



# Starting with the end in mind: How a backwards design approach to StREAM interventions can support student (re)engagement

Case Study  
May 2023



## Executive summary

Nottingham Trent University (NTU) have worked with StREAM from the beginning of their learning analytics journey, partnering with us to collaboratively design and develop the **StREAM** student engagement analytics platform. It is they who are responsible for some of the foundational design principles that underpin **StREAM** - from ensuring that decisions on 'risk' are based on what students do while they are at university, not who they are, through to ensuring that whatever data and information is visible to staff users of **StREAM** is also visible to students - including information about any interventions/interactions.

**In this case study**, Ed Foster, Head of Student Engagement and Analytics at the Centre for Student and Community Engagement at NTU, reflects upon and explores some of the key factors that impact how successful an interaction with a student can be, based on their **StREAM** engagement data. NTU received Erasmus+ funding to participate in the OfLA project (Onwards from Learning Analytics) where their research focused on effective student interventions.



Ed Foster,  
Head of Student Engagement and Analytics

The OfLA project was 'designed to deal with the challenge of acting meaningfully upon learning analytics or other early warning systems to support inclusion and student success'. In this regard, the project aligns to the broad adoption approach that take to a **StREAM** deployment, namely that the provision of engagement information based on students' digital footprints is simply the starting point in effecting meaningful change at the individual student level. The key to a successful deployment and use of analytics is dependent upon what happens next - how that engagement information is used to impact outcomes for each student.

Ed explores how starting with the end in mind when it comes to intervention design can help to maximise the potential for success for every student.

## Generating Impact

At NTU, successful outcomes are the result of different factors coming together for each student. Engagement (defined as student participation in 'educationally-purposeful activities') is determined by who students are, their prior educational experience, how they engage at university and the wider university environment in which their engagement takes place - what happens to them when they are at university and the ecosystem of support available) (Figure 1).

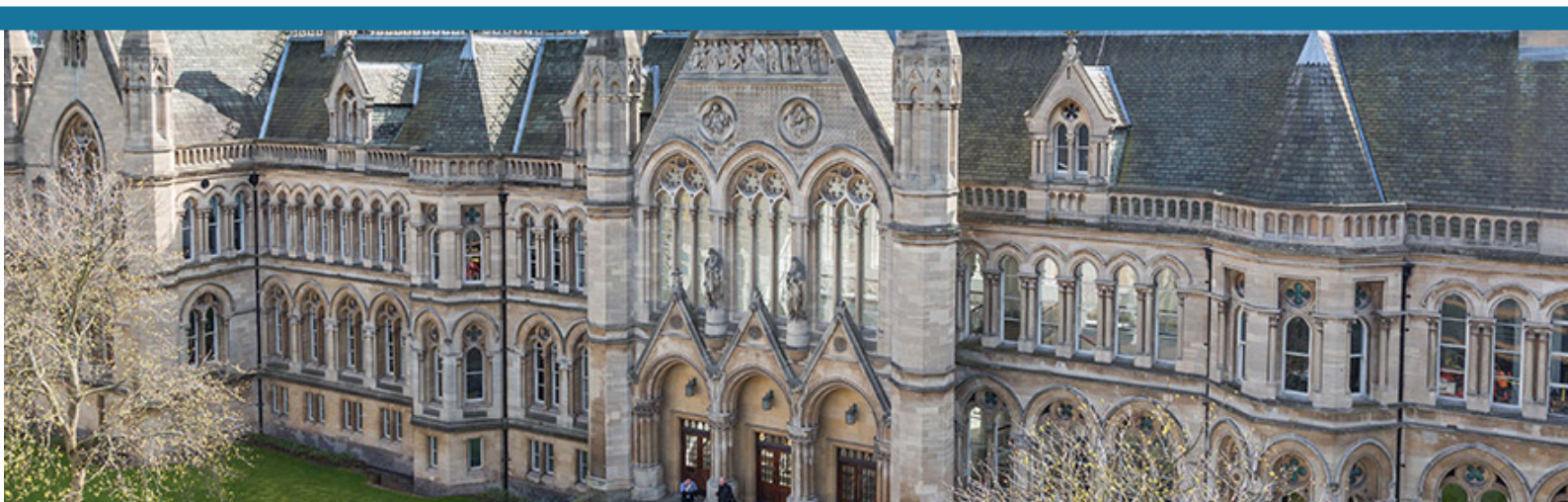
The goal for NTU, as indeed is likely to be the case for every university, is to facilitate and enable a learning environment that engages every student from the outset. The reality of course, is that every student's learning experience and engagement is unique to them and influenced by the factors demonstrated in Figure 1. Given that reality, it becomes necessary to identify ways to enable each student to engage as fully as possible and to provide meaningful, accessible and personalised support.



Figure 1: Factors determining student engagement

'Engagement' can also include 're-engagement', i.e. working with students who have engaged with the university to an extent (which could be as simple as enrolling onto their programme), but who would benefit from some additional information, advice and guidance to meaningfully and actively participate in their academic studies.

In those situations, it is helpful to have a sense of the aim and purpose of meeting with a student - ask yourself 'what are you hoping to achieve as a result of this conversation?' Think also about what perfect support would look like in each context i.e. at the point of the intervention, outreach or support.



## The importance of support interventions

Generating interventions is the final stage in **Clow's Learning Analytics Cycle** (Figure 2).

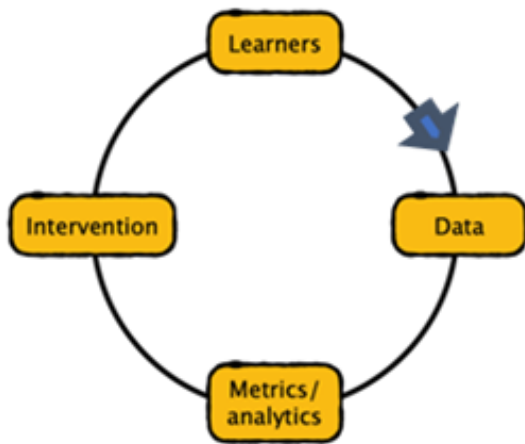


Figure 2: Learning Analytics Cycle (Clow, 2012)

When it comes to reaching out to a student, stages 1-3 (learners - metrics / analytics) should already be in existence. A digital footprint of how the student has been engaging in their studies (stage 1) will have provided various data points that are visualised in **StREAM** (stage 2) and used to provide an engagement rating or score that fundamentally operates as a determinant of 'risk' - is this student at risk of disengaging with their studies / underachieving? Making this determination is conditional upon the application of metrics or analytics that help to quantify or articulate that level of risk (stage 3). Within **StREAM**, this involves comparisons with historical data on how previous students with the same study profile (programme, study mode, level of study, start date) have engaged. It is only at this point that the data becomes meaningful and can indicate how any outreach activity (stage 4) should be focused.

### Interventions at NTU

Before taking a step back to review the effectiveness of the NTU approach to student support interventions, it is helpful to provide a short summary of what their interventions approach consists of.

To determine 'engagement' NTU use one core algorithm within **StREAM** but weight their digital resources differently, depending on whether the student is studying full-time, part-time or on a degree apprenticeship.

Automated alerts (or notifications) are sent out to students after 10 days of no activity (first years) or 14 days of no activity (other years). Students are offered a coaching call to support their re-engagement. If a second alert is generated, the calling team will once again seek to contact the student, but once the third alert is raised, it was agreed that this required intervention from more senior colleagues on the course. During the academic year 2020/21, 4000 support calls were generated.

### Interventions process at NTU

Interventions at NTU take a variety of formats in addition to the foundational principle of data transparency that NTU were keen to hard-code in during the initial **StREAM** development phase:

1. The use of automated 'no engagement' alert emails from within **StREAM** which are actioned by a dedicated 'calling team' initiated in summer 2020 after the first Covid-19 national lockdown in the UK
2. Organised campaigns from within relevant student services teams
3. Provision of management information to senior management (use of engagement metrics)
4. Logging of interventions - creating a record of the conversation and any subsequent agreed action, within **StREAM**.

**You can find out more about the NTU student calling campaign in this [blog post](#) from Ed.**



*'Despite everything happening in the world, I wasn't forgotten about or abandoned by uni.'*  
(from 1st calling campaign in lockdown 1)

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*The call... 'motivated me to start getting back into my studies'.*

Student feedback on the NTU calling campaign

## Creating an effective ecosystem of support

Once a student has been identified as being 'at risk', automated alerts from within **StREAM** function as a trigger to indicate that the student would benefit from some form of action. Alert emails can be received by students themselves as a soft nudge to indicate that their engagement behaviours are below those of their cohort and to offer an opportunity to meet and discuss what factors might be impacting their under-engagement. NTU chose not to use that approach, instead the alert was sent straight to the calling team, with a link to the student dashboard within **StREAM**, and an expectation that the staff member proactively seek to engage with the student on a 1:1 basis.

The ultimate, long-term aim, in every intervention conversation that follows, is to maximise the chance of each student effectively re-engaging with their studies, recognising that for some students, this could take a while. And there are some hazards to be negotiated along the way.

### Effectively negotiating the hazards

One of the key questions anyone evaluating the use of data analytics to support student engagement and success should ask is 'what works?' Which interventions are proving most effective at supporting students to (re-)engage with their studies? Answering this question can enable an institution to proactively allocate resource and budget in both preventative and responsive ways to maximise the impact for students and, ultimately, for universities in terms of key sector metrics used, for example, in determining TEF outcomes. Not surprisingly, the answer to the 'what works' question is not clear cut. There is no silver bullet, formulaic approach to an effective intervention that is universally replicable, scalable or transferable. Rather, effective interventions are influenced by different factors and consequently raise valuable questions for consideration by **StREAM** users.

### To support or not to support?

Through the OfLA project, Ed identified that staff have a complicated relationship with interventions. For example, new students arriving at university from a school/college background are typically used to a high-level of proactive support from their education provider. Against this is a view that an important part of the university experience is learning to live and function as an adult learner and to take responsibility for seeking support when required.

Students also have a complicated relationship with interventions. Having explored the influences of heuristics interfering with an individual's motivation or capacity to change, Ed is aware that the natural response of students is that they don't want to be told that their engagement activity isn't 'good enough', that they believe that they can manage their own engagement and that they will be able to catch-up.

## Research Findings

Yet their data tells them otherwise. Early indications of risk have been identified in the NTU student engagement data as early as week 2 of a student's first term at university. The question to which NTU continue to return is 'what should they, as an institution, do in response to that insight?'

The outcome of Ed's OfLA research shows the importance of a whole-institution approach to deployment of analytics. The use of data to provide staff and students with information on how students are participating in their studies is simply the starting point for activity that will effect change and impact the student experience and their ultimate outcomes. When it comes to what happens next, Table 1 lists the top considerations in respect of the three potential points where the chain of events from identification of risk through to a successful intervention could be impacted: alert triggers, communications about interventions and the interventions themselves.

Triggers/Alerts	Communications	Interventions
<ul style="list-style-type: none"> <li>Alerts operate as an unambiguous action trigger</li> <li>There is value in using (combinations of) different types of alert e.g.:               <ul style="list-style-type: none"> <li>- self-reflection/self-referral</li> <li>- binary alerts (non-submission / academic failure)</li> <li>- thresholds (engagement ratings, attendance %)</li> </ul> </li> <li>Early, actionable triggers are preferable to waiting for additional information</li> <li>There is a need to balance autonomy to act with ease of use - each decision point adds time and complexity, but increases ownership and enhances users understanding of the data</li> <li>Consider your institutional capacity to act - don't make work and stress by alerting more students than your teams have the capacity to support</li> </ul>	<ul style="list-style-type: none"> <li>Most NTU students appreciated the outreach calls from the dedicated calling team</li> <li>Remember that communication is part of the intervention process, not typically an end in itself.</li> <li>Communication provides a valuable record that can benefit all those involved in supporting each student</li> <li>Use appropriate communication channels as identified by your students</li> </ul>	<ul style="list-style-type: none"> <li>Interventions are a necessity if objectives and requirements around the student experience and outcomes measures are to be addressed</li> <li>Not all students possess the ability/confidence to effect independent change</li> <li>Using a system like StREAM can effectively depersonalise the conversation and help staff to build rapport with the student</li> <li>Data can identify the type of change required and appropriately focus any support conversation</li> <li>Staff need support to develop their coaching skills</li> <li>Don't overload the student in terms of 'next steps' Agree small, achievable steps to support (re-) engagement and build from this.</li> <li>Use StREAM to develop personal approaches to support and help students build a network of support</li> <li>Start simple and build from there</li> </ul>

Table 1: Factors impacting the effectiveness of interventions

## Conclusions

Given that heuristics show how the natural human response to difficult situations is to ignore or downplay the evidence, or to misinterpret or selectively understand what the data is telling them, it is helpful for users of **StREAM** to understand that to effect any lasting changes in behaviour, students need to: 1) Know how to be different 2) Believe they can be different 3) Possess the skills to change 4) Have the capacity to change (the ability to overcome identified barriers to engagement).

Working in partnership with each student to meet these requirements is a complex, inter-related and multi-faceted task. Universities need to find a balance between the need to support student autonomy and responsibility for learning, with the need to intervene and help students to navigate university life in all its complexity - particularly in the early days of student life.

Those responsible for creating and embedding appropriate processes and structures around interventions will benefit from a backwards design approach that starts by considering the nature of any planned intervention - especially those planned for institution-wide delivery, such as the NTU calling campaign. Having identified the end goal, it becomes important then to work back through any barriers that might inhibit student engagement or limit their ability to access the requisite support. For example, in order to reach a point where a student at risk can actually engage with, receive and benefit from relevant support, the ecosystem of support in operation at the university needs to be able to support both first stage interventions and any subsequent support. For example, it needs the capacity to manage referrals and self-directed requests, have appropriate spaces for meetings with students, provide relevant learning resources in appropriate formats that are accessible and available at a time and place to suit. Success in this regard is therefore much broader than the provision of data and the understanding of how a student is engaging with their studies:

- Do **StREAM** users understand the data that is available to them, the student support available and how to access that support?
- What is the university approach to balancing proactive outreach with encouraging students to become independent learners?
- What staff development activity exists to help personal tutors, coaches, mentors, advisers and other colleagues involved in using StREAM to become better at coaching their students based on engagement data?
- What are the expectations on staff when it comes to using analytics to inform outreach activity? Are the roles and responsibilities clearly defined? When and how frequently should staff be using **StREAM**?
- Are the associated processes in place and working effectively to enable the entire ecosystem to function effectively?
- Is the digital and physical estate set up to support outreach activity in all its forms - individual meetings, group tutorials, confidential appointments etc.?

It is equally as important for institutions to remove these factors that impact the ability of staff to use and engage effectively with student data as it is for them to remove individual barriers to student engagement. Find out more about the OFLA project on Ed's blog - [Living Learning Analytics](#).



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