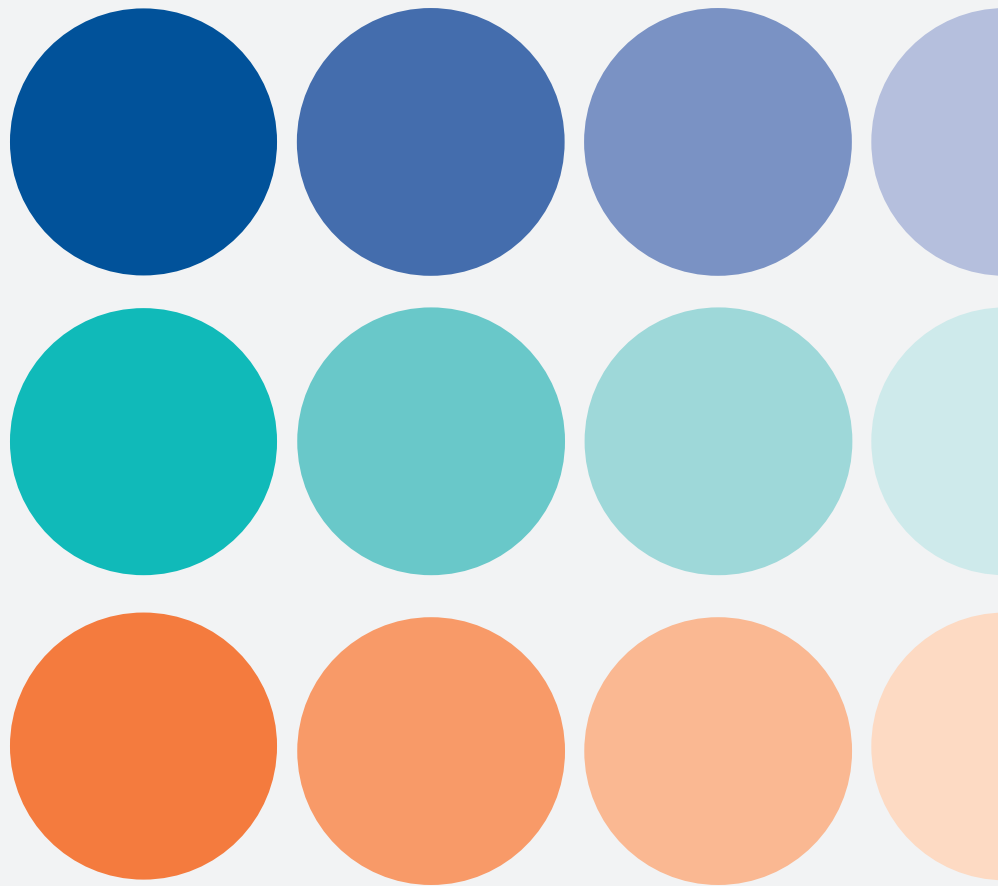


ANALYTICS IN HIGHER EDUCATION



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THE CASE FOR BETTER USE OF ANALYTICS IN HIGHER EDUCATION

1. Universities already collect vast amounts of data, charting students' footprints through their studies and extra-curricular lives. These datasets are rich and growing. Technological and methodological leaps mean that collection and analysis is easier than ever. However, this data resource is often underused.¹
2. Learning analytics provide a set of powerful tools to inform and support learners. They enable institutions and individuals to better understand and predict personal learning needs and performance.^{2, 3}
3. These tools offer more than improvements in teaching and learning: they can also be used to deliver increased efficiency. The UK has one of the highest levels of expenditure per student among OECD countries.⁴ Universities are asked to demonstrate value: to students, who have higher expectations of their time at university; and to the public, which contributes to the cost of higher education.
4. Of course, data analytics can be used to add value across a wide range of university activities. This briefing considers just one: the education of undergraduate students.

POLICY CONTEXT

5. UK universities have a longstanding commitment to improve teaching and learning. The higher education sector already demonstrates high levels of student satisfaction and attainment in positive comparisons with our international rivals.⁵
6. Successive governments have sought to introduce policies to recognise and reward good learning and teaching. The latest in this line of interventions is the Teaching Excellence Framework (TEF).
7. External performance assessments, such as the TEF, don't in themselves support institutions understanding and using their data. Advanced learning analytics can allow institutions to move beyond the instrumental requirements of these assessments to a more holistic data analytic profile. Predictive learning analytics are also increasingly being used to inform impact evaluations, via outcomes data as performance metrics. Ultimately, this allows institutions to assess the return on investment in interventions⁶. Analytics are being used to determine how limited resources may be used to support students in the most effective way.
8. The development and deployment of learning analytics may still be at relatively early stage. However, there is already convincing evidence from early adopters that learning

¹ <https://www.civitaslearningspace.com/webinar-unifying-data-systems-and-sources/>

² http://ifets.info/journals/15_3/4.pdf

³ https://www.researchgate.net/publication/283730873_Learning_analytics_should_not_promote_one_size_fits_all_The_effects_of_instructional_conditions_in_predicting_academic_success

⁴ http://www.keepeek.com/Digital-Asset-Management/oecd/education/education-at-a-glance-2016/united-kingdom_eag-2016-85-en#page3

⁵ <http://www.universitiesuk.ac.uk/policy-and-analysis/reports/Pages/uk-competitive-advantage-summary-report.aspx>

⁶ <https://www.civitaslearningspace.com/learning-true-impact-campus-initiatives/>

analytics tools can drive improvement and may support more fundamental innovation along the learning pathway.⁷

STRATEGIC APPROACH

9. Maturity of practice varies considerably across the UK sector. A 2015 study of 53 institutions by the UK Heads of e-learning Forum found that nearly half of the institutions surveyed had not introduced learning analytics. The study also found that awareness and understanding of the benefits of learning analytics varied widely across departments within institutions. In short, few institutions are collecting, linking and using data in a systematic way.
10. As suggested, institutions often have rich, but underutilised datasets. Initially, institutions should develop a data strategy. This should set out what questions they want answered about the learning pathway and consider how available data should be used. It may also indicate a framework for what should be collected next.
11. Separate institutions will want different strategic approaches. The introduction of a single, sector-wide framework is undesirable. For example, while one institution may wish to progress a higher proportion of its undergraduate body to postgraduate study, another may wish its students to progress to other institutions.⁸
12. Most importantly, in adopting and developing analytics, institutions should adopt question or curiosity-driven approaches. A data-driven approach is unlikely to be effective. It tends not to produce a resilient analytic framework; nor does it encourage buy-in from across the institution. Data must be made to work for non-expert users. It must translate into actionable insights.
13. Academics and organisations are helping institutions build predictive models specific to their circumstance and unique to the challenges they are trying to solve. Jisc's [Learning Analytics Architecture](#) is a basic solution working with commercial tools and platforms, to support innovative practice, including from developers and researchers who wish to build applications on a framework.

WHAT ELSE NEEDS TO HAPPEN?

14. A major reason that datasets are underutilised is that they are stored in silos across an institution. Systems reflect existing, or even past, ways of working: too often, this development reflects both the good and bad practice within an institution. Effective use of learning analytics depends on cultural change as much as on the adoption of new tools.^{9,10}
15. Successful change programmes involve assembling a cross-functional team that brings in stakeholders from all relevant parts of the organisation, to ensure that the design and

⁷ <http://er.educause.edu/articles/2016/9/blending-human-intelligence-and-analytics-for-student-success>

⁸ <https://www.civitaslearning.com/sandy-shugart-changing-the-value-proposition-at-valencia-college/>

⁹ <http://www.forbes.com/sites/schoolboard/2016/09/16/higher-educations-turn-to-big-data-for-healthy-change/#209e4b453270>

¹⁰ <http://info.civitaslearning.com/student-success-platform-white-paper>

implementation of new products is undertaken in such a way that it matches the requirements of all users.

Case study: University of South Florida

In 2010, the University of South Florida (USF) launched a student success initiative with an institutional focus on improving graduation and retention rates. This initiative met with early success: the six-year graduation rate increased from 52% (2005 cohort) to 68% (2009 cohort). In the same period, first-year retention moved from 87% to 89%. However, progress stalled as the institution hit a plateau.

Bringing together cross-functional teams moved department-led activities to a university-wide focus. This change in working practice, and partnering with Civitas Learning to link previously disparate datasets, allowed performance to be measured in a more meaningful way, with decision makers across the campus able to access more predictive data than had previously been possible.

To date, the initiative has led to an increase in the first-year retention rate, and the approach has allowed USF to develop a holistic case management approach – targeting student services where they are required the most. USF was recently recognized for their approach to this work with an EDUVENTURES 2016 Innovations Award.

IMPLEMENTATION CHALLENGES

16. As with any change programme, there are obstacles to overcome in the implementation of new analytics tools and techniques in institutions. In addition to generic theories of change, academics and organisations such as Civitas Learning have set out frameworks to help smooth the adoption of analytics by mapping the specific obstacles that face institutions.¹¹
17. The generic model for learning analytics put forward by Wolfgang Greller and Hendrik Drachsler is just one framework. The framework was originally set out in a research paper intended to act as a guide for setting up learning analytics services in support of educational practice and guidance for learners by two researchers based at the Open University of the Netherlands.¹²
18. There are a number of potential, and immediate blockers that are often cited as a reason not to engage in the development of analytics. These are each considered in the section below.

GOVERNANCE

19. In the short to medium term future, governing bodies will be required to take on more explicit responsibility for quality and standards. However, governing bodies often have little confidence in their ability to comment on educational issues. In the same way that

¹¹ <https://www.civitaslearningspace.com/building-organization-capacity-success-getting-past-growing-pains/>

¹² http://www.jstor.org/stable/jeductechsoci.15.3.42?seq=1#page_scan_tab_contents

governing bodies receive detailed financial reports, they could also receive detailed information about the educational performance of institutions.

LEGAL AND ETHICAL CONSIDERATIONS

20. There are important ethical questions around the use of data and analytics, and these have been recognised by earlier reports, such as the [Higher Education Commission's *From Bricks to Clicks* report](#). The authors recommend that institutions put in place clear ethical policies and codes of practice, and seek informed consent from their students to the use of their personal and learning data in analytics.
21. In practice, there is already a great deal of guidance available to institutions. For example, Jisc have published a [code of practice for learning analytics](#), and the National Union of Students have issued a [guide for students' unions](#).

STUDENT SUPPORT

22. There seems to be a perception within some parts of the sector that students are averse to sharing their data with universities, citing, among other issues, concerns over privacy. In reality, there seems to be limited evidence for this. In a survey undertaken by Jisc, 71% of students indicated that they would be prepared to share data on their academic activities if it could help to improve their grades. Just 12% said they would not.¹³
23. As with the legal and ethical considerations around the use of personal data, a critical issue is to ensure that students are informed about the use of their personal and learning data to drive improvement at the institutional level.
24. Ultimately, however, learning analytics might come to be characterised in terms of opportunity rather than risk for individual end users. Thus students benefit from their data and the experience of students who came before. They access their data via dashboards or applications and are empowered to work with universities to configure personalised curricula and learning trajectories through their life course.

PRODUCT LOCK-IN

25. In the past when adopting a new technology or tool, an individual institution may have run into problems, for example, getting locked into a service or not getting the best possible deal through sub-optimal contract management. As the market becomes more open and standardised, such concerns will subside. With the basic national learning analytics solution Jisc is piloting, this is being developed in collaboration with the sector with openly defined application programme interfaces (APIs), into which other vendors can securely interface their dashboard and predictive tools, thereby mitigating against lock-in. When selecting a student success vendor, institutions should select a platform or

¹³ <https://www.timeshighereducation.com/news/jisc-finds-most-students-happy-share-data-learning-analytics>

applications that can ingest and interoperate with multiple systems, including student information systems and virtual learning environment tools.

Case study: Wollongong University

Wollongong University has employed social network analysis to analyse online student discussion forums to assess student engagement. This use of analytics is based on the premise that collaborative learning promotes student understanding. The models are used as a diagnostic tool to help identify students who are less engaged than others, or alternatively groups where just a small number of students are dominating the discussion of a much larger group.

- [Learning analytics in higher education: A review of UK and international practice.](#)

DATA PROTECTION

26. Institutions have important responsibilities under the Data Protection Act 1998, and these are often delivered by dedicated data protection officers. Unfortunately, this sometimes leads to obstacles to implementation being raised internally. Institutions need to adopt permissive frameworks that encourage innovation while meeting the requirements of the Act.

FUTURES: A US PERSPECTIVE

27. Although there is general agreement that institutions in the United States of America (US) are ahead of those in the UK in terms of adoption of data analytics, this appears to be happening within individual institutions rather than at sector level.¹⁴

28. These individual institutions have adopted tools of increased sophistication, moving from descriptive statistics that detail institutional or school-level performance to predictive analytics that consider the performance of the individual.

29. A key part of the adoption of these techniques has been a shift in organisational culture. In practice, this doesn't mean an increased number of technical staff, but staff with the knowledge and skills to make informed decisions based on the data that is presented to them.

¹⁴

http://www.policyconnect.org.uk/hec/sites/site_hec/files/report/419/fieldreportdownload/frombrickstoclicks-hecreportforweb.pdf

Case study: Rio Salado Community College

Primarily funded by the Bill and Melinda Gates Foundation, Rio Salado College implemented an initiative that sought to promote student success, retention and completion with five integrated technological innovations designed to scale advising support delivered by only five advisors to more than 5,000 students enrolled in the initiative.

Learning analytics were employed to test the effectiveness of the initiative using a prediction-based propensity score matching model. The model demonstrated the effectiveness of initiatives and further identified students and student groups whose demands were not met by the initiative. This allowed Rio Salado to develop targeted campaigns and outreach to meet the needs of these students. A similar approach has been used by institutions such as the University of Arizona to personalise outreach supporting students at the right time, and in the right way.

- [Marketplace: Colleges tap big data to help students stay in school.](#)

FUTURES: A UK PERSPECTIVE

30. As with the US, the adoption of analytical tools varies between institutions. A growing number of institutions have adopted systematic approaches to analytics, or are in the process of doing so. The University of Edinburgh and the Open University are two examples of institutions that have adopted systematic approaches to analytics. A further 50 institutions (universities and colleges) are in the process of piloting Jisc's beta learning analytics service, which includes a dashboard and student app, as well as resources to support users.

TEACHING EXCELLENCE FRAMEWORK

31. The UK's university sector has a well-deserved international reputation for high-quality teaching and learning, and universities are always seeking to improve what they offer students.
32. The government has introduced the (TEF) to recognise and reward excellent learning and teaching. In practice, the development of a single framework that can respond to the diversity of the higher education system in the UK is a significant challenge.
33. Given the scale of this challenge, the development of analytic tools presents institutions with an opportunity not just to deliver a better student experience and improved internal processes, but to better articulate the value of teaching provision.

Case study: University of Edinburgh

The University of Edinburgh has a wide range of learning analytic projects and initiatives that cross both organisational and disciplinary boundaries. The university's involvement in the delivery of both fully online Masters level programmes and courses and MOOCs offer further opportunities for development. For example, a partnership with Civitas Learning is underway to develop learning analytics models, promote teachers' and students' understanding of the area and enhance understanding of where data collection might be improved.

Edinburgh's approach is complemented by its researchers. The Chair in Learning Analytics and Informatics, Professor Dragan Gasevic is also the President of the [Society for Learning Analytics Research](#), an inter-disciplinary network of researchers who are exploring the role and impact of analytics on teaching, learning, training and development.

- [Learning analytics in higher education: A review of UK and international practice.](#)
- [Learning analytics at the University of Edinburgh.](#)

CONCLUSIONS

34. Universities already collect vast amounts of data about their student populations, but often this is underutilised. The current 'state of the science' of learning analytics means that substantial benefits could already be realised through effective implementation of appropriate technology and techniques.
35. To put this data to better use, institutions will have to ensure that they foster cultures that bring departments together to ask questions about their students, to use data in such a way that personalises the learning experience and targets resources where they can be most effectively employed.
36. The opportunity of learning analytics is not overstated. However, to realise benefits, institutions will have to reach for wider programmes of transformation. Leading edge global experience, including that of Civitas Learning, suggests that mandated frameworks, such as the TEF, are highly unlikely to achieve this. Instead, change will be endogenous, driven and owned by institutions themselves and, ultimately, by the individual owners and end-users of these powerful sets of data.

FURTHER RESOURCES

This briefing document represents an introduction to the use of learning analytics. The list below provides further resources, including reports and frameworks that may be of interest to those seeking to better use analytics in their institution.

REPORTS AND FRAMEWORKS

- [From Bricks to Clicks: the Potential of Data and Analytics in Higher Education](#).
Policy Connect. Higher Education Commission (2016).
- [Learning analytics should not promote one size fits all: The effects of instructional conditions in predicting academic success](#)
The internet and Higher Education, 2015
- [Learning analytics in higher education: A review of UK and international practice](#)
Jisc. (2016).
- [Code of practice for learning analytics](#).
Jisc (2015)
- [White Paper: Student Success Platform](#)
Civitas Learning (2016)
- [Research & Practice in Assessment Journal: Three case studies to consider](#)
Civitas Learning
- [Learning analytics: a guide for students' unions](#)
National Union of Students (2015)

CASE STUDIES

- [Blending Human Intelligence and Analytics for Student Success](#)
Educause review, 2016
- [Learning Brief: University of Arizona](#)
Civitas Learning
- [From Insight to Action: Using Predictive Analytics To Impact Student Outcomes](#)
Civitas Learning
- [Learning Brief: Strayer University](#)
Civitas Learning
- [Learning Brief: Valencia College](#)
Civitas Learning
- [Learning analytics: the current state of play in UK higher and further education](#)
Jisc. (2014).

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