

Big data and learner analytics

HESPA conference 2017

Paul Clark

10 February 2017




“For the higher education sector to fully embrace Big Data technologies, it needs to adopt a culture of data-driven decision-making.”

[B. K. Daniel: “Big Data and Learning Analytics in Higher Education”]



Big Data definition

- Large volume
 - High velocity
 - Diverse variety
 - Exhaustive in scope
 - Fine-grained resolution
 - Relational: capable of being joined through common fields
 - Flexible
- 

Data strategy: disruptive models for HE

1. Radical personalisation
2. Massive data integration capabilities
3. Enhanced decision-making
4. Data-driven discovery

Data in HE: drivers of change

- Increased pressure to base evidence on data, rather than experience
- Increased accountability demanded by stakeholders
- Collection of different forms of data for internal and external reporting
- Increasing use of IT by students and staff
- Emergence of unstructured forms of data
- Shift from aggregated to individualised data

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Spectrum of data



Curated

Administrative

Learner analytics is not new...

- Curriculum design
- Student feedback
- Assessment
- learner plans
- Teaching interventions

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... but technology supports learner analytics in new ways

- Faster
- Personalised
- More accurate/grounded in actual behaviour

Levels of learner analytics applications

1. Micro Individual: helping institutions improve the quality of learning and teaching while streamlining processes and reducing workload
2. Meso Overall programme/cohort performance (e.g., graduate retention rates)
3. Macro Institution and sector-level performance monitoring and benchmarking

Benefits of learner analytics

Students

Increased chances of success; better graduate outcomes

Providers

More efficient and effective use of resources; better-designed interventions; higher success rates; enhanced reputation

Policy-makers

Improved decision-making; better insights; more efficient use of resources

Preconditions of successful learner analytics

- Appropriate ethical and legal framework
- Aggregation of raw data
- Interoperability
- Agreed specifications and standards
- Underpinning technology

An effective learner analytics framework therefore needs to address:

- Policy
- Technology
- Security
- Legal framework



HESA's role in learner analytics

- Data Futures will transform the environment to deliver many of the preconditions for a successful learner analytics framework
- HESA's role is to collect the right information and make it available for the advancement of UK HE, through our systems and expertise
- This includes:
 - A new technology platform to support refreshed governance, data collection, analysis, and reporting
 - Collective governance, through the Higher Education Data Landscape Steering Group
 - Support for data capability-building in HE providers

Future developments

- Technology will have an increasing influence on pedagogy
- Privacy will become a growing concern
- Question marks remain over the scalability of learner analytics and individual approaches across the sector

10/02/2017

The Future of Learner Analytics

Dr Phil Richards, Chief Innovation Officer, Jisc
HESPA Annual Conference 2017

- » About Jisc
 - » Jisc's national learning analytics
 - » Looking ahead
 - » Summary
-



About Jisc

Vision

To make the **UK** the most **digitally advanced education and research nation in the world**

Aim

We aspire to be the **world class powerhouse** of digital support and transformation to the UK teaching and research communities

1

Shared **digital infrastructure** and **services**

Current examples:

Janet network, shared data centre, eduroam wireless, geospatial services

Future examples:

Learning analytics, research data management

2

Sector wide deals with IT vendors and commercial publishers

Current examples:

Microsoft 365 email, Amazon web services, e-journals, FE e-books

Future examples:

Prevent web filtering, new models for digital publishing

3

Expert and trusted **advice** and practical **assistance**

Current examples:

Financial x-ray, cloud advice, cyber security/business continuity

Future examples:

FE mergers, open access good practice, national monograph strategy

Jisc's national learning analytics

Learning Analytics

A guide for students' unions

The following highlights some anticipated emerging issues with the use of learner analytics and student data in UK higher education and how students' unions might deal with them on their campuses.

Learning Analytics – the basics

Learner analytics is about using the increasing potential of data insight to improve students' learning. As IT infrastructures and processing power develops, it is now possible to record and store data relating to many aspects of the student learning experience: classroom and library/lab attendance; use of books, VLEs and other resources; assessment marks and feedback; and student profile and demographic data. Data models can identify trends and patterns to assist educators in designing personalised support and assistance for students, and to arrange interventions if there is evidence of a student struggling.

This has massive power and potential to tackle some of the problems and challenges that currently exist in UK higher education, such as avoiding unnecessary drop-outs, student demotivation, reducing the number of exam resits, enabling more reflective learning and engagement, and reducing inequalities such as the BME attainment gap.

Analytics also have the power to help us understand more about what cultivates effective student engagement and learning in higher education. Early indicators from those institutions pioneering analytics work has suggested that institutions could make huge strides in using engagement measures to increase student success and support, and that even very basic analytical models are being used to prevent unnecessary drop-outs.

Issues to consider

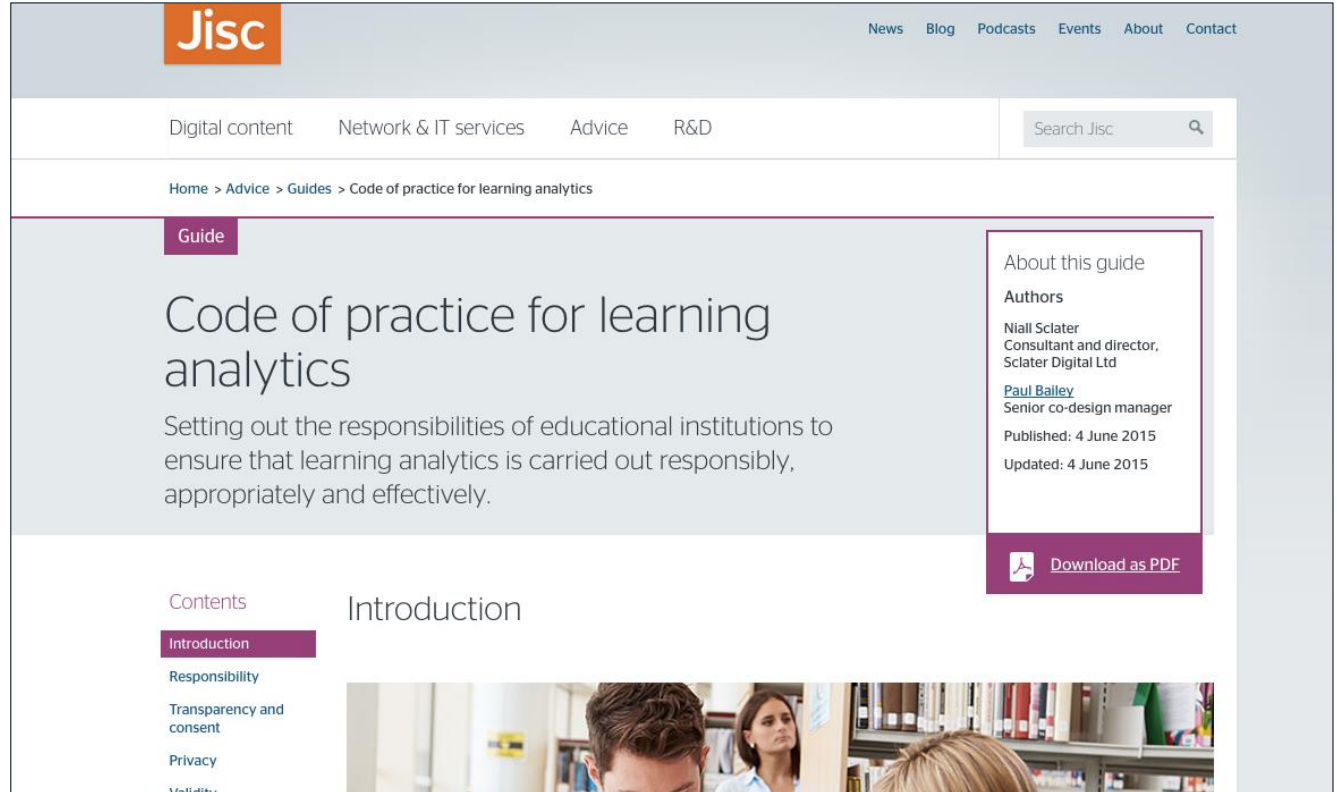
Despite all the exciting potential of learner analytics there are a number of issues that could prove problematic if the appropriate checks and balances are not in place to defend students' rights and interests.

Partnership

The prime purpose and use of analytics should be to support the student-teacher partnership that is at the heart of education. This sits nicely with Jisc's starting principle that analytics is a "transparent moral practice". In a partnership, the use of a students' data to support them and their peers must be seen as transparent, as a way of bringing out the best in students and educators, and must always be used whilst recognising the primacy of student individuality and independence.

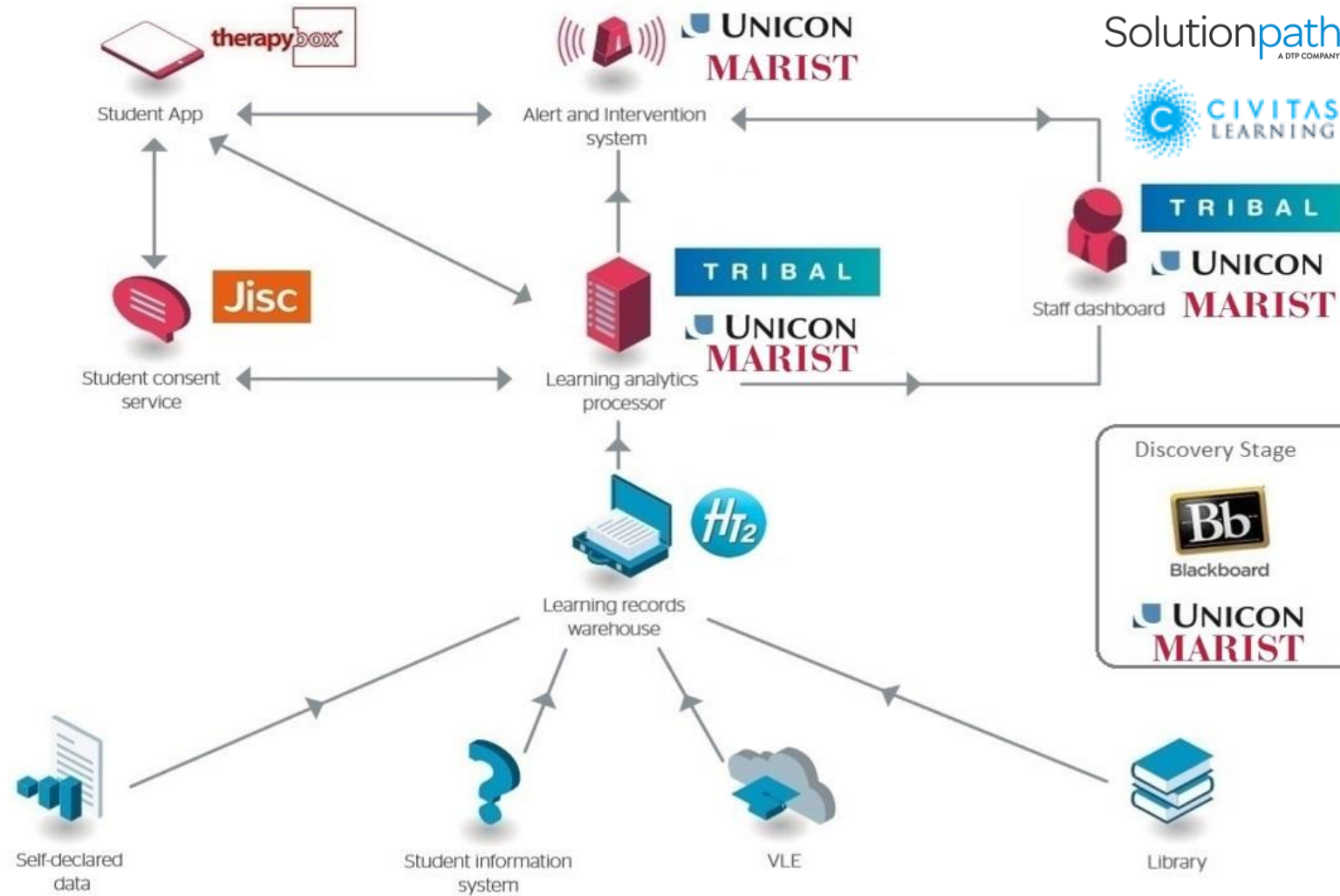
The role of students' unions

The issues involved in the ethics and fair use of learner analytics are broad and unprecedented, and there will be many points of contention within institutions that are unforeseeable. Analytics development is built around 'secondary use' innovations of data (i.e. uses that we cannot anticipate yet). It is therefore vital that students' unions form a core part of institutions' considerations on the use of analytics and are given recourse or space to dispute uses that students object to. NUS will be on hand to support officers and staff in students' unions to engage with their institutions on learning analytics issues and to defend students' rights.

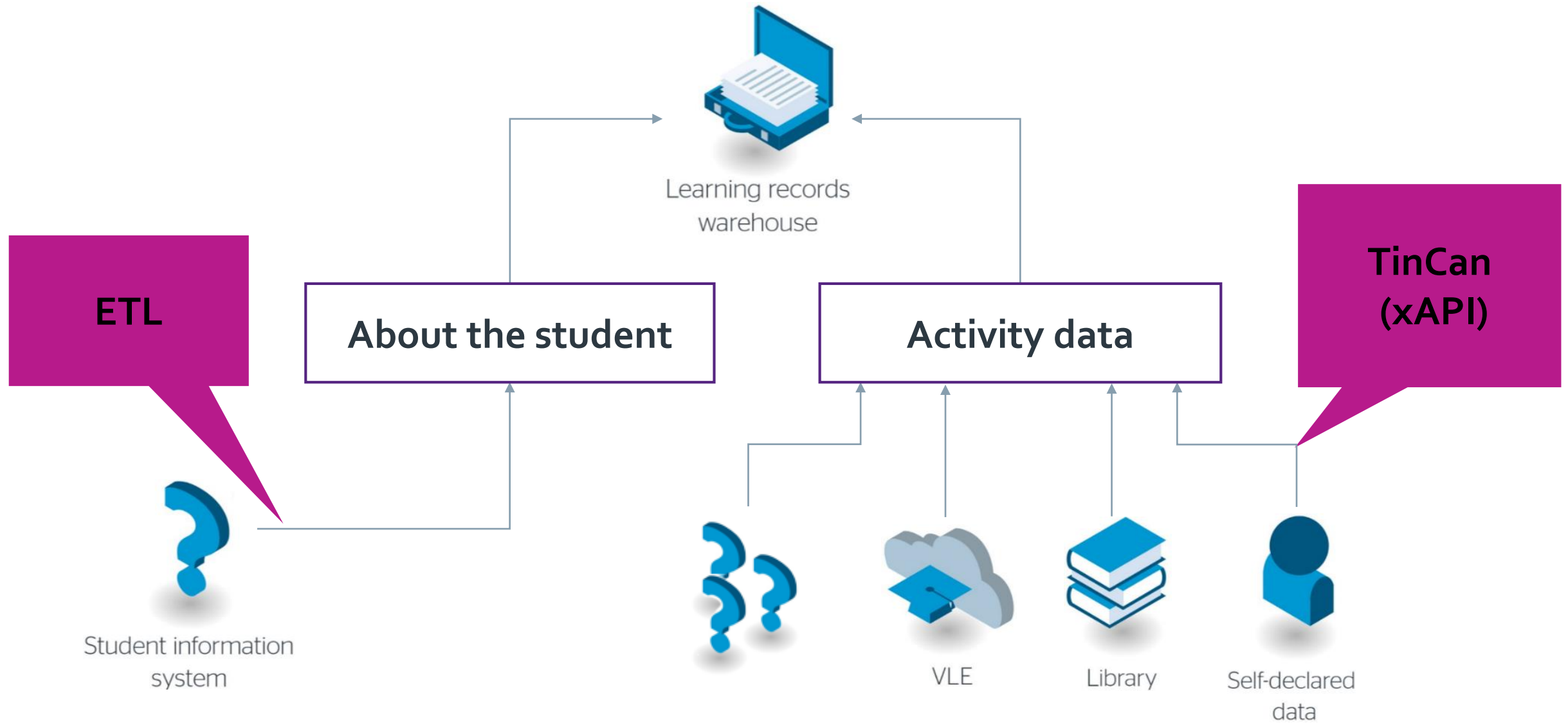


The screenshot shows the Jisc website interface. At the top is the Jisc logo and navigation links: News, Blog, Podcasts, Events, About, Contact. Below this is a secondary navigation bar with links: Digital content, Network & IT services, Advice, R&D, and a search bar labeled 'Search Jisc'. The main content area shows the breadcrumb trail: Home > Advice > Guides > Code of practice for learning analytics. A purple 'Guide' tag is next to the title 'Code of practice for learning analytics'. Below the title is a subtitle: 'Setting out the responsibilities of educational institutions to ensure that learning analytics is carried out responsibly, appropriately and effectively.' To the right, under 'About this guide', it lists the authors: Niall Sclater (Consultant and director, Sclater Digital Ltd) and Paul Bailey (Senior co-design manager), with publication and update dates. A 'Download as PDF' button is also present. On the left, a 'Contents' menu lists: Introduction, Responsibility, Transparency and consent, Privacy, and Validity. The bottom of the page features a photograph of three people in a library setting.

<https://www.jisc.ac.uk/guides/code-of-practice-for-learning-analytics>



<https://www.jisc.ac.uk/rd/projects/effective-learning-analytics>

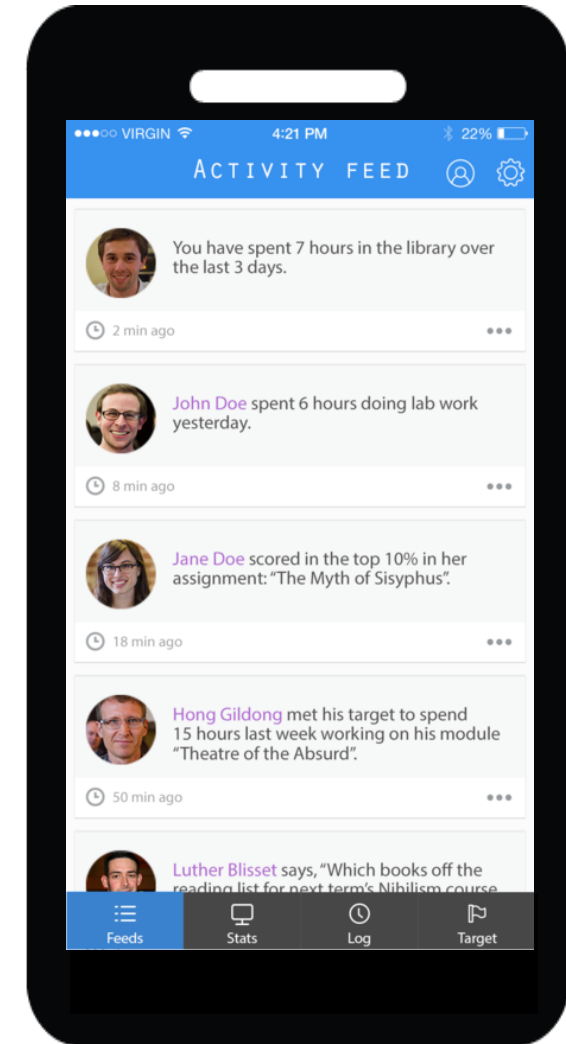


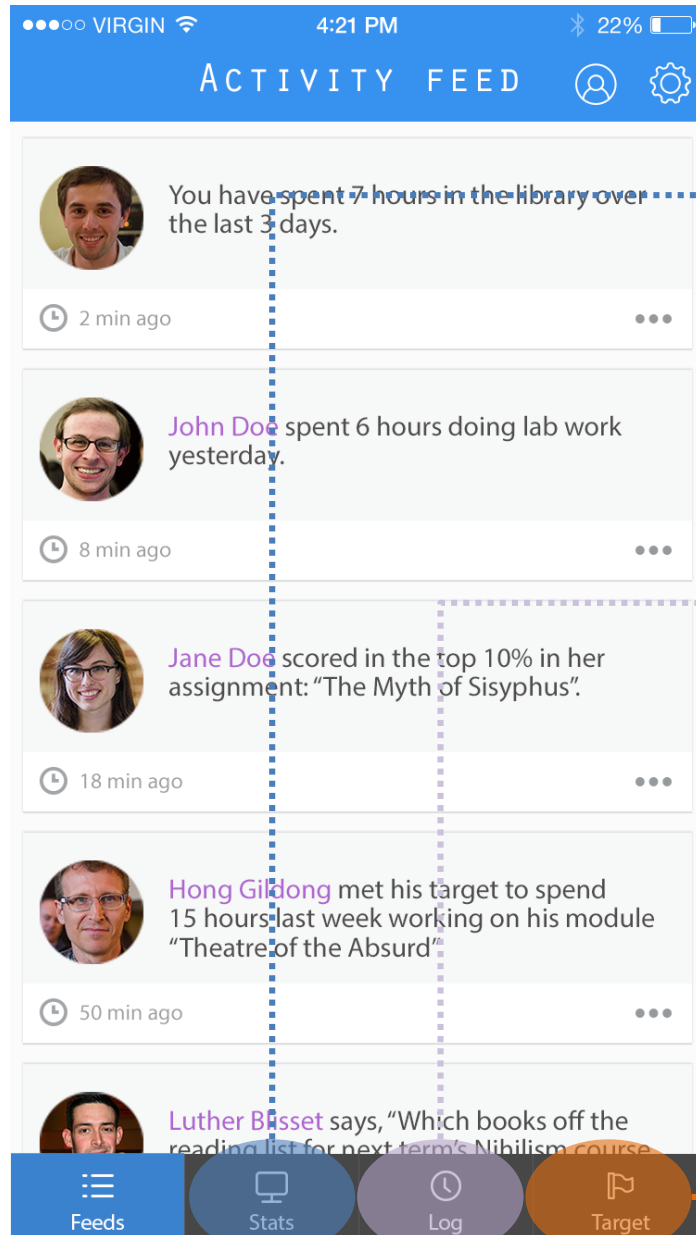
'Study Goal' Student App

First version includes:

- » Overall engagement
- » Comparisons
- » Self declared data
- » Consent management

Bespoke development by **Therapy Box**

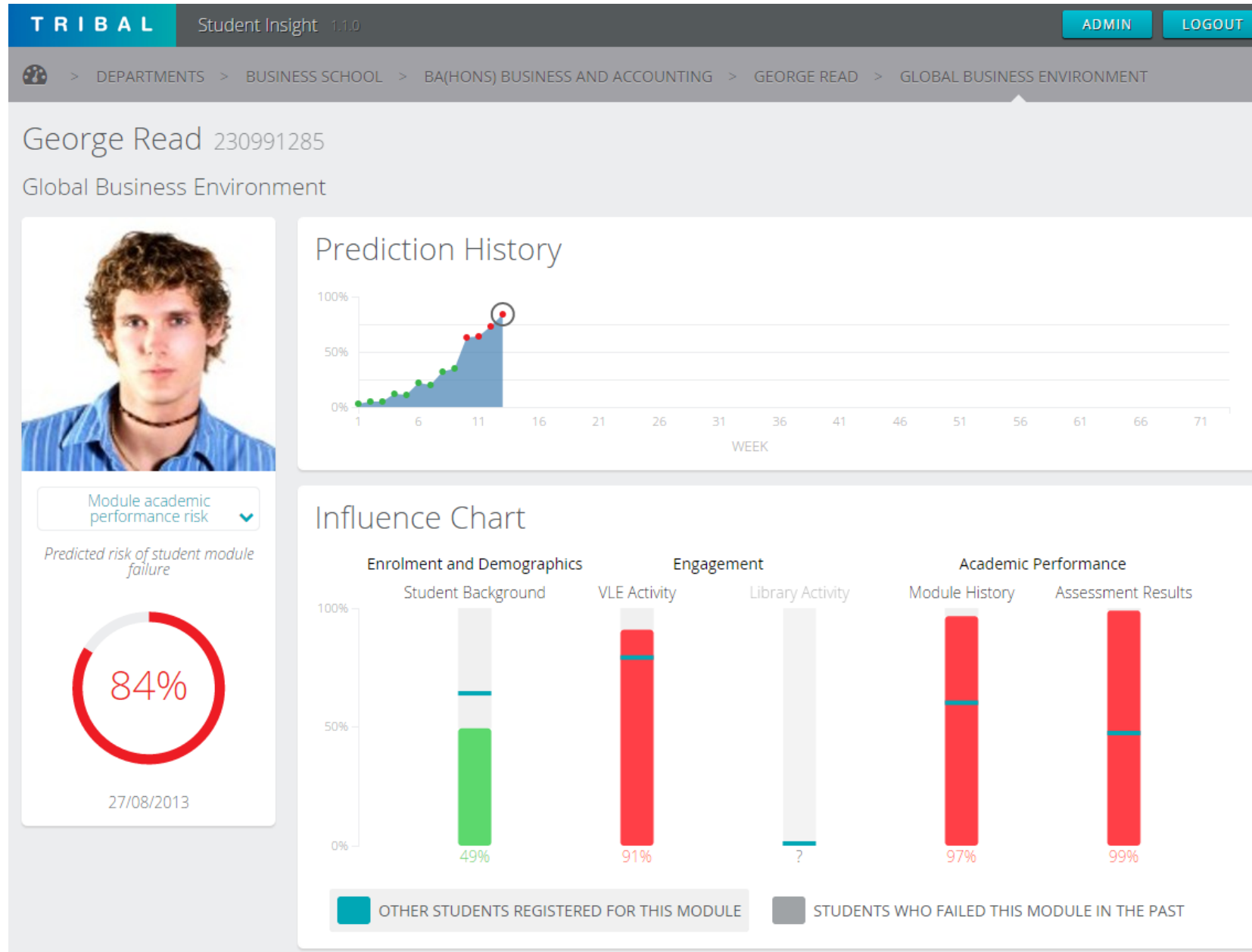




Stats – Provides an **engagement and attainment overview** and drilling down to gives **comparative activity** graphs.

Log – Allows you to log time spent on specified activities e.g. reading for an assignment

Target – Allows you set personal targets to improve your engagement e.g. study for 10 hours this week



Alert and Intervention System

Tools to allow management of interactions with students once risk has been identified:

- » Case management
- » Intervention management
- » Data fed back into model
- » etc...



Based on open source tools from **Unicon/Marist** (Student Success Plan)

Looking ahead

Twin projects risk a rebirth of dual system

Warnings of two quality frameworks as TEF and Hefce reforms take shape. Jack Grove reports

Universities will be asked to submit their comments on the TEF, with a government Green Paper due to be published in the autumn.

Quality assurance and TEF should be under ‘one system’, says Hefce head

New arrangements for quality assurance and the teaching excellence framework should form a “single overall system” to avoid “unnecessary duplication”, says Hefce head. Universities will be asked to submit their comments on the TEF, with a government Green Paper due to be published in the autumn.

Poor students’ ‘cognitive gain’ may play role in TEF

Debate may also consider efficacy of running new framework in tandem with REF. John Morgan writes



Metrics and inspections are just two options. Many advocates believe it should be informed by emerging methods of teaching gain

Tight TEF timetable prompts concerns over link to fees above £9K

The timetable to introduce the teaching excellence framework is so tight that the government risks having to rely on existing measures to judge university teaching so that some institutions can charge fees above £9,000. The view emerged after chairman George Osborne announced in the 8 July Budget that the fee cap would be linked to inflation from 2017-18 for institutions that can “show they offer high-quality teaching”. Senior sector figures see the fee plan as part of a radical government move to “differentiate the market”, alongside plans to further open up the sector to “new providers” announced in the government’s Productivity Plan published on 30 July. Nick Hinkley, director of the Higher Education Policy Institute, who was special adviser to former universities and science minister David Willetts, said the Budget measures did “begin to put differential fees on the agenda in a way they haven’t yet been to date”, although he doubted that there was political will among Conservatives to let caps above inflation. But questions have been raised over the timetable for using the recently announced TEF to measure teaching quality. Emma Miles, director of the Social Market Foundation, who was the lead civil servant on the former Review of higher education funding, said decisions on fee caps for 2017-18 “would need to be made by spring or early summer 2016”. “Either the TEF needs to be mainly an aggregation of existing measures, or it is to involve new data collection, the decisions on fee colleges need to be based on existing measures. Either way, the question is which existing measures will do the job?” Mr Miles said it was easy to imagine an institution “that fails to see the right to charge at the new higher fee ceiling, challenging that decision in court”, meaning the testing process “has to be robust”. David Phoenix, vice-chancellor of London South Bank University, said that if fees were to rise from 2017 “the only thing I could see that you could link it to would be existing data measures”. If that happened, “I would worry that you’re not... giving under much the quality of the academic environment and the student experience.” Professor Phoenix said existing metrics on employability or completion rates “link back to a range of variables: gender, ethnicity, socio-economic background” in terms of an institution’s intake and there was, as yet, insufficient understanding of the “value added” by institutions. He warned that “modelling” into grading institutions for 2017 might “create a crude tool to influence the market” thereby undermining the UK higher education sector’s reputation. A Department for Business, Innovation and Skills spokesman said it would “consult on the TEF mechanisms” for allowing universities with high-quality teaching to increase fees from 2017-18. The Organisation for Economic Co-operation and Development’s Assessment of Higher Education Learning Outcomes project, aimed at testing graduates’ knowledge and skills, will not form part of the TEF, as a BIS spokesman said this week that the government would not take part in the project. This is because “our current national programme of work on measuring learning gains... provides a more efficient and broader approach for the country”, he added. policycentre.org/tef/tef.html



Future approaches to quality assessment in England, Wales, and Northern Ireland

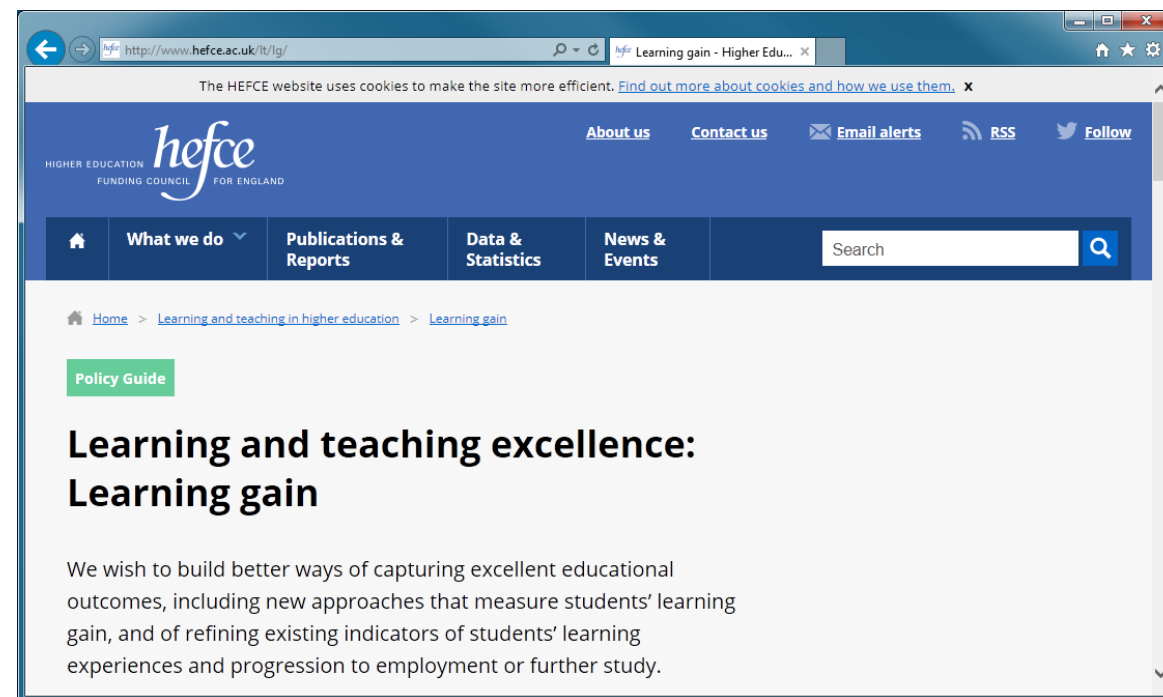
Consultation
June 2016
HNC2 2016/17

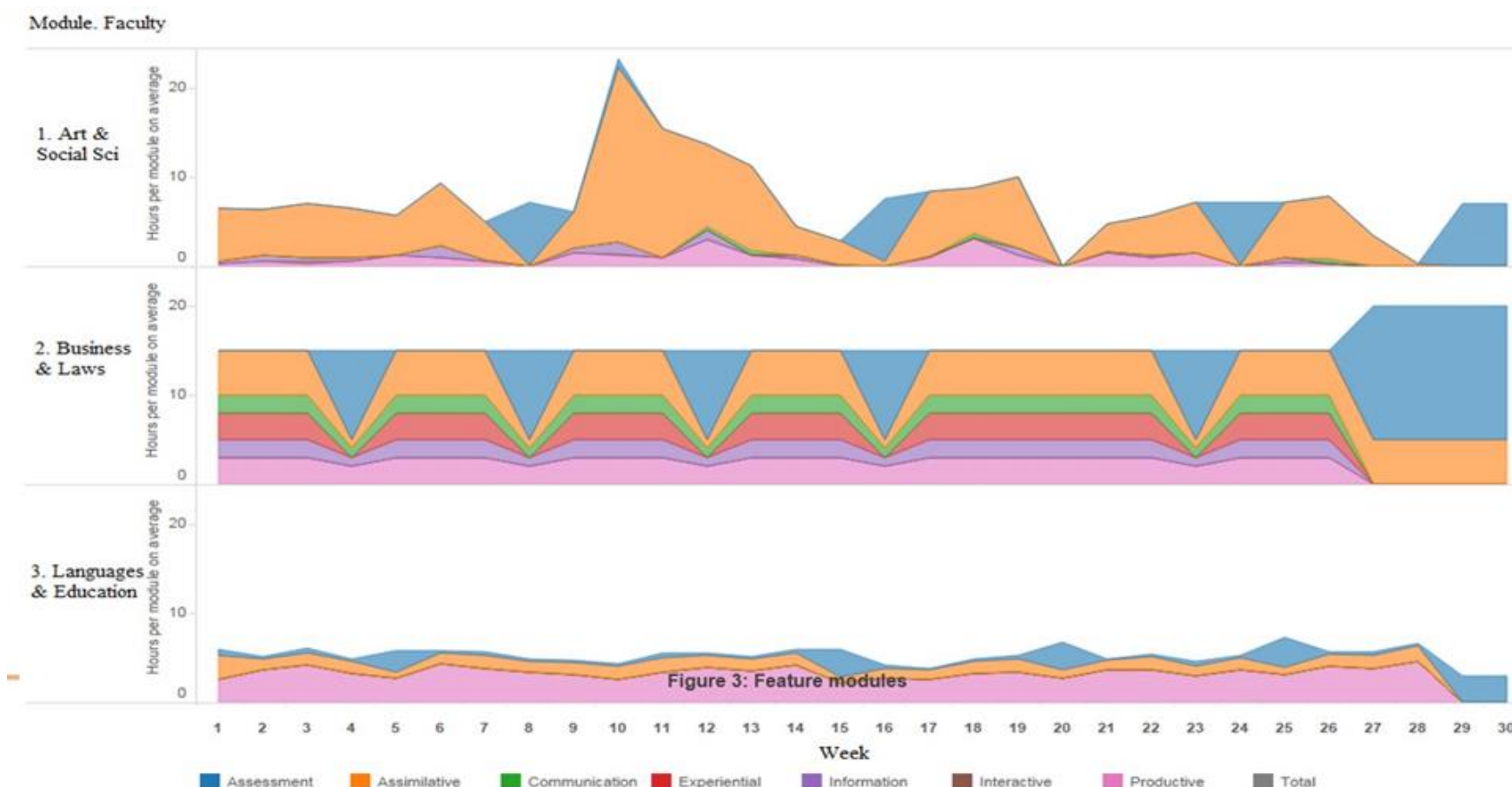
Quality Assessment Review

HEFCE learning gain call May 2015

May 2015 call:

- » Standardised tests
- » Grades
- » Self-reporting surveys
- » Mixed methods
- » Other qualitative methods





Nguyen, Q., Rienties, B., Toetenel, L. (Submitted: 17-10-2016). Unravelling the dynamics of instructional practice: A longitudinal study on learning design and VLE activities. Paper submitted to LAK2017.

Reference data

- Demographics
- Entry qualifications
- Learning and employment outcomes

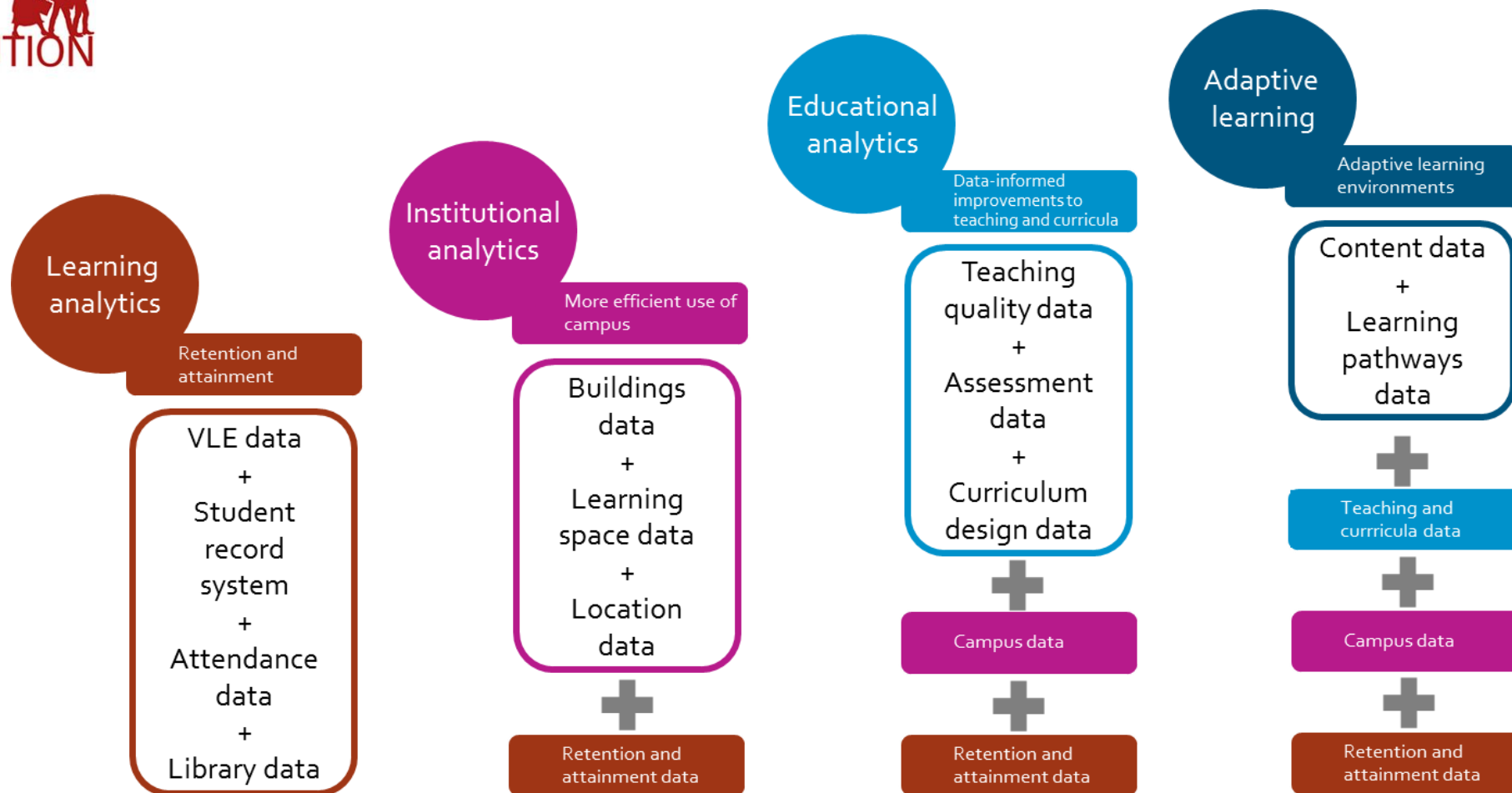
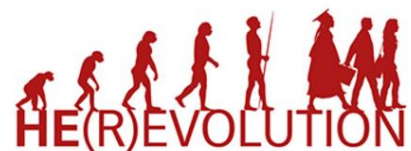


UK learning data warehouse



Outcomes

- Deep understanding of e-learning
- Metrics for engagement, **learning gain**
- Personalised next generation e-learning



Summary

- » Jisc national learning analytics
 - » Learning Records Warehouse
 - » Benchmarking and new metrics
 - » Personalised e-learning, learner pathway guidance and curriculum design
 - » Analytics evolution
-

Dr Phil Richards
Chief Innovation Officer

phil.richards@jisc.ac.uk

One Castlepark Tower Hill Bristol BS2 0JA
T 020 3697 5800

info@jisc.ac.uk jisc.ac.uk



Sheila MacNeill

**Discovering and connecting the institutional
dots around learning analytics**

HESPA 2017

**10 February 2017, University of Strathclyde,
#hespa17**





Social Innovation for the Common Good @ GCU

Social Innovation

Home › The University › Social Innovation

Social Innovation for the Common Good @ GCU

Social innovation involves new strategies, ideas and organisations that meet social needs of all kinds. It flourishes when people from different backgrounds and experiences come together to produce new ideas and initiatives.

"Universities are the engines of our economies, they ignite our imagination and curiosity, produce untold ideas and some universities, like GCU, also seek to put their best ideas into practice for social benefit."

Professor Pamela Gillies CBE, Principal & Vice Chancellor of GCU

The University's commitment to social innovation is reflected in and inspired by its motto, *For the Common Good*, and is shared by its students and staff at all levels and not least by the University's Chancellor and Nobel Laureate, Professor Muhammad Yunus.

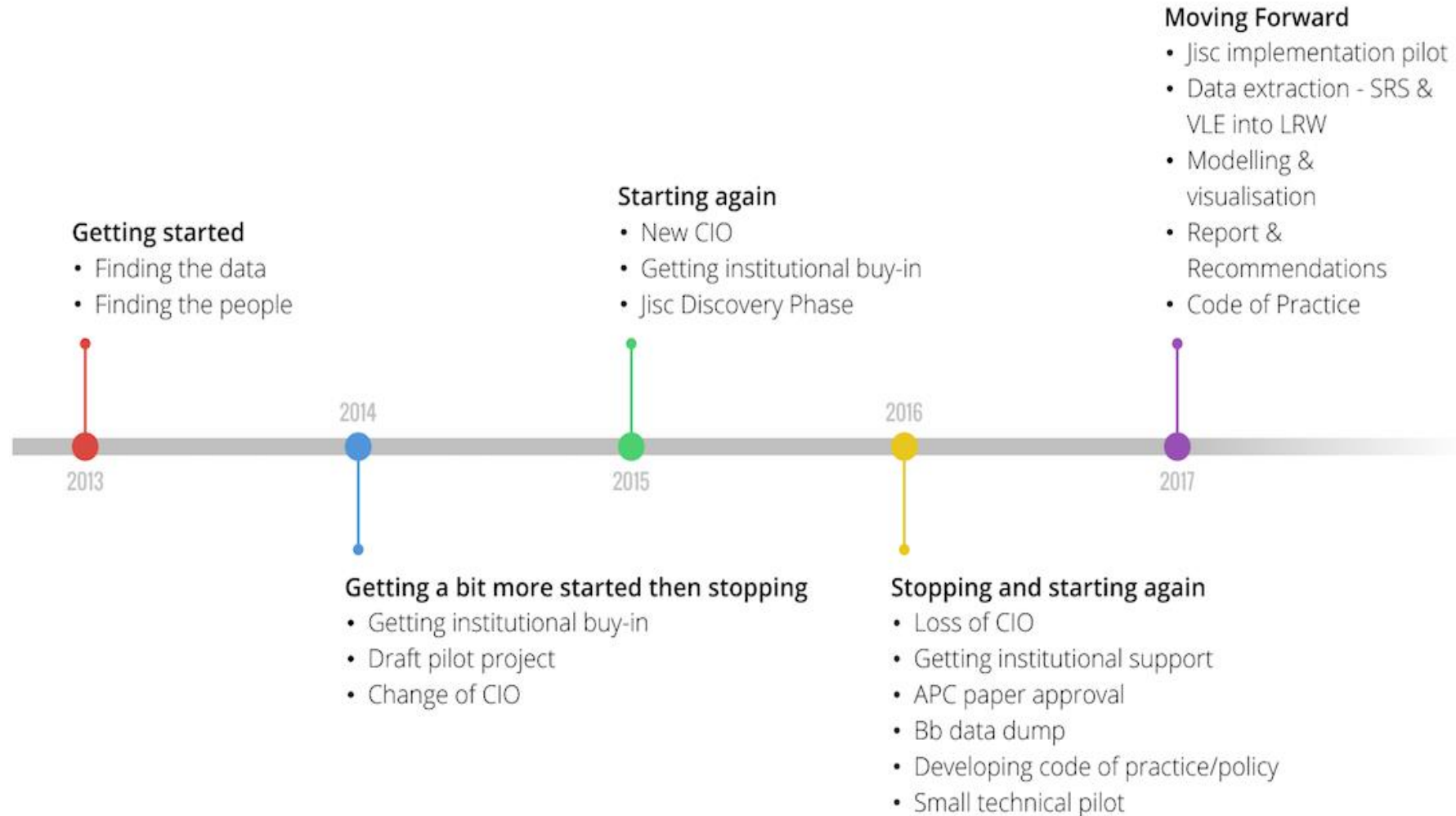
GCU is the first university in Scotland to be designated a [Changemaker Campus](#) by Ashoka U, reflecting its global reputation in promoting social innovation through teaching and research.

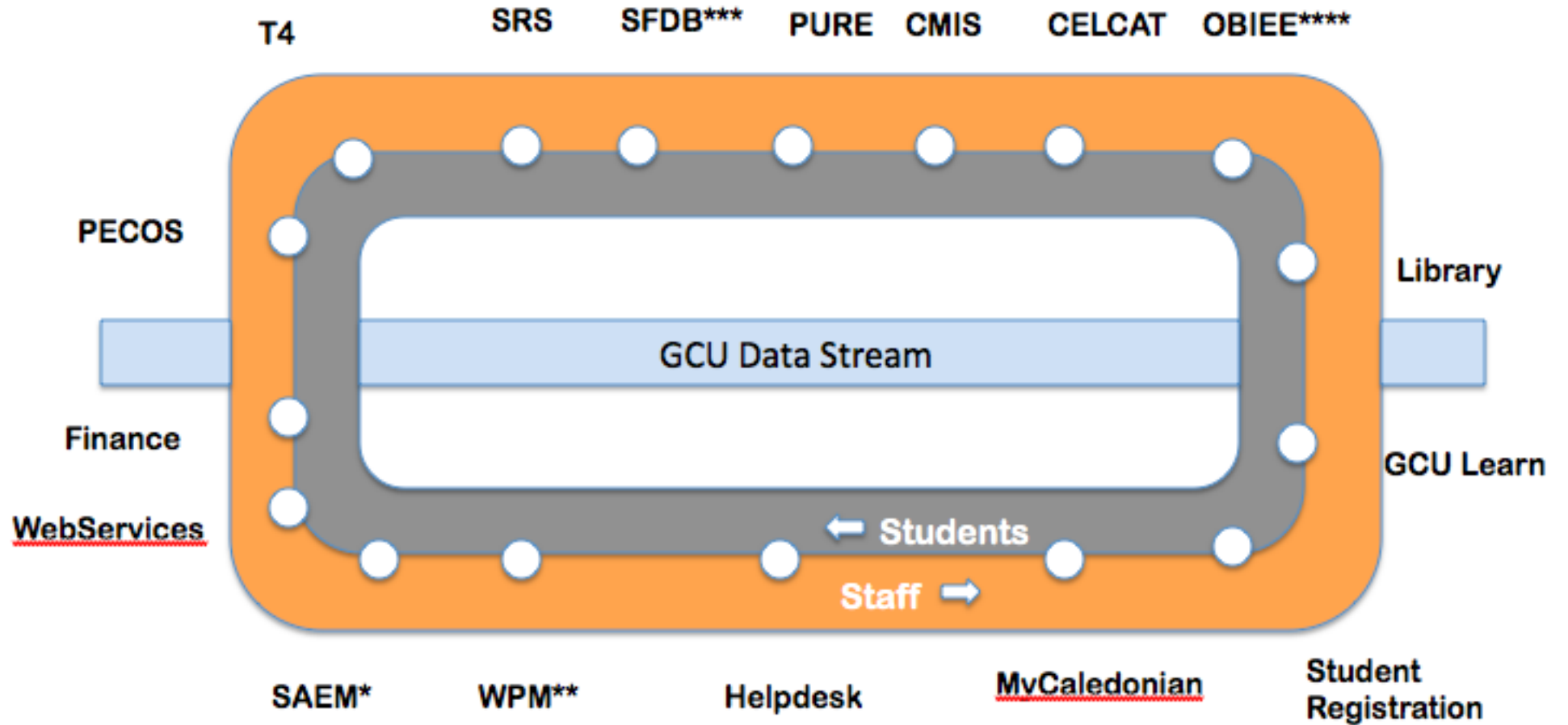
Find out more about [GCU's Changemaker Status](#).





My learning analytics timeline





[Digital resources](#)
[Network & technology](#)
[Advice](#)
[R&D](#)

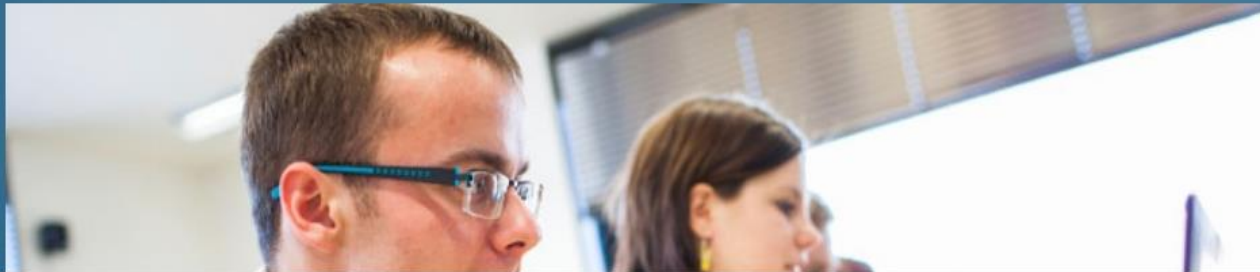


[Home](#) > [R&D](#) > [Projects](#) > [Effective learning analytics](#)

R & D project

Effective learning analytics

Helping further and higher education organisations to analyse and understand their data



3 years

Ends 31 Jul 2017



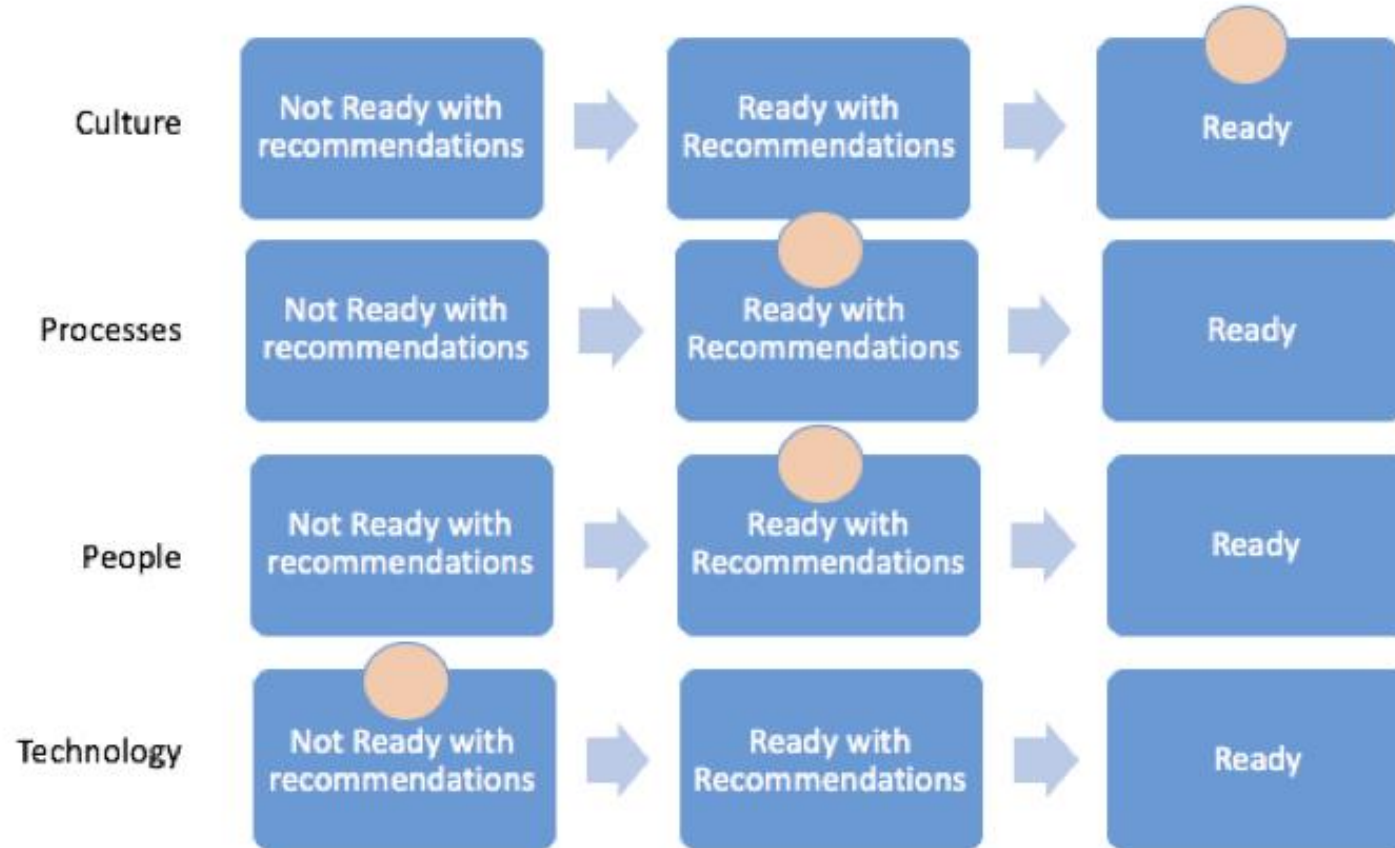
Budget:

Over £1m

Expected outcome:

Ready, steady . . .

Figure 1: Readiness for Learning Analytics: Breakdown by Category



Key Recommendation

“Implement a pilot project using the VLE as the key data source to enable Glasgow Caledonian University to enhance it’s institutional understanding, capacity, and capabilities of enhanced reporting and intervention strategies.”

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theguardian

website of the year

politics | sport | football | opinion | culture | business | lifestyle | fashion | environment | tech | travel |  browse all sections

columnists

In a post-truth world, statistics could provide an essential public service

John Pullinger

Statisticians can now amass more data more quickly than ever. This could help us to make decisions based on real numbers, not prejudice

The Guardian, 31 January 2017

<https://www.theguardian.com/commentisfree/2017/jan/31/post-truth-statistics-data-facts>

How alternative facts rewrite history

A chart's ability to mislead is off the scale

“The Chart Doctor



The Wall Street Crash of 1929: its effects can be eradicated with data visualisation trickery



YESTERDAY by: **Alan Smith**

There is no more contentious area of chart design than the choice of scale — the mechanism by which numbers of any size are converted into readable proportions on the page or screen.



Measuring and monitoring

REF
TEF
NSS



What are we measuring?

Data issues challenges

- Access to data
- Ethics: students and staff
- Data processing and protection – secondary use of data
- Developing data literacy and data informed culture(s)
- Expectation management
- Actionable insights – not just retention management
- Resource and cost implications

sheila.macneill@gcu.ac.uk

@sheilmcn

<https://about.me/sheilmcn>