Learning analytics
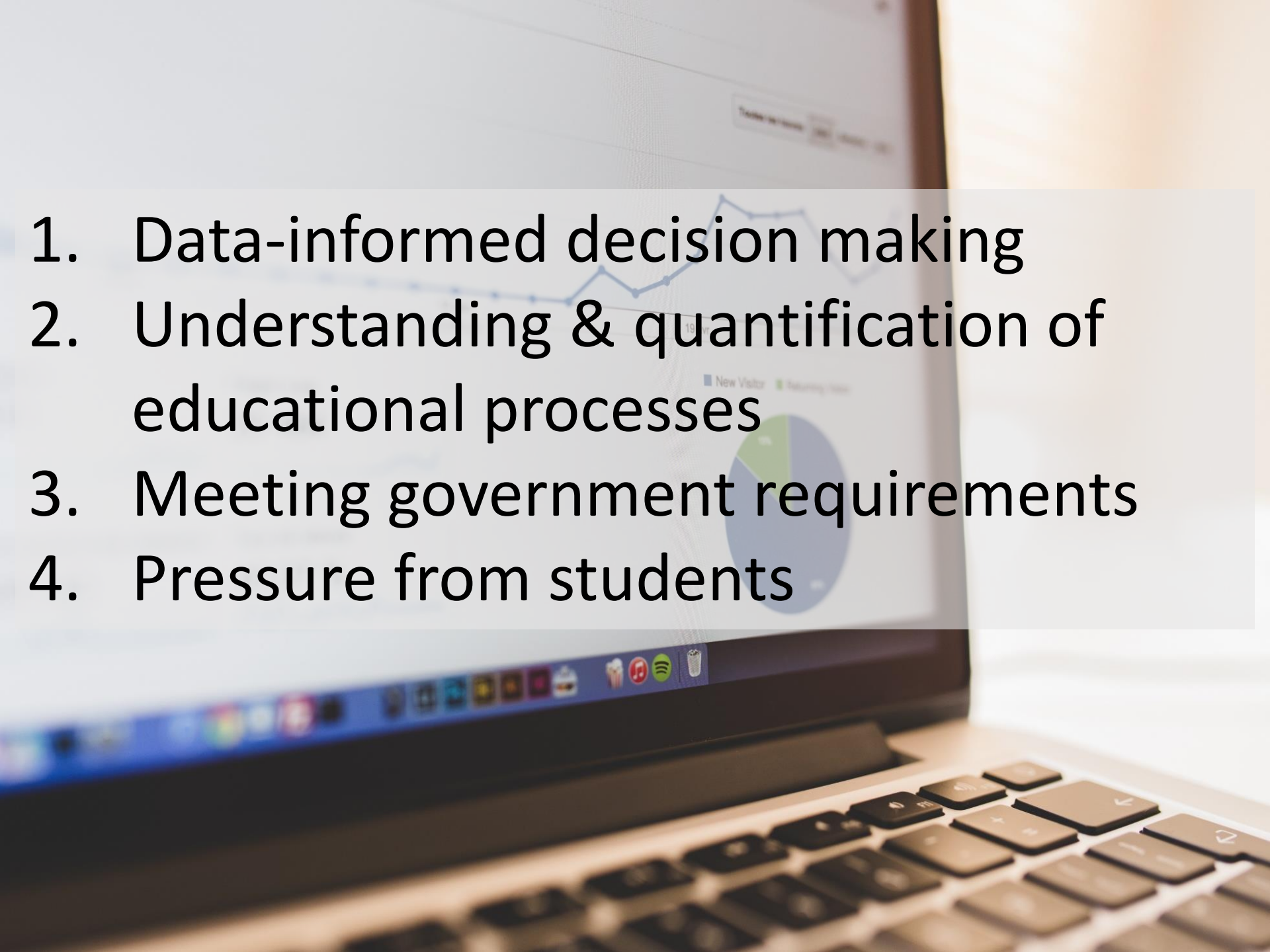## Considerations for university management

Niall Sclater
@sclater

ICDE Leadership Summit
Nancy, France, 22-23 May 2017

Drivers

1. Data-informed decision making
2. Understanding & quantification of educational processes
3. Meeting government requirements
4. Pressure from students

Learning analytics
The current state of play in UK higher and further education

Niall Sclater

John Henry Brookes Building, Oxford Brookes University

Variety of motivations

» Enhancing the student learning experience

» Improving retention

» Providing students with better information on their progress

» Improving National Student Survey scores

» Enhancing teaching

» Building better relationships between students and staff

» Providing additional support to under-achieving groups
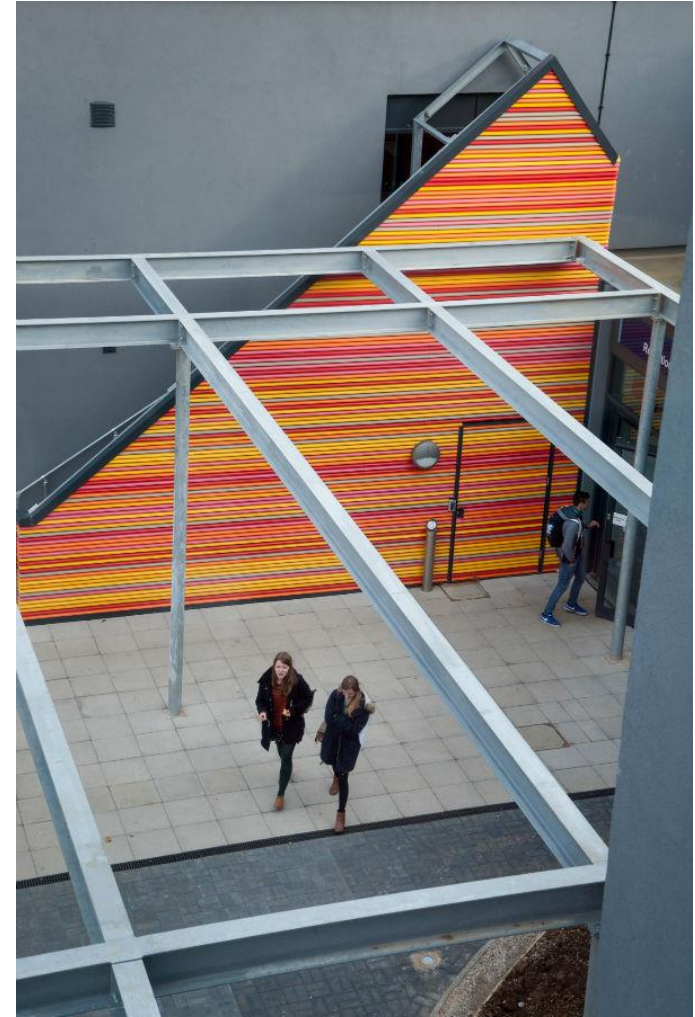
Nottingham Trent University

Project goals:

» to enhance retention

» to increase a sense of belonging within the course community particularly with tutors

» to improve attainment
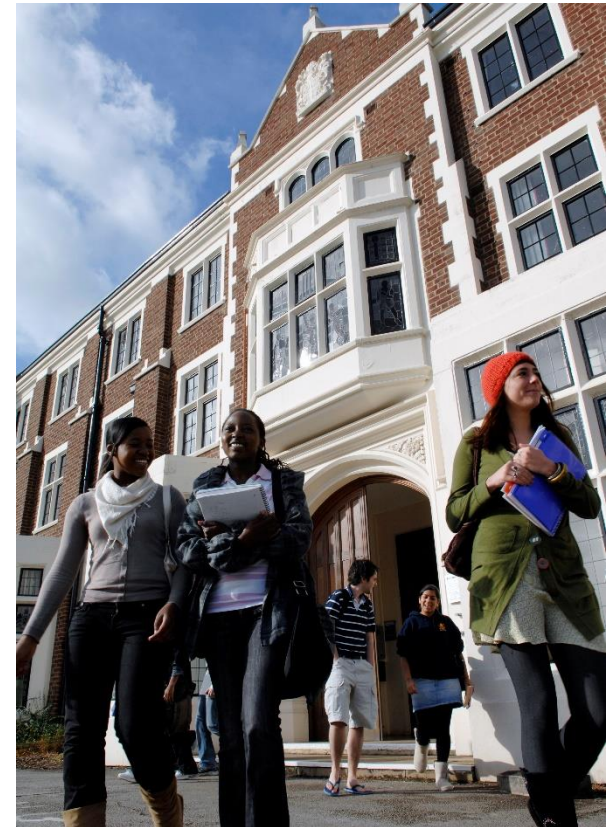
University of Technology, Sydney

Project goals:

» provide information to reduce student attrition

» help understand the factors affecting low pass rates in 'killer subjects', i.e. those with high failure rates

» provide a dashboard to students showing their study and engagement patterns

» better understand how different types of interventions affect student success

» help to develop more personalised adaptive learning

Evidence

University of South Australia

» 730 students identified as at-risk

» 549 contacted:

› 66% passed with av GPA of 4.29

» Those not contacted:

› 52% passed with av GPA of 3.14

Signals at Purdue

» Problems identified in 2nd week of semester

» Interventions include:

  › Posting signal on student's home page

  › Emailing or texting them

  › Arranging a meeting

» Courses that deploy signals see consistently better grades

» Students on Signals seek help earlier and more frequently
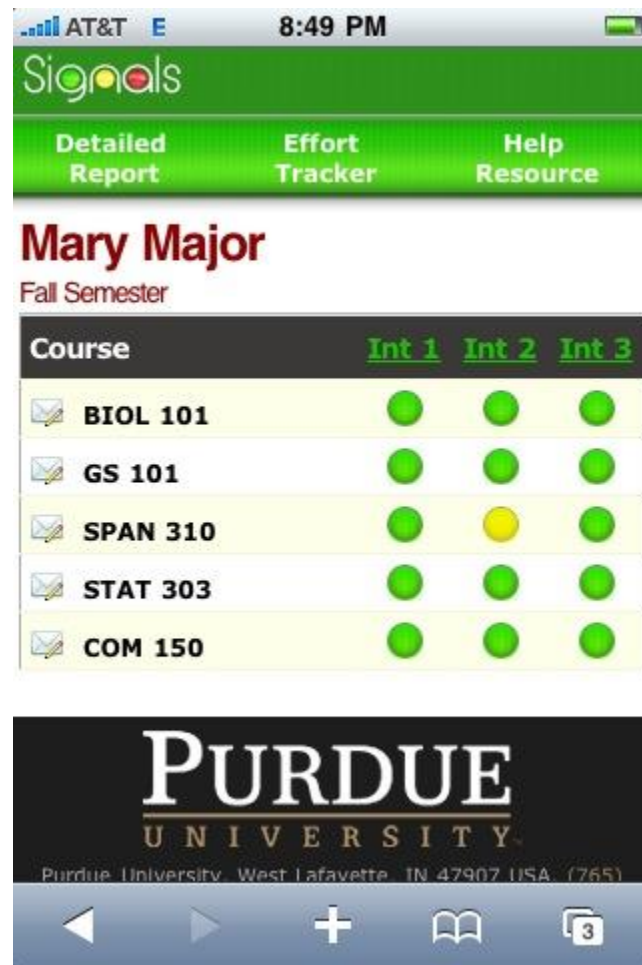
California State University - Chico

» Total hits is strongest predictor of success

» Assessment activity hits is second

» Metrics relating to current effort (esp VLE usage) are much better predictors of success than historical or demographic data.

(Whitmer, 2016)

"a student with average intelligence who works hard is just as likely to get a good grade as a student that has above-average intelligence but does not exert any effort"

(Pistilli & Arnold, 2010)

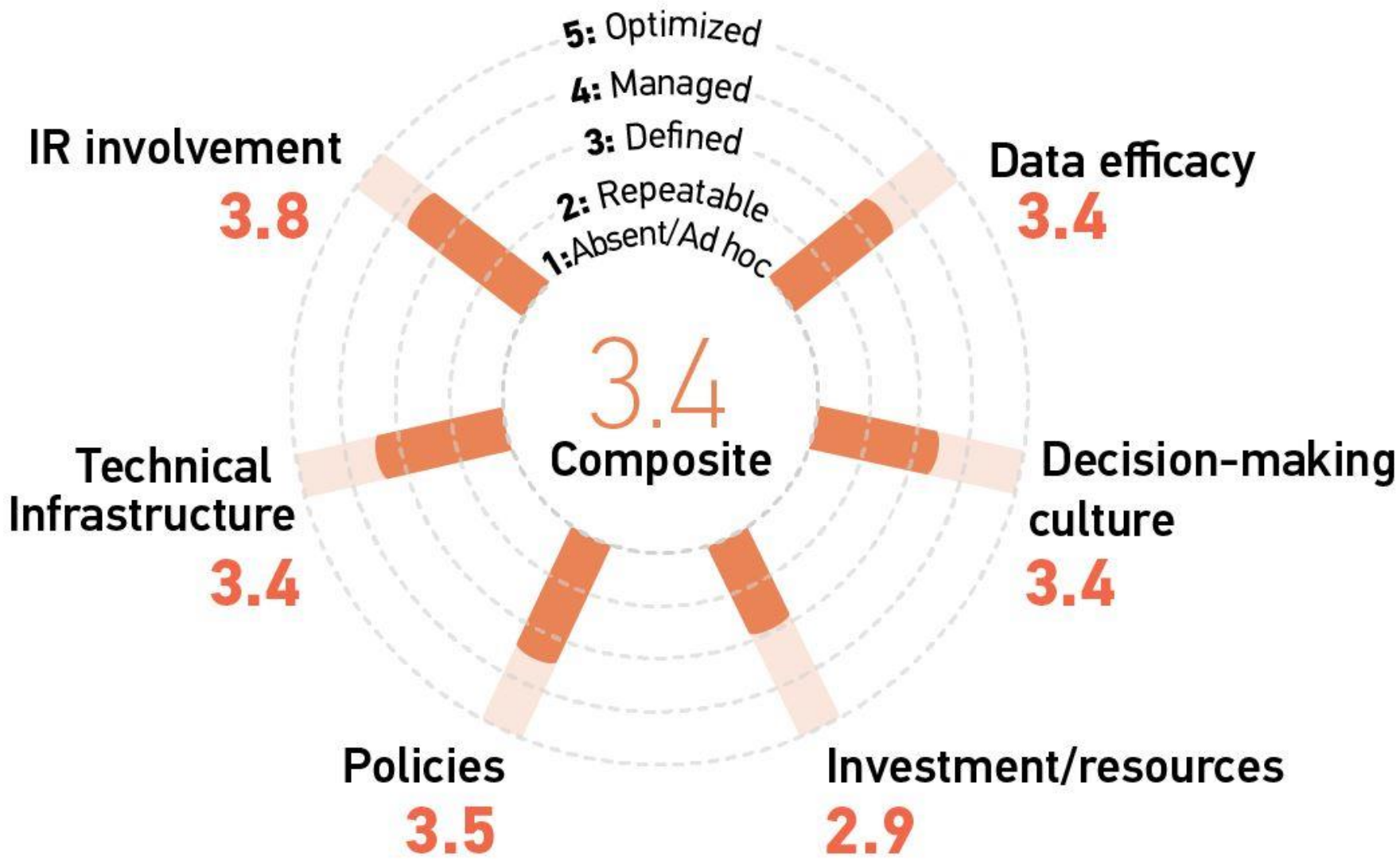# Readiness

Survey of 33 people in 9 North American universities

Rating from **strongly disagree** to **strongly agree** e.g.

"My institution has a culture that accepts the use of data to make decisions"

"My institution has professionals with knowledge and expertise in manipulating data from multiple sources and platforms to conform to institutional specifications"

Arnold, Lonn & Pistilli, 2014

2015

- **5:** Optimized
- **4:** Managed
- **3:** Defined
- **2:** Repeatable
- **1:** Absent/Ad hoc

3.4 Composite

IR involvement **3.8**

Data efficacy **3.4**

Technical Infrastructure **3.4**

Decision-making culture **3.4**

Policies **3.5**

Investment/resources **2.9**

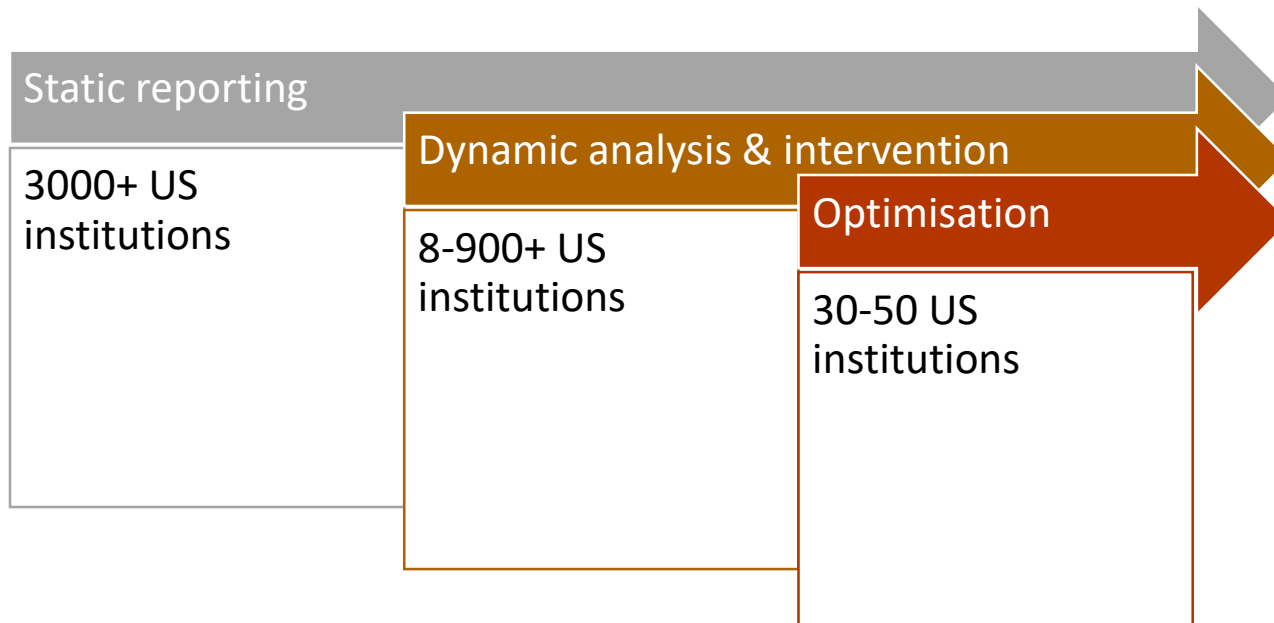EDUCAUSE Benchmarking Service; EDUCAUSE Analytics Maturity Index for Higher Education, 2015

"I was pleasantly surprised that we got such [a] good score in terms of our cultural readiness. The validation of having an external report from a nationally recognised agency such as Jisc is also incredibly useful for those of us on the ground to remind/cajole (hit people [on] the head – oh wait that's only in my dreams) with in terms of what we should be doing next.."

Sheila MacNeill, Glasgow Caledonian University

- a strong vision and belief in the importance of learning analytics from senior managers in order to enhance the student experience
- interest in better reporting and dashboards, rather than simply predictive analytics at this stage
- interest in enhancing both progression and attainment
- the agent of change seen primarily as the personal tutor mediating the data rather than automated, unmediated, student-facing dashboards

Andy Ramsden, Blackboard

"A focus on technological issues merely generates 'urgency' around technical systems and integration concerns, and fails to address the complexities and challenges of institutional culture and change."

Macfadyen & Dawson, 2012

"Absolutely vital to success was having a leader with a deep scholarly understanding of learning analytics principles and practices and the mechanics of creating predictive models."

Arnold, Lynch, Huston, Wong, Jorn & Olsen (2014)

Static reporting

3000+ US institutions

Dynamic analysis & intervention

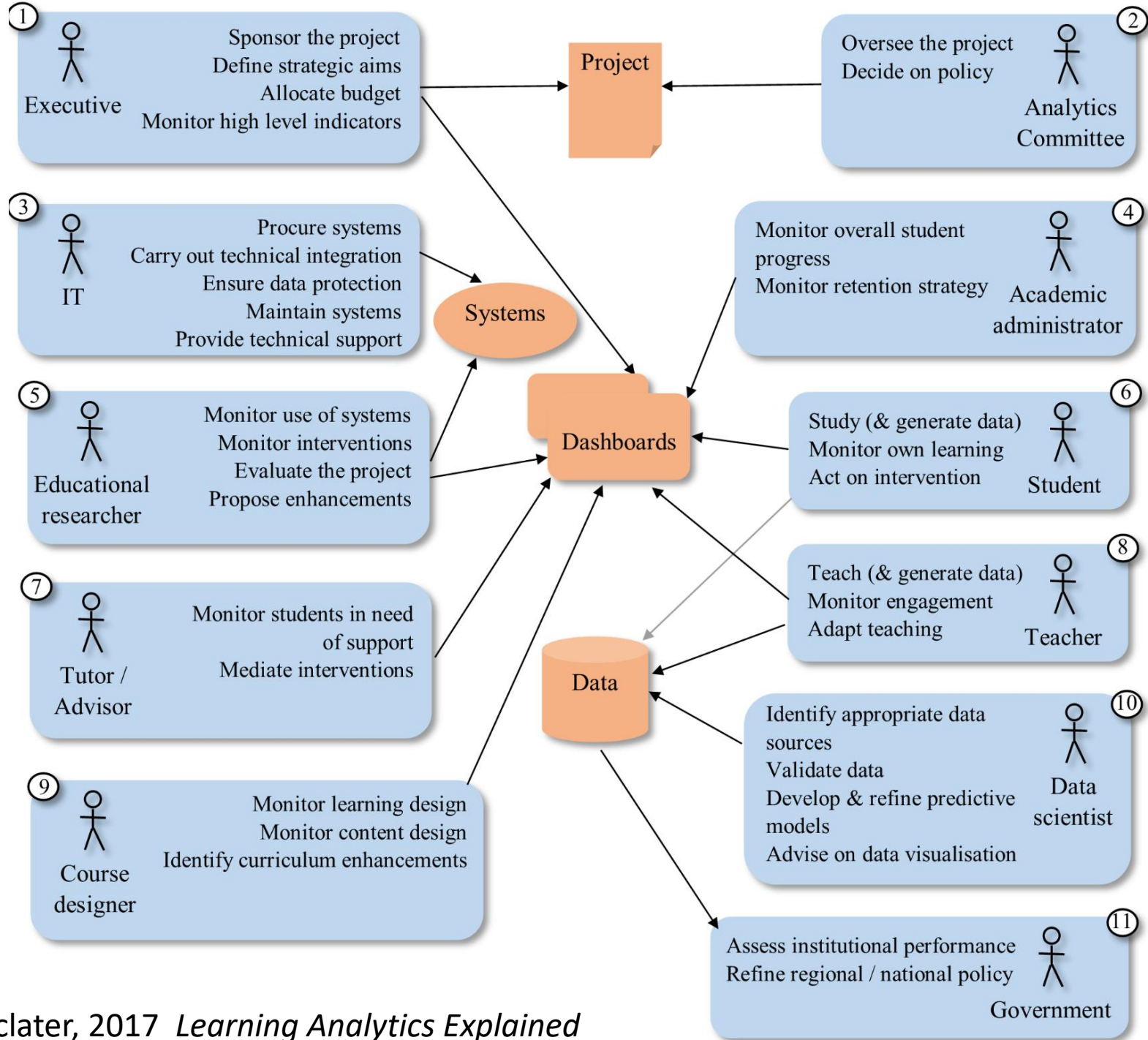8-900+ US institutions

Optimisation

30-50 US institutions

Norris & Baer (2013)

unable to identify a single example of an institution which had implemented an institution-wide learning analytics strategy

Siemens, Dawson & Lynch (2013)

Tips

1. Start on a small scale
2. Support and empower the key stakeholders
3. Transparency and openness are key to success
4. Distribute learning analytics governance power structures (datasets, technical infrastructure & interventions)
5. Minimise possibilities for conflict between different stakeholders by defining principles around the collection and use of the data

Elouazizi (2014)

① Executive
Sponsor the project
Define strategic aims
Allocate budget
Monitor high level indicators

② Analytics Committee
Oversee the project
Decide on policy

Project

③ IT
Procure systems
Carry out technical integration
Ensure data protection
Maintain systems
Provide technical support

④ Academic administrator
Monitor overall student progress
Monitor retention strategy

Systems

⑤ Educational researcher
Monitor use of systems
Monitor interventions
Evaluate the project
Propose enhancements

Dashboards

⑥ Student
Study (& generate data)
Monitor own learning
Act on intervention

⑦ Tutor / Advisor
Monitor students in need of support
Mediate interventions

⑧ Teacher
Teach (& generate data)
Monitor engagement
Adapt teaching

Data

⑨ Course designer
Monitor learning design
Monitor content design
Identify curriculum enhancements

⑩ Data scientist
Identify appropriate data sources
Validate data
Develop & refine predictive models
Advise on data visualisation

⑪ Government
Assess institutional performance
Refine regional / national policy

Sclater, 2017 *Learning Analytics Explained*

Ethics & legal issues

If a student is al[lowed to opt out of data col]lection and analysis could th[is have a negative effect o]n their academic progr[ess]

What should a s[tudent do if their interest]s are in conflict with their study

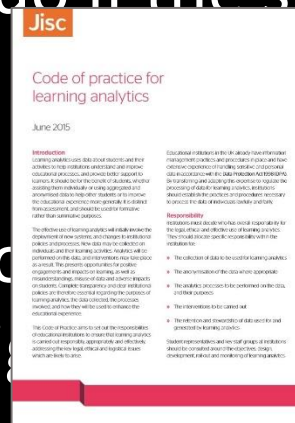How can institutions avoid overly simplistic metrics and decision making which ignore personal circumstances?

86 issues in 9 groups
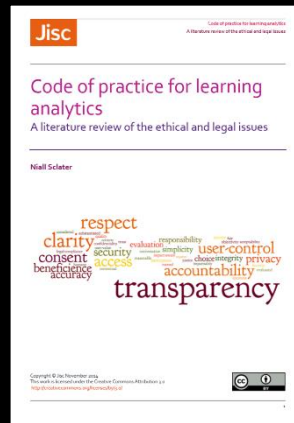
Group	Name	Question	Main type	Importance	Responsibility
2 Consent	Adverse impact of opting out on individual	If a student is allowed to opt out of data collection and analysis could this have a negative impact on their academic progress?	Ethical	1	Analytics Committee
7 Action	Conflict with study goals	What should a student do if the suggestions are in conflict with their study goals?	Ethical	3	Student
8 Adverse impact	Oversimplification	How can institutions avoid overly simplistic metrics and decision making which ignore personal circumstances?	Ethical	1	Educational researcher

What should a student do if the suggestions are in conflict with their study goals?

How can institutions avoid overly simplistic metrics and decision making which ignore personal circumstances?

Group	Name	Importance	Responsibility
2 Consent	Adverse impact ... out on individua...	1	Analytics Committee
7 Action	Conflict with stu...	3	Student
8 Adverse impact	Oversimplificati...	1	Educational researcher

Code of practice for learning analytics

June 2015

Introduction

Learning analytics uses data about students and their activities to help institutions understand and improve educational processes, and provide better support to learners. It should be for the benefit of students, whether assisting them individually or using aggregated and anonymised data to help other students or to improve the educational experience more generally. It is distinct from assessment, and should be used for formative rather than summative purposes.

The effective use of learning analytics will initially involve the deployment of new systems, and changes to institutional policies and processes. New data may be collected on individuals and their learning activities. Analytics will be performed on this data, and interventions may take place as a result. This presents opportunities for positive engagements and impacts on learning, as well as misunderstandings, misuse of data and adverse impacts on students. Complete transparency and clear institutional policies are therefore essential regarding the purposes of learning analytics, the data collected, the processes involved, and how they will be used to enhance the educational experience.

This Code of Practice aims to set out the responsibilities of educational institutions to ensure that learning analytics is carried out responsibly, appropriately and effectively, addressing the key legal, ethical and logistical issues which are likely to arise.

Educational institutions in the UK already have information management practices and procedures in place and have extensive experience of handling sensitive and personal data in accordance with the **Data Protection Act 1998 (DPA)**. By transferring and adapting this expertise to regulate the processing of data for learning analytics, institutions should establish the practices and procedures necessary to process the data of individuals lawfully and fairly.

Responsibility

Institutions must decide who has overall responsibility for the legal, ethical and effective use of learning analytics. They should allocate specific responsibility within the institution for:

» The collection of data to be used for learning analytics

» The anonymisation of the data where appropriate

» The analytics processes to be performed on the data, and their purposes

» The interventions to be carried out

» The retention and stewardship of data used for and generated by learning analytics
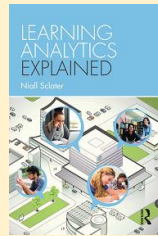
Student representatives and key staff groups at institutions should be consulted around the objectives, design, development, roll-out and monitoring of learning analytics.

jisc.ac.uk/guides/code-of-practice-for-learning-analytics

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analytics.jiscinvolve.org

New book:

Learning Analytics Explained
Niall Sclater (Routledge, March 2017)

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