

## How new technology is addressed by researchers in Educational Studies: Approaches from high-performing universities in China and the UK

### Authors

Charles Crook

Xiaoqing Gu

Charles Crook is a Professor of Education at the University of Nottingham.

Email: [charles.crook@nottingham.ac.uk](mailto:charles.crook@nottingham.ac.uk)

Research interests: collaboration, cultural psychology

Xiaoqing Gu is a Professor of Educational Technology at East China Normal University, Shanghai.

Email: [xqgu@ses.ecnu.edu.cn](mailto:xqgu@ses.ecnu.edu.cn)

Research interests: learning design, pedagogical innovation, computer-supported collaborative learning

### Abstract

There is a crisis of expectation in relation to educational technology. This is sometimes interpreted as a failure of academic researchers to disseminate their work to educational practitioners. However, another interpretation dwells on the lack of vision characterising such research. Because teachers often encounter research most intensely during their own pre-service and in-service education, we review academic research here through a snapshot of output from 10 leading university Education departments sampled in the UK and China. Empirical papers with a central interest in new technology were scarce, representing around 10% of the sample. Research was strongly situated in ‘classroom’ contexts although, as critics have suggested, with limited attention to the wider ecology of those places and with teachers being the focal interest as much as students. An ‘outcomes’ research orientation was less common than an interest in process. Although this was approached with different methodologies in China and the UK. Discussion addresses the challenge of effective and authoritative dissemination and constraints arising from the political economy of research itself.

### Structured practitioner notes

What is already known about this topic

- Transformational adoption of educational technology has been limited
- The academic research agenda on this topic has been criticised
- Academic research is poorly disseminated

What this paper adds

- A credible sample of research centred on the discipline of Educational Studies
- An analysis of the pattern of that research output
- Illustrating the political economy of research practice

Implications for practice and/or policy

- A basis for the research community to reflect on strategy
- Practitioner awareness towards constraints on research methodologies
- A more inclusive strategy of practitioner dissemination

## Introduction

Digital technology has deeply penetrated the experience of those living in today's developed economies. Unsurprisingly, its application to education is one area where both investments and expectations have been set high. Consequently, it can be unsettling to read analyses that critique strategies of media innovation in education (Cuban, 2009; Selwyn & Facer, 2013), or to learn of large scale interventions that have modest impacts (Mora, Escardibul & Di Pietro, 2018). More generally, some argue that the transformative promise of diffusing new technology into teaching and learning is not yet being realised (Collins & Halverson, 2018; Cuban & Jandric, 2015; Spector, 2001). One approach to understanding these circumstances is to consider how implementation of new technology is shaped by the various actors and professions that surround educational practice. The present paper considers the relevance of one such community: academic researchers.

However, our strategy is not simply to review studies concerned with implementation. Doubtless this would furnish a mixed story of successes and failures (probably more of the former, given the bias against publishing negative outcomes). Instead, we capture a cross section of current work by academic researchers in the area of Educational Studies. This corpus of educational research concerning technology will be taken from high-performing academic environments, in order to reference material that the community is likely to judge as exemplary. We shall describe the form that research takes in two contrasting contexts and discuss how well it suggests a potential creative or inspirational influence on practice. By way of introduction, we first define the domain of 'academic research' and then consider how educational practitioners might typically engage with such a body of work. Finally, we acknowledge a current strand of criticism that has been directed towards research practice in this area, allowing its concerns to guide our evaluation of the sample to be reported.

## Academic research

Peters and White characterise academic research this way: "systematic and sustained inquiry carried out by people well versed in some form of thinking in order to answer some specific type of question" (1969, p. 2). This captures the problem-driven nature of research, its seeking of programmatic coherence, and its grounding in theory. It may then serve practitioners by furnishing authority, clarification, and inspiration. Systematic evaluation of an innovation can provide an *authority* that gives confidence in what is being implemented. Research also offers theoretical frameworks and structured observations that may *clarify* the particular ways in which innovation supports pedagogy. Finally, research may document 'worked examples' of innovation that may be a source of *inspiration*. Our interest here is in how these responsibilities are approached by Educational Studies academics when researching new technology.

However, *academic* research is not the only way to investigate some cultural practice. Richardson (1994) distinguishes 'practical inquiry' and 'formal research'. The latter being what has been defined above as 'academic'. With 'practical inquiry', Richardson allows various ways whereby teaching itself becomes research. Through iterative pathways of observation, reflection and personal adjustment, the practitioner researches their practice and thereby innovates the shape that it takes. Yet oppositional relationships of the practical/formal kind are increasingly challenged by approaches to investigation that strive for teacher-researcher partnerships (Day, 2002; Hollingsworth, 2005): consequently, identity boundaries may blur, and methodologies may diversify.

Nevertheless, one stable feature of research traditionally termed 'academic' is the management of dissemination. 'Authority' is protected by rigorous practices of peer-reviewed publishing. In contrast, 'practical inquiry' is not traditionally conceived for purposes of generalisation or publication. However, practitioner communities may chose to work together in that spirit (Cochran-Smith & Lytle, 1999) and social media may now be providing a resource that encourages such sharing of practice

insights (Tseng & Kuo, 2014). In this way, practical inquiry may increasingly become more visible and, thereby perhaps, more influential within teaching and learning innovation. Such trends create an imperative for academic researchers to address the accessibility of their work – if it is to be a source of influence.

### **Dissemination of academic research to practice**

To what extent do teachers invoke research when reflecting on practice with technology? One approach towards understanding practitioner engagement is to seek its presence within informal professional discourse. Sites of professional text-based discussion are one way to explore this: they are publicly visible and involve a large number of topic threads. The UK service ‘TES’<sup>1</sup> is one such community; it claims over 4 million members. We sampled its discussions by seeking all references to the term ‘research’ in an 8-week period covering vacation and term time. Two sets of discussion were considered: (i) ‘Workplace’, comprising 8 sub-discussions relating to different education sectors with approximately 900 postings in this period, and (ii) ‘Subjects’, comprising 18 discipline-related sub-discussions with approximately 600 postings. After discarding non-education references to ‘research’, there were a small number (11) of references to research practice that could be considered academic.

These entered into informal discourse in four ways. Five of the 11 invoked research as a general device that might fix a point of discussion. E.g.: “Research usually shows that a lot of screen time equals worse speech and language”. Three postings requested references, as in: “Does anyone have any examples of action research they might have done...” or “I am interested in the linkage between English literacy and digital literacy”. One posting speculated on a direction for research: “A very simple way of doing this would be to correlate GCSE results...”. Finally, two postings sought access for their own dissertation research. It was clear from the forums viewed that contributors were pre-service or in-service practitioners. Yet although invoking research was understood as an appropriate discourse move, specific references were scarce, even when a forum topic was central to professional practice. In no case was a particular study identified: if research was summoned up it was in very general terms – an unspecified authority.

#### *Routes towards practice*

Research is often supposed to reach practice through a process (fashionable in Economics and Management Studies) sometimes termed ‘trickle-down’. This fountainhead metaphor supposes that research findings ‘leak’ outwards to influence policy makers, specialist agencies, or the media. From these sources it might be further encountered by practitioners.

Much has been written about the role of research in shaping policy. That literature includes examples of politicians’ scepticism and frustrations over research advice, as well as examples of successful programmes, well grounded in evidence (Mortimore, 2000). It is rarely clear how far policies in the particular area of educational technology have been directed by politicians’ attention to academic research findings. Although reasoning about this area may be untypical. Because policy-makers have been so readily drawn to the imperatives of mobilising technology (UNESCO 2011), their investments may have been prompted by a generalised and high expectation for digital tools and services – perhaps more than by attention to research evidence.

Some educational innovation is constructed and supported through agencies that *mediate* the role of policy (Scott & Jabbar, 2014). Examples include NCET in China, KERIS in Korea, *Enlaces* in Chile, MSSSI in Malaysia, and BECTA in the UK. Less widely discussed are the various think tanks that furnish evidence-based reports on education (McDonald, 2014). Indeed mass media is thereby another source through which practitioners may gain access to research findings (Yettick, 2015).

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<sup>1</sup> <https://community.tes.com/>

Yet such a model of influence might be dispiriting to academic researchers. First, because they hope their work is a potential resource for the *individual* teacher – not only for underpinning the construction of centralised curricula. Second, because the ‘fountainhead’ may not be how they experience their relationship with practitioners. Instead, that experience will be dominated by the direct and human exchanges of pre-service, in-service, and post-graduate teacher education. It is in these arena that gaps between research and practice can be most vividly addressed (Deem and Lucas, 2006). The significance of these academic (teaching) environments may become apparent when attending to how teachers describe their professional work. Bridges observes how, in teacher talk, one hears “...the unselfconscious use of categories, concepts, and ‘theories’ that have become part of a professional language that has absorbed the fruits of past research” (2016, p. 83). This suggests closer attention to how practitioners encounter research in their initial teacher education, in continuous professional development, and in contexts of postgraduate study. From considering the outcome of such encounters, studies indicate that teachers often come to express a respect for the necessity of research but admit some scepticism about the extent of its practical value (e.g. Gitlin, Burbank & Kauchak, 2005).

Insofar as a positive perspective is cultivated, this may reflect the growing practice in teacher education to create more researcher-practitioner partnerships (Burbank & Kauchak, 2003) which, in turn, may resonate with new teachers’ expectation that academic research should accommodate to experience-based knowledge (Mausethagen & Raan, 2017). However, for teachers to migrate their direct contact with academic research into the longer journey of professional practice, that research must promise two things. First, it has to be useful: in the case of new technology, it has to offer authority for practical decisions, clarify the digital experience, and inspire innovation. Overarching such ambitions, it has to address the political and cultural realities of implementation. Second, research has to be accessible. If there is a disconnect between academic research and practice it may be, in part, because primary material is rarely published in open source. Research insights should more often reach those whose practices they address.

Our present aim is to consider a sample of scholarly output around new technology in terms of how it relates to the above imperatives. Others have characterised contemporary research strategies by mining the content of specialist journals in that area (e.g., Reeves & Oh, 2017). However, our unit of consideration here is the Education academy: whereas the publication niche of ‘educational technology’ accommodates a much wider range of voices. By sampling at the level of the institution, rather than the journal, we extract an unusual record of how the Educational Studies community approaches new technology as a research challenge. We have not sampled institutions randomly. Instead, we consider the ‘leading edge’ of research, investigating institutions judged as high performing in the discipline. However, the direction of research is always likely to be shaped by the socio-cultural context in which a research community is embedded. Accordingly, we have sampled institutions from two differing cultural contexts - China and the UK.

In sum, to capture the work of the academic research community here and to consider its relationship to technology adoption, we focus on the record of that community’s published work. Our conception of academic research as a *community* is based upon those pursuing the discipline of Educational Studies in universities. Our conception of academic research as a *practice* is based upon evaluating the voice and visibility of its published output. However, first it is appropriate to recognise significant strands of critique that educational research around technology has attracted. This will serve to contextualise our sample and help shape the way in which analysis may systematise it for interpretation.

### **Perceived limits of Education research addressing technology**

There is a challenge (associated with critical realist approaches in social science) arguing that educational research around technology addresses its concerns too narrowly. Such academic research disappoints because: it has failed to engage adequately with the role of new technology in young peoples' everyday worlds, it chooses to neglect the 'political economy' of 'classroom' innovation, and it may help foster an instrumental model of learning and pedagogy (Bayne, 2015; Facer & Selwyn, 2013; Friesen, 2013; Haugsbakk & Nordkvelle, 2007; Li, 2013; Oliver, 2011; Ross, 2017; Selwyn, 2014; Selwyn & Facer, 2013).

This tradition of critique nevertheless urges the need to pursue innovation through new technology. But it suggests that, at present, "many of the fundamental elements of learning and teaching remain largely untouched by the potential of educational technology" (Selwyn & Facer, 2013, p. 3). The reasons for this concern gather around two issues. First, proposed or observed interventions often neglect to research them with adequate attention to the complex ecology of educational practice. Second, the purposes of intervening are often expressed in terms of a restrictive 'enhancement' metaphor for learning.

The first issue overlooks how technology adoption is embedded in layers of socio-cultural context. Even so-called socio-constructivist theories may "...offer a very localized concept of the 'social' contexts in which technology use is situated" (Selwyn & Facer, 2013, p. 2). Friesen suggests this means that, in mainstream research "...what is important is not the shaping of learning by historical tradition, multiple stakeholders, or its constitution as a social or cultural reality, but how the "environment" causally impacts the elementary constituents of learning." (Friesen, 2013, p. 34). Li (2013) refers to this narrow 'environment' focus as a pre-occupation with the 'micro-' level of educational practice – neglecting the 'meso-' level of institutional structures and the 'macro-' level of "wider cultural, societal, political and economic contexts" (p. 280). Facer and Selwyn (2013) urge that academic research exploring new technology "...needs to bring its imagination and insights into ongoing and extensive dialogue with students, educators, developers, and civil society groups who are working to explore how society and education might be arranged differently" (p. 214). Friesen (2013) argues that educational discourse increasingly foregrounds the learner - where once we spoke of the pupil, or student or apprentice etc. Such cultural identities and relationships thereby remain unexplored by analyses steeped in this "new language of learning" (Biesta, 2015). A recurring observation is that academic research around educational technology has particularly cultivated these conceptual shifts (Haugsbakk & Nordkvelle, 2007).

The second strand of contemporary critique concerns how this "new language" frames learning in 'enhancement' terms. Griffin and Cole (1980) make this same point when questioning the value of "cognitive amplifier" metaphors to describe educational intervention. Accounts of change based on enhancing or amplifying do not express the mediational nature of educational intervention: capturing it as a process of *re-configuring* individual learner experience. Enhancement models risk hiding the processes of change behind discussion of "learning effects". Moreover as Bayne (2015) has noted, the language of enhancement is inherently conservative: "...assuming as it does a pre-existing set of practices which are not in any need of radical shift or displacement, but are rather simply open to being made even 'better' by the judicious application of a little (in this case technological) assistance" (p. 10).

These are compelling concerns. If such challenges are to be evaluated, university Education departments define the communities within which evaluation might be pursued. Because this is where teachers will have a particularly intimate encounter with the nature and practice of educational

research. For that reason, we consider here research addressing new technology, identifying it from within a sampling of Educational Studies communities within leading universities. Our analyses will then relate such a portfolio with some of the concerns raised above and, more generally, allow an evaluation of how well such research serves practitioner innovation with new technology.

## Method

### (i) Sampling of research articles

The QS World University Ranking tables<sup>2</sup> were used to identify five of the top-performing universities in Educational Studies for both China and the UK. Through a mixture of direct contact with Research Managers and online search, copies of all SSCI and CSSCI journal papers published by all members of their academic staff in Education during the year 2016 were gathered for the 10 institutions. This provided 602 papers from the China sample and 471 from the UK sample.

### (ii) Thematic coding of research articles

For present purposes, only papers that had a significant concern with new digital technology were selected. These were coded according to whether the paper was empirical, a review paper or a position paper. Empirical papers were also coded according to methods used in the research. Tables 1 and 2 show the meaning of these distinctions made in abbreviated form. They were supplemented by fuller definitions which can be viewed online<sup>3</sup>.

Table 1 Summary of coding distinctions for genre of research paper

Empirical	A position is grounded on <i>data</i> assembled and analysed qualitatively or quantitatively
Review	A topic is critically and systematically reviewed
Perspective	A perspective is developed – may invoke selected literature and/or indicative cases

Table 2: Summaries of coding distinctions for empirical methods

Documents	Claims arise from interpreting formally documented practice or policy
Accounts	Claims arise from interpreting personal accounts furnished by participants
Observation	Claims constructed from systematically interpreting observation of participants
Survey	Claims are grounded upon describing the self-reporting of surveyed participants
Correlational	Claims depend upon collecting two or more participant measures and co-relating
Records	Claims are constructed from analysing records in established and external databases
Experiment	Claims depend upon controlled group comparisons of measures

Articles were treated as individual data artefacts thematically analysed with the method outlined by Braun and Clarke (2006). First, a general familiarity with the articles was achieved by close reading. Articles were then organised into a spreadsheet with links from their titles to original text. Further reading allowed them to be positioned and re-positioned into groups defined by their primary concerns. Codes elaborating those concerns were noted in repeated reading and through cross-referencing. The practice of constant comparison (Lincoln & Guba, 1985) was exercised between individual articles in each (national) set and across sets. The complete corpus was then characterised according to a small number of themes with annotations that elaborated the nature of individual cases in these terms.

<sup>2</sup> <https://www.topuniversities.com/>

<sup>3</sup> <https://bit.ly/2AzzVkX> and <https://bit.ly/2DaUgj6>

## Findings and discussion

In the China sample 73 articles (12% of total sample) had technology as a significant concern. For the UK sample this number was 33 articles (7% of total sample).

Articles were distinguished according to whether they were (1) *Empirical*: the arguments made significantly depended upon original data captured and reported for that purpose, or (2) *Review*: a topic was identified and related literature was systematically reviewed, or (3) *Position*: an agenda or perspective was presented independently of any new and reported data or a systematic review. The UK sample was dominated by empirical papers (72%) with smaller numbers of both position papers (24%) and review papers (4%). For the China sample 33% of research papers were empirical, while more were position papers (52%) and review papers (15%). When only technology-related papers are presented as a proportion of all papers in each genre (Figure 1) it is clear that this topic is more central to both empirical and review articles in China than in the UK.

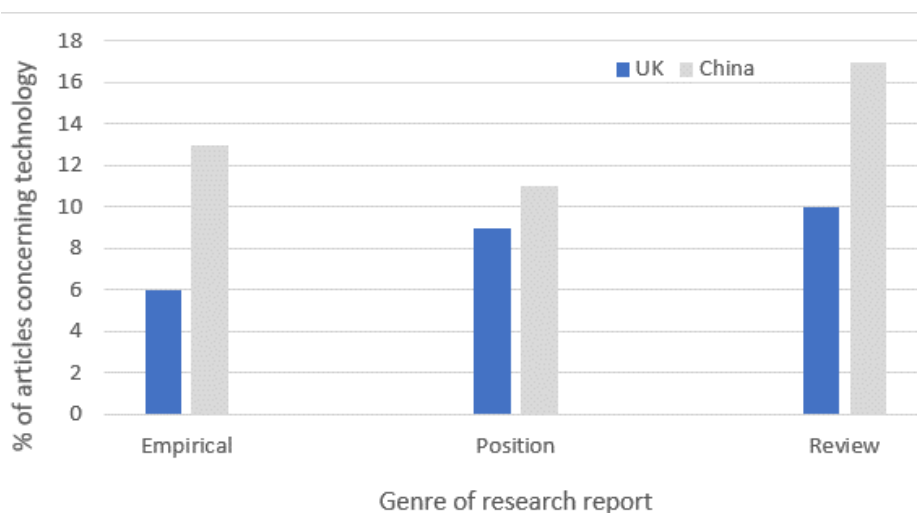


Figure 1: Proportion of technology-related papers in each article category

Thematic analysis of the empirical papers suggested they could be economically systematised in relation to six key design characteristics. These are identified below along with constituent sub-categories: those that are not intuitively clear are defined (see Tables 3 and 4).

- (A) Participants for whom data was reported. '*Other professionals*' were learners outside of mainstream education (medicine etc.). '*Generic users*' had no particular educational affiliation.
- (B) Site of the researched activity of those participants. '*Exhibition*' refers to sites for informal learning. '*Outside spaces*' were fieldwork environments, an '*open community*' was an unbounded site of professional practice. '*International*' refers to studies focussed on educational practice outside the researchers country.
- (C) The particular technologies referenced.
- (D) Participant outcomes were measures taken outside of (and usually after) the technology experience of concern. '*Service evaluation/use*' were measures of satisfaction or attitude, '*praxis*' was any measure of reflection or judgement on professional experience or activity.
- (E) Enacted practice was recording of learning or teaching as captured during the intervention or experience. '*Agenda setting*' refers to discussions in which agendas or strategies of practice were explored, '*Research process*' refers to a reported record of activity involved in the design of some research tool or procedure.

(F) Any curriculum area to which the intervention referred. ‘*Comparative*’ was coded when a study compared curriculum matters across different countries, ‘*CPD*’ means continuing professional development initiatives.

For each set, individual studies were coded with an alphabetic letter: 25 for the China sites, 21 for the UK sites. These codes were associated with any thematic category to which that study fitted (Tables 3 and 4). The resulting matrix allows a panoptic view of the two research patterns.

Table 3: Pattern of research within 21 empirical UK studies

(A) Participants		(B) Site of research		(C) Technology in use	
HE student	F	Classroom	DEGHO	Mobile	AB
Schooled student	ABDEO	Online arenas	FK	Tablet	DO
Teacher	DHJKLMNOP	‘Exhibition’	ABC	Video	E
Other professionals	IT	Outside spaces	B	Social media	IOQR
Generic user	CQSU	Open community	I	AI	J
		International	GHO	Discussion forum	FK
				Online course	
				Application	
				Multimedia	CH
				Design space/tool	LN
				Agents	P
				Infrastructure	
(D) Participant outcome		(E) Enacted practice reported		(F) Curriculum	
Knowledge	S	Teaching processes	HO	STEM	O
Cognition/skill	DG	Learning processes	AO	Literacy	D
Affect/engagement	F	Affective processes	BC	Humanities	AB
Sociality	E	Social processes	Q	Computer Science	N
Service evaluation/use	HP	Agenda setting	M	Media studies	GRS
Praxis	DJKLNOT	Research processes	U	Social sciences	
				Languages	
				CPD	
				Comparative	

Table 4: Pattern of research within 25 empirical China studies

(A) Participants		(B) Site of research		(C) Technology in use	
HE student	ILPQD	Classroom	MNOQ	Mobile	



Schooled student	FGHJMNST		Online arenas	AJLT		Tablet	N
Teacher	ABCEKRU		'Exhibition'			Video	
Other professionals			Outside spaces			Social media	J
Generic user			Open community			AI	
						Discussion forum	LT
			International	FG		Online course	I
						Application	MOQD
						Multimedia	
						Design space/tool	
						Agents	
						Infrastructure	EFGH
<b>(D) Participant outcome</b>		<b>(E) Enacted practice reported</b>			<b>(F) Curriculum</b>		
Knowledge	FJ		Teaching processes			STEM	FQ
Cognition/skill	GHMN		Learning processes	Q		Literacy	GN
Affect/engagement	A		Affective processes	T		Humanities	O
Sociality	L		Social processes			Computer Science	M
Service evaluation/use	SOX		Agenda setting			Media studies	
Praxis	BCEU		Research processes	KR		Social sciences	TVW
						Languages	I
						CPD	AB
						Comparative	VWY

Critical commentaries reviewed earlier, might predict a canonical format for technology-related research in Educational Studies. That format would be students using a classroom digital artefact to improve performance on some curriculum task; perhaps compared with control students for confidence of causal influence. Such 'learning effects' or 'learning enhancement' studies were rare in our corpus. Nevertheless, these Tables do raise concerns regarding the breadth of the research culture described.

One perspective on the data is to note the topics missing. Critics often comment on a narrowness of the prevailing agenda. So it is apparent that teachers and students are the focal participants – there is no research that involves, for instance, parents, school leaders, designers or other professionals in a central role. The sites of educational practice invoked are almost always traditional 'classrooms' or online. One direction of critical commentary is the claim that research is preoccupied with micro-level phenomena: that is, the dynamic of immediate and local events. These are rarely approached as embedded in meso- and macro- levels of influence (e.g., institutional management, parental perception, curriculum integration, overarching policy). Some studies may have been researcher/teacher partnerships (although this is rarely stated); the frequent reporting of teacher data (especially in the UK sample) is more normally a matter of observing teacher-focussed activity, rather than the dynamics of teachers being in a range of relationships.

Against expectation, student 'learning outcome' is not a strong theme: *teacher* experience or perception is at least the equal of it. Therefore research with a simple 'what works?' appetite is quite rare. While research investigating *how* matters are working is more common. Yet the China and UK samples reveal two different approaches. The majority of such process research in the China sample is based upon multi-factor modelling. Experience with technology along with relevant performance metrics are factored together with demographic, attitudinal, personality measures etc. to produce a statistical model of association: one that locates the potential influence of some technology in relation to a range of moderating variables. Findings from studies of this sort offer a highly quantified or probabilistic argument for the adoption or use of some technology.

By contrast, process research from the UK Educational Studies community is based upon interrogating episodes of captured interaction. Findings in this case encourage a view of technology impact in terms of its mediating various forms of practice – cognitive, meta-cognitive, affective, attitudinal etc. The analysis of such encounters may take the form of close scrutiny of observed

student (or teacher) activity or, alternatively, participant reflection on the experience retrospectively. The numbers of such studies were split between student participants (4) and teacher/professional participants (5).

This particular contrast around process questions highlights a dimension of difference in research culture: put simply, a quantitative/qualitative difference. Figure 2 characterises this difference more fully through methodology preferences. The UK studies are more likely to favour observational and self-accounting methods while the China sample are more likely to apply statistical and modelling methods to quantitative measures.

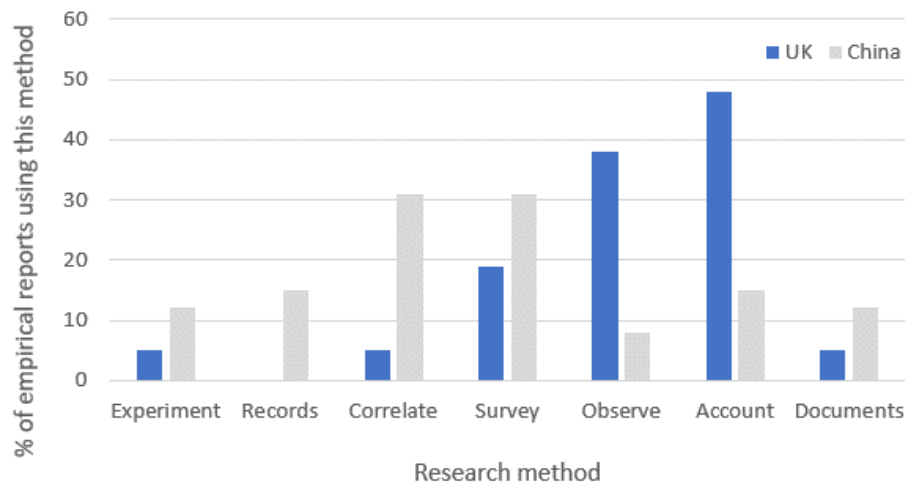


Figure 2: Distribution of technology empirical articles in relation to research method

Although such differences might represent long-standing traditions of research conduct, they may also signal some of the practical constraints that academic researchers face. Teachers are likely to be particularly receptive to research exploring educational practices through close observations or through detailed personal accounts. However, in neither country are conditions favourable to researchers being present at length during precious class time. The mode of multi-factor analysis favoured by China researchers may be attractive because of the low time cost of participants completing questionnaires or psychometric tests. Rare studies in the China sample that did observe ongoing episodes of technology-supported learning were often in an *online* classroom environment – where the cost of ‘observation’ is minimal given its background and digital nature. On the other hand, in the UK sample the predicament of limited opportunity for classroom access may be managed differently: that is, by directing more of these process studies towards teachers rather than students. Teachers may be more readily involved in research studies – not least when they are themselves on hand as practitioner/students in higher education.

This point is a general one: it is important to acknowledge the political constraints acting on the agendas of academic researchers. Close capture of education-in-progress makes challenging demands on any individual or institution that hosts engagement with researchers. Social theorists may rightly regret researchers’ lack of attention to the political economy of educational innovation. But it behoves critics to notice and acknowledge the corresponding political economy of the researcher’s world.

## Conclusions

We have reported a survey of research studies relating to technology, as currently published from within the Educational Studies communities of 10 leading universities in two countries. This exercise was set against a background that stressed: a sense of disappointment around technology's transformative influence on educational practice, the modest impact of academic research at the frontline of teaching innovation, and a consequent social science critique on perspectives adopted by this community of researchers. In relation to the last point, our findings offer some endorsement to the critical social science challenge. Research problems do seem typically confined to the micro-structure of innovation, neglecting the wider ecology of new media experience. Moreover, it could be argued that if only 7% (UK) and 12% (China) of empirical research drawn down from these Educational studies communities is directed at new technology, this is a level of investment that is out of step with the pervasive and transformational nature of new media in society more widely.

However, when issuing political criticism it must be recognised that research itself entails complex political relationships. Any shortfall in research expectation needs to be judged against the difficult management of risk and credibility that arises when researchers integrate with sites of educational practice. To which might be added the political pressure on researchers to design projects whose duration and granularity is consistent with the productivity demands of their professional research auditing processes.

While the pattern of research practice in our corpus may seem vulnerable to some critiques earlier identified, in many respects it meets such challenges. In particular, we find engagement with a good range of new media and although concern with 'learning outcomes' in a 'what works?' spirit is present, it is not a predominant theme. This is not to say that the social science critique is misplaced but it is necessary to consider to whom it is most appropriately directed. There is an important difference between 'the corpus of research manifest in the *educational technology community*' and 'the corpus of research on technology manifest in the *Educational Studies community*'. Here we have focussed on the latter. One reason was that it is within the latter community that teachers themselves are most likely to encounter research in a direct and vivid manner – through participating in their own professional education. This second community should therefore bring academic breadth to researching the challenges of implementing educational technology. We claim that there is some effort to embrace this imperative, although still modest in scale.

Consider the alternative corpus that we did *not* address: namely, that from the 'educational technology research community'. It might be harvested simply from those who publish in educational technology specialist journals. Yet this would be a very loosely knit 'community'. Often it will comprise individuals from a range of disciplines, sometimes with only a secondary interest in teaching innovation. It will be a community ill-prepared to take on challenges such as that put down by Selwyn (2013): "As such, most of the questions that surround education and technology are the fundamental questions of education and society—that is, questions of what education is, and questions of what education should be" (p. 102). Of course that challenge is a worthy one. But perhaps better directed at the other research community: those in Educational Studies. This has been the one chosen here to represent 'academic researchers' who might influence educational technology adoption and application. In short, publishing in educational technology journals hardly creates a 'community'. Therefore, those who do so lack the coherence of purpose that would make them a proxy for the 'academic researchers' whose role in innovation is here under scrutiny. Indeed it is the disciplinary mix of those that publish in educational technology journals that could make them – along with practicing teachers – most receptive to the kind of intellectual leadership that Selwyn's challenge demands.

That observation leads to a final point: the need to address mechanisms for academic research dissemination. In making individual research studies more accessible there is a challenge of identifying the particular kinds of writing that are most effective. One suggestion is that this must include writing that summarises and *integrates* individual research insights. There is some evidence of breadth of treatment in the sample we report. Researchers do venture beyond the mainstream classroom, excluded groups are sometimes addressed, social media in young peoples lives can be a topic. However, these matters tend to be approached in a piecemeal and circumscribed manner within individual studies. Such variety of approaches are rarely recruited into the design of individual projects; therefore what they reveal needs to be integrated through overarching commentaries if it is to make a difference. Our scrutiny of the non-empirical papers from the present corpus suggests this task is rarely taken on. Again, the politics of research practice may be relevant. National research audits do not necessarily attach great credit to writing that synthesises and summarises, particularly if it is directed towards practitioners.

The ease of digital publication has opened up some opportunities for research/practice dissemination. For example, in the UK there are online magazines published by organisations such as the Chartered College of Teaching (Impact<sup>4</sup>) or by the online community UKedChat (UKedMagazine<sup>5</sup>). To some degree they invoke academic theory and research. However, an ideal situation would involve researchers taking responsibility for presenting their own work and an editorial policy that protected the credibility of what was written. A model for this might be ‘The Conversation’<sup>6</sup> which strives for those conditions of authorship. Strength of authorship is one requirement there. Another is a low-intrusion yet high visibility mode of subscriber contact. The Conversation also does well on that: it invites email subscription and it issues periodic emails that list title and two-line summaries linking directly to web articles. Moreover, each of these articles allow (moderated) reader commentary. This last feature is important. Earlier we reported high levels of practitioner engagement with the TES community forum. Yet we also noted little discussion that invoked specific research findings. Arguably this is unsurprising: lively discussion needs a clear target. Outreach of the kind just sketched could achieve both greater awareness of academic research but also a more animated and critical engagement with it. This is an important goal for the future.

### **Statement on open data, ethics and conflict of interest**

Neither author declares any conflict of interest. All research procedures were performed in accordance with the institutional research committee of the University of Nottingham School of Education.

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<sup>4</sup> <https://impact.chartered.college/issue/issue-1-assessment/>

<sup>5</sup> <https://ukedchat.com/2018/11/01/uked-magazine-issue-52/>

<sup>6</sup> <https://theconversation.com/uk>

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