Learning Analytics position paper for consideration of QAEC

Summary

This position paper provides a broad overview of what Learning Analytics are and entails, summarises work to date in exploring and scoping the development of Learning Analytics policy and practice within the context of the University of the Highlands and Islands, and proposes a pragmatic way forward for the university in terms of immediate next steps.

QAEC is being asked to discuss this paper and, subject to that discussion, endorse the recommendations herein. The content of this paper, and the work undertaken in preparing it, relate to the QAEC Enhancement Priority currently titled, 'Using student data for monitoring and evaluation'. The work outlined and proposed at the end of this paper is intended to move us towards learning analytics practices focused on using student data for 'feedback and improvement'.

Introduction

Since 2010 there has been a marked rise in Educational Data Mining (EDM) and the use of Learning Analytics to support research and practice in education, as institutions seek to better understand and support student learning. In addition, increased scrutiny and expectations from funders and government has forced institutions to look more closely at metrics and targets in relation to student success and impact, promoting a drive for greater efficiency and cost-effectiveness.

The 2020 Horizon report highlights 'analytics for student success' as one of the top 6 emerging technologies and practices that will have a significant impact on postsecondary teaching and learning, from a list of 130 potential current and emerging technology developments.

Research literature is awash with papers espousing the benefits that can be realised by employing Learning Analytics. These fall into four target groups or beneficiaries: students, staff, institution and researchers and in general the aim of Learning Analytics is to provide an improved, more effective and efficient learning experience leading to lower attrition and higher student success. Learning Analytics achieve this by various means. For example, by highlighting areas/topics where students may be struggling analytics can be use to validate and evaluate learning materials and teaching strategies providing a focus for timely curriculum improvement and targeted support. The use of analytics to predict student success through the identification and use of optimum pathways can provide an opportunity for early intervention, personalised learning experiences and real time feedback. More broadly analytics can be used to identify trends and best practice across the entire institution. This can enable forward planning in the provision of learning and highlight areas for professional development of staff leading to improved instructor performance. Researchers can use data from Learning Analytics to identify emerging trends in education and market opportunity. Learning Analytics can also inform institutional performance metrics required for funding bodies such as the Scottish Funding Council.

Despite the promise Learning Analytics hold, there are fears that uptake has slowed, and in some cases been reversed due to concerns about ethics, data privacy, surveillance and the handling of personal data, not only of students but also of staff (Drachsler and Greller, 2016) (Sclater, 2016).

> *"The ensuing hiatus means learners are being denied the potential benefits of learning analytics." (Sclater, 2016)*

It should be noted that many institutions (Open University UK, University of Edinburgh, Nottingham Trent, University of Brighton, City University of London) have successfully implemented Learning Analytics and according to much of the existing research, the key to this success is early stakeholder engagement and transparency. Rientes (2020), presenting on the success of Learning Analytics in the UK Open University highlights the need for digital skills, the use of evidence to foster buy-in and a strong digital skills programme, wrapped in a sound ethical framework.

In context of the University of the Highlands and Islands' mission 'To have a transformational impact on the prospects of our region, it's economy, it's people and its communities', and the values of the current Learning and Teaching Enhancement Strategy, the introduction of Learning Analytics has the potential to make a significant impact on student experience, success, retention and student ownership. It aligns directly with our Learning and Teaching Enhancement Values concerned with 'Evidence-based Educational Practice', 'Supporting the Learner as an Individual' and 'Reflective Practice and Continuous Improvement'. The development of our Learning Analytics practices also aligns well with other uses of student generated data and feedback to enhance the learning and teaching experience, for example the BRAG (Blue, Red, Amber, Green) system, module surveys, National Student Survey and Student Satisfaction and Engagement Survey.

Considerable scoping work with respect to Learning Analytics and their development in the context of the university has been undertaken to date. This position paper is informed by and builds upon that work, which includes an initial benchmarking and stakeholder perspectives report by Schlappy (2016), which was jointly sponsored by the LIS and LTA, an Erasmus+ exchange to the University of Vienna undertaken by Smith and Rennie (2018), and a paper for QAA Scotland by Smyth (2018) which relates directly to the exploratory work around analytics and student engagement indicators initiated by QAEC.

This paper seeks to summarise and extend our work to date by laying out the current state of Learning Analytics in education and in the university, with a particular forward focus on predictive analytics. The paper will look at current practices, benefits, challenges and considerations. It will conclude with a focused set of practical recommendations for immediate next steps.

What is Learning Analytics?

As with many terms, Learning Analytics suffers from multiple definitions, however, this definition from the Society for Learning Analytics Research (SOLAR)[1][2] is widely recognised and quoted:

> *"the measurement, collection, analysis, and reporting of data about learners and their contexts, for purposes of understanding and optimising learning and the environments in which it occurs."*

Learning Analytics can be divided into 4 areas:

- Descriptive analytics – looking to the past and asking, what happened? e.g. for reporting purposes (pass/fail)
- Diagnostic analytics – looking to the past and understanding why something happened based on an analysis of descriptive analytic data. Provides actionable data and generally results in an intervention

[1]

[2] https://www.solaresearch.org/about/what-is-learning-analytics/

- Predictive analytics – looking forward and trying to understand what is likely to happen, based on historical data and past performance. Requires human interpretation and intervention
- Prescriptive analytics – looking forward and recommending a course of action based on an analysis of predictive analytics. Can leads to systemic changes e.g. in methods, syllabuses or even courses

While the broad categories above are widely accepted, there are important emerging areas of Learning Analytics practice that are focused more directly on teaching and the curriculum, for example concerned with the nature and spread of formal assessment activities across concurrent modules and time periods so as to identify potential pressure points for students in their engagement (and ability to engage effectively) in their formal learning and activities.

As an institution, the university is striving towards the linking of student engagement indicators to student interventions across the entire range of data sources, with initial thinking in this area captured in Smyth (2018).

For the purpose of this position paper, we are primarily concerned with the potential use of predictive analytics (as defined above) in the institutional VLE/LMS, currently Brightspace by D2L, and the associated human prescriptions based on these analyses. However, the work proposed in the recommendations of this paper (including pilot research) would provide the platform for further exploring the development of a range of Learning Analytics applications.

Uses of analytics

Learning Analytics data is collected by a range of systems at both course and institutional level, and includes student information systems, student records, library systems, VLE, video conferencing systems, collaborative cloud services, registrar records and financial systems. Data is also generated through internal feedback mechanisms such as module feedback and external mechanisms such as the National Student Survey and the Student Satisfaction and Engagement Survey. Implicit in the terms Learning Management System and Virtual Learning Environment is the concept of management; this includes engagement and progress indicators and as such, and historically this data has always been collected, and to a large extent has been available for analysis (e.g. the early warning system or gradebook in the Blackboard VLE, library loan records or the student attendance register). More recently the university has developed a data privacy notice that provides guidance and the parameters for the continued use of the above data in Brightspace, the new VLE. The above Learning Analytics data falls primarily into the 'descriptive analytics' category. Data of this kind provides valuable insights into how students are engaging with the VLE and related resources, informing support interventions and learning design. However, it is only with establishing further analytical procedures that data of this kind can be used to provide greater insight including in relation to more tailored, individualised support and conducting detailed patterns of analysis for cohorts and programmes.

To date, there have been a number of projects and initiatives within the university that have either been focused on further understanding the potential applications of Learning Analytics in the university, or which have involved the use of student data in ways that align with or exemplify aspects of practice that relate either broadly or directly with Learning Analytics. This includes:

- The Blue, Red, Amber, Green tracking and action planning tools to support student retention and attainment which are in place within several Academic Partners

- The external benchmarking and internal UHI stakeholder perspectives on Learning Analytics undertaken by Marie-Lise Schlappy (2016), as part of a jointly sponsored scholarship project supported by the LIS and LTA and overseen within the LTA
- The work initiated by QAEC, and featured in recent rounds of SNLQM dialogues, around attendance monitoring and student engagement indicators, including initial scoping of how student engagement indicators can be linked to supportive interventions (Smyth, 2018)
- The Erasmus+ exchange to the University of Education Vienna to explore Learning Analytics practices with renowned expert Professor Wolfgang Greller, undertaken by John Smith (LIS) and Professor Frank Rennie in 2018 (as captured in the Smith and Rennie, 2018, report)
- Consultation work undertaken with class representatives at the joint HISA/LTA Class Rep Summit in 2019, at which there was a 'world café' session exploring the student perspective on engagement indicators and learning analytics. This was part of the university's work for the recently concluded QAA Scotland Enhancement Theme on evidence-based practice
- The further benchmarking work and research undertaken for this position paper
- And, most notably, the current Dashboard Reporting project currently underway and the move to Brightspace as our new VLE with advanced Learning Analytics capabilities

In addition to the above, at the time of writing the university is concluding a MSc student placement for 2020, managed by Dr Heather Fotheringham of the LTA. The 12-week summer placement is a result of a partnership between The Data Lab, MBN Solutions, Robert Gordon University (RGU) and the University of the Highlands and Islands (UHI). The project has sought to make data and insights from the university's student surveys (NSS, ESES and SSES) more accessible to various stakeholders including Quality Managers, Subject Network Leaders and Programme Leaders. It has had three key objectives: to automate data preparation; develop new analyses and visualisations; and to explore insights from applying advanced data science techniques, such as natural language processing.

Whilst there are occasions when data from a single system or process can be used in isolation to provide insights into activity, progress and engagement, within the sector there is an increasing move towards cross-functional integration and analysis of datasets (multimodal LA) to provide a more holistic view of the student journey, providing early indication and proactive intervention at an individual level.

Ultimately this is where the university would like to be with regard to Learning Analytics, however as Smyth (2018) highlights, these datasets are not being effectively harnessed, and to do so requires developing staff and student capability in interpreting an acting upon the data; linking our interpretation to timely interventions and enhancements in learning and teaching; meeting wider student support needs; and tracking and evaluating the effectiveness of those interventions.

However, while in short the university is not currently in a state of readiness to enable the successful rollout of a large-scale, integrated Learning Analytics initiative we do have the potential capacity to do so, and the initiatives above (and the work proposed in this paper) provides a means to do so.

Brightspace and Analytics

Institutional VLEs collect large amounts of data about our students and their interaction with the system.

The legal reason for UHI's collection of VLE data is 'public task'. Data is collected to ensure that students are engaging with their programme/module(s)/unit(s) that comprise their course of study, to identify and offer support to students who may be experiencing challenges relating to their

engagement, and to evaluate and refine learning, teaching and assessment practices in relation to our programmes, modules and units.

In Brightspace this data is visible in the DataHub as a set of reports with access restricted by system role. These reports are divided into two subsets; core analytics and performance analytics and can be visualised on the Insight Portal. Interpretation of these reports requires an understanding of the data. In order to further assist institutions Brightspace have created a Student Success System (S3) that provides a prediction of student success by comparing the performance of previous cohorts with current students. This predictive ability relies on the structure and pedagogy of the previous delivery being similar to the current one, something that will undoubtedly be impacted by the current Covid-19 pandemic which accelerated many face-to-face and blended deliveries to predominantly online, even if temporary.

Potential for analytics (post covid-19)

Within the sector there is currently increased interest in, and related initial development of, potential applications of Learning Analytics that are informed by, and would help frame future potential responses to, COVID-19 and other pandemic enforced contingency responses to student support, learning and teaching, and the operationalisation of digital data, spaces and resources to inform timely decisions and interventions in the event of further instances of lockdown or social distancing. Areas of emerging application including identifying and intervening to support students and cohorts at most risk and disadvantage, to inform decisions on the nature and sequencing of learning, teaching and assessment activities and the curriculum itself, and to identify other mitigations and interventions to ensure continuity of an effective and equitable learning experience.

The work proposed in this paper, while limited in terms of initial scope, would contribute to and provide a platform for the development of Learning Analytics policy, procedures and practices that are relevant within the broader post-COVID19 context the sector now finds itself in.

Considerations

Whilst the above paints an optimistic picture of analytics there are some caveats that should be observed in relation to the use of analytics. In the development of their DELICATE checklist (Determination, Explain, Legitimate, Involve, Consent, Anonymise, Technical, External) for the implementation of trusted Learning Analytics, Drachsler and Greller (2016) highlight how in some cases Learning Analytics uptake has stagnated and even gone into reverse following concerns by governments, stakeholders and civil right groups about privacy and the handling of personal data. They state that privacy is an area of big concern to institutions and highlight the institutional dilemma of wanting to do the best for their students whilst fearing the negative consequences of implementing Learning Analytics, such as negative press, loss of reputation and brand value or even legal liabilities.

In their paper on avoiding failure in Learning Analytics, Ferguson and Clow (2017) draw attention to the importance of a **clear vision** of what you want to achieve that is closely aligned with institutional policy supported and steered by a senior leadership team. They also highlight the need for **capacity building**, especially of a skilled data analyst and the users of Learning Analytics outputs.

Drachsler and Greller, in accord with the Jisc 'Code of practice for Learning Analytics' (2018), also point to acceptance of technological solutions as being dependent on "data subjects being sufficiently aware of the consequences of using the system, the validity and relevance of the results obtained and the level of transparency of the data model". The Jisc 'Code of practice for Learning

Analytics' clearly highlights a range of areas where serious consideration is required, these are summarised below:

Responsibility – for collection, processing, interventions, retention and stewardship. This requires engagement with key stakeholders and key staff groups.

Transparency – what are our objectives, what data do we need and what is out of scope. Make visible the processes involved in producing the analytics.

Consent – may be covered by the current enrolment arrangements but may also require a PIA and additional consent. This should include potential adverse consequences of opting out and a complaints procedure (ombudsman).

Privacy – data should only be accessed by those with a legitimate need. Anonymised data should be protected from reverse engineering by aggregating multiple sources.

Validity – data should be as complete as possible, understood, seen in its wider context and not used in isolation.

Access – students should be able to access all data held about them if requested.

Interventions – state when, why how and by whom interventions will be made. We also need to recognise the impact on the staff involved in relation to workload and training. Interventions are likely to be domain specific and we need a consistent approach across the partners and programmes of learning.

Minimise adverse impact – by designing systems that allow students to maintain autonomy; by minimising the opportunity to 'game the system'; by reducing the likelihood of non-participation due to knowing they are being monitored; by making sure staff understand legal, ethical and unethical practice and their fiduciary duty towards students.

Stewardship – data should be kept to the minimum necessary, as safe as possible from external interference (hacking) and processed in the EU or according to the DPA and retained only for defined periods.

Recommendations

In light of the findings in this report and the readiness of the institution to embrace Learning Analytics it is proposed that in the first instance a constrained research pilot project is run and managed by the LTA. This will reduce the potential pushback from students, teaching staff and perhaps trade union bodies and afford us time to engage with key stakeholders and better understand the use, implications, benefits and ethics of using Learning Analytics. It will also give us time to develop the relevant policies, processes and staff training required for wider roll-out and will reduce the risk of widespread adverse effects. In addition, it will provide more time to integrate and test any required technical systems across the partnership.

It is important that we collect student data over the forthcoming academic year (20/21) as this will form the basis of future predictive analyses. This is permissible under the current Brightspace Privacy Statement.

In the context of the above, our specific recommendations for endorsement from QAEC are:

1. The establishment of a Learning Analytics working group to advance the recommendations in this paper which are to:

a. Identify and engage key stakeholder
b. Identify and engage potential pilot groups
c. Initiate and oversee a robust research pilot developed and managed through the LTA and which will report to QAEC in the first instance
d. Advance the PIA for a revised Privacy Statement
e. Evaluate the impact of the pilot and disseminate the findings with recommendations.

As the working group (and the purpose of the proposed work) is focused on Learning Analytics to support students and enhance learning and teaching, it is proposed that membership is drawn from across the university with representation including QAEC, HISA, LTA, LIS, EDU, Student Records and Faculty and Academic Partner representatives.

2. Given the focus on student support and learning and teaching enhancement as outlined above, we propose that the working group is chaired by an appropriate senior member of staff with the work managed through the LTA.

It is also recommended that we adopt the Jisc 'Code of practice for Learning Analytics' in conjunction with Drachsler and Greller's DELICATE 'checklist for trusted Learning Analytics' as a basis for moving forward.

Parallel activity will include developing policies, processes and guidance and assessing the impact on staff in relation to awareness and upskilling in order to implement and maximise the impact of future Learning Analytics initiatives.

Authors:

Scott Connor – Digital and open Education Lead, LTA, UHI

Prof. Keith Smyth – Head of the LTA and Professor of Pedagogy, LTA, UHI

John Smith – Head of Integrated Technologies and Resources, LIS, UHI

References

Drachsler, H. & Greller, W. (2016). Privacy and Analytics – it's a DELICATE Issue. A Checklist for Trusted Learning Analytics. LAK '16: Proceedings of the Sixth International Conference on Learning Analytics & Knowledge April 2016 Pages 89–98 https://doi.org/10.1145/2883851.2883893

EDUCAUSE (2020). 2020 EDUCAUSE Horizon Report. [Available from] https://library.educause.edu/resources/2020/3/2020-educause-horizon-report-teaching-and-learning-edition [last accessed] 19 August 2020.

Eynon, R. (2013) The rise of Big Data: what does it mean for education, technology, and media research?, Learning, Media and Technology, 38:3, 237-240, DOI: 10.1080/17439884.2013.771783

Ferguson, R. & Clow, D. (2017). Learning Analytics: Avoiding Failure. *Educause Review Online*, 31.07.2017

Rientes, B (2020). Learning Analytics adoption in Higher education: reviewing six years of experience at the Open University UK. Online webinar. 11 June 2020.

Sclater, N. (2016). Developing a code of practice for Learning Analytics. *Journal of Learning Analytics*, pp.16-42.

Sclater, N. (2018). Code of Practice for Learning Analytics. Jisc. [Available from] https://www.jisc.ac.uk/guides/code-of-practice-for-learning-analytics. [Last accessed] 10 June 2020

Schlappy, M-L. (2016). Learning Analytics at the University of the Highlands and Islands.

Smith, J. & Rennie, F. (2018). Report from an Erasmus+ knowledge exchange visit to the University of Vienna. 14 – 17 December 2018.

Smyth, K. (2018). Linking engagement indicators to supportive interventions. Paper presented at QAA Scotland 15th enhancement Conference – evaluation, Evidence and Enhancement Inspiring Staff and Students. Glasgow Caledonian University, 7th June 2018.

UHI (2020). Brightspace Data Privacy Notice. [Available form] https://www.uhi.ac.uk/en/t4-media/one-web/university/privacy-notices/privacy-notice-brightspace-30-06-2020.pdf. [Last accessed] 19 August 2020.