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Unleashing The Potential of Learning Analytics: A Project Outline And A Model To Put The Student First

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To Put the Student First

ABSTRACT:
This paper provides the project outline of a major OLT application across 4 partner universities. Based on a model that utilizes 'a whole of organization' view of student retention, the aim is to cross institutional silos and boundaries and allow administrators, academic and professional staff and most importantly students, to access information that will assist decision making. It is a starting point for Universities to develop a system of aggregated and rich data from which to track student progress more closely and identify the barriers to student success that need to be addressed. In order to achieve the greatest effect, it is necessary to integrate strategic support with key resources in a way which reduces and ultimately removes barriers to student success.

Keywords: organisational performance, human capital, student centred learning

INTRODUCTION
Learning analytics enables a new level of data-driven decision making in order to support students to successfully complete their university education. Often information is located in discrete systems and in differing formats that are not easily accessed or used because of the inherent problems associated with aggregation. In this paper we provide a project outline and a model that utilizes 'a whole of organization' view of student retention, that crosses institutional silos and boundaries to allow administrators, academic and professional staff and most importantly students, to access information that will assist decision making. A key benefit to universities will be the establishment of an aggregated system of learning analytics that provides rich data to use in understanding the factors that contribute to student attrition and how to stem it. Business schools and universities are also interested in boosting student
completion rates as it enhances their reputation and standing with industry, staff and prospective students as well as a range of other stakeholders.

**Learning Analytics**

The NMC Horizon Report (2013 p.24) notes that ‘learning analytics in many ways is ‘big data’ applied to education.’ Whilst a very recent field of study, with the first online reference appearing to be from a blog by Siemens in 2010, it is also gaining ground very quickly because of the promise it holds in being able to provide informed decision making at every level of the university. It is a compelling vision which, as May (2013) found in her review, is currently widely conceptualized as one where ‘the most universal goal involved in the adoption of a learning analytics system by an institution is to improve retention.’ Quite simply, the promise of a learning analytics platform is that it provides a whole of organization view of retention which crosses institutional silos and boundaries to allow administrators, academic and professional staff and most importantly students, to access information in the form of reports, alerts, and even assistance functions. The reality is that this promise is also the major challenge in its ability to deliver.

While analytics marries large data sets, statistical techniques, and predictive modelling, universities have tended to limit the focus of analytics to administrative functions – from student enrolment management to determine which applicants will be admitted to measuring their levels of learning and engagement (Travill & Ballard, 2012). Early academic analytics initiatives are seeking to predict which students are in academic difficulty, allowing faculty and advisors to customize learning paths or provide instruction tailored to specific learning needs (Parry, 2012). There are also other academic systems, such as course management systems, student response systems, and similar tools which have generated a wide array of data that relate to student effort and success. Applying the lessons learned from the collation of multiple data sources, learning analytics has the potential to utilise these traditional academic systems to ‘create actionable intelligence to improve teaching, learning, and student success’ (Travill & Ballard, 2012 p.4) – but first we need to ensure that the right data
is being collected to achieve this. This is the gap we seek to address, contextualised by Johnson, et al. (2013 p.5), as one where the role of learning analytics is ‘as an emergent field of research that aspires to use data analysis to inform decisions made on every tier of the educational system ... to leverage student-related data to build better pedagogies, target at-risk student populations, and to assess whether programs designed to improve retention have been effective and should be sustained.’ Given that we never ask students themselves for their views on these issues, we suggest that it is simply nigh on impossible for these aspirations to be achieved.

Our Model

For the potential of learning analytics to emerge it is vital that the data it draws on is not just of high quality but also as rich as possible. With this aim in mind we have developed a model of learning analytics, synthesised from the literature, to both assess and quantify what data we do have as well as provide the basis for what we currently either have but do not use or simply do not have. This lack emerges as a feature of the university system where much of the data gathered on students is for macro administrative purposes, often for mandatory reporting requirements. The result is that much of the data sources shown in blue in our model (see Figure 1 below), is backward looking, historical and for organisational administration and reporting purposes rather than for individual student or even for learning purposes. The current reality is that many important actions are premised on data which is limited to being reactive – simply because we do not ask students (or those involved most directly with them), why they did not enrol in the university, the degree or the unit etc.

Adding to the problem is that the more dynamic, current student level, micro data shown in yellow in Figure 1 below, is not formally collected, integrated or analysed by many universities. The starting point for a valuable research project in this area is the view that in order to maximize the potential of learning analytics with regard to retention, an integrated approach is required which captures data currently both visible and not visible within the
Administrative and the Activity data systems (with the latter including items such as student medical certificates, assignment completion etc.).

**Insert Figure 1: The Project Model About Here**

**The Project**

The project model above, positions the Learning Management System as the interface between these two major bodies of data. The project’s first aim is to provide an assessment of both the current use of, as well as perceived future needs (in terms of both that which is absolutely needed as well as the visionary potential), within Administrative and Activity data sources across a selection of universities. At a macro level, this is clearly a massive and lengthy undertaking, however, the project will be kept both manageable and meaningful by focusing at the micro level of the first year course units that each proposed project team member is currently involved in teaching. It is important to keep both the research team and key stakeholders interested and engaged in this project therefore the suggestion of an initial narrow focus on the area of study and a timeline of no more than 12 months to conduct the project and gain substantive outputs. Additionally, this narrowed focus provides both an examination of and guidelines for the implementation of:

- a model for a more accurate and effective system providing effective early identification of at-risk students - with details such as referral points and an integrated intervention to help students manage and achieve successful learning outcomes;
- improved administrative decision-making through enhanced data collection, access to “real time” data on students - leading to a better allocation of resources to students, staff and other stakeholders;
- options as to how to provide students with access to and insight into their own learning habits and course progression in ways which encourage them to be self-directed and independent - but to also to identify and access appropriate support when needed;
increased productivity and effectiveness throughout the university through the timely provision of quality and current information on student retention - also allowing enhanced response times.

Learning Analytics is currently employed in Australian universities and in universities globally using very limited data sets. The full potential of Learning Analytics is yet to be realised. It is for this reason that we suggest that the results produced from our model and aims will provide a powerful and viable basis for any university who wants to really use Learning Analytics to their full potential.

Value and the Perceived Need for this Project

The fact that the notion of university-initiated attrition does not seem to be widely discussed in any of the higher education or teaching and learning literatures, except in the guise of discussions of “at risk” students, provides some indication as to the importance of a model which takes a more generous view of retention. With this in mind, our model draws directly on the analytics model developed by Travill and Ballard (2012) as well as synthesising the work of Campbell et al. (2007), Long and Siemens (2012), Parry, (2012), Siemens and Grasevic (2012) and Willcoxson et al. (2011). Our model separates Administrative data from Activity data, with the first currently captured in most university environments as the subject of compliance reporting systems, generally typified as upward in reporting direction (with little downward data flow and it is largely historical where this does occur). Individual student, academic or support services input and insight are absent and their access to the results of data analysis is often restricted. This is where much of the work in learning analytics currently resides. Activity data areas cover a range of largely informal and often seen as unrelated data systems, but one where the individual focus emerges most importantly.

This is where the LMS is the interface which translates the macro view of the institution into the day to day educational focused operations of a university - implemented through platforms such as Blackboard or Moodle. The LMS is the single largest area of interaction a student has with a university during their degree course, simply because it is the source of
their access to course/unit materials. The ability to plan, monitor and assess their own course progression, to provide explanations for course, unit or degree changes and have medical and other relevant information entered into their profile are all aspects to consider. The project is an ambitious one but we believe that it will provide value in assisting universities to adopt a “whole of student view” of the challenges and potential for learning analytics and its role in assisting with a more sophisticated and actionable perspective on student retention. Our model clearly positions student retention as a total university responsibility - and reveals sources of currently untapped data as the basis for a truly powerful, useful system which delivers maximum value to a wide range of stakeholders.

THE MODEL AND PROJECT OUTLINE

An important feature of this model is the inherent change in focus, where a much greater range of information sources provide data to address the issue of retention. The need for a nuanced, multi-level and multi-stakeholder view of retention is one which cuts across the institutional data silos which tend to stop the transfer of important information between those who need it. The submission of medical certificates by an individual student to an academic member of staff in support of an extension for an assessment task is one example of this. Such instances tend to be held and remain at the individual level and therefore the university may miss the ability to identify a student at risk. This example also highlights the student focus of the project and the need for learning analytics to also deliver a service to them. Our model therefore makes a valuable contribution to learning analytics as it repositions the role of students and sees them move from simply being the unit of analysis to playing an active role in contributing to the provision of high quality data about themselves.

Our view of student retention has been important in shaping this project. Early research on student retention has consistently highlighted the pivotal roles of personal background as well as the interactions students have with their academic institution – with the failure to integrate into both social and academic systems seen as a key explanatory factor in attrition (Bean, 1980; Pistilli et al., 2012; Tinto, 1993). This logically leads to the
view that retention can be enhanced through initiatives which develop student study skills, increasing their commitment to the institution and establishing appropriate expectations for engagement, feedback and support (Tinto & Pusser 2006). As with Bean (2001), we see student retention is a nuanced concept, one where there are many grey areas between the extremes of completing a degree and dropping out of university - where attrition points need to be captured at the university, the faculty/school, the departmental, the unit and, of course, at the individual student level. These levels also reveal an important gap that we seek to address – namely, what do we mean by retention? It is clear that the reason we measure and the point at which we measure student retention and attrition provides constraints as to the usefulness of the data collected. Re-focusing stakeholders into an appreciation of the larger view of the data possible as well as the value of a focus on data quality provides in itself a valuable contribution to learning analytics. We aim to extend this and deliver on the potential suggested by the 2013 Horizon Report (Johnson et al., 2013), and to move students from simply being the unit of analysis to playing an active role in the provision of high quality data about themselves.

The university LMSs provide the most student focussed data management system and they also reveal the potential for important data often uncaptured by formal administrative systems. If we take for example the university initiated attrition of students through formal processes, such as exclusion, we would find that it is likely to be the end of a long and, for the students at least, a fraught process of failure. Not all of the interaction and processes in the exclusion process will be captured, as there will be a mix of formal processes and informal interactions and actions. Indeed, it appears that it is often the role of other stakeholders such as student counsellors, student union representatives and even practitioners and professions who sit outside of the formal university system, who may be part of the informal activity data that is not formally integrated into and synthesised in an LMS. We believe that this data provides the real time aspect to learning analytics and the important role of these other stakeholders in the bigger picture of the data that is valuable in examining the issue of student retention.
PROJECT OUTLINE

The project will compare the Business schools the four collaborating institutions in order to provide depth and breadth to this topic in terms of how each uses their administrative (generally formal) systems of data collection and their activity based (often informal) systems of data collection. Premised on the Learning Management System (LMS) as the student interface between administrative and activity data, the project focus is:

1. What data is currently available and used (by whom, for what) and how is this integrated into the LMS?; and
2. What could also be used (such as existing as well as potential sources not currently integrated into the LMS)?

Our comparative approach will establish a solid base for the development of a practical guide to the development of a robust Learning Analytics system which would deliver useful information to all stakeholder groups concerned with the issue of student retention.

The method in this project involves the use of desktop analysis (to gauge current practice at each partner institution), a survey template (developed from the model) and interview schedules (to add explanatory depth to survey results as well as qualitative insight into individual stakeholder views, particularly students, on the potential of learning analytics for them). It may be appropriate to refine the project model presented in Figure 1 to fit the features of the administrative and activity data systems discovered at each partner university in the project. Further, the project will begin at the Chief Investigators university as it is the most complex and large and it is hoped that lessons learned from this trialling of the template at the first university will lead to any necessary refinements and then this step can be conducted in each subsequent institution. Again, the LMS of each partner university will provide the key reference point for comparison and the ability it has/ does not have in drawing on/ interfacing with other data sources.

The results of the two stages of desktop analysis and surveys will feed into interviews with the key contact people for each data source identified above to provide deeper insight and explanation as to the results gathered up to that point in the project. The focus moves
from the macro view of providing the detail behind the model and verifying its accuracy to the individual first year unit/course level that each of member of the project team coordinate within their university. This provides a practical perspective, with real students and real issues, generating a basis for meaningful dialogues with participants.

CONCLUSION

In this paper we provided a project outline and a model that provides ‘a whole of organization’ view of student retention which crosses institutional silos and boundaries to allow administrators, academic and professional staff and most importantly students, to access information that will assist decision making. We make a valuable contribution to learning analytics by repositioning the role of students to see them move from simply being the unit of analysis to playing an active role in contributing to the provision of high quality data about themselves. With aggregated data the task of identifying student learning and personal support sources which may influence student retention in their chosen course/degree/ university through to completion is achievable. Society also benefits from limited educational resources being allocated in universities where they are best used and have greatest impact on enhancing student completion rates of education and human talent being enhanced by successful acquisition of university qualifications. The project outline and model provides a starting point to develop a system of aggregated and rich data that establishes a baseline from which to track student progress more closely and identify the barriers to student success that need to be addressed. It should be noted however, that in order to use learning analytics to greatest effect, universities need to strategically support learning analytics with resources that reduce and ultimately remove barriers to student success.
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Figure 1: The Project Model