CASE STUDY H: Developing an 'analytics mind-set' at the Open University

The Open University is the UK's largest distance education provider, with over 200 000 students studying part time degree, postgraduate and sub-degree qualifications. The institution is investing heavily in a strategic learning analytics programme to enhance student success by embedding evidence based-decision-making at all levels. Building on extensive experience of handling student data, the university has a considerable research and development base in learning analytics, which informs institutional initiatives as well as the wider academic community.

Key takeaway points

- Due to funding regime changes, retention of students on qualifications (rather than individual modules) has become a strategic issue for the university, and the implementation of learning analytics is one response to this challenge. The university operates across the nation-states of the UK, which have different funding structures, adding another layer of complexity.
- Dashboards, automated reports and other tools are being developed for students and staff throughout the University. Based upon Schön's concept of reflective practice, the aim is to develop an 'analytics mindset', so evidence-based decisions can be taken at micro and macro levels, the impact of those decisions can be evaluated and that informs the next loop of 'modelling-evidence-intervention-evaluation'.
- A Policy for the Ethical Use of Student Data has been agreed with students and staff through the usual governance and consultation channels. Openness and transparency are key principles, which take this policy beyond the legal requirements.
- This is a major initiative for the university, which will impact upon all student-facing activities, so the full impact has yet to be seen. Individual projects are providing evidence that proactive intervention and reflection upon practice using evidence are having positive effects.

Rationale

In the past, OU students would study a series of individual modules, building them into a qualification over several years. Each student's study path would be different and a final degree composed of a wide variety of subjects was not uncommon. With the current funding regime, students have to sign up for a named qualification at the start, so they can obtain a student loan. The OU has undergone a major reorganisation of its activities around qualifications rather than modules, so the introduction of learning analytics comes at a time of major organisational change. The new funding structure also makes retention on a

qualification a strategic issue, which is particularly demanding when students are geographically scattered and studying part-time. For much of their study time, OU students work alone, creating an additional challenge when establishing measures of student engagement.

Enhancement of the student experience has a high priority, with the introduction of learning analytics across the institution as one of the key strands within a wider strategic programme. Although the OU has always carried out research into the student experience and retention, and the institution has been systematically analysing student data for over a decade to inform curriculum and teaching support, the current learning analytics implementation is the first systemic institution-wide use of learning analytics. One of the aims is to develop an 'analytics mind-set' throughout the University, so staff incorporate evidence-based decision making into their routine work.

The project

The current three-year project uses Schön's concept of the reflective practitioner to inform the processes that impact student success. The unifying principle is the idea of reflecting for practice, in practice and on practice to enhance the work of staff in a wide range of roles across the university. The project is led by the Pro Vice-Chancellor for Learning and Teaching and managed by the Head of Analytics in conjunction with a management group including key stakeholders.

The project operates at macro and micro levels. At the macro level, aggregation of information about the student learning experience is intended to inform strategic priorities continually to enhance the student experience, retention and progression. At the micro level, analytics are used to drive short, medium and long-term interventions at the student, module and qualification levels.

The University is developing its institutional capabilities in ten key areas to strengthen the foundations of for the effective deployment of learning analytics. These ten areas are organised into three main strands:

- Availability of data, which includes data collection, technology architecture, data storage and access for analytics
- Analysis and creation of insight via a 'prototype-design-build' pipeline, which includes data exploration and rapid prototyping, operational analysis models and results interpretation
- Processes that impact upon student success, which include direct intervention, information advice and guidance, continual quality enhancement as well as learning design and delivery methods

Understanding the impact of interventions is a major goal, especially interventions aimed at improving student success. Within the University, interventions are carried out by student support teams, individual tutors and faculty staff, creating a complicated ecology of student support. Previously it was difficult to identify how a single intervention impacted upon student success, so the learning analytics strategy is intended to create a more coherent picture.

Dashboards and interventions, data sources and indicators of engagement

The University has an in-house student information system and an extensive VLE, both of which are thoroughly embedded within staff and student practice. Data is drawn from both of these sources, with work currently underway to improve some of the data feeds. There is a range of activities to enhance data collection from the following areas, in particular:

- Students who withdraw, so that factors leading to withdrawal can be identified and addressed
- Associate lecturers (tutors) currently provide some information about the students in their tutor group, but there is a need to gather this in a more systematic way
- Linking student behaviour on a module with the learning design of that module, to inform the development of curriculum and learning design
- Including library data in the model. This is problematic because OU students do not use the library in the same way as students in traditional campus universities (where inclusion of loan data into models has proved helpful). OU library data is primarily about access to online library resources, and searches are carried out via third-party software, which creates challenges for extracting data and integrating it with the models

Multiple dashboards, reports and tools are under development to provide easy access to analytics outputs for a range of users, including senior management, student support staff, academics and students.

The student support dashboard enables staff to generate reports based upon a range of criteria, such as overdue assignments and visits to the module website. A student dashboard will enable students to track their progress and make better choices about their study path. These dashboards are intended to work in real time, drawing data from a wide range of sources. Student support teams now have a structured programme of analytics-triggered interventions to enhance their capabilities. For example, the first assignment in a module can often be a decision point for a struggling student, so non-submission of that assignment now triggers an intervention from the student support team.

Predictive analytics are being developed to address student progression at individual module level and institutional level. One of the university's research centres, the Knowledge Media Institute (KMi) is developing "OU Analyse", a predictive engine developed in-house, addresses to address a particularly challenging problem: modelling the behaviour of students new to the University. The approach taken is to predict the behaviour of a new cohort on a specific module, based upon previous cohorts on similar modules and demographic data. Challenges include the differing assessment patterns between modules, the differing module start dates (a module may be presented twice a year, and retention of the October cohort may differ from the February cohort), and the lack of historical behavioural information about students new to the University. A prototype is currently being tested.

At the curriculum level, faculty staff with responsibility for the content and assessment of modules may intervene by rewriting a section, or modifying an assignment, if the analytics indicate a problem. Analytics can also identify successful learning designs, enabling the sharing of best practice. The Institute for Educational Technology (IET) has a substantial academic research programme in learning analytics, as well as delivering evidence at the module, qualification and subject level to faculties on a regular basis. The data is managed by the Information Office and IT, although most of the analysis and insight generation is carried out in IET.

Ethics and legal issues

The University sees the use of learning analytics as an ethical process, with the focus on the student as an active participant in that process. The eight key principles within the 'Policy for the Ethical use of Student Data for Learning Analytics' go beyond legal requirements (Open University, 2014). This approach also recognises that however good the models, a student is more than a set of data, so there will always be aspects of the student experience that lie outside the domain of learning analytics. The policy has been approved through the University's Learning, Teaching and Student Support Committee, giving it the same status as other core policies within the organisation. This approach demonstrates the importance of using existing governance structures to embed the use of learning analytics alongside other institutional processes. The eight principles are:

1. Learning analytics is an ethical practice that should align with core organisational principles, such as open entry to undergraduate level study
2. The OU has a responsibility to all stakeholders to use and extract meaning from student data for the benefit of students where feasible
3. Students should not be wholly defined by their visible data or our interpretation of that data
4. The purpose and the boundaries regarding the use of learning analytics should be well defined and visible
5. The University is transparent regarding data collection, and will provide students with the opportunity to update their own data and consent agreements at regular intervals
6. Students should be engaged as active agents in the implementation of learning analytics (e.g. informed consent, personalised learning paths, interventions)
7. Modelling and interventions based on analysis of data should be sound and free from bias
8. Adoption of learning analytics within the OU requires broad acceptance of the values and benefits (organisational culture) and the development of appropriate skills across the organisation

Findings and outcomes

The pilot projects and study support implementation are not yet at a stage to produce clear evidence of effectiveness. The key factors that impact upon student success are now understood sufficiently well to inform priorities in strategic planning. This project involves many levels of granularity and different timescales, from an entire faculty's curriculum (changing over a period of several years) through to a student on a single module who has not logged onto the VLE recently (changing over a period of a few days). The impacts of the various interventions will take some time to appear and interpret, given the complexity and scale of the system.

References

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