing, negotiation, customisation and refinement mean that going ‘live’ can take much longer than initially hoped.

Overall, the Newcastle case study provides an open and frank discussion of the complex interplay between the technical and strategic elements that play a huge role in influencing learning analytics implementation.

The figure below illustrates where the University of Newcastle case study fits in relation to the Let’s Talk Learning Analytics and Retention framework.

---

**Figure 4: Illustration of the Newcastle case study focus**
Institutional Context

In 2015, the University of Newcastle (UoN) celebrates its 50th anniversary, having gained independence from the University of New South Wales in 1965. The founders of the University had a clear vision: a bush land campus that blended a traditional university with innovative approaches that stayed connected to the community who campaigned for its creation. Over these 50 years, the University has maintained its connection to the local community as the second largest employer in the Hunter Region. The university has grown from a single campus in Newcastle (Callaghan) to now having four additional satellite campuses at Port Macquarie, Ourimbah (Central Coast), Sydney and Singapore.

The UON has a distinctive identity as a research-intensive non capital-city university serving a large and diverse regional population, including Australia’s 7th largest city, Newcastle. In 2014, the University had 40,203 student enrolments, of which 19.6% were international students coming from 117 countries. Sixty-three percent (63%) of students were in undergraduate programs, with 19.8% postgraduate coursework students, 4% Research Higher Degree students and the remaining 13.2% were enabling, ELICOS or non-award students. The University has five faculties (Business and Law; Education and Arts; Engineering and Built Environment; Health and Medicine; and Science and Information Technology) divided into 16 Schools.

Equity of access to higher education is a fundamental principle of the University. This is reflected in its institutional values and demonstrated by its successful history of supporting students from a range of backgrounds to achieve a university education. In 2014, 60.8% of students were female, 2.8% identified as Aboriginal or Torres Strait Islander, 8% had a first language that is not English, and 2.5% were people with a disability. In 2013, 26% of enrolled students were from a low SES background, compared to the national average of 16%.

When the case described below began in 2013, the teaching and student support infrastructure at UoN had an internally-hosted learning management system (Blackboard Learn 9) as well as an internally-hosted student information system (NUSTAR – based on a PeopleSoft platform).

A management information system (MIS) was available through the Planning Quality and Reporting unit that aggregated data from a number of systems including NUSTAR, Human Resources, Admissions and Enrolments and the Course Tracking System. This system had been progressively developing into a more diverse data warehouse and included student demographic and load information, research and grant capture information, detailed program outcomes and human resources data. Learning analytics were not available through the MIS, but student demographic information and grade statistics were available. No learning analytics systems were directly accessing Blackboard but many academics did track student activity through the built-in Blackboard functionality. At this point, all courses were required to have a Blackboard site available to students, but course coordinators were not required to use the Gradebook within Blackboard. UoN’s virtual learning environment (UoNline) also included Turnitin© text matching software and ECHO360© lecture capture in most large and many smaller teaching spaces.
Learning Analytics Initiative

For a number of years, The University of Newcastle had been focused on several related initiatives to analyse data for student support through existing systems – especially the Student Information System. Great gains had been made with the use of pre-admission data sets and other coordinated data. The university decided, however, that richer data as could be gained from integrating additional sources, especially from the learning management system and associated systems. It was believed that this additional insight into student circumstances, needs, and activities could allow new and increasingly effective support to be provided to students. In 2013, the Centre for Teaching and Learning (CTL) recommended to the Executive Committee that UoN should embark on securing the capacity to perform formal Learning Analytics functions in order to assist with the improvement of student retention and success.

In 2013 CTL secured funding to purchase a one-year license for Blackboard’s Analytics for Learn© (A4L) in order to conduct a pilot of the potential functionality and benefits of the emerging analytics technology. At the time of purchase of the license, UoN was poised to be the first Australian university to implement Blackboard’s Analytics for Learn. At that time the strategy for the utilisation of the analytics data was in an early stage of development as a general proposal had been developed regarding academics’ and students’ use of the information to improve student engagement, retention and success. Some administrators were also interested in the potential use of A4L to evaluate the success of curriculum design in specific courses as well as teaching practices.

A consultant was contracted to determine which data, functionalities and reports would be useful and practical, for teaching academics and other senior administrators to access. The applicability of the out-of-the box reports for the use of course coordinators and students was also reviewed. It was determined that most teaching academics would have little appetite for doing their own detailed analyses, but would require reports to be generated from their class data and forwarded to them with detailed suggestions for their use. The general analysis of the A4L data that was available to UoN is represented in the table below and is exemplary of the fact that there are a number of approaches and uses for learning analytics depending on the primary requirements of the end user. This has resulted in a number of different, but equally compelling business questions:
Table 1: Business questions across different levels

<table>
<thead>
<tr>
<th>Category</th>
<th>Definition / Purpose</th>
<th>Example</th>
</tr>
</thead>
<tbody>
<tr>
<td>Students</td>
<td>To reflect on their achievements and patterns of behaviour in relation to others</td>
<td>How many times did I use Blackboard compared to other students?</td>
</tr>
<tr>
<td>Intervention</td>
<td>To identify individual students requiring extra support</td>
<td>Which students are at risk of failing? Which students did not submit any assignments?</td>
</tr>
<tr>
<td>Diagnostics</td>
<td>To help course coordinators and lecturers plan supporting changes for groups or teaching improvement within the current course</td>
<td>Why are all the students in a particular school doing poorly compared to others? Can we improve their tutorials?</td>
</tr>
<tr>
<td>Course Improvement</td>
<td>To help course developers to seek improvements to current courses or develop new curriculum offerings</td>
<td>Are there course tools that are not used? Should we use the online discussion groups when only 10% of the class used them in the past?</td>
</tr>
<tr>
<td>Administrators</td>
<td>In order to help make decisions on matters such as marketing and recruitment or efficiency and effectiveness measures of course offerings</td>
<td>Which courses have the lowest pass rates? Is there a correlation between access and final grades for students?</td>
</tr>
<tr>
<td>University</td>
<td>For quality assurance, recruiting, and comparisons between systems (regional, state national and international comparisons)</td>
<td>How does UoN learning management system (LMS) use compare to other universities for first year students?</td>
</tr>
</tbody>
</table>

The final project was approved in July 2013 and in August, Blackboard offered revised pricing which included a 30% discount for the software and a 20% discount for the Pyramid© advanced analysis and report generation software, with the intention of having A4L fully integrated into the virtual learning environment and all data from Blackboard active by the beginning of Semester One, 2014.

The requisite IT project was chartered the Blackboard contract signed after a one-month period of negotiation. In September 2013, installation and migration into UoN’s virtual learning environment began. This included the preparation of student information system data that needed to be integrated into Blackboard A4L.

In the early days of the installation of Analytics for Learn (Blackboard’s first Australian installation) it became apparent that there were a number of issues of translation for this
American-based product. During Blackboard’s initial visit in December, it was discovered that there were a number of items that were not applicable to the Australian market – and this continued to become more and more evident as the project progressed. Some examples:

- All of the terminology in the out of the box reports was based on the American system and nearly all headers and titles had to be modified. Examples included the date format was Month-Day-Year as compared to the standard Australian Day-Month-Year and student program years were defined as Freshman, Sophomore, etc.

- The system was designed with little flexibility and any changes to the standard American methodology were considered a customisation. For example, the relationships in the data were designed assuming that Blackboard Learn courses align to ‘Sections’ of a class, resulting in small student numbers in each Blackboard course. Because the Australian system doesn’t use sections in Blackboard, customisations had to be made throughout the database and across the reports. The more customisations that were required, the more difficulties were encountered with the upgrade.

- The main A4L report was difficult to run due to its design for small class sizes – it was not capable of handling classes with 250+ student enrolments typical of Australian universities. Blackboard recommended the removal of many of the calculations that allowed the report to provide graphs and visual information, but this substantially diluted the value to the end user.

Other issues also revealed the tool not ready for wide use and support within either the University of Newcastle or other Australian institutions. For example, application troubleshooting required full knowledge of the Blackboard Database, the Student Information System data and integration and technical expertise to manage between multiple applications. This was partially due to the infrastructure inadequacies, the need for complex internal service arrangements and the considerable complexities of the self-hosted environment. This scenario required that a technical person within IT Services supported Blackboard, with full business knowledge of Blackboard and access to multiple databases.

Blackboard assisted by building the development environment incorporating this data and made a site visit to train our IT and eTeaching Support Group in the functionalities and technical aspects of A4L.

By early April, 2014, Blackboard had worked out many of the incompatibilities of its Analytics for Learn product vis a vis its implementation in the Australian market. At this point, final data uploads were proceeding as we were preparing to ‘go live’ to meet the new start date for the pilot that had now moved to the second semester of 2014. The project was on track (for the reallocated dates) and moving ahead.

In early- and mid-2014, a separate project that was evaluating whether UoN’s Blackboard Learn should remain hosted internally or be moved to Blackboard’s external hosting environment. This
resulted in a major decision to move all Blackboard services to Blackboard’s external hosting environment (but A4L was to remain an internally hosted product). Intense negotiations included a number of Blackboard services, such as Disaster Recovery and a data channel between the Blackboard data and UoN’s Management Information System (the developing data warehouse). These negotiations left a brief window for preparation to port all learning management system data and software to the externally hosted environment.

While implementation of A4L was still in the planning stages, a larger data warehouse (NINA – Newcastle Information and Analytics) was being developed by the Strategy, Planning and Performance unit (formerly Planning, Quality and Performance) within the Vice Chancellor’s division at UoN. The original intent was to pilot A4L prior to this larger data warehouse’s development, but the issues described here resulted in the data warehouse project moving forward at a quicker pace and being launched first. At this point, the decision was made to delay the installation of Analytics for Learn until such time as the functionality of the NINA analytics system within the data warehouse, as well as the new Blackboard Learn 9 retention centre could be explored.

The purpose of this MIS NINA system is to aggregate data from a number of systems, including Blackboard, the student information system, research systems, the HR system and the admissions system as a data warehouse. It is designed to provide rich information regarding trends and analysis relating to research performance, student demographics, cohort success, as well as recruiting, admissions and student support strategies. It is still unclear how this information will inform individual course coordinators’ teaching strategies as current intentions are to answer business questions posed primarily by senior university administrators and increasingly those by teaching academics. Student functionality within this system is also uncertain at this time.

Specifically, the capability of NINA to support analytics of student data for teaching staff needs to be explored. As there are obvious overlaps between what is being offered within the NINA system and that of A4L, these capabilities need to be further defined prior to a decision to continue with the installation of the A4L product. Additionally, there are clearly gaps in the NINA system’s ability to provide data to students on their own performance. Some of this information may be available to students in a functional format through Blackboard Learn’s © Retention Centre, and this will be further explored along with reconceptualising how Analytics For Learn could fit most effectively into the University of Newcastle’s overall analysis of data focusing on student retention and success.

The intention of UoN is to fully embrace and leverage the data from the Strategic Planning and Performance unit’s big data warehouse (NINA), for large and campus-wide initiatives, while at the same time utilising Blackboard Learn 9©’s Retention Centre to give simple, course-based analytic information to individual course coordinators and students. Further exploration of how A4L may enhance the value of information from the data warehouse (NINA) will be ongoing as
use of this data matures – especially relating to immediate student data relating to personalised course activities and success.

**Key Lessons**

This case demonstrates the importance of a functional analytics software product, and a sound and reliable infrastructure as an essential underpinning to a learning analytics maturity model for any university. Attempting to install A4L with an immature product not ready for the Australian market, as well as while the platform on which Blackboard Learn sits was in transition resulted in delays and an unclear pathway for installation. Administrative and planning hurdles, existing in any large institution must be cleared prior to the introduction of any learning analytics software or strategic implementation. This places physical, virtual and administrative infrastructure issues firmly at the core of any analytics maturity model.

Also, a detailed plan for how analytics data will be used to benefit students and teaching staff should be developed and disseminated to gain broad institutional support, and a definitive appetite to leverage the benefits of the technology. A clear business question (or number of questions) must be salient and central to the strategic direction of the university, with senior executive support. Otherwise, competing priorities and initiatives will supersede analytics projects, and the project may stall. A definitive plan must be in place relating to how all systems (data warehouse and targeted learning management analytics) will work together to provide rich and powerful data. While the data warehouse can provide answers to a large number of overriding questions relating to research, admissions, enrolment, and program performance, the A4L platform may eventually found be a better fit for those questions asked by students and individual course coordinators about specific course cohorts. Considering the divergent business questions and stakeholders asking them, there will most likely be space for both systems to work in concert, and this is currently under exploration.
Case Study 4: Charles Darwin University

This case study presents an in-depth discussion of the learning analytics decision-making processes over a sustained period of time at one institution. In terms of the framework this case study focuses most intently on the Learning Analytics for Retention and Transitional Retention Elements sections of the framework. As a relatively mature provider of online learning and teaching CDU has a range of broad institutional goals and aspirations in terms of learning and teaching quality. However, when learning analytics emerged as an area of interest it became clear that learning analytics raised the stakes for what might be possible and thus thinking about the relationship between the institutional retention strategy and learning analytics became a key imperative.

In a practical sense this case study represents evaluation and decision making processes over time so readers are able to see the actual impacts of decisions taken. Somewhat inevitably - given that learning analytics sits at a complex intersection of strategic goals, people and expertise, technical infrastructure, and stakeholder aspirations - unexpected challenges and problems arose. In and of itself, this is one of the most important lessons of this case study. One may not be able to flawlessly predict which unexpected challenges will arise as part of learning analytics implementation, but one can be fairly certain that challenges will arise.

Overall, the CDU case study provides a detailed look at how the process of implementing learning analytics was managed from the point of initial preparation, through orientation, rollout preparation, ‘live’ deployment and into an ongoing process of support and iterative improvement.

The figure below illustrates where the Charles Darwin University case study fits in relation to the Let’s Talk Learning Analytics and Retention framework.

Figure 5: Illustration of the Charles Darwin case study focus
Institutional Background

Charles Darwin University is a dual sector regional university with approximately 22,000 students (CDU Annual Report, 2013). The university prides itself on being accessible to students from diverse and non-traditional backgrounds as well as equity groups. The student population in higher education reflects this commitment with 75% being mature age, 68% female and 6.4% Indigenous (CDU Annual Report, 2013).

The university has 5 campuses (Casuarina, Alice Springs, Palmerston, Nhulunbuy and Katherine) and 5 centres (Yulara, Tennant Creek, Jabiru, Sydney and Melbourne). As the location and spread of centres and campuses would indicate, CDU has a clear mandate to deliver both Vocational Education and Training (VET) and Higher Education (HE) throughout the NT and beyond with delivery in regional, remote and very remote locations. Much VET training also takes place within Indigenous communities across the NT.

Delivery in HE, and increasingly in VET, is very technologically dependent. The use of technology for teaching and learning varies between our HE and VET offerings due to a variety of factors including pedagogical differences, student cohort needs and requirements, technological infrastructure available in some areas of the NT combined with the course being delivered. In HE 69% of our students study in online mode with the vast majority, or in many cases all, of their engagement occurring via technology. Virtually all higher education units have a unit site in the Learning Management System (LMS) which means that all students engage in the use of the LMS irrespective of enrolment mode. This allows students to engage with materials any time, any place, providing essential flexibility for our student cohort.

VET uses the LMS predominantly to support face to face learning approaches due to the nature of the qualifications, the student cohort and the technological infrastructure available in remote communities (as this is where we deliver the bulk of our courses at AQF levels 1 & 2). However, the LMS is used increasingly and with more sophistication in AQF levels 3 to 5. At these levels, LMS sites will usually comprise a range of text and multi-media resources which replace more traditional paper-based resources as well as providing demonstration of key skills which can be reviewed by students at their convenience.

Technical systems

The university has a sophisticated suite of enabling technologies to support student management, learning and teaching and relationship management. The Callista Student Information System (SIS) is the core system used to cover student admission, enrolment, grades progression, and graduation and recently the university has integrated curriculum management with Callista through the addition of the Curriculum Approval and Publication System (CAPS). Complementing the SMS, the university has developed a suite of custom built applications that enable views of staff, student, course and unit related data and has well developed systems to integrate key data elements with the LMS.
To enable online learning and teaching the university uses Blackboard Learn as the core LMS accompanied by Blackboard Collaborate web conferencing, SafeAssign for detecting text matching, and Blackboard Analytics. Our suite of online learning technologies extends to mobile via Mobile Learn and Blackboard Collaborate Mobile, incorporates social engagement and learning through Blackboard Social and extends to integrating rich media content management and streaming services through ShareStream.

The university uses the Client Relationship Management (CRM) system RightNow for its recruitment and marketing data management. The CRM system’s primary focus is on developing relationships with prospective HE students. These relationships are created through marketing campaigns, retention activities, and applications to study, etc. This data is used to inform ongoing individual communications and wider strategies. Current student information is also stored in the CRM system, enabling personalised communication and recording of interactions between students and Student Services.

Integration of data between the SIS and the CRM system allows campaigns to be targeted for particular sub-sets of the student population. The University has commenced the establishment of a data warehouse to integrate key data from various sources in order to run refined reporting.

Progress on Analytics (including all systems across the institution)

The infrastructure for learning analytics (and other forms of analytics) is currently being enhanced. Two of these elements (CRM and data warehouse) are at relatively early stages of development in relation to their usefulness for student retention while the work on the LMS is more advanced.

The data warehouse has been established and data is gradually being pulled in. At present it includes selected data from human resources, financial management and the SIS. Work will continue in 2015 and it is anticipated that by the end of the year data will be imported from the LMS, CRM, IT and Blackboard Helpdesks and the Library. At present the CRM is focused on recruitment and does not currently contribute to work on retention but is expected to when integrated with the data warehouse.

Concurrent with this work, implementation has proceeded on Analytics for Learn, the proprietary program that integrates data from the SIS with Blackboard Learn. This tool is seen as critical to assisting with student retention via direct interventions and curriculum improvement.

How it fits with overall institutional strategy

The implementation of Analytics for Learn and other analytics systems is based on institutional strategy related explicitly to several goals, actions and indicators outlined in the CDU Strategic Plan (2012). The essence of these is around ‘identifying factors that affect student success, and target support and other programs towards those factors’ (CDU, 2012, p. 9) as indicated by...
improved retention and completion. While this goal relates to all students, a separate goal also targets improved outcomes for Indigenous students (CDU, 2012).

The overall mechanism for achieving Analytics for Learn implementation is embedded in a separate goal and action to ‘Improve the University’s overall analysis and reporting capacity to underpin better decision making’, which is carried through in the CDU Learning and Teaching Plan and as such has the highest level of support.

This project is also linked to a separate strategic initiative which is completely focused on improving student retention. The ‘retention project’, as it is known, has both informed and been informed by the implementation of Analytics for Learn. The two have been operating on a similar timeline but are driven by different areas of the University. The analytics project has been led centrally while the retention project is led by the faculties. In earlier stages of both projects there were issues with the two having little interaction. However, as work has progressed the interaction between the two has become more complementary.

The Goal: Improving Retention via Analytics for Learn

The decision to acquire Analytics for Learn was taken by the University executive based on the fundamental principle that quality improvements benefit from quality information. However, it was recognised that detailed understanding, effective implementation and beneficial utilisation of such advanced learning analytical capacities are in a nascent stage and would have to emerge as the project progressed.

The implementation of Analytics for Learn has been viewed as having five stages:

1. Preparation
   - Identify and detail specific project objectives and deliverables, key stakeholders, resource requirements, and technical requirements including technical leads and system owners

2. Orientation
   - Product familiarisation, data variables and mapping, nature of reporting and dashboards, access and security roles, and stakeholder consultation and feedback

3. Rollout preparation
   - Review, gap analysis, support and training requirements, case scenarios, communication and data validation

4. Deployment
   - Enable system, key messages, formative use, feedback and improvements, initial training, ongoing management plan

5. Ongoing
   - Ongoing review, data models, systems monitoring, operations management, interventions, policy and procedure implications

Figure 6. Five stages of implementation

Stage 1: Preparation

This early stage included gathering information related to the establishment of the project. The decision to implement Analytics for Learn had already been made based on institutional direction and our existing commitment to Blackboard as the LMS.

This stage included scoping the project to identify and detail specific project objectives and deliverables, key stakeholders, resource requirements, and technical requirements including technical leads and system owners. During this period an organisational impact assessment and risk analysis was undertaken. Following this broad scoping a Project Reference Group was
established including key stakeholders who established a communication plan and began to identify governance, policy and procedural requirements.

Considerable technical work was undertaken documenting technical systems and requirements and initial system set up including:

- Establishment of systems infrastructure, including the provision of appropriate network set-up
- SIS data mapping to Analytics data schema
- Integration of SIS data with Analytics through establishment of a virtual private network (VPN) connection
- SIS data customisations to university context and requirements, particularly in the context of a dual sector institution
- Installation & configuration of Analytics server environment
- Installation & configuration of Analytics tool in LMS environment
- Importing SIS data to Analytics.
- QA and testing
- Security models and role-based access controls

**Stage 2: Orientation**

The next stage of work entailed becoming familiar with the product and making decisions about the set-up of Analytics for Learn in terms of the data being mapped, the nature of the reports and dashboards, and who has access. A beginning step in this stage was to undertake a wide range of stakeholder consultation at various levels and provide awareness sessions to introduce the product and what was possible while also gathering feedback on requirements.

Within this work there were a series of critical issues and/or questions to be addressed and which were referred to the Project Reference Group. What quickly became apparent in responding to such questions is that most are not simple to answer and require consideration of technical aspects such as data accessibility, data integrity, functionality of the system etc. and resources as well as purpose and institutional culture, values and approaches. Some examples included:

- What type of information we wanted (i.e. what types of questions we might like to ask of the data)
- Who should see what data, and what we might do with the data
- Whether or not to turn on the student view
The date from which we would import data.

One of our very first questions, which would influence many later elements, was which variables should be mapped from the SIS to the LMS. The process of this decision making took into account the various purposes of the system with the main focus on the use of Analytics for Learn as improving retention. This took into account literature on retention, stakeholder input and linkages with the retention project. The following list of variables was agreed to:

- International/Domestic students indicator
- Gender
- NESB indicator
- Unit load in current semester
- Internal/External student indicator
- Campus location or centre
- Course progression status
- Basis of admission to university
- GPA
- Unit progress (number of unit attempts)
- Anticipated number of paid work hours per week

One of the desired variables (anticipated number of paid work hours per week) was not available in the SIS as no data was being collected in relation to this variable. Work was begun to change the systems and process to collect this data so that the variable could be mapped.

Another critical issue was to gather feedback from academics, heads of school, faculty and university executives about what types of reports they would like, what questions they wanted to be able to answer, what the reports should look like, and the design and content of the dashboards. With this information in hand, we could then proceed to design and customise the dashboards and reports to CDU’s needs. We could also assess whether the data was available in the system to respond to what people wanted. Considerable work was done to identify the educational and business questions people at various levels would like answered by the data and then mapping that to what was possible in the system. Overall, this feedback provided us with valuable insight and information, a mechanism for managing expectations, and also provided significant information for other projects such as the data warehouse initiative.

The idea of our responsibilities to students in this area was central to the discussion. This was wide ranging from ensuring that students are aware that such data is being collected through to deliberation of whether or not we should turn on the student reporting. Our discussion and thinking focussed on the benefits that a student view could bring against our responsibility to the student cohort. While comparative data may helpful to students, the story the data tells the
student is complex and requires careful analysis and contextualisation. Additionally, the design and context of these reports is an important consideration. We were concerned that it could potentially create more harm than good for at least certain cohorts of students.

We considered that our responsibility included ensuring our student population understands what they are looking at, providing a point of view and guidance on interpretation and took into account the fact that, many of our students are from diverse and non-traditional backgrounds.

Despite the fact that the student view function can be enabled, or not, by the responsible teaching academic (i.e. it can be turned-on for some cohorts but not others) a decision was made to not turn on the student view until we better understand the potential impact on our student cohorts more generally. Further work then needs to be completed to ensure that reports are appropriate, supporting materials are in place and most importantly, clear interventions are identified and enacted in a proactive manner to reduce the risk to the student.

The awareness sessions (open presentations introducing Analytics for Learn to the academic community led by a specialist consultant and project leaders) and other consultation meetings with University Executive and Heads of Schools also allowed us to begin to identify the training needs and approach that should be taken in the lead up to roll out. A range of training and support resources began to be prepared including the development of case scenarios for use in the broader deployment stage.

**Stage 3: Rollout preparation**

This stage involved review and revision of various elements initiated at earlier stages including the gap analysis, (the comparison of current position with potential or desired position), support and training requirements and materials, case scenarios, contextualised reports, and dashboards. Data integrity was also checked encompassing review of the data model and SIS mapping, including data validation and inclusion of identified retention variables.

A critical decision in this stage was the confirmation of the ‘go live’ scope and date. Once confirmed, further awareness and training sessions were scheduled and communication strategies and messages were refined. This led to further consideration of the resources that would be needed in relation to training and support as well as intervention strategies.

**Stage 4: Deployment**

Deployment included the technical aspects of turning the system on to make it available for all academics. However, as we still felt that we were learning about the system and what it could, should, and perhaps should not be used for, an important message was that it should be used for formative purposes only. At this point we asked academics to start to experiment with the available reports, identify potential uses cases, review the information available, and provide further feedback on how they could be improved. Thus, initial training sessions were offered to the academic community and other staff involved in supporting Analytics for Learn and a range
of materials produced including guides, user dictionaries, and supporting documents. However, it had always been the expectation that the materials would be further revised and amended and that a much more comprehensive training program would be put in place prior to the start of semester 1.

An ongoing management plan was developed to include further review of data models and mapping, promotion of the system, communication and training. At this point the key idea was to promote and embed the use of analytics as a core utility that compliments the LMS.

**Stage 5: Ongoing- support/consultation/training/ System Admin**

From a technical point of view, this next stage will include ongoing review of data models and mapping and monitoring of systems infrastructure and data integration feeds.

Considerably more work is required at this stage in relation to pedagogical aspects, policy development and intervention approaches. This work is only at the very early stages. Key questions include what the University will do with this data, what interventions will be undertaken and by whom. Work can then continue to identify the impact of various interventions and refine the process. This will need to flow onto policy and procedures.

**Some Challenges and Follow-up**

Obtaining buy-in from academic staff takes some time, owing to such factors as the perceived lack of an immediate imperative to engage (proportional to other teaching and work responsibilities), and the conceptually complex nature of the possibilities which take time to digest. As the product became more established and the project progressed we have seen heightened interest and buy in from the academics. As anticipated, academic staff with an interest in the discipline or associated with first year student experience initiatives have embraced and championed the implementation of Learning Analytics.

Buy-in from the executive was imperative to the implementation, supporting this position was the sponsorship of the project by the Pro Vice-Chancellor Academic (PVCA). While this enabled direct communication with the leadership group the realisation of the benefits Learning Analytics can bring to university leadership will take some time. Further input from the executive is required to shape reports that will fit with institutional strategies, resources available for intervention and policy positions.

The VET / HE dual sector nature of CDU presented some challenges in terms of data models though customisation was expected and considered as part of the implementation. VET and HE teaching periods differ and subsequently the reporting presentation was modified to reflect this. The structure of VET teaching sites in the LMS will require further review and consideration as the sector transitions from face-to-face teaching to online supported or reliant teaching models. Much more work will be required in this space to ensure that *Analytics for Learn* is useful to the VET sector.
The focus on analytics has highlighted some other considerations around data and reporting which has flow on effects. Some examples of questions that are raised include: How does the use of third party provider including SCORM, publishers, and other types of learning objects or technologies outside of the LMS interact with Analytics for Learn? Do we capture data? Where is the data? Such questions lead onto more fundamental questions about our position on outside technologies. More work is required in this space.

As noted above, the main work is now around the use of the data for interventions. In this way the main questions are: What will we do with this data? What actions will we take?

**How does this link to student retention?**

The use of learning analytics is seen as much broader than student retention in relation to ‘at risk’ students although this is an excellent starting point. The implementation of Analytics for Learn has been influenced by CDU’s student retention project. This has led to particular variables being mapped between the SIS and the LMS. Additionally, a review of factors contributing to retention has highlighted several additional variables which were not captured in the SIS being introduced.

This project also had a significant impact on the content, look and feel and information available from the unit level reports. The retention project team already had a set of key information which they had identified as central to improving retention and were looking to develop an academic dashboard independent of the Analytics for Learn implementation. Customising the Analytics for Learn dashboard to these needs became an important part of the implementation project as it was eventually decided that this was the most convenient place for the dashboard to live. This brought the two projects closer together and has resulted in a ‘dashboard’ in the unit that meets the needs of the academics as well as the retention strategies. Additional work in this regard is expected to lead to further use of the tools in a predictive rather than reactive or same time context.

The use of analytics beyond identifying ‘at risk’ students is an area of much promise but is in early stages. A broader view of the factors that contribute to retention is useful in this context. For example, it has become apparent in our consultations that academics are particularly interested in answering questions related to curriculum design and teaching practice. They appear much more likely to engage in the use of analytics for these purposes rather than a focus on variables which contribute to risk. This appears to be the case for several reasons:

- Tools were already available in the LMS to identify students who were ‘at risk’
- Academics and professional staff were already using some of this data although it took more time to compile
- There were few tools which would enable investigation of the curriculum and teaching practice in a robust way
- Improvement of curriculum is seen as a core academic undertaking.
It is also apparent that various stakeholders are seeking to use the system for different purposes and also want a variety of information in relation to analytics. As there are a range of reporting tools available at various levels (unit, course, school, faculty, and institution) in the associated LMS program considerable input is required from all levels in the university to make this useful to various needs.

It remains to be seen whether or how Analytics for Learn will contribute to the improvement of student retention. Without clearly defined use cases, clean data sets and organisational commitment to act upon the reports, Analytics for Learn is just a tool. Data on its own will not make any difference but has great potential to assist in targeting resources and identifying key areas for ongoing improvement. The real impact will be made by the interventions that flow from the data provided.

**Key Lessons**

A variety of lessons have been learnt along the way including the following:

- The value base of an institution will affect the approach taken and decisions made during implementation (e.g. the enabling of the student view).

- Coordination of related projects is essential. Having multiple projects operating separately from different areas of the university has been challenging (e.g. retention project, Analytics for Learn, Data Warehouse) and has led to overlap, tension and confusion in some areas. Identifying all relevant projects and their overlap is critical to avoiding backtracking later and is likely to gain better outcomes for the university.

- Timing is everything! The implementation project will take a considerable amount of time. The technical side is relatively straightforward although still time-consuming. Much more important in this sense is that there are many critical questions that need to be answered along the way which are not technical and require input from across the institution.

- Following on from this, key questions in relation to the implementation process cannot be divorced from institutional strategy, values and the student demographic profile.

- Buy in is more difficult than may be anticipated. Stakeholders at various levels are critical to the process yet many do not see the benefit that the data might bring to them.

- Data sets are complex and usually will not address all the dimensions of complex human behaviours. Great care must be taken in interpreting reports that may, at first glance, appear convincing.

- Use cases are beneficial – and perhaps essential – in turning Analytics for Learn from a disconnected tool into a vital component of university improvement efforts.
Case Study 5: Griffith University

This case study presents an overview of the use of learning analytics for retention purposes at Griffith University. In the context of the framework this case study highlights a relatively mature and sophisticated analytics implementation, and in doing so, explores factors across all levels of the framework. More specifically, the Griffith case study helps describe how learnings derived from analytics informed interventions can be reflected on and used to drive iterative improvements to the system. This is the Intervention and Reflection section of the framework.

In a practical sense the Griffith case study explores the use of predictive analytics and how these compliment and guide more traditional ways of responding to students at-risk. One of the key messages provided by participants in the project was that a modern university generally does not lack for data. Rather, for them, the challenge was often expressed in terms of actually doing something with the data. This case study spends considerable time focusing on the intersection between people and data, which helps illustrate the types of expertise and organisational structures that are pivotal when learning analytics are being deployed to assist with retention.

Overall, The Griffith case study provides a thorough explanation of the iterative development of a retention strategy and accompanying actions that are underpinned by the use of analytics.

The figure below illustrates where the Griffith University case study fits in relation to the Let’s Talk Learning Analytics and Retention framework. Though this case study has a focus specifically on intervention and reflection, it is also intended as a holistic case study that integrates discussion of all of the framework domains, as the arrows spanning the framework indicate.
Institutional Background

Griffith is a large multi-campus metropolitan public university located in South-East Queensland across five campuses (Southbank, Mt Gravatt, Nathan, Logan and Gold Coast). The University hosts approximately 44,000 students (80% domestic and 20% international). About 70% of students are school-leavers and the balance enter the University from other pathways. A significant proportion (60%) of Griffith student are the first in their family to attend university. Approximately 90% of students study in on-campus mode and the balance in online/distance mode. The University learning management system is Blackboard and the student administration system is Peoplesoft.

Analytics Strategy

The Griffith Student Retention Strategy proposes a whole-of-institution approach to facilitating the success, progression and graduation of our students. The strategy is informed by four key principles: the use of evidence-based interventions, the use of the student lifecycle to inform practice, the involvement of all University staff (everybody’s business) and communicating the criticality of the retention agenda to the core business of the University.

Clarifying our ideas about student risk is a necessary starting point in designing analytics-based strategies to prevent or reduce academic failure. At Griffith, our understanding of student risk, and our related analytics strategy, is informed by three propositions. Firstly, academic risk is not an inherent characteristic or inevitable outcome of group membership (e.g., first in family students, students from low SES backgrounds). Group membership is often a proxy indicator of the potential increased likelihood of underlying risk factors (e.g., access to resources). While there is great value in predictive early-alerts based on student information at enrolment, we are mindful in our approach of not creating self-fulfilling, and potentially disempowering, expectations that ‘uni will be difficult’ for various student populations.

Generally speaking, proximal factors (i.e., things that are closer in time and place to university) are more controllable, empowering and predictive of success than distal factors (i.e., group membership/demographic background). Thus, for example, the time students spend studying (time-on-task) is a reliably stronger predictor of their academic success than their demographic characteristics. Our analytics strategy therefore places emphasise on factors which are within our own and our student’s control or are amenable to our influence.

Finally, risk is not necessarily an inherent quality of individual students (as in the term ‘at-risk student’), but rather it can be a function of the interaction between a student and the university. Thus, a fuller understanding of ‘student risk’ requires us to consider how the design and conduct of our learning environments and assessment practices may inadvertently increase commencing students’ risk of academic failure or impede their engagement. In this sense, risk can be defined as a mismatch of the demands of a course and the resources of commencing student (the knowledge, attitudes and capabilities we assume they possess). In this sense, risk is reduced when courses are designed based on an explicit understanding of students’ capabilities. This
does not necessarily imply ‘dumbing down’ or ‘reduction of standards’, but rather, making conscious design choices about where and how to start the learning and teaching process to optimise learning based on students’ entry capabilities. Conscious course design is an investment in prevention and is the ultimate risk management strategy. Importantly, ‘good design’ reduces the need for co-curricular support and can result in a significant saving of time, effort and finances. Therefore, our analytics strategy seeks to provide insight as to how we might optimize the ‘transition enabling’ qualities of our learning environments for our commencing students.

We have accordingly conceptualised our evolving retention-focused analytics strategy in terms of responding to the needs of different student populations (See Figure 8).
Given the above we are currently employing the following complementary modes of analytics to develop related forms of actionable knowledge about our students:

- **Predictive analytics** to provide insight into the influence of demographic or historical factors on student success
- **Within-semester analytics** to provide insight into the influence of proximal or current context factors on student success
- **Student self-report analytics** to provide insight into students’ experience and concerns
- **Academic analytics** to provide insight into the transition-enabling features of our first-semester courses

**Predictive Analytics**

**What methodology are we using to predict students at-risk of discontinuation?**

The University is committed to an evidence-based approach to supporting student success and retention. As part of this strategy we have modelled the behaviour and outcomes of our past undergraduate students to identify patterns of success and attrition. We are now using these insights to predict the likelihood of attrition of our current students and to provide targeted early-intervention to increase their chances of persistence, success and graduation. This process of data optimization or predictive analytics is increasingly becoming ‘best practice’ in higher education.

Predictive analytics is based on the working assumption that the factors which can be linked to students who have left the university in the past, are likely to also impact on current students. We seek to discover patterns of student success and failure (i.e., predictive algorithms) by modeling the behavior of our past students. We apply these statistical models to analyse what we know about our current students to predict their likelihood of attrition. We then use this information to identify our ‘at-risk’ students and provide targeted early intervention to increase their chances of success. As we learn more about our students and the types of strategies that support their success we are able to improve our capacity for proactive outreach and prevention. This can be thought of as a self-improving or virtuous cycle (See Figure 9)
In developing our predictive algorithms we draw student data from a range of administrative sources, including student administration systems (PeopleSoft), tertiary admissions data, and university financial databases. The types of student data we analyse includes demographic information, entrance rank and degree preference, financial data relating to engagement and ease of access to the university (e.g., On-Campus accommodation and parking fees), study area, load undertaken and grades received. We have understandably primarily focused on information that can be automatically collected from established databases, and in this sense our algorithms are based on relatively non-intrusive observations or measurements of our students.

In modelling historic student data to predict current behaviour it is important to appreciate that Griffith students are a dynamic population, and the further back one looks in time the less likely it is that the same factors are influencing student behaviour and decision-making. While in some cases data back to 2006 has been used, particularly for supporting analysis and for looking at longer-term trends, the primary data is sourced from students who commenced a study career from 2010 onwards. We use a combination of statistical procedures to generate predictions about our current students. We have generally found logistic regression models to be the most accurate so these are used as the primary analysis. CHAID (decision tree) models are robust to missing data, which affects a significant number of students, so these are essentially used as a backup procedure.

Our approach has been to develop predictive models for specific cohorts of students across the lifecycle. For example we have developed commencing student models (e.g., first year-first semester domestic commencing students and commencing first year-second semester students) and continuing student models (e.g., second semester continuing students).

Analyses provide an estimated or predicted level of risk of attrition for each student compared to the rest of their cohort. This is organised into five risk categories: the top 5% of students are classified as Extreme risk, then the next 10% are Very High risk, the next 25% are High risk, the next 30% are Medium risk, and the bottom 30% are Low risk. These risk categories are based on

Figure 9: The Predictive Analytic Cycle at Griffith University
our understanding of the probability of students persisting with their studies. For example, in
general terms, students identified as *Extreme Risk* (the ‘riskiest’ 5% of students with the highest
estimated risk) have less than 50% chance of returning for their second year of study and
students identified as *High Risk* have less than 70% chance of returning for their second year.

**What factors predict the success of commencing students?**

Predicting student risk is an inherently complex task with many possible contributing factors
varying in the type, combination and strength in the way they influence individual students.
However, generally speaking, the major factors which have been shown to influence the success
and persistence of our students include: their prior and current academic performance, degree
preference, socio economic status, first-in-family to attend university status, entry pathway and
study load. Some of the main predictive factors are summarised in Table 1.

We have tested the predictive validity of our current algorithm against actual first-semester
attrition and the findings generally support the validity of our predictive model with more
commencing students identified as high risk failing to return in Semester 2. For example, 93% of
students identified as ‘low risk’ return to study, compared to 75% of students identified as being
at extreme risk of attrition. We can safely conclude that we have established a sound empirical
basis for identifying our at-risk commencing students.

The process of data optimization is dynamic and we are actively engaged in enhancing the
predictive power of our algorithms. We are continuing to refine our predictive algorithms for
commencing students and developing additional models to predict the risk of first year
international and second year domestic students leaving. The University is commencing a major
project incorporating more proximal or real time data into our models with the intention of
providing more timely and individualised support to students. Data sources that have been
identified as candidates for modelling include library borrowing history and in-semester course
enrolments, along with Learning Management System (LMS) data on class
attendance/participation, on-line activity and early assessment submission and outcomes.

**How do we use this information?**

A key component of our retention strategy has been to establish a network of Student Success
Advisors (SSA) across the University with an SSA allocated to each degree program. Success
Advisors provide advice and support to commencing students, conduct academic skills
development and work with academic and professional staff in establishing the conditions for
student success in degree programs. Success Advisors are provided with analytics *Risk Reports*
detailing the students who are identified as high risk or above in each degree program. Each
student is ‘risk profiled’ (i.e., patterns of weighted contributing factors for each student is
provided) to provide SSAs with enhanced knowledge on why a student is considered at-risk of
attrition. Success Advisors proactively outreach to students identified at-risk by our predictive
analytics process and through this process have conducted academic planning interviews with
around 22% of the commencing student population.
It is important to understand that while some predictive variable (e.g., study load) are clearly statistically important, they are not necessarily readily amenable in themselves to meaningful interpretation or suggestive of intervention. In this sense our ‘risk reports’ are a point-of-departure or triggers for exploratory outreach which may lead to the identification of underlying issues, strengthen engagement or build capability or resilience through the development of Student Success Action Plans. In cases where the predictor variable is both important and suggestive of action (e.g., degree preference) a targeted cohort or group-level intervention may be undertaken (e.g., call campaign, offering of specific resources/opportunities).

Student Success Advisors are engaging a significant proportion of our student population through a range of channels: face-to-face sessions, phone consultations, email conversations and social media. In 2013 our SSA network reported 10,265 consultations (9,317 with first-year and 948 with later-year students) and in 2014 SSAs have conducted 13,830 consultations (10,681 with first-year and 3,149 with later-year students).

It is important to emphasise that student risk is a complex issue with many possible contributing factors. Our aim is to sensitively and positively outreach to students, offering assistance with planning for their educational success. Success Advisors do not label students or tell them that they have been identified as ‘at-risk’ by the University. Clearly, for reasons of confidentiality, only SSAs have access to information about these individual students. This work is guided by a set of student-centred practice principles that serve to empower our students and position us as active partners in their success:

- **Evidence** We seek to better understand our students so that we can help them acquire the tools and keys to success.
- **Proactive Focus** We positively outreach to our students to ‘optimise success’ rather than ‘wait for failure’
- **Success Focus** We approach students with open-ended invitations to ‘plan for their success’, we do not label or categorize students.
- **Empowerment** We respect students’ choices at all times. We do not ‘do things’ to students but rather we ‘work for and with’ them.
- **Privacy** We maintain the strictest level of confidentiality with the information we gather and use

We also have experimented with delivering aggregated (non-identifiable) summary Students At Risk reports to academic managers (e.g., Deans, Heads of School) with the aim of providing them with strategic information to support their ongoing leadership of the student success and retention agenda in their School.
Table 2: Summary of some of the main factors influencing the attrition of Griffith commencing students

<table>
<thead>
<tr>
<th>What factors influence attrition?</th>
<th>How is this measured?</th>
<th>How does it influence attrition?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Prior Academic Performance</td>
<td>Tertiary Entrance rank score</td>
<td>Students who achieve a better rank are more likely to persist in their studies.</td>
</tr>
<tr>
<td>University Academic Performance</td>
<td>Grade Point Average (GPA) and number of courses failed.</td>
<td>Students who do better academically at university are more likely to persist in their studies.</td>
</tr>
<tr>
<td>Degree Preference</td>
<td>Degree preference rank</td>
<td>Students who are enrolled in a more preferred degree program are more likely to persist in their studies.</td>
</tr>
<tr>
<td>Entry Pathway</td>
<td>Alternative bases for admission (e.g. Mature Age Entry or via VET Award Courses)</td>
<td>Students who enter Griffith through pathways other than Secondary Education are more likely to persist to the second year of study. Students awarded prior credit into their current academic career are more likely to succeed.</td>
</tr>
<tr>
<td>Study Load</td>
<td>Number of credit points enrolled</td>
<td>Part-time students more likely to leave university</td>
</tr>
<tr>
<td>Campus of study</td>
<td>Host campus for degree program</td>
<td>There is variation in attrition across Campuses. Part, if not most, of this variability can be explained by the other factors in this table.</td>
</tr>
<tr>
<td>School of study</td>
<td>Host School for degree program</td>
<td>There is variation in attrition across Schools. Part, if not most, of this variability can be explained by the other factors in this table.</td>
</tr>
<tr>
<td>Residency on Campus</td>
<td>University financial records</td>
<td>Students who live on campus have a lower level of attrition</td>
</tr>
</tbody>
</table>
Learning Analytics: Assisting Universities with Student Retention

### What factors influence attrition?

<table>
<thead>
<tr>
<th>Factor</th>
<th>How is this measured?</th>
<th>How does it influence attrition?</th>
</tr>
</thead>
<tbody>
<tr>
<td>Non-English home language</td>
<td>Student self-report</td>
<td>Students who speak a language other than English at home have a lower level of attrition.</td>
</tr>
<tr>
<td>First in Family (FiF) to attend university</td>
<td>Student self-report</td>
<td>Students whose parents didn’t undertake tertiary study (or whose parents’ educational background is unknown) are more likely to attrite.</td>
</tr>
<tr>
<td>Socio-Economic status (low to high)</td>
<td>Postcode of home address</td>
<td>Both low and high SES students are more likely to leave than medium SES students.</td>
</tr>
<tr>
<td>Distance</td>
<td>Postcode of home address</td>
<td>Students from states other than Queensland and NSW have been more likely to attrite.</td>
</tr>
<tr>
<td>Engagement</td>
<td>Completion of course evaluation</td>
<td>Students who complete at least one course evaluation survey are less likely to attrite.</td>
</tr>
</tbody>
</table>

Some general points of note:

- While all of the above factors make some contribution to predicting attrition they vary in their relative strength or predictive capacity. In this sense each student’s level of relative risk is predicted by a unique cluster of factors.

- The relative contribution of these predictive factors varies across the student lifecycle, and in particular, they differentially predict end of first semester and end of first year attrition.

- The level of attrition does vary across the student lifecycle, with higher levels of attrition occurring at the front-end. Thus, in general, more students attrite before the first semester of the second year than between the first semesters of second and third year.

- It is important to note that there is a ‘revolving door’ pattern with student engagement with university. Thus, there are fairly high numbers of students who don’t return for their second or third semester of study, but do return to university at some later point. For example, over 1 in 3 students who commenced a program in semester 1 of 2006 or 2007 and didn’t return for their second semester have subsequently returned to Griffith. We are currently analysing which ‘departing students’ are most likely to return to Griffith in
an effort to identify differentiating characteristics of students who could potentially return to Griffith. This could inform an ongoing relationship management strategy.

**Academic Milestones Analytics and Interventions**

While the predictive algorithm for commencing students is primarily based on distal or demographic factors and provides a measure of baseline risk, we also employ a complementary set of proximal markers that provide a measure of emerging or cumulative risk over the semester.

Based on the premise that ‘early engagement is a good predictor of later success’ and the corollary ‘early non-engagement is a good predictor of risk of failure’, we can identify a number of points and tasks across the early student lifecycle that offer the potential for relatively efficient monitoring of student engagement and performance. This reflects our commitment to a ‘front-loading’ lifecycle approach to monitoring and outreach.

Based on the criteria of effectiveness, feasibility and sustainability, the following five ‘risk and success markers’, representing key milestones across first-semester, are utilised:

- **Readiness**: as represented through attendance at orientation or completion of online orientation
- **Early engagement**: as represented through class attendance or online participation
- **Early performance**: as represented through submission of first or early assessment
- **Early outcomes**: as represented through passing of first or early assessment
- **Cumulative outcomes**: as represented through passing of first-semester first year courses

The rationale for each of these milestone markers is presented in Table 2.

**Table 3: Within-Semester Student Attrition Risk and Protective Markers**

<table>
<thead>
<tr>
<th>Risk Marker</th>
<th>Rationale</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Early readiness markers</td>
<td>Both attendance at, and satisfaction with, orientation predict early student satisfaction with their degree program.</td>
</tr>
<tr>
<td>Non-attendance at on-campus degree program orientation and/or Non-use of online orientation</td>
<td>Students’ expectations and (mis)conceptions of university study are related to their invested ‘time on task’ (i.e., the amount of time they invest in study-related activity)</td>
</tr>
<tr>
<td></td>
<td>Signalling ‘missed orientation’ provides an assertive signal to students regarding the importance we attach to the depth of their early engagement, developing accurate expectations of</td>
</tr>
<tr>
<td>Risk Marker</td>
<td>Rationale</td>
</tr>
<tr>
<td>-----------------------------------------</td>
<td>--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>university study and ensuring their ‘time on task’.</td>
<td></td>
</tr>
<tr>
<td>2. Early engagement markers</td>
<td>Early attendance at class or engagement with online learning modes (time on task) predicts subsequent outcomes (learning and persistence).</td>
</tr>
<tr>
<td>Non-attendance at class (especially tutorials/labs in weeks 1 to 4)(prior to census date) in a first-semester first year course, and/or Non-use of online environment (e.g., logging on to LMS) in a first-semester first year course</td>
<td></td>
</tr>
<tr>
<td>3. Early performance marker</td>
<td>Commencing students may ‘fall at the first hurdle’ for a wide range of reasons (some out of their control), and are routinely not aware of the capacity of the system to respond flexibly to genuine concerns (e.g., extensions, special considerations, study support).</td>
</tr>
<tr>
<td>Non-submission of first/early assessment in a first-semester first year course</td>
<td></td>
</tr>
<tr>
<td>4. Early outcome marker</td>
<td>Commencing students imbue their performance on early assessment with great personal significance (e.g., am I smart enough to be at uni?), and this can negatively impact on their self-efficacy and persistence.</td>
</tr>
<tr>
<td>Fail or poor result on first/early assessment in a first-semester first year course</td>
<td></td>
</tr>
</tbody>
</table>

Offers probably the first practical test of, and opportunity to discuss, students’ progress (helps and hindrances) towards the goal of self-regulating/self-managing in an academic environment.

High payoff point for intervention as this is the first risk marker which involves actual material consequences for students.
Students’ performance on each of these academic milestones has demonstrated their efficacy as predictive markers of success or failure.

**Orientation**

We have found non-attendance at orientation to be an early indicator of low engagement and subsequent risk of attrition. We have undertaken significant work to increase student attendance/participation, better outreach to those not attending and to improve the quality of the orientation experience. Overall 70% of our 2014 first-semester commencing students attended orientation, but a much lower proportion of mid-year commencing students (40%) do so. Providing an ‘online orientation’ process appears to be a viable alternative for a number of ‘time-poor’ students.

**Non-submission of early assessment**

While we may expect our commencing students to be mature and independent, many require early support and scaffolding to achieve an adequate level of self-regulation. Overall 8% of our 2014 commencing student cohort submitted their first/early piece of assessment after the due date, and more critically, a greater proportion (15%) of students identified as high risk of attrition late-submitted their initial piece assessment. This not only clearly demonstrates the value of this academic performance risk marker but also that the seeds of academic disengagement and failure are sown early!

**Early Assessment Failure**

Overall 10% of our commencing cohort fail their first/early piece of university assessment and, similar to the pattern of late submission, there is higher failure rate (15%) of students identified as being at high risk of attrition. Given the established critical importance of early success to student’s academic efficacy, the *University Assessment Policy* has been modified so that Course Convenors have the discretion to allow students to resubmit their first assessment piece for a passing grade.
The utility of the academic performance risk markers (non-submission and failure of first/early assessment) in ameliorating attrition risk depends strongly on the design (relevance, stakes and timing) of assessment in first year courses. In courses where the assessment regime is less transition-sensitive (e.g., later in semester, too high weighting or too close together) there is reduced capacity for Success Advisors to outreach effectively to struggling students. In a very real sense, the efficacy of advising to support students directly depends on course design and culture.

**Course Failure**

We have found that, not surprisingly, the number of courses that a student fails in their first semester of university study is the strongest equal predictor (with overall GPA) of their subsequent attrition. A significant number of our commencing students trigger this risk marker, with approximately 8-10% of the commencing cohort, and a greater proportion (12-15%) of students predictively identified as at-risk, failing two or more courses in their first semester of university study.

Student Success Advisors are tasked with outreaching to all commencing students who fail two or more of their first semester courses to offer the opportunity of an academic recovery planning interview (Get Back On Track). There are, however, significant challenges with engaging students who have had a failure experience (many experience feelings of shame and a sizeable number have already given up) and only 1 in 5 students offered the opportunity actually accept the offer and participate in the process. These late-stage tertiary interventions, while necessary, can only produce limited engagement and success. This reinforces the need to invest even more conscientiously in primary and secondary prevention activities (such as transition-sensitive assessment design, academic skills development and classroom engagement).

**Enrolment Call Campaigns**

Students often do not progress in a predictable and orderly fashion through their degrees and their progression is interrupted for a range of reasons. Academic administration data inform a series of call campaigns to target students at predictable key ‘touch points’ or ‘crunch points’ in the lifecycle (e.g., returning from leave of absence, non-returning students from previous semester). Analyses show these outreach campaigns help students to better navigate their progression and manage the related administrative procedures.

**Self-Report Analytics to Scaffold Student Help-Seeking**

It is clear that students are able to accurately self-identify when they are having problems or experiencing challenges that will negatively affect their academic success. For example, commencing students who indicate around week 6 that they are ‘not doing as well as they hoped’ on our Starting@Griffith survey subsequently attrite at significantly higher rates (27%) than students who say that they are ‘doing well’ or ‘doing okay’ (20%). Most critically, a number of these students may not be identified by our commencing predictive analytics protocol (based as it is on demographic profiling) simply because their academic challenges are the result of
emerging ‘proximal and personal’ factors (e.g., life circumstances and cumulative stressors). This suggests that institutional retention strategies might optimally combine intrusive academic advising with a just-in-time student self-referral approach.

We survey our commencing students early in first semester (Starting@Griffith survey) with the aim of better understanding their early needs and concerns. The survey is distributed through our institutional Client Relationship Management (CRM) system which then enables us to initiate targeted email outreach to students. The process involves assigning ‘response threshold’ values to survey items and students who provide a rating ‘just above’ the nominated threshold receive a customised automated email (high-tech and low-touch) with embedded hot links to resources or referral contacts, and students self-rating ‘significantly above’ the threshold are referred to a Success Advisor (low-tech high-touch). We employ four categories of items to inform our self-report analytics process:

- **Students enrolment intentions** (continue, internal transfer, external transfer, exit);

- **Students experienced or anticipated challenges to academic success** (e.g., financial issues, competing demands and life-study-work balance, personal, family and health issues, study strategies and habits, poor home study environment, disengagement and low motivation);

- **Students expressed request for help** (e.g., no need: I’m doing well and don’t need to talk to anyone, un-met minor need: I’m doing okay but it would probably be useful to talk to someone about one or two things, un-met major need: I’m not doing as well as I hoped and I think it might be useful to talk with someone about ways to get back on track, currently met need: I’m not doing as well as I hoped and I am already getting the help I need, undeclared need: I’m not doing as well as I hoped but I don’t want to talk to anyone at the moment); and,

- **Students dispositional self-evaluations** (e.g., academic efficacy, sense of purpose).

Once again, any discussion of facilitating students’ help seeking must also appreciate that a significant minority of our students (between 10 and 15%) experience problems but actively reject any offer of help or outreach (I’m not doing well but I don’t want to talk to anyone). Not surprisingly, this group of ‘help rejectors’ has a comparatively higher attrition rate. As has been often noted, one of the fundamental ironies of student support, an inherent challenge for any retention strategy, is that those who are most in need are often least likely to accept it. In a similar vein, our capacity to identify risk and need far exceeds our capacity to effectively respond.

Griffith students, probably similar to most Australian students, lead complex lives with a significant number of challenges to their academic success. The majority of issues self-nominated by our students relate to the challenges of managing their life circumstances: one in three identify financial difficulties, one in four identify competing demands from family, carer,
work responsibilities and one in five identify personal and family issues as significant challenges to their success at university. The highest factor self-nominated by Griffith commencing students as likely to negatively impact on their success is ‘financial challenges’. Over 30% of our students rate finance related issues (and the related need to work longer hours and have less time for study) as a significant negative factor. Not surprisingly, our low SES students report financial challenges at a higher level (35%). Student poverty is likely to be a significant underlying contributor to attrition, and a proactive approach to student support and welfare is an essential aspect of any student retention strategy.

Interestingly around one in five students identify disengagement with their current degree (lack of interest, change of direction, lack of career prospects) as a potential reason for dropping-out of university. Such early questioning and ambivalence is consistent with the significant pattern of internal movement across our degree programs. For example, in 2013 around 12% of commencing students transferred from their program of initial enrolment. In this period of transition, students, based on very early experience of University adjust their expectations and appreciations of particular disciplines. Helping our students find the right match and making an informed choice about what to study is not only relevant to the student recruitment phase of the student lifecycle, but also critical in its contribution to subsequent student engagement and retention. From a lifecycle perspective there is significant value in better coordinating recruitment activities with ‘future students’ to achieve better alignment with retention goals for ‘commencing students’.

**Academic Analytics to Enhance Course Design and Delivery**

A particularly strategic application of analytics in support of student retention is to facilitate general or primary prevention strategies which benefit all our students. These approaches function to reduce the types of risk that result from a mismatch or misappraisal of course demands and student resources. Critical among these universal capacity-building strategies is the design of first-year semester courses (and related assessment practices) to effectively enable successful transition to university study. The most useful form of help for students is a well-judged, well-paced and well-aligned curriculum. A course that is ‘crammed’ or ‘content heavy’, and that ‘moves forward’ each week without checking if students are ‘keeping up’ is the antithesis of a student-centred self-adjusting learning system. Programs and courses that strengthen students’ sense of purpose and build a sense of connection also reduce the risk of failure or non-persistence. Analytics which provide actionable knowledge to staff enables the iterative loop of course design and delivery quality improvement, which may consequently positively impact on both student retention and the success and satisfaction of all students.

Commencing students are invited (about weeks 4-6) to **nominate one course or unit** that they are finding ‘most challenging’ and to respond to a series of questions about ‘what makes it challenging’. Students’ early experience of their identified ‘challenging course’ is considered to be the most salient
data for this application of academic analytics since commencing students’ early academic experiences can influence their subsequent success. There is a well-established relationship between students’ academic self-efficacy and their subsequent academic achievement, persistence and aspiration. Students who ‘get off to a good start’ are more likely to experience enhanced self-efficacy, and those who ‘struggle early’ are more likely to experience a loss of personal and academic confidence.

Students provide both qualitative and quantitative feedback on a range of course/unit-level factors that are likely to influence their sense of efficacy (e.g., match between their starting baseline and the assumed knowledge of the course, feedback on the experienced cognitive load as a function of the content (what is taught) and process (how it is taught) (pace, organisation, relevance, etc). A summary **Challenging Course Profile** is produced when a ‘sufficient threshold’ (usually around 30% of a class) of students identify a course/unit as their ‘most challenging’.. Approximately 50 reports have been produced, evenly distributed across disciplines, for both 2013 and 2014. The report is provided to the teaching team and framed as a *starting point for further discussion*. As with identifying whether or not a student is at-risk of attrition, identifying a course as challenging is complex-careful interpretation of underlying factors is critical, and in should in no way reflect a negative perspective. Just because students nominate a course as ‘most challenging’ doesn’t mean that it is a poorly-designed course or that poor teaching is involved. Often quite the opposite may be the case. Quite commonly, challenging courses are often those that contain the ‘hard knowledge’ of a discipline and/or require mastery of threshold ideas or professional practices that lay the foundation for later student success. In any scenario, it is the impact on students’ academic efficacy that is the focal point of the analytics process.

**Key Lessons and Findings**

Over the past few years we have learnt or reaffirmed a number working principles in relation to implementing analytics-informed strategies in the service of student retention:

**Mutual responsibility**

There will be predictable limits to the level to which we can intervene in the lives of students to positively reduce academic failure. Some factors may be out of our or students’ control, and ultimately, ‘academic success’ is the responsibility of individual students. However, this should not preclude an assertive approach to enhancing the early academic success of our commencing students and our active outreach to those potentially experiencing difficulties.

Students also do not necessarily seek timely help for a range of personal and systemic reasons. Reactive coping processes, under-developed problem-solving skills, frustratingly siloed systems and feelings of shame and inadequacy impede students in seeking and finding help in a timely manner. Students benefit from clear, predictable and active scaffolding of their efforts to succeed. On the one hand, it is our responsibility to design and provide appropriate help systems
and to facilitate students’ access to these. On the other hand, it is our students’ responsibility to make effective use of the resources we offer.

**Transparency**

The reduction of risk of academic failure is simply the other side of the coin of ‘enabling academic success.’ All of our commencing students, irrespective of group membership or academic pathway, will benefit from being systematically informed and educated about the factors within their control that will help or hinder their success at university. Being clear and frank with our commencing students about ‘what it takes to succeed’ and ‘what we will do to help you’ positions them as active and responsible partners in the learning process. Thus, if our ‘at risk strategy’ and our associated ‘analytics processes’ are transparent to students and a normalised aspect our overall explicit contract with them about ‘studying at Griffith’, then they may be less likely to be ‘surprised’ or ‘offended’ when someone contacts them about ‘how they are going’ after they trigger a risk marker. Thus, we actively communicate our at-risk strategy to all our students. Any analytics-informed strategy needs to be partnered with a transparent user-friendly help-finding framework which informs students as to ‘the best way to help yourself’ and staff as to ‘the best way to offer help’.

**Authentic Culture**

Managing student risk involves a number of stakeholders with range of expectations. Our response to students is a function of both regulatory obligations and helpful intentions. In seeking to satisfy both of these agendas simultaneously we need to be careful not to confuse compliance with regulatory or institutional obligations (e.g., sending automated emails), with actions that may be of more help to individual students (e.g., contact by a tutor). We need to be mindful of the related but distinct purposes of compliance and authentic help, and design our strategies accordingly.

Staff beliefs and attitudes regarding the way ‘a university should function’ and their ‘expectation of student independence’ are key moderators of the extent to which analytic data about student experience or performance will be both seen as legitimate and acted upon. While it can be argued that the meta-goal of early university education is purposefully scaffolding students’ capacity for independence and self-regulation, we cannot safely assume that students arrive at university with the ability and willingness to be independent learners. Facilitating student independence is a valid meta-educational goal, which is, however, not incompatible with identifying potential risk and providing and encouraging students to seek appropriate assistance. Students who are helped to recognize when they need help or assistance to ‘go to the next level’, and who feel empowered to do so, are more likely to succeed and feel good about themselves. In this sense the implementation educational analytics needs to be sensitive to the implied ‘staff-student contract’ implicit in the established academic culture of a School or university.
Local ownership

Analytics–informed help-rich learning environments do not necessarily create dependence, and indeed, high levels of student help-seeking may equally indicate poorly designed curriculum and assessment as much as limitations in student ability or motivation. Well-designed help systems have facilitating student self-regulation as their meta-goal, and, while providing multiple sources and flexible modes of help, emphasize as their foundation, purposefully facilitating self-help. It is also important to recognize that facilitating students to make use of self-help strategies is not the same as not offering little if any help. The former is a process of strategic scaffolding; the latter is a process of premature insistence on independence. Importantly, the more that we are able to integrate disciplinary-relevant data-informed help-systems into the local design of programs and courses the less we will need to invest in broad-brush university-wide mechanisms. Local data and help is always best!

Students are not so much ‘at-risk of not succeeding at uni’, but rather of ‘not succeeding in their degree’. Students are likely to respond best to help provided by staff they know within the context of their particular degree program. Thus our analytics and intervention strategies should preference the ‘local and relational’. Technology-based mechanisms may be effectively employed to identify students who have triggered risk markers, and to initially communicate with or invite contact from them. However, in almost all circumstances, ‘effective responding’ will involve a focused and supportive conversation between staff member and student. Thus, degree program should develop and implement locally relevant approaches to supporting their at-risk students which are consistent with university minimum standards.

Any strategy for identifying and supporting at-risk students is necessarily multi-layered. Some individuals may need higher level intervention or support, relating to personal, mental health or other issues. For some this may be on one occasion – for others there may be patterns of being unable to cope. Staff working with students on a daily basis need to feel both informed about and empowered to refer students to appropriate services.

University-wide coordination and partnership

Both staff and students are best served by consistency and predictability. There is a need for a consistent university-wide minimum standard for both the identified markers of risk (What will we monitor?) and the minimum level of response with degree programs (How will we help?). Adopting a university-wide benchmark does not proscribe Schools implementing additional good practices above and beyond the agreed minimum standards. Adopting a ‘shared rubric’ across the university has the value of facilitating strategy coherence and a common language between staff.

There is a need for ongoing coordination between school/program-based responses and central university strategies. Low-level coordination simply involves boundary management strategies such as avoiding redundancy or not ‘stepping on each other’s toes’. This aids efficiency. High-level coordination involves boundary spanning strategies such as the active exploration of
complementary activities. This builds effectiveness. Thus governance and coordination across silos and stakeholders around a common purpose is fundamental.

Supporting student success and reducing academic risk necessitates that we develop new and creative partnerships between academic, administrative and professional staff. Thus, supporting student success in the present context involves shifts in our traditional strategies, skills and roles, and is genuinely everyone’s business.

**Information management**

The availability of information often motivates people, often simply out of curiosity or a need to ‘be in the know’, to seek access to it. Thus, for example, academic staff, seeing that student advisors have access to the ‘risk profiles’ of individual students, may argue that they are entitled to ‘equal access’. In some cases expectations of access to information can be conflated with questions of relative status and authority. *Clear principles for access to identifying data are critical for maintaining student trust and protecting university integrity.*

**Monitoring of effectiveness**

The efficiency and effectiveness of strategies should be systematically monitored and evaluated at the granular level of degree program. What works in one degree context, curriculum and culture may not be so effective in another. Schools and disciplines differ, in particular, in their willingness and capacity to engage identified students in the process of academic recovery.

**Sustainability**

It is particularly imperative that we do not design strategies that are reliant on the ‘energy of enthusiasts’, these are almost always short-lived, and result in staff burnout and impede genuine systemic responses to students’ needs. Thus, we need to design strategies that are both effective (what works?) and sustainable (What can we feasibly continue to do?), and embed these as owned and ongoing core business in university systems and degree programs.

**The Griffith Team**

The Griffith retention analytics strategy is a partnership across a number of university elements and roles each making complementary contributions:

**Learning Futures**

Professor Alf Lizzio (Dean Learning Futures), Professor Keithia Wilson (Portfolio Leader, Student Success and Retention), Dr Sakinah Alhadad (Learning Consultant, Research and Evaluation), Mr Louis Albert (Senior Project Officer): Developing intervention frameworks and analytics-informed protocols, coordinating the Student Success Advisor network and evaluating the efficacy of interventions.
Office of Planning Services

Mr Andre Easom (Senior Statistical Consultant), Mr Leo Shenqu (Planning Consultant): Developing our predictive algorithms and at-risk reports for Success Advisors and partnering in the ongoing development of evidence-based models and intervention strategies.

Student Success Unit

Ms Michelle O’Brien (Manager, Student Transition and Leadership Team), Mr Chris Dell (Manager CRM Team), Mr Joel Moller (CRM Support Officer): Developing and maintaining our Client Relationship Management (CRM) system which both hosts student risk and intervention data and drives targeted outreach campaigns.

Blackboard LMS Team

Mr Leigh Stevenson (Manager Academic Enterprise System Services), Mr Paul Brown (Team Leader Learning@Griffith) and Blended Learning Advisors: Managing and developing our Learning Management System (LMS) and facilitating data queries related to LMS-based risk markers. Supporting staff in the configuration and extraction of data.

Faculty Staff

Deans (Learning and Teaching) and our Student Success Advisor network: Undertaking front-line support of at-risk students based on provided analytics and local knowledge and relationships.