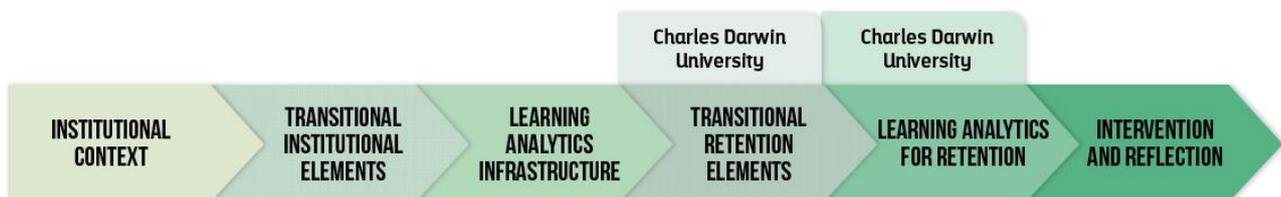# Case Study 4

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.

INSTITUTIONAL CONTEXT → TRANSITIONAL INSTITUTIONAL ELEMENTS → LEARNING ANALYTICS INFRASTRUCTURE → **Charles Darwin University** TRANSITIONAL RETENTION ELEMENTS → **Charles Darwin University** LEARNING ANALYTICS FOR RETENTION → INTERVENTION AND REFLECTION

CHARLES DARWIN UNIVERSITY

Australian Government

Office for Learning & Teaching

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.

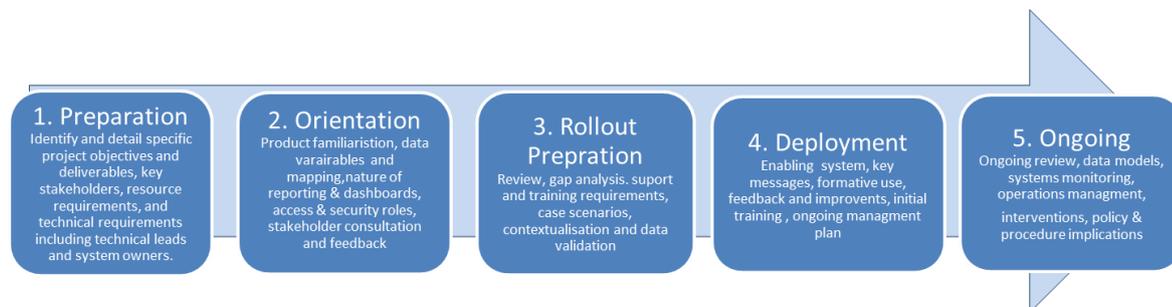The implementation of *Analytics for Learn* has been viewed as having five stages:

Figure 1. 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 includes: 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.

References:

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