An education in educational technology

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"Educational technology" is a perfectly serviceable name for a field of research and development that is of practical importance and in which interesting intellectual challenges can be found. Stick with it.

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Introduction

> It is the feeling of this editorial board that the AJET should be both accurate and scholarly but that it should not become dessicated [sic]. Contributions which are clear, concise (and even entertaining) should be welcomed. (Aset, 1985, p. 1)

I retired last year. People celebrated. The current editors of *AJET* – Kate Thompson, Jason Lodge and Linda Corrin – were kind enough to come to the celebration. They also asked me to write an editorial for the journal. This is it.

My aim is to encourage people to write about educational technology and to write for *AJET*. My method is to defend "educational technology" as a worthwhile label for a field that is worth working in. My data is mainly anecdotal; my results may be unsurprising. But I hope the discussion offers glimpses of some ideas worth further exploration. I end where I began.

Before I worked in education, I was a geographer. One of my first publications was in a journal called *Antipode: A Radical Journal of Geography*. I want to start with a much more recent quote from the same journal, by two much more successful geographers:

> No one is allowed to claim that they have the one and only answer or the one and only privileged vantage point. Indeed, to make such a claim is to become a part of the problem. (Amin & Thrift, 2005, as cited in Selwyn, 2010, p. 68)

Positioning EdTech

I've made a good living in EdTech over the last 43 years. It was called "educational technology" when I first started. I would have described my specialism then as "computers in education" or "educational computing". (I was half of an EdTech unit. The other half did TV production.) Over the years, other names have ebbed and flowed: "computer assisted learning" (CAL) was fashionable in the 1980s, "learning technology" and "technology enhanced learning" (TEL) caught on in the 1990s, "e-learning" and "online learning" in the 2000s, and now, what? "Digital education" currently has some legs, but I can't say it grabs me.

Labels and banners can be important. I note, for example, that the Educational Technology SIG of the British Educational Research Association (BERA) has recently rebranded itself as "Digital Education".

> Colleagues and members of the SIG were concerned that the existing name 'Educational Technology' may not be appropriately reflecting the aims of the SIG, which is to create a space to discuss the application and impact of new technologies in education across both curricular and professional areas. Second, that the existing name may be affecting the appeal of the SIG to wider BERA members. (BERA Digital Education SIG, 2023)

The BERA journal in our field, published by Wiley, is still called the *British Journal of Educational Technology*. I hope that both BERA and Wiley have the good sense not to mess with the name, and that ASCILITE also holds firm with the masthead of its rightly celebrated journal.

"Digital education" strikes me as an odd and untimely choice. Educational technology predates the digital computer (Miller et al., 2023). Historically, it has explored ways of thinking about relations between materials, media and learning. It is not trapped in a "digital" mindset. It doesn't see the "post-digital" as an impasse, or even as much of a surprise.

The switch from "educational technology" to "digital education", as a label, also performs a trick that may not signify to all readers of this journal. It echoes a squabble within mainstream education(al) research, where some education researchers see educational research as instrumentalist: narrowly or blindly concerned with means and insufficiently aware of the bigger picture – the broader purposes of education, education institutions as sites for reproducing inequality, the insidious shaping forces of global capitalism, etc., as studied by education researchers. Pretty much everyone I've worked with in ("Western") academia over the last 40–50 years has understood that they labour inside a capitalist regime that's tuned to preserve the wealth of the already privileged. (By contrast, up until 1989, my colleagues in "Eastern" academia understood that they laboured inside an anti-capitalist regime tuned to preserve the wealth of the already privileged.) I think we have a sharp appreciation of these matters, even if we don't centre our research on them. But here's the rub: if you write about your craft, about making and doing, about the details of how you do what you do, it's quite likely that some higher being will infer, and may imply, that you're just an ignorant tradie (Saldaña, 2014).

Digital education has become a preferred term among some scholars in the area because it makes it easier for them to position *EdTech* as a pernicious object of study, rather than a field in which they are active players. This targeting of EdTech intensified with COVID, school closures and the experiments with emergency remote teaching. It continues: fed, I think, by a sense that there's uncertainty of purpose among educational leaders (especially those with large budgets who can't decide whether to hire more teachers or buy EdTech) and by a justifiable belief that technology entrepreneurs are circling public education, biting off the most profitable parts, with no signs of a diminishing appetite. I don't disagree with that part of their analysis.

Where I do part company with some scholars in digital education is in their use of the soubriquet "EdTech" and the way this occludes critical, reflective, thoughtful scholarship other than their own. "EdTech" is used to mean:

(1) Vendors of equipment and services who make money from educational institutions
(2) The spectacularly voracious and/or hubristic Silicon Valley entrepreneurs who are making money or wanting to make money from the education sector, or who are working to create new markets and raise venture capital in order to profit from education.
(3) Tech innovators and "thought leaders" who hype new educational products, services, methods, and/or foretell the end of bricks-and-mortar education
(4) Researchers and innovators who are developing, testing and promoting new technology-based tools and services – with a particularly cold eye being directed at artificial intelligence and learning analytics/data mining.
(5) People whose job involves supporting other people's use of technology in education.
(6) People who research and write about any of (1) to (5), but who don't style themselves as "critical scholars".

To be clear, I think there's excellent, timely scholarship investigating (1) to (3) and this is commendable. (See, e.g., Selwyn, 2023; Williamson, 2018, 2021; Witzenberger & Gulson, 2021.) There should be more of it, and it would be good to read more of it in *AJET*.

I see (4) to (6) as the heartland for *AJET*. So what bugs me is the frequency with which people writing critically about EdTech imply that the folks in (4) to (6) are chumps, charlatans or worse. Indeed, there's a strand of writing called "critical EdTech", because, by implication, EdTech itself has no critical capacity. Here's an example, picked at random and not because I've been writing about convivial technologies and design for a decade or more. A subsection of an editorial by Selwyn et al. (2020), headed *Finding alternatives: Solidary economies, convivial technology, respectful design*, includes the following statement:

> These approaches contest the currently dominant racist, monolingual, ethnocentric and sexist discourses of EdTech by foregrounding relational and community approaches to design. This would involve educational technology designers taking time to think about who they are designing for, who their most vulnerable users are, and who their designs might harm as well as benefit. (Selwyn et al., 2020, p. 4)

I think most all of us want to be better people, better citizens and better at what we do, more alert to racist, sexist and other poisons in our work. But the implication that EdTech designers (people in set (5) above) don't take time to think carefully about who they are designing for is gratuitously inaccurate and insulting. Enlarging the target from designers, Macgilchrist (2021) conjures EdTech as a societal process:

> Edtech has become visible as a societal process that codes racialised, gendered, classed, religious, heteronormative, able-bodied norms into everyday educational practice. (Macgilchrist, 2021, p. 244)

To my mind, this isn't wrong, but insufficiently nuanced. It totalises "EdTech", such that countervailing processes, and the people mindfully bound up in them, are rendered invisible.

Here's another example from self-styled "critical EdTech" which targets our supposed lingua franca, "Ed-Tech speak":

> Expressions such as the ones above are typical in Ed-Tech research where optimistic claims are common discursive devices … This feature is often referred to as Ed-Tech speak/discourse … which consists of 'extensive claims, promotional activity, and imaginative marketing which centers on the idea that technical solutions have the capacity to transform education for the future' (Williamson 2017, 7–8) and is often certain about events, thus leaving little room for alternate outcomes … Put differently, Ed-Tech speak can be conceptualized as a combination of various (more specific) technology-related discourses, including those of technological optimism … technological solutionism … and technological determinism. (Mertala, 2021, p. 230)

The allegation that we cannot think deeply, act virtuously or speak honestly about our work turns up even more forcefully here:

> We believe that a continuance of these patterns of research and scholarship will consign the field to little more than a pseudo-scientific component of the marketing arm of companies that produce the various digital artifacts, which keep practitioners and researchers busy locating problems for which the artifacts can be solutions. A more worrying consequence of the hubris is that the field becomes limited in what it pays attention to and is always confident that no matter what happens it has the research approaches to deal with any new development. It is a recipe for more of the same for policy and practice. It is a recipe that has overseen a limited and limiting approach to thinking about computing and related technologies in education for more than three decades. (Bigum et al., 2015, p. 6)

Even the way we name our field is deemed deceitful:

> In the field in which this book is located, we have similar, wishful terms like "educational technology," "learning technologies," "networked learning," and the like. They are labels that are used to impose particular characteristics on hardware and software that are independent of context. The use such labeling receives from scholars who use these terms as glibly as vendors, clearly works against establishing a sharp sense of what is under consideration. (Bigum et al., 2015, p. 9)

On this view, it is deceitful, wishful thinking to call something an "educational technology" unless one can demonstrate convincingly that the technology in question has been educational, in the sense that it has played a successful part in part of someone's education, and that it's been the right sort of education. In almost the same breath, we are accused of using the word "technology" to perpetuate a social-technical binary. I'll come back to this "technology" point shortly, but I note in passing that "educational technology" has long defined itself as embracing so-called "soft" and "hard" technologies – methods and know-how as well as gadgets (Richmond, 1970; Reigeluth, 1983; Romiszowksi, 1981; Rowntree, 1974). On the "wishful thinking" point: I'm really not sure how far it makes sense to pursue this line of reasoning. Calling something "educational" doesn't mean it will succeed. Success is required to warrant some terms: *finished* or *retired* or *over the hill*, for example. But *educational* can be used quite legitimately to mean *pertaining to education*.

What worked: Dissemination for understanding and dissemination for use

> The academic study of educational technology could be accused of having worked itself into an analytic corner – well-able to discuss how educational technologies *could* and *should* be used, but less competent and confident in discussing how and why educational technologies are *actually* being used. (Selwyn, 2010, p. 66; emphasis in original)

One talks and writes about one's work with the hope that others may find within it some interesting, perhaps even reusable, ideas. For this to happen, people need to become aware of a piece of work – such as through a new paper in *AJET* – then to come to some understanding of it, and then – if it makes sense – to use it for their own purposes. For example, when university teachers experiment with some new tool or method and get outcomes they have reason to value, it makes perfect sense for them to try to share what they've done with a broader community of teachers (e.g., in their own discipline). The logic runs: "I tried X in teaching Y; it worked pretty well; it should work even better next year when I try X 2.0". In other words, "X can be done; you should try it".

The first large-scale conferences that I went to in the early 1980s were the biennial CAL symposia. My first was at Leeds University in 1981. Selected papers from the symposia were, for a number of years, edited to make special issues of the journal *Computers & Education*. (See, e.g., *Computers & Education*, Vol. 6, No. 1; Smith, 1982). Browsing back through the conference proceedings, I'm reminded of the fact that these conferences were heavily populated by university lecturers talking rather diffidently about their own innovations in the use of technology for teaching in their own classrooms. There were also academic researchers, talking about small-scale studies that they had been doing, in labs and classrooms, a smattering of computer scientists sharing glimpses of tomorrow's world and a few bureaucrats charged with ensuring that taxpayers' money was spent efficiently, with a maximum of collaboration and a minimum of duplication. Conferences for schoolteachers had a similar mix, with more teachers sharing their own stories from the classroom and fewer researchers and computer scientists.

The overwhelming sense – and it was actually a source of concern at the time – was of a cottage industry, one in which practitioners met up to show and tell. It was a good form of professional development and moderately good at disseminating practical lessons learned. One can scan proceedings of recent conferences, such as the annual ASCILITE conference or United Kingdom Association for Learning Technology conference (https://www.alt.ac.uk/altc), and also recent issues of *AJET* and the *British Journal of Educational Technology* and still see a significant representation of papers by people describing local innovations, talking about their own teaching, courses and classes, some with and others without evaluation data and/or theoretical framings. (TeachMeets [Amond et al., 2020] have a similar purpose.)

In short, there's a well-established tradition within educational technology of people sharing what goes on in their own teaching work: a strand of educational technology research and development (R&D) which has not left the realities of the classroom for the illusionary uplands of rhetoric. It comes from *actual* use. But the conflation of roles and practices perpetrated by that term *EdTec*h can make it hard to see the difference between (say) an enthusiastic teacher of physics and a snake-oil salesman from Silicon Valley.

Of course, Selwyn (2010) is right in claiming that we should make a better job of describing what is actually happening. It can be hard to do this in one's own teaching – or by observing other people's teaching, for that matter. Moreover, understanding what is actually happening needs theoretical constructs that take us beyond what is readily observable and readily expressible in everyday language.

In educational technology, we do not depend on critical scholarship for such intellectual resources.

In terms of methodology, we have decades of experience with close-up research using a range of techniques and framings: ethnographically informed, systematic classroom observation, participatory action research, design-based and developmental research, and more (see, e.g., Brown, 1992; Cobb et al., 2003; Levy, 2003; McKenney & Reeves, 2019; Schofield, 1995). In terms of theory, there's a well-used path to higher education passing through the zone where educational technology meets the learning sciences. I'm thinking, for example, of situated and distributed cognition, learning through peripheral participation and communities of practice: active areas in educational technology in the 1990s but barely visible in higher education until a decade later. (An extraordinarily influential, and still underestimated, role has been played here by the Cambridge University Press book series founded in 1987 by Roy Pea and John Seely Brown: *Learning in Doing: Social, Cognitive & Computational Perspectives*. See, e.g., Lave & Wenger (1991), Salomon (1993), Sørensen (2009), Suchman (1987). In this series and elsewhere, one can readily find insightful theorising about relations between technology and social practices, sociocultural research, activity theory, sociotechnical and sociomaterial studies of various flavours, picked up and elaborated by educational technologists and other educational innovators (e.g., Bliss et al., 1999; Ludvigsen et al., 2011). On another tack, interest in AI in education dates back more than 50 years (Papert, 1980; Self, 1988; Sleeman & Brown, 1982) and was generating its own internal critical capacity by the 1980s, long long before critical EdTech became excited about ChatGPT (Ridgway, 1988).

Given this wealth of theoretical and methodological ideas, how is it that educational technology has come to be branded as a field that is uninterested in theory and incompetent with methodology? Bulfin et al. (2013) surveyed authors publishing papers in the *British Journal of Educational Technology*, *Computers & Education*, *Australian* [sic] *Journal of Educational Technology* and *Learning Media & Technology* between 2007 and 2012. A total of 462 responded. The authors concluded that their survey:

> Clearly highlighted a paucity of theoretical engagement (and perhaps theoretical ambition) among many respondents. It would appear that many respondents' notion of what constituted useful 'theory' often related to specific ideas, concepts and frameworks that would not be considered to be theoretically grounded or particularly theoretically sophisticated. Further thought and discussion need to take place regarding the apparent absence of bona fide 'theory' from the field. (Bulfin et al., 2013, p. 343)

Hew et al. (2019) followed up by reviewing 503 empirical research articles published in *Computers & Education*, *Learning, Media and Technology* and the *British Journal of Educational Technology* in 2017 and 2018. They also concluded that use of theory was very weak. A total of 65% of the papers made no explicit use of theory or were vague in describing the theory and its links to their empirical research. Hew et al. characterised this as "naïve empiricism", of two kinds:

> The first kind of naïve empiricism is concerned with data collection and analysis without anchoring or grounding the results in particular theoretical perspectives. The second kind of naïve empiricism, although seemingly more sophisticated, still relies primarily on empirically descriptive regularities rather than relevant theory to explain the results. In

> cases in which theory is mentioned, it is not used to explain a specific phenomenon but presented without adequate connections to the phenomenon under study. (Hew et al., 2019, p. 966)

There are a number of tangled issues to be worked through before it's clear what should be done about a theory-data disconnect. I'll focus on two – what kinds of theorising are implicated in different kinds of research and how theory-use and researcher identity co-evolve.

Variations in the role of theory

Hew et al. (2019) expressed a concern that low and/or poor use of theory undermines progress in educational technology research in that it makes it harder to generalise findings across contexts and for researchers to build on one another's work. Like Bennett and Oliver (2011), they observed that most R&D in the field is concerned with practical implementation, underpinned by "commonsense" assumptions. We might place it in the Edison zone of Donald Stokes's well-known quadrant model of scientific research.

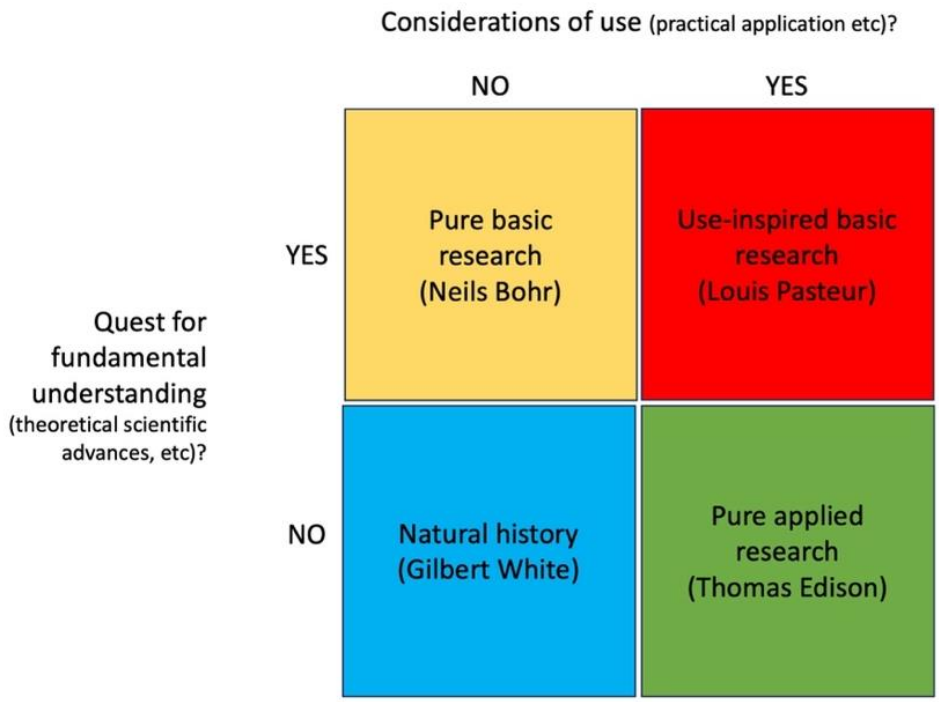

Figure 1. Quadrant model of scientific research (adapted from Stokes, 1997, p. 73)

Ever since Alan Schoenfeld (1999) brought Stokes's diagram (Figure 1) to the attention of the educational research community, there's been a strong presumption that we should be working in Pasteur's quadrant (Klahr, 2019). (Education researchers may beg to differ, feeling more at home in Bohr's box, while nevertheless worrying about the reductive nature of diagrams.)

Stokes's (1997) book was intended to help reform classificatory practices in research administration. It offers a few steps forward from conceptions of research that place "basic" and "applied" in opposition to one another and that posit a simple linear flow from basic research to commercialisation. It is not rocket science. Nor would the diagrams that illustrate his argument withstand any serious assault from the philosophy of knowledge. That said, I think the images help with discussion about variations in the status and role of theory in different kinds of educational technology research.

Fundamental understanding of what?

If as educational technologists we are working in Pasteur's quadrant, making better technologies and improving educational outcomes, what kind of contribution to fundamental understanding do we make? What kinds of questions do we answer? What bodies of knowledge do we extend? Do we add to knowledge about how people learn? (Or is that more properly a contribution to psychology or the learning sciences?) Do we add to knowledge about what teachers ought to be capable of doing? (Or is that more properly a contribution to education(al) research?) Do we make a distinctive contribution? My answer would start with a focus on relations between, or entanglements of, technologies and learning; but there are other starting points. Then there's the reciprocal question of what bodies of knowledge – what understandings of the world – align with our R&D practices?

Useful to whom? For what?

If we see ourselves as doing use-inspired research in Pasteur's quadrant, what are our contributions useful for? Who uses them? What are those users working on, and how can our research translate in a timely, actionable fashion to improve what they do? Why, for example, did university leaders make so little use of educational technology research in the 2020 switch to emergency remote teaching? – a key question raised in an earlier *AJET* editorial (Thompson & Lodge, 2020). Studying and theorising the working practices of the various sets of intended users of educational technology research is an important but neglected area.

Gilbert White's quadrant

David Klahr (2019) has argued that educational and learning sciences research can feel at home in every one of the four quadrants, including the bottom left quadrant that Stokes came close to naming after Roger Peterson and that I've previously dedicated to Gilbert White. It's a space in which knowledge can be advanced with neither a strong urge to explain nor an eye on application. Early naturalists like Gilbert White (1789/1977) made and shared thousands of observations of the natural world without rushing to explanation or application. This massive, distributed corpus of observations turned out to be an invaluable resource for Darwin, Wallace and others, formulating what has come to be known as the theory of evolution. The neurologist Oliver Sacks made a related point in his final book. While searching through the literature on visual disturbances preceding migraine, Sacks looked in vain for examples matching a case at hand, until he got as far back as a book published in 1860. He describes the book as "written in an age far more leisurely, less rigidly constrained, than ours" (Sacks, 2017, p. 188) and he links this to a lost quality in psychiatric case notes, which up till the 1930s offered "extremely detailed clinical and phenomenological observations, often embedded in narratives of an almost novelistic richness and density" (Sacks, 2017, p. 193). He laments the loss of this resource, replaced now by "meagre notes" that reduce the patient and their disease to a list of diagnostic criteria.

> Present-day psychiatric charts in hospitals are almost completely devoid of the depth and density of information one finds in the older charts and will be of little use in helping us to bring about the synthesis of neuroscience with psychiatric knowledge that we so need. The 'old' case histories and charts, however, will remain invaluable. (Sacks, 2017, p. 194)

Among other things, a corpus of rich descriptions of educational events and phenomena can be a source of explananda – of things that, when the time is right, pique our curiosity and nudge us towards forming explanations. The compulsion to explain is not always helpful.

Dynamics: Flows of knowledge and tools

Klahr (2019, p. 155) also draws our attention to a diagram (Figure 2) that he, and Stokes, believed more important than Figure 1. This introduces a temporal element, sketching flows of knowledge through different kinds of R&D.

The main point I want to make here is that (the much more famous) Figure 1 is often used as a way of talking about researcher intention, whereas it is also important, in considering the dynamics of a field, to think about flows of knowledge and tools, including unanticipated and unintended ways in which discoveries and inventions are used by others. In passing, I'd also note that "fundamental understanding" isn't restricted to the so-called natural world.

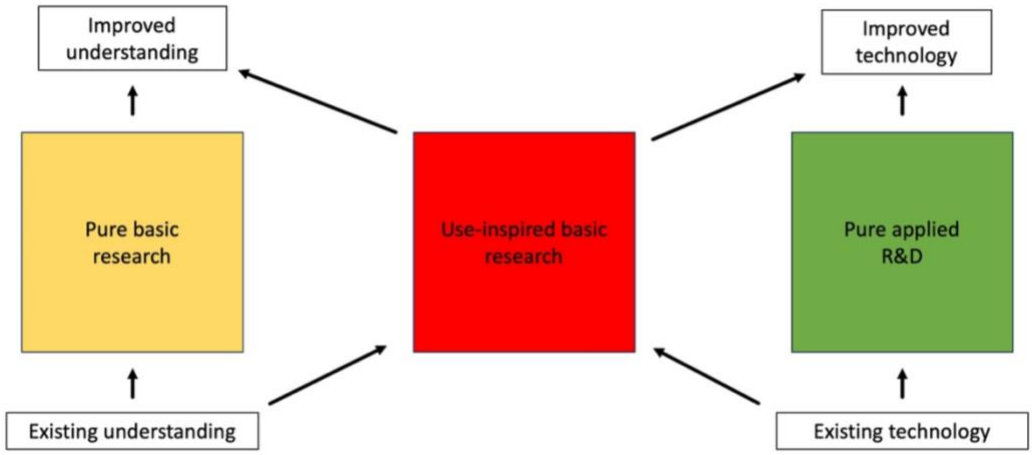

Figure 2. Dynamics model (adapted from Stokes, 1997, p. 88)

Figure 3 portrays another set of dynamics, outlined by Pettigrew and Cook (2022, pp. 2–3). (Pettigrew and Cook weren't sure who to put in the bottom-left box so they named it the innominate quadrant.) On this view, the outcomes of R&D work – for example, ideas, methods, theory, tools – swirl and meld, irrespective of their originators' intentions.

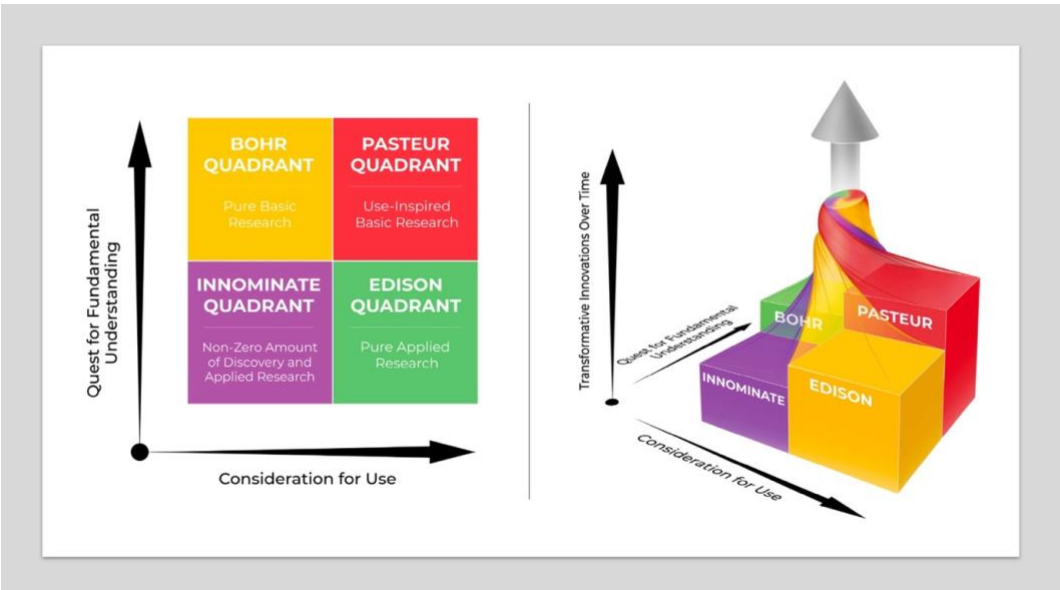

Figure 3. Stokes's (1997) models reworked by Pettigrew and Cook (2022, pp. 2–3)

What should be clear by now is that there is no simple story about the use of theory in educational technology R&D. In the Peterson/White/Sachs quadrant – a valuable source of explananda, populated with case studies – there is no obvious place for theory, and it would be strange to ask the people who are contributing cases to these corpora to talk about the theories they espouse. The Edison quadrant is, by definition, theory light, or rather, theory is used to shed light on practical work but theory-making is

taboo. In Bohr's quadrant, theory and empirical studies enjoy a more conventional relationship. And in Pasteur's quadrant, as I have noted, use of theory for practical application and contributions to theory as an outcome from practical work are not necessarily symmetrical. For example, a team working in this space may draw on constructivist accounts of learning but what they discover may have implications for understanding in other areas of knowledge (e.g., in the micropolitics of organisational life). The addition of the dynamics in Figures 2 and 3 make tracing relations between theory and practical or empirical work even more complicated. Is it any wonder that educational technologists struggle to give simple, coherent answers to online surveys?

Theory use and researcher identity

Coming back, briefly, to the question of theory use and researcher identity, I want to turn to a paper by Brett Bligh. Bligh (2020) offers the most thorough and thought-provoking analysis of theory use in educational technology that I've come across. (He speaks of "TEL" rather than "educational technology" but the arguments apply.) I'm simply going to pluck the following pragmatic advice from his paper:

> Researchers should consider, in a multifaceted way, how their theoretical choices reflect the research identity they are striving to construct for their future … TEL researchers are employed disparately: even those engaged within universities are located across a broad swath of disciplinary departments and service units, with different mandated job priorities and levels of employment security. That TEL is not, in most places, anything like an established academic discipline, means that relationships between theoretical development and disciplinary identity need to be engaged with urgently, as matters of practical import rather than merely as matters of disinterested contemplation. (Bligh, 2020, p. 163)

In other words, think about theory as part of developing your research identity: how do you want to be able to describe yourself (including to yourself), what do you want to be known for, what kinds of practical projects will and could you work on and what sets of ideas do you see your future self working with? "Digital education" and "critical EdTech" do not have a monopoly here.

Technology first

I'm nearly finished, but I can't leave without saying something inflammatory/encouraging about education's squeamishness in the face of "technology". Wanda Orlikowski (2010) remarks, of research in management and organisational studies, that there's a perspective that can be labelled "absent presence", in which everyone knows that technology is there, but most research(ers) ignore it. Mainstream research in education, including higher education, was like that until the late 1990s. I was working in education in the United Kingdom from 1979 to 2003 and I could count on the digits of one hand the serious education scholars who had any serious engagement with technology. In those times, it was OK to say "I'm a bit of a Luddite really" (without having any of Ned Ludd's craft skills, or indeed the courage to wreck a loom). Unlike the situation in the United States, where some tech developments, such as those involving community bulletin boards, attracted left-leaning academics, English academia was not a congenial home for tech-savvy progressives.

This cultural antipathy towards, and suspiciousness about, digital technology meant that those of us who were being paid to help educators make some sense of the computers that were arriving, willy nilly, in their schools and classrooms, had to find strategies for resolving the forces of "technology push" and "education pull". Computers were arriving in educational institutions because governments and industry pushed them in: to build "computer literacy", upskill the workforce and shore up the British information technology sector, not because there was persuasive evidence that computers helped students learn (other stuff) more efficiently (Milne & Anderson, 1984; Selwyn, 2007). It seemed to me that many of the more worthwhile things to do, in education, with computers, centred on helping students appropriate the toolsets of the practices to which they were apprenticed: the revelatory,

conjectural and emancipatory paradigms sketched by Barry Macdonald, Stephen Kemmis and colleagues in their evaluation of the United Kingdom's National Development Programme in Computer Aided Learning. "Computer as tutor" made little sense to me then (MacDonald et al., 1977; Rushby, 1979; Taylor, 1980).

It's rarely contested, in education, that "educational purpose" should come before choice of methods and tools. Tim Fawns (2022, p. 711) talks about a version of this in discussing ideas around "entangled pedagogy". As he says, it's rarely the case that either technology or pedagogy is unassailably first. And yet, there's still a sense that technology should be in the back seat; that it should be in the service of education.

I want to float an idea from a new book by Rupert Wegerif and Louis Major (2023). This will make delicate readers uneasy, but it's a compelling thought: without technology, there's no need for education.

> There is an interdependence or entanglement between technology and education that goes back to the origin of humanity. We find that while educational technology is now commonly seen as a supplement to the main business of education, the first recognisable schools emerged to teach how to use educational technology as the core curriculum. The complex demands of teaching how to use stylus and clay to record trade deals and collective stories led to the emergence of formal schools in Ancient Sumeria. The need to teach the communication technologies of literacy and numeracy drove the spread of schooling after the development of printing and national education systems emerged closely dependent on, and influenced by, print literacy. ... Schooling is required not to make people human, but to make humans into a particular kind of 'human plus technology' combination. (Wegerif & Major, 2023, np)

Jon Dron (2023, p. 8) develops a similar argument: "All educative activity and most if not all learning that we accomplish could not begin to occur without technologies. To educate, including to educate oneself, is to be a user of, and a participant in, technologies". He follows Arthur (2010) in defining technology expansively: assemblies that orchestrate phenomena to achieve some purpose, or in Dron's words: "We organize stuff to do stuff, and the stuff that we organize to do stuff can be anything, including other stuff that we organize to do stuff" (p. 8).

The philosopher Andy Clark talks about this as a capacity for self-engineering:

> We do not just self-engineer better worlds to think in. We self-engineer ourselves to think and perform better in the worlds we find ourselves in. We self-engineer worlds in which to build better worlds to think in. We build better tools to think with and use these very tools to discover still better tools to think with. We tune the way we use these tools by building educational practices to train ourselves to use our best cognitive tools better. We even tune the way we tune the way we use our best cognitive tools by devising environments that help build better environments for educating ourselves in the use of our own cognitive tools (e.g. environments geared toward teacher education and training). Our mature mental routines are not merely self-engineered: they are massively, overwhelming, almost unimaginably self-engineered. (Clark, 2011, pp. 59–60)

Technology is intimately bound up with being human and essential to being post-human. People interested in education shouldn't be othering it. They shouldn't be afeared of it. They shouldn't find technology unappealing.

Walking a way

Let's look back at the quote from Ash Amin and Nigel Thrift that I shared near the start of this piece: the one warning about taking a privileged vantage point and becoming part of the problem. It's embedded in an article by Neil Selwyn (2010). Here's what he says next:

> In extolling the virtues of a critical stance on education and technology, this paper's intention has not been to indulge in academic one-upmanship or convey an arrogant belief that one particular intellectual approach is more privileged and correct than any other. Indeed, the paper has not set out to contend that a critical approach is somehow superior to existing modes of inquiry and analysis. Rather, it should be concluded that a critical approach offers an important additional dimension to the study of educational technology – providing an often challenging but ultimately complementary perspective to the learning-centred studies that have dominated the field over the past 25 years or so. Of course, it would be unreasonable to expect all writers and researchers working in the academic field of educational technology *to perform an immediate volte-face* [emphasis added] in their thinking. Yet, showing an increased awareness of the critical aspects of technology-based education would certainly go some way towards lessening the disparity between the 'rhetoric' of educational technology scholarship and the 'reality' of educational technology practice. (Selwyn, 2010, p. 72)

It's a long while since I was a proper geographer. Ideas about space have changed. But I can't shake the feeling that if you want to walk alongside people, you shouldn't start by telling them they're walking in the wrong direction.

Anyway. That's me. I'm off. Don't forget to write.

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Figure 3 is from Pettigrew and Cook (2022, pp. 2–3); reproduced under Creative Commons Attribution License (https://creativecommons.org/licenses/by/4.0/).

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