Learning analytics: let's get real…

Work in progress…

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The Open University

Structure

- How can we think about how generalisable (or not) our scholarship projects are?
- Propose a critical realist approach to evaluation
- Illustrative example – evaluation of learning analytics in OU STEM

Now that's what I call a dashboard…

What is critical realism?

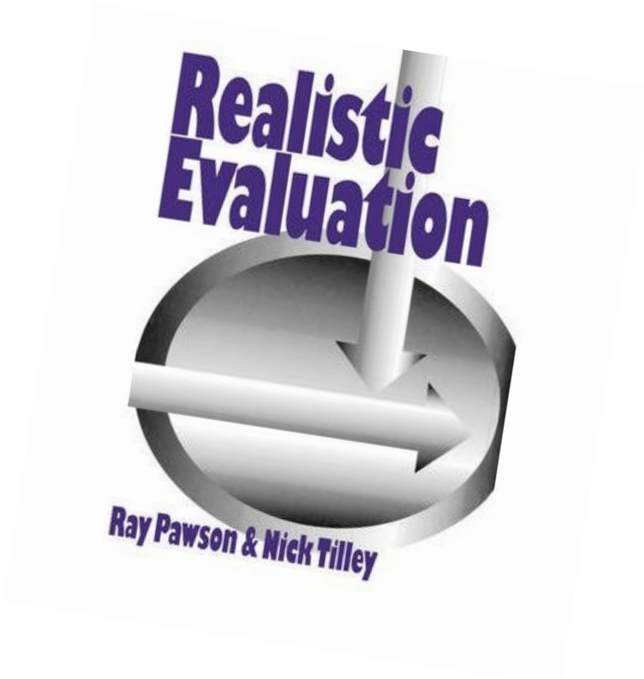
A family of approaches to with three general commitments:

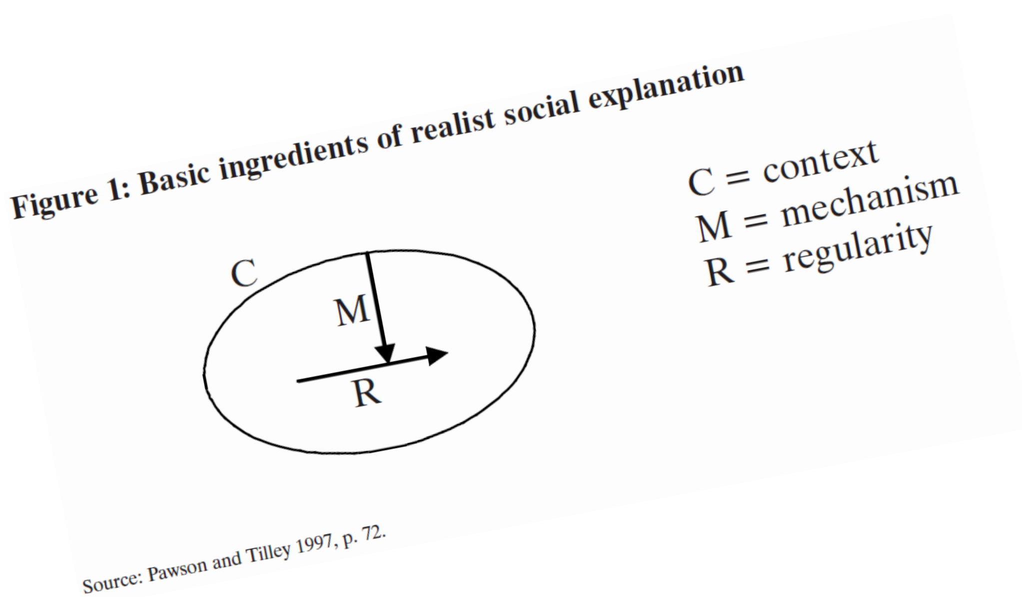
Ontological realism
There is a reality independent of our knowledge about it
(unlike strong post-modernism/ interpretivism)

Epistemological relativism
Our knowledge of that world is always mediated by our theories and is socially/historically/ culturally situated
(unlike positivism, 'scientism')

Judgemental rationalism
We can still make judgements about whether alternative accounts of the world are better or worse (not all accounts are equal)

An aside: there is no single 'critical realist methodology'. It tends to favour multiple methods.





Realist evaluation

A realist approach to applied
social research
(Pawson & Tilley, 1997, 2005)

- Underlying structures and mechanisms not generally observable directly (e.g. we can't see racism, sexism, class directly)
- Mechanisms may be enabled or suppressed by context
- Outcomes are often highly sensitive to context
- Look for regular configurations of context, mechanisms and outcomes (CMOC)
- ***Infer mechanisms*** (abduction – what, if it existed, would explain…)

Generate 'mid-range' theories in a domain/ context rather than universal laws.

Aims at explanations for why things happen.

For an introduction see: https://www.betterevaluation.org/en/approach/realist_evaluation

OU Analyse context

Levels of context

Global:

technological change, technological rhetoric

OU:

2017 – Digital by design

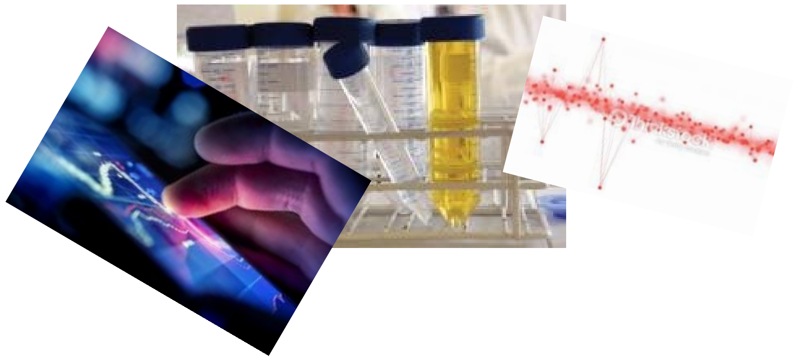
Technological innovation not closely linked to tuition/pedagogy

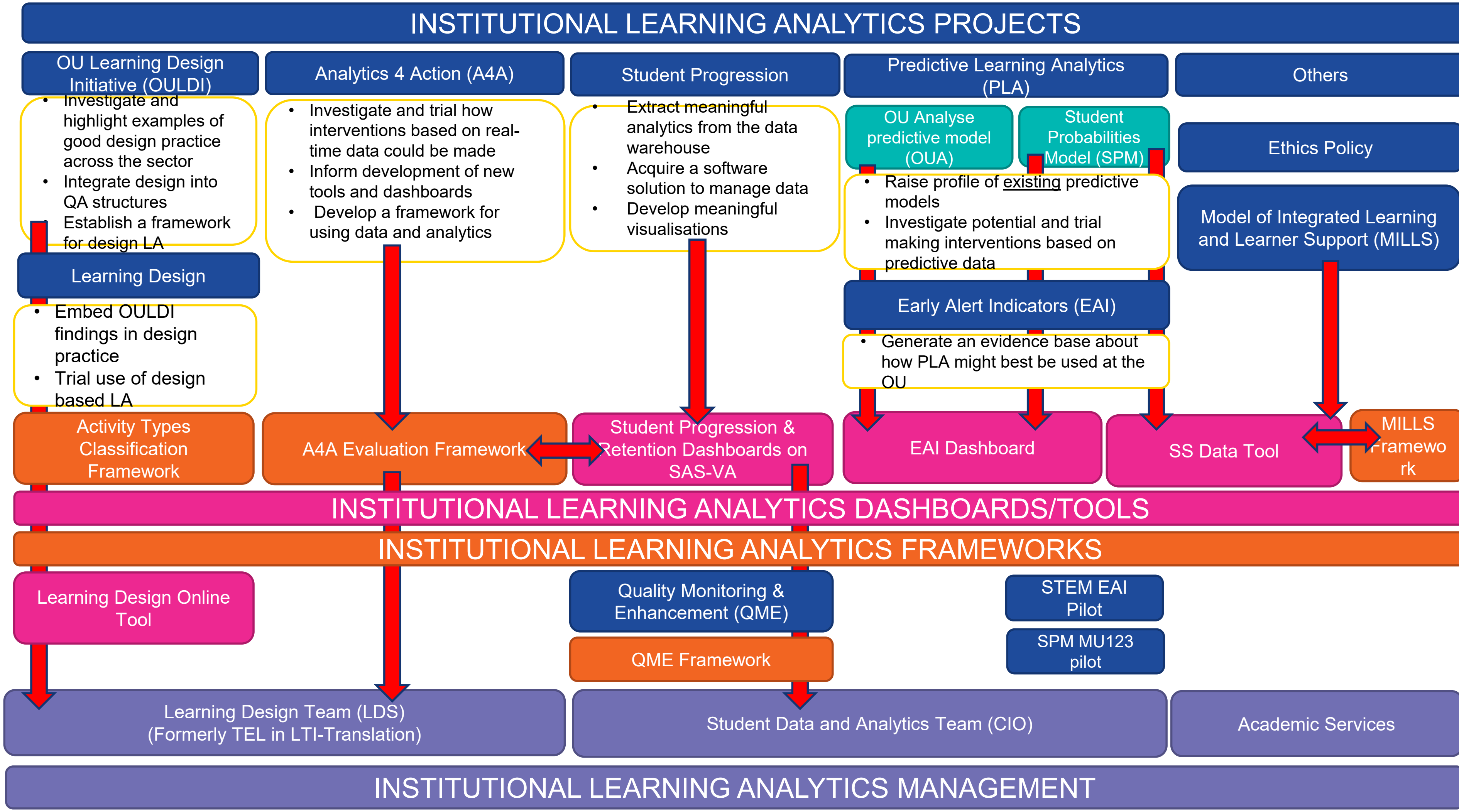
Curriculum:

Discipline, level,

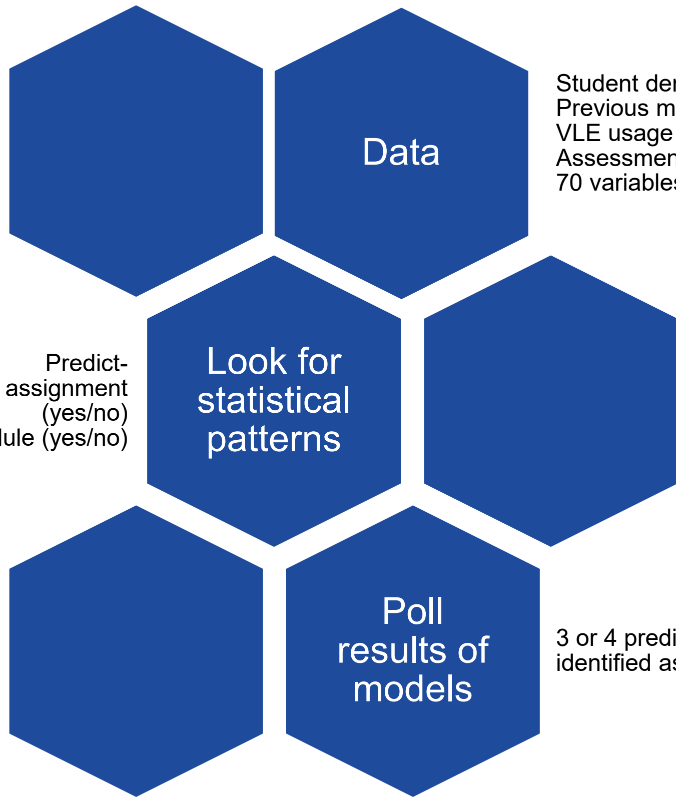
Maturity of module; experience of ALs

Volunteer modules and (mostly) ALs




INSTITUTIONAL LEARNING ANALYTICS PROJECTS
OU Learning Design Initiative (OULDI)
Investigate and highlight examples of good design practice across the sector
Integrate design into QA structures
Establish a framework for design LA
Learning Design
Embed OULDI findings in design practice
Trial use of design based LA
Activity Types Classification Framework
Analytics 4 Action (A4A)
Investigate and trial how interventions based on real-time data could be made
Inform development of new tools and dashboards
Develop a framework for using data and analytics
A4A Evaluation Framework
Student Progression
Extract meaningful analytics from the data warehouse
Acquire a software solution to manage data
Develop meaningful visualisations
Student Progression & Retention Dashboards on SAS-VA
Predictive Learning Analytics (PLA)
OU Analyse predictive model (OUA)
Student Probabilities Model (SPM)
Raise profile of existing predictive models
Investigate potential and trial making interventions based on predictive data
Early Alert Indicators (EAI)
Generate an evidence base about how PLA might best be used at the OU
EAI Dashboard
Others
Ethics Policy
Model of Integrated Learning and Learner Support (MILLS)
SS Data Tool
MILLS Framework
INSTITUTIONAL LEARNING ANALYTICS DASHBOARDS/TOOLS
INSTITUTIONAL LEARNING ANALYTICS FRAMEWORKS
Learning Design Online Tool
Quality Monitoring & Enhancement (QME)
QME Framework
STEM EAI Pilot
SPM MU123 pilot
Learning Design Team (LDS) (Formerly TEL in LTI-Translation)
Student Data and Analytics Team (CIO)
Academic Services
INSTITUTIONAL LEARNING ANALYTICS MANAGEMENT

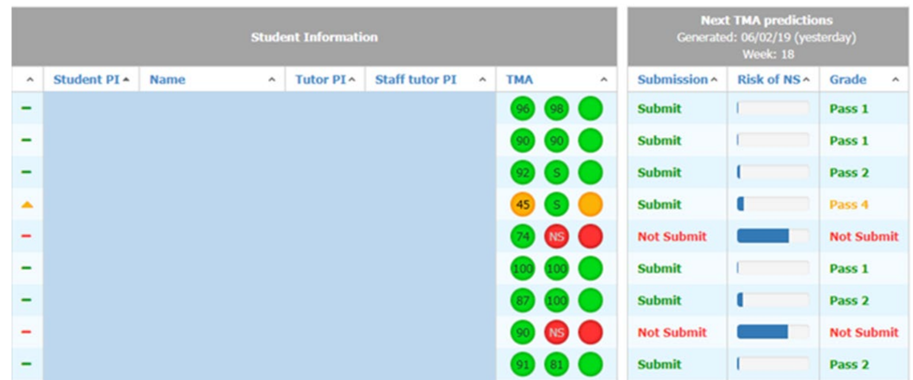
OU Analyse dashboard



Student demographics
Previous module results
VLE usage
Assessment marks
70 variables

Predict-
submit next assignment (yes/no)
Complete module (yes/no)

3 or 4 predict ‘no’, student identified as at risk



Student Information						Next TMA predictions Generated: 06/02/19 (yesterday) Week: 18		
	Student PI	Name	Tutor PI	Staff tutor PI	TMA	Submission	Risk of NS	Grade
					96 98	Submit		Pass 1
					90 90	Submit		Pass 1
					92 S	Submit		Pass 2
					45 S	Submit		Pass 4
					74 NS	Not Submit		Not Submit
					100 100	Submit		Pass 1
					87 100	Submit		Pass 2
					90 NS	Not Submit		Not Submit
					91 81	Submit		Pass 2

Case: evaluating learning analytics pilot in STEM

Context:

How/why/were ALs using the OU Analyse?

2017 – digital by design, digital innovation…
Modules (& generally, ALs) volunteered, took varied approaches

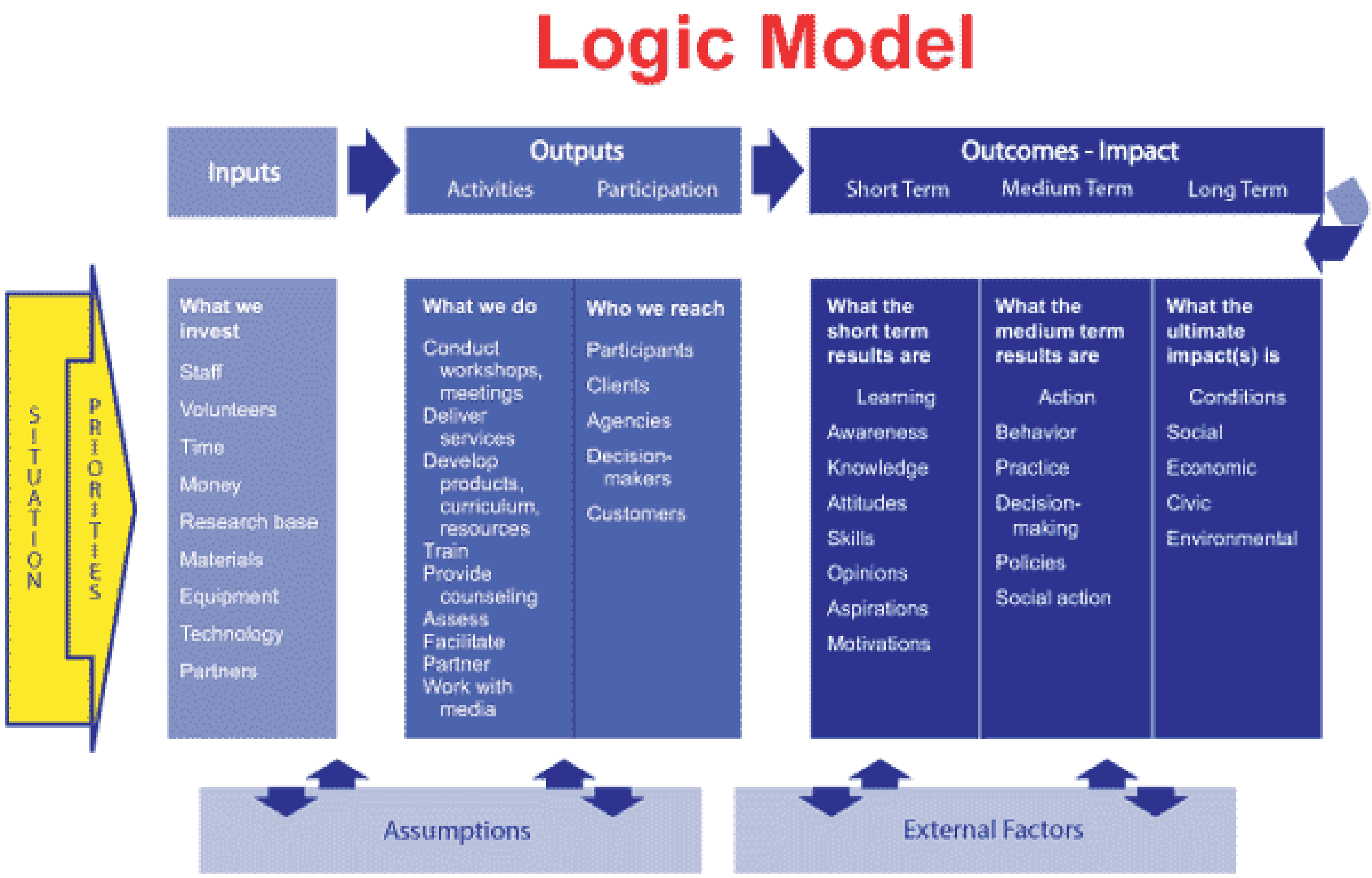
Outcomes (regularities) for OUA included:*

- Few outcomes intended by module teams were realised (especially retention)
- Usage of the dashboard by ALs declined markedly through the presentation of every module
- Tutors and module teams did not trust the data.
- Tutors and module teams repeatedly emphasised the importance of communicating with students rather than the OUA information

- See Olney et al (under preparation), Walker et al (2019); Piloting OU Analyse and the Student Probabilities Model on 12 STEM Modules Full Report

'Programme theory'

How, logically, did module teams expect their activities to lead to intended outcomes

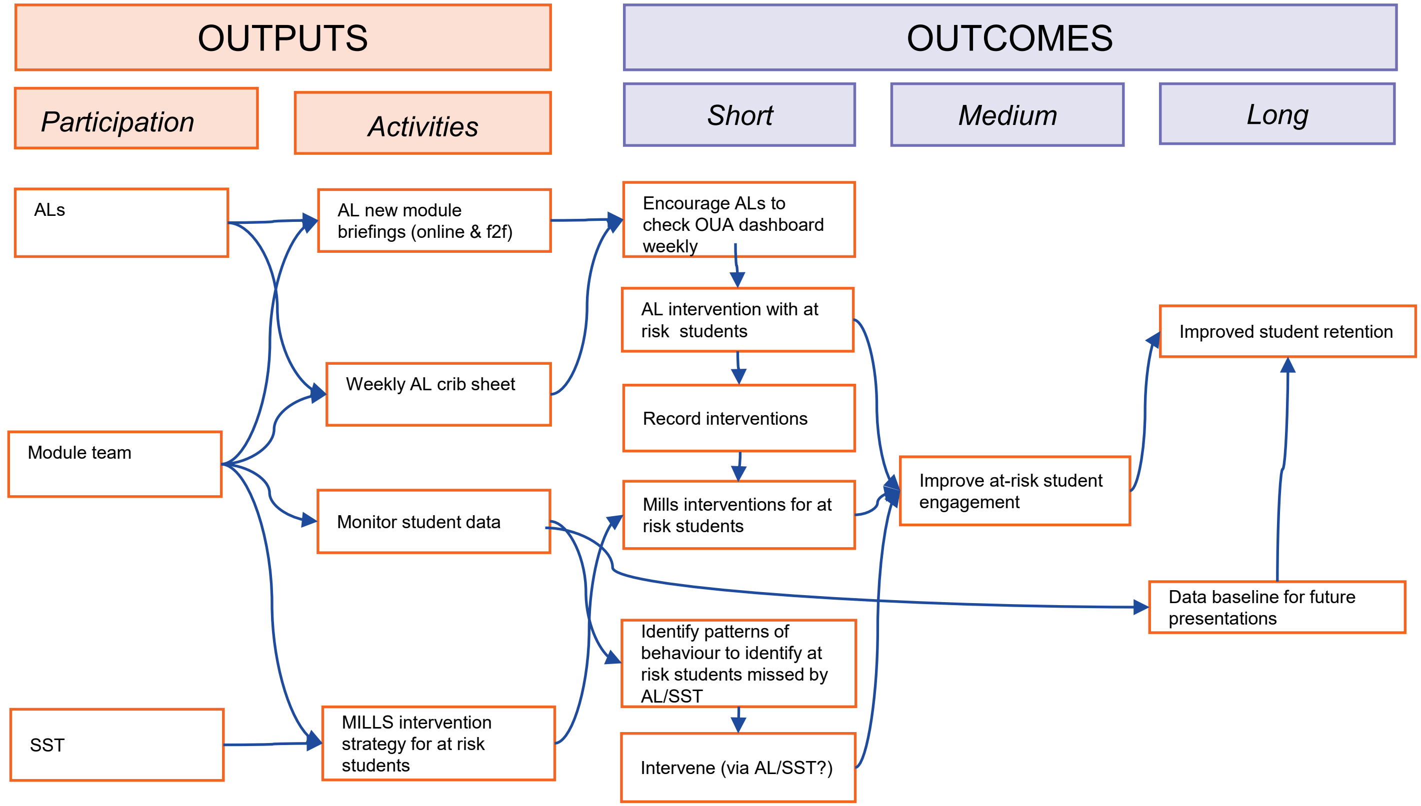


INPUTS

- Associate Lecturers
- Students
- OUA dashboard
- SST

- Maria Velasco
- Helen Copperwheat

X123



Assumptions

External Factors/context (Summary)
First presentation
Experienced ALs
SCA (exam)

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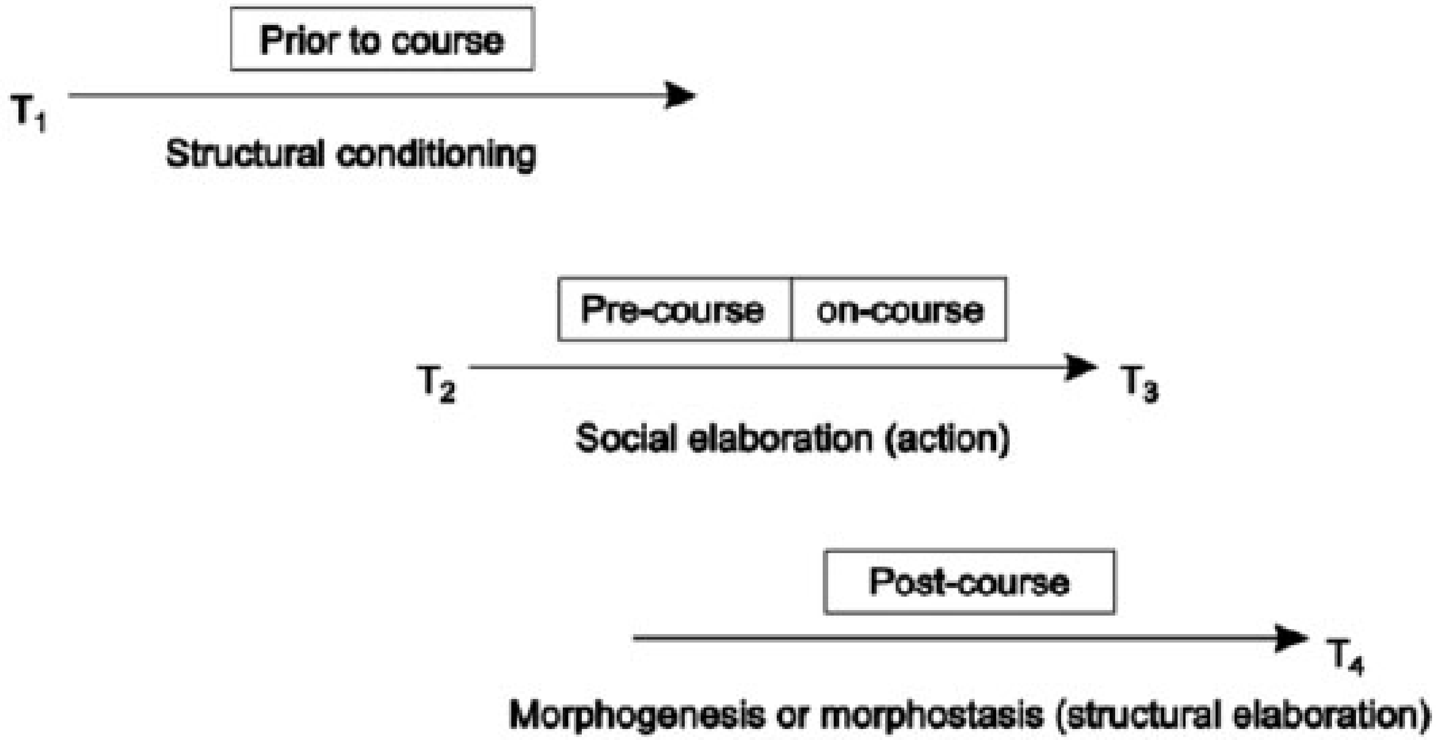
Figure 3: The morphogenetic cycle with the change project mediation phases (Archer, 1995, p. 157)



Types of mechanism

Coleman, Archer etc

Macro->micro	Micro->micro	Micro->macro
(Structural conditioning)	(Social (sociotechnical) interaction)	(Structural elaboration)
Belief formation: initial briefing	Interpretation of data, personal histories	Patterns of analytics use?
"I'm going to have to be honest and say that it's been introduced in the briefing in <module> I didn't quite understand what it was about or I came away thinking it must be a tool I'd have to get my head around but the explanation … why I should use it or even how I should use it, especially when you're having to take on other things new to the module anyway."		

Types of mechanism

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Micro->micro

(Social (sociotechnical) interaction)

Interpretation of data, personal histories

"You look at it and think; "I know that's wrong!" Sometimes it gives you an orange for someone you know it doing the best they can but they might be finding that bit difficult so sometimes the predictions seem a bit odd and it gives you complete red dots at the start."

Micro->macro

(Structural elaboration)

Patterns of analytics use

Types of mechanism

Coleman, Archer etc

Macro->micro

(Structural conditioning)

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Micro->macro

(Structural elaboration)

Patterns of analytics use

“It’s not something you think ‘oh i’ll go check OU analyse’ it’s not something that crosses my mind because it’s new. It’s not something that’s talked about on the tutor forums either so it’s about remembering.”

Candidate claims

	Macro->micro	Micro->micro	Micro->macro
Example	Belief formation *"I didn't quite understand what it was about"*	Interpretation *You look at it and think; "I know that's wrong!"*	Patterns of use *"It's not something you think 'oh i'll go check OU analyse"*
Regularity	Lack of clarity about the purpose and use of OU analyse	Lack of confidence in dashboard data	Declining use across presentation
<u>Candidate</u> general statement (Context: technological innovation pilot in OU STEM)	In introducing innovation in OU STEM - Why are we doing this? - What am I expected to do?	In OU STEM - If a tool (technology, data) doesn't align with or contradicts tutors' existing 'craft' knowledge, less likely to be used, especially where not transparent	In OU STEM - Individual choice to adopt/not adopt determines uptake - Individual choice about how to use it determines patterns of use

Possibilities

Library of mechanisms?

Building a library of mechanisms that may be applicable across (e.g. edtech, esteem) contexts

“This works (or not) for these people, in these contexts, and here’s why”

Possible route to generalisability across contexts

- Some of the mechanisms identified more general than just learning analytics

FIN

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