Analysis and design for complex learning ...
environments
networks
systems
spaces
(etc)

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Overview

1. The production of educational design knowledge
   Knowledge that is useful to people who design (for learning)

2. R&D from inside the (learning) system: its architecture,
   how it functions, etc ... analysis

3. Activity-centered analysis and design (ACAD)
   ▪ Focus on what students actually do (their activity)
   ▪ Distinguish carefully between what can be designed in advance and
     what happens at ‘learntime’
   ▪ Design components: what should we offer?
   ▪ Entanglements: how does this work?

4. Integrating multiple forms of knowledge & ways of knowing
   ▪ Designers, design knowledge and epistemic fluency
   ▪ Students as designers of their own learning (environments, networks ... )
Ed Tech as a discipline or field

Tom Reeves on 26 Sep 2016, Facebook

Disciplining Education Technology

Audrey Watters on 28 Sep 2016
hackededucation.com

The University of Sydney

Martin Weller on 27 Sep 2016
blog.edtech.ie
Ed Tech as a discipline or field

Reeves
- outrage at ignorance (how would a geologist feel if someone who knew nothing about the field decided studying rocks would be a good idea)
- maybe it’s our fault for being too insular

Weller
we have a lot of the apparatus of a professional field (journals, conferences, professional accreditation schemes), but people come into Ed Tech with very partial knowledge of the field – maybe we need:
- undergrad degrees; canonical body of texts – and something solid for critical work to push against
- greater intellectual rigour – good principles/process for evaluating evidence

Watters
- we need ‘undisciplining’
- ‘utter lack of criticality’
- ed tech can’t see its own disciplinary practices, mechanisms, technologies
EDR/DBR for/in HE sits in what can be an awkward space – neither Mode 1 nor Mode 2; or a bit of both

It’s a space in which different drivers/shapers of research rub against each other – friction, not nec. productive

Not surprising that there’s uncertainty about appropriate forms of research etc

In passing; this space is (a) potentially key to improving the quality, effectiveness, efficiency, productivity etc of Australia’s 3rd biggest export earner (after iron & coal), yet (b) under-resourced – with the scrapping of ALTC/OLT, (c) structurally disadvantaged – eg hard to get Linkage grants; definitions of ‘non-academic’ impact/engagement don’t work smoothly here.
Key questions/uncertainties in our field/discipline

- What counts as useful knowledge?
  - functional x critical; general principles x locally applicable
- How should such knowledge be produced?
- Who should be involved in this knowledge production work?

Exacerbated by:
- Marginalised/subordinate status of ed techs in academia

Despite being at the confluence of two of the great shaping forces of our time:
- Knowledge economy; intellectual capital; innovation; learning
- Technology (digital; hybrid)
Learning, technology and design: architectures for productive networked learning

Research as analysis (of learning networks, systems etc) to create actionable knowledge for design

Research on methods for analysis & design, especially to enhance collective/participatory design processes

Design knowledge & design research

Design research: an activity capable of producing knowledge useful to those who design – that is, design knowledge
- Research for design: produces better conceptual and operational tools for designing
- Contrast with research through design (where the emphasis may be more on refining theories of learning, for example)

Motives for design research include:
- Increasing scale & complexity of challenges tackled by design teams
- Design is increasingly distributed among numerous actors, who can work better if they share some design knowledge (shared ways of representing, discussing and making decisions about what exists and what is needed)

x-ref Cross and Laurillard
What does ‘analysis’ mean (in ed tech/ed design)?

Analysing a problem;
needs analysis; performance (gap)
analysis; task analysis; content analysis

Analysing what students
currently know and need to know

Analysing contextual issues, constraints on
poss designs etc

Especially suitable for new
courses, programs, learning
resources etc: “Greenfield sites”
e.g. ADDIE

Analysing what already exists
and how it works

Shortage of tools & methods
for this

“In medias res” as the norm:
we are rarely working on a
greenfield site

Goodyear, P., & Dimitriadis, Y. (2013). In medias
res: reframing design for learning. Research in
Learning Technology, 21. doi: http://dx.doi.org/
10.3402/rlt.v21i0.19909
As the VC$^*$ sees it

(existing) lecture(r) + new video camera = MOOC

VC$^*$ - could be Vice Chancellor; could be Venture Capitalist

http://www.sciencesmaths-paris.fr/upload/Contenu/Photos%20cours%20et%20images/CaucherBirkar.jpg
http://cdn1.ustream.tv/zendesk/forums/cameras/hpx170.png
https://www.edx.org
This is mainly ‘Khan academy style’ lecture + realtime handwritten text/diags – instructor’s hand & gestures as well as what they write/draw

Notes:
1) There are 5 pages of instructions on essential customisation to Sketchbook Pro before first use – default pen & canvas sizes etc and 7 pages of instructions about how to composite & edit the video
2) Also 2-3 pages on the promotional headshots they do for each course & on curriculum dev & costs

“As you can see from the process above, designing good online classes is a significant amount of work and planning”!!
As the Educational Technologist sees it

“As you can see from the process above, designing good online classes is a significant amount of work and planning”
(Andrew Erlichson, Jerzy Fischer, and Shannon Bradshaw, 2016)

https://university.mongodb.com/about/how-mongodb-university-online-courses-are-produced

Their use of the term ‘above’ refers to the main text of their article which is really a process description (20pp) – this diagram is our creation & merely maps out the tools, artefacts. software programs, and key personnel involved.

Moreover – when we are thinking about analysing the learning environment (etc) we’re not just thinking about how learning objects get produced; that’s only part of the story.
From analysis to design: what matters is ... what the student does

Tool → Outcome
Task → Outcome

Tools, artefacts, place

Task → Activity → Outcome
Groups, communities
Activity-Centered Analysis and Design (ACAD) framework
Activity centred analysis and design: some core tenets

- Activity is central ... what people are actually doing (thinking, feeling, etc) really matters – it is consequential
- Activity is physically, socially and epistemically situated
- Activity cannot be designed – it emerges [indirection]
- Design can lead to the creation of artefacts, places, divisions of labour, tasks etc that situate and influence activity, but rarely determine it. Design issues invitations.
- Activity can involve the (collective) reconfiguration of artefacts, tools etc: it can cause lasting changes in the learning environment (network, system ...)
- Design is often distributed, but distributions vary between networks/systems and over time
Design knowledge that helps with reasoning about relations between humans & things
Design knowledge that helps with reasoning about relations between humans & things
Representation and collective (re)design (1/2)

Challenges in the evolution of a learning network (system etc) where design solutions are not self-evident (including ‘wicked’ problems, where criteria for judging between solutions are not self-evident)

May require the invention of means of inquiry (methods of analysis and representation)

Three coupled processes:
- a shared commitment to action (skin in the game)
- use of structured discussion to create a shared (temporarily stabilised) conception of what action should be taken
- production of models/representations of problem(s) and candidate solutions (≈ how the network/system functions; how it might function better in the future), as resources for structured discussion

(Ison & Blackmore, 2014)
Representation and collective (re)design (2/2)

Choices can be made about representations in terms of how they are meant to function in a structured discussion, which is (in turn) being used by a team of people who are invested in, and committed to, taking some design action

Particular appropriate in the context of ‘participatory design’ understood as a paradigm in which people are designing for their collective good, and as a practice in which joint inquiry and structured decision-making processes are needed in order to make progress with complex, even wicked, problems

ACAD as a way of helping participants in learning network/system converge on ways of representing key aspects of how it functions:
- broad brush (e.g. Carvalho & Goodyear 2014 book), or
- specific areas of activity & infrastructure seen as problematic
Cyclic/spiral process: incremental adjustment

'runtime' or 'learntime'

'entangled' activity system

analysis & (re)design
But aren’t you just talking about DBR/EDR?

Or better use Tom Reeves et al 2011.
The paradox of (educational) design (-based) research

DBR: ostensibly an approach to working with the complexities of real learning environments; sheparding a theory-informed educational invention into practice & deriving publishable insights (theory, design principles etc)

- making academic educational research more relevant to practice
  (Reeves, McKenney, Herrington, 2011)
- mapping & testing design conjectures; refinements to learning theory
  (Sandoval, 2014)

BUT, this is the tail wagging the dog; we need to focus inquiry on the key phenomena without an *a priori* goal of contributing to such-and-such a literature; else we distort the approach from the outset. (How do design principle &/or LT agendas distort how we frame phenomena?)

DBR doesn’t take design seriously; or analysis

DBR insists on researchers as protagonists; but ed teams can do inquiry without leadership from academic researchers (and become researchers)

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(was also an award winning paper at ascilite 2010)


The refs above can all be found below:

References


Combining incremental change with radical rethinking

Structural critiques of normative hierarchies of power and imagined possible futures
PLUS
Consequential impacts in the here and now.
(Bang & Vossoughi, 2016, 174
Participatory Design Research)

Monitoring inequitable distributions of benefits (and costs)
Deeper, forward-looking analysis of what outcomes are most valuable
Helping students learn to how to reconfigure their own learning spaces (environments, networks ...)

https://epistemicfluency.com

Epistemic fluency involves a set of capabilities that allow people to recognize and participate in different ways of knowing, using different forms of knowledge. Such people are adept at combining different kinds of specialised and context-dependent knowledge and at reconfiguring their work environment to see problems and solutions anew.

- TT relations x HH or HT relations
- local x general x universal knowledge
- identifying what knowledge (and kinds of knowledge) are appropriate for the design task at hand
- designing appropriate forms of inquiry/analysis etc
- learning how to (re)configure one’s environment — surround oneself with helpful tools, resources, people etc — to tackle novel problems.

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Slides, references, follow up:

https://petergoodyear.net
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The design principles project has stimulated the development of an emergent vocabulary to communicate design ideas. Terms used in the database follow: We use feature to refer to any effort to use technology to advance learning. In particular, we use feature to describe designed artifacts, or parts of artifacts, such as modeling tools, simulations, micro-worlds, visualizations, collaboration tools, games, and assessment tools. We define a learning environment as a system that incorporates a set of features along with a navigation system and curriculum materials. We use design principle to refer to an abstraction that connects a feature to some form of rationale. Design principles can be at several levels of specificity. Principles can link to one feature, to several features, and can link several principles together. Design principles emanate from and connect to theories of learning and instruction.

http://www.edu-design-principles.org
http://www.edu-design-principles.org
Ed tech as a discipline

“To practice a discipline is to be a lifelong learner on a never-ending developmental path.

A discipline is not simply a ‘subject of study.’ It is a body of technique, based on some underlying theory or understanding of the world, that must be studied and mastered to put into practice.

As you develop proficiency, your perceptual capacity develops; you gradually surrender to new ways of looking at the world.” (Senge et al., 1994, p7)
Design anthropology [probably cut]

The creativity of design is not found in
“prefigured solutions to perceived environmental problems but in the
capacity of inhabitants to respond with precision to the ever-changing
circumstances of their lives … finding the grain of the world’s becoming …
[and] bending it to an evolving purpose … opening up pathways rather
than setting targets” (Gatt & Ingold, 2013, p.145, our emphasis).

Underestimates the complexity of some of the binds in which
people find themselves – traps people in a world they can
directly sense

Analytic representations as tools for shared inquiry, sense-making
and action rather than as claims to truth