Engineering academics and technology enhanced learning; A phenomenographic approach to establish conceptions of scholarly interactions with theory

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Abstract

Discussions and debates of theory in technology enhanced learning (TEL) within
higher education (HE) are often characterised by instrumentalist motives, where
theory is either juxtaposed somehow with reality or is used in expedited attempts
to order, predict and monitor directly business-driven outcomes. The current paper
instead examines and interprets scholars' experiences of their activities at a nexus
of their research and practice; specifically, how participants conceive of their own
scholarly interactions with theory in TEL. The paper summarises an interpretive
study conducted in mid-2019 with teaching-focused lecturers at the Royal School of
Military Engineering, a school providing HE in infrastructure engineering for defence
personnel. The paper first describes problematic notions of scholarship, theory and
TEL then analyses the related existing literature, to illustrate a dearth of studies
which examine experiences, perceptions and conceptions of scholarly interactions
with theory in TEL. A phenomenographic study is presented, with outcomes disclos-
ing four parsimonious conceptions ranging in successive inclusivity and complexity.
Participants conceive that scholarly interactions with theory in TEL enable them
to: understand their own competence; exhibit their own competence; critique the
change endeavours of others; and undertake their own change endeavours. The
categories of description and dimensions of variation show how, to the study's
participants, the status of theory in TEL is very much thriving and informs

sociocultural perspectives of TEL's enhancement. The findings also expose important contradictory social conditions, which are beyond the scope of phenomenography and are lucrative for further research of an interventionist nature.

1. Introduction

In this paper I set out to contribute to debating the status of theory by examining lecturers' experiences, perceptions and conceptions of their scholarly interactions with theory in technology enhanced learning (TEL). A phenomenographic study is described in the paper, which was conducted in mid-2019. Participants of the study are teaching-focused lecturers at the higher education (HE) wing of the Royal School of Military Engineering, a defence school in the United Kingdom concerned with knowledge and understanding of built infrastructure. It is important at the outset to differentiate the content knowledge of engineering from the pedagogical knowledge being examined. In their disciplinary scholarship, the participants' content knowledge can be described as a nexus of engineering theory and application (Christensen et al., 2015). In the current paper, I examine their experiences at a similar nexus of "practice informed by theory and theory informed by practice" (la Velle, 2019, p. 369) but specifically in their scholarly interactions with theory in TEL. It is also important to note that the paper discusses second-order perspectives of scholarly interactions with *theory* in TEL. It does not scrutinise any particular *theories* in TEL.

The research question driving this paper is "What is the nature of variance in lecturers' conceptions of their scholarly interactions with theory in TEL?". I open the paper with a discussion of three notions which can be problematic in HE; scholarship, theory and TEL. I describe some key issues which frame these three notions, examining the related existing literature and depicting an apparent dearth of empirical studies which examine academics' perceptions, conceptions and experiences of scholarship, theory and TEL. An empirical study is then described, where I present phenomenographic interpretations of participants' experiences in their scholarly interactions with theory in TEL. My analyses identify an outcome space with four collective and parsimonious ways that participants conceive of their scholarly interactions with theory in TEL, from understanding their own competence in TEL to undertaking their own change endeavours. The paper's discussion analyses how participants place importance and meaningfulness on sociocultural enhancement of TEL, exposing lucrative contradictions for further research of an interventionist nature. To close the paper, I conclude by describing how the categories of description – the most important outcomes of

phenomenographic research – show that for these participants the status of theory in TEL is very much thriving.

2. Literature review

Three notions which are foundational for the current paper, and which can be problematic in HE, are scholarship, theory and TEL. These are used to structure the sub-sections below, where I discuss key issues which are presented in existing literature and clarify positions taken in the paper. The fourth sub-section summarises the coverage of empirical studies which examine perceptions, conceptions and experiences of scholarship, theory and TEL.

2.1 Scholarship

In this paper scholarship is broadly conceived as undertaking activities relating to the character of knowledge and understanding, which take place within the purview of HE. In my discussions I use Boyer's (1990) definition of scholarship as informed, reflexive and inquiring approaches of: discovery (creating knowledge); integration (knowledge across disciplines); application (engagement beyond HE) and teaching (developing others). Varied interpretations of scholarship and scholarly activities in HE have been discussed including by Marshall and Pennington (2009); Tight (2019); and Weller (2011). Many contemporary debates have centred on dissatisfaction with defining scholarship; the conflation of scholarly competence with market-driven procurement and publishing of research has been commonly disputed. While relating scholarship to TEL in this paper may serve to focus on specific literature, technology can also add ambiguity to the notion of scholarship, with terms like "digital scholarship" having been used as euphemistic shorthand for the "curation and collection of digital resources" (Weller, 2011, p. 43). I thus deem scholarship in TEL to include participants making research contributions to the TEL activities they are involved in (Laurillard et al., 2013; 2018). I also consider that researching such TEL activities has an *a-priori* requirement for a theoretical approach (c.f. Antonenko, 2014; Elken & Wollscheid, 2016; Tight, 2016a), accepting that theory is also a problematic notion.

2.2 Theory

Theory can be understood in three ways (Calhoun, 2002): as some conjecture to be refuted or confirmed; as that which is commonly accepted as truth; and as some means with which to understand the connections of phenomena. The latter is the notion of theory which I use in this paper. Educational researchers who have shared this

conception, where theory guides and illuminates research and practice, have presented varied judgements of notable criteria and attractive attributes of theory. Examples include: Sayer's (1992, p. 10) theoretical dimensions of ordering, conceptualising and hypothesising; Tight's (2012, p. 196) association of theory with evaluation, generalisation, explanation and prediction; Halverson's (2002, p. 245) theoretical powers of description, rhetoric, inference and application; and Ashwin's (2012: pp. 129-135) discussions of simplification, consistency, framing and openness to development. In this paper I try to avoid endorsing particular characterisations, seeking instead to interpret experiences of others. Yet I do presuppose theory as being in an interweaved nexus of thought, research and practice. I concurrently wish to carefully avoid appearing to use the term theory simply to avoid or obscure analysing reality, whilst "grasping for legitimation" (Bligh & Flood, 2017, p. 128). I reject claims that theory is inconsequential (see e.g. Thomas, 1997) or peripheral (such as the dichotomy of "book knowledge" and "practical knowledge" described by Jarvis, 2002, p. 125).

2.3 TEL

The third problematic notion to describe is that of TEL, which has faced accusations, notably from within, of being under-theorised (Hew et al., 2019), of lacking a stable ontology (Laurillard et al., 2013) and of pervasive "common sense assumptions" of positive effects of techno-logical innovation based on hype (Bennett & Oliver, 2011, p. 178). In response, authors have called for an explicit repositioning and reconsideration of a theory of TEL (e.g. Crook & Sutherland, 2017; Gunn & Steel, 2012; Jones & Czerniewicz, 2011). Passey (2019) has proposed that the very term TEL has become so encompassing as to have lost much of its theoretical meaning to scholars, calling for the representation of distinguishable technology-enhanced fields: managing learning (TEML); education (TEE); managing education (TEME); teaching (TET); and managing teaching (TEMT). In this current paper, I conceive of TEL as a social activity related to the qualitative development of learning processes, activity whose production is mediated by technology yet with the precedence of pedagogical concerns above technological concerns (Kirkwood & Price, 2014). Of additional note, I consider that technological artefacts are both tools (acting on the world) and signs (acting on the mind), which can be either digital or analogue in TEL. By extension, I reject the notion of TEL as referring to wholly virtual interactions which preclude physical co-presence at places of education (see also Crook & Bligh, 2016).

Table 1. Prevalent themes in studies of perceptions, conceptions and experiences of scholarship, theory and TEL from 1983 to 2019

| Notion	Prevalent themes from Tight's (2012) schema for HE research								Total
	Teaching and learning	Course design	The student experience	Quality	System policy	Institutional management	Academic work	Knowledge and research	
Scholar-ship	3	5	8	0	0	0	9	13	38
Theory	8	9	0	0	0	0	9	6	32
TEL	9	8	3	0	0	5	4	1	30

2.4 Coverage of empirical studies

To locate relevant and informative empirical studies in each of the three notions of scholarship, theory and TEL, I first used search criteria to identify peer-reviewed papers ranging from 1983 to 2019 inclusive. The results were manually screened to identify studies of perceptions, conceptions and experiences of phenomena, as discrete from studies of phenomena themselves. During detailed analyses and coding, each paper was allocated a thematic category from Tight's (2012, p. 198) schema for HE research: teaching and learning; course design; student experience; quality; system policy; institutional management; academic work; and knowledge and research. At the time of writing, the literature was found to have the coverage in Table 1. The review highlights gaps, whilst indicating prevalent trends:

- In research of experiences of scholarship, there is a dominance of business-driven outcomes such as knowledge transfer and marketisation of the student experience.

- In research of experiences of interacting with theory, studies most frequently examine redesigning curricula and developing academic staff to sustain competitive advantage.

- In research of experiences of TEL, projects dominate which conduct post-hoc validation of technologies

and which relate implemented artefacts to changing teaching and learning.

When the intersects of these three notions were examined, as shown in Figure 1, there were studies which examined perceptions, conceptions and experiences at the intersect of any two of the three notions. Yet there were none which examined conceptions at the intersect of all three notions. In synopsis, the review illustrates a deficiency of research which examines perceptions, conceptions and experiences of scholarly interactions with theory in TEL.

Figure 1. Quantities of studies of perceptions, conceptions and experiences of scholarship, theory and TEL and quantities of those studies (in brackets) at their intersects
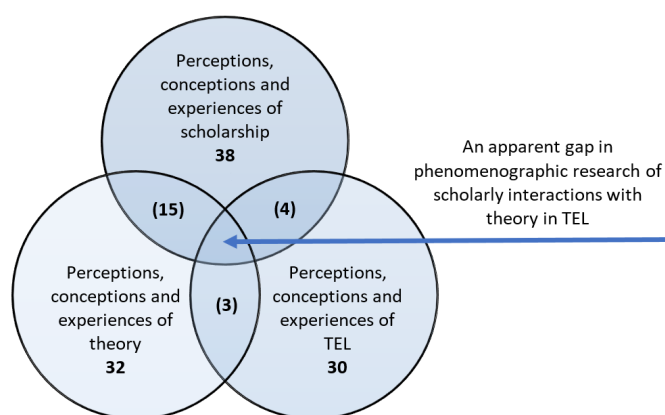
3. Theoretical framework

Phenomenography was used as the study's theoretical framework to interpret participants' perceptions, conceptions and experiences of their scholarly interactions with theory in TEL. It is a qualitative, interpretivist and relatively recent form of research rooted in education (Marton, 1981). A phenomenographic theoretical framework is non-dualistic, and it assumes a limited number of ways in which a group of people perceive, understand or experience a shared phenomenon. Knowledge is thus constituted through relationships between individuals and the world (ibid.). Phenomenography emerged from an empirical basis, and it is the only methodology to have been substantially developed within HE, where it is hermeneutically developed by researchers who apply, critique and improve its methodological processes. Phenomenography concentrates on participants' experiences and conceptions of phenomena as knowledge's central form, rather than focusing on researching phenomena themselves (Svensson, 1997). Experiences and variances are presented for a unitary group; the findings apply to variation

in meaning across, as discrete from within, a population (Åkerlind, 2005).

As a second-order technique based on accounts of experiences, phenomenography is susceptible to allegations of poor rigour, questionable validity and disputed reliability. The majority of criticisms appear to be most notably raised by phenomenographers themselves: it is described by Hallett (2014, p. 203) as "methodological idolatry" which over-prioritises its own procedural concerns; its methodological processes can merely expose the researcher's own pre-ordained categories (Ashworth & Lucas, 1998); and naïve researchers can uncritically replicate participants' conservative, descriptive and neutral data (Webb, 1997). Ekeblad (1997) counters that such critiques are unhelpfully postmodernist, and that the processes of phenomenography do not necessarily impede a researcher being able to test or critique findings. The research design in Section 4 is presented in consideration of these concerns, notably those related to quality. Particular arrangements are summarised which sought during the study to provide assurance of theoretical validity and reliability (Sin, 2010).

4. Research design

In designing the study described in this paper, proposals for phenomenographic research were discussed with a disinterested colleague who conducted regular checks of validity and reliability; not to provide tacit agreement with my conduct or my findings, but for some assurance that the outcome space could have plausibly originated from the research design, the gathered data and the analyses. To further substantiate quality in the research design, I incorporated theoretical and methodological recommendations from more established authors. In particular, my research design included arrangements for: bracketing my intentions; being parsimonious with findings; presenting illustrative quotes for informed scrutiny; and overtly presenting the participants' social conditions (Åkerlind, 2005; Ashworth & Lucas, 1998; Marton & Booth, 1997). In Sub-section 4.1, I describe who the participants of the study were, and how they were selected, followed in Sub-section 4.2 by an explanation of the design to gather and phenomenographically interpret their data.

4.1 Participants and their selection

The participants in the study are amongst my work colleagues at the Royal School of Military Engineering. They are teaching-focused lecturers, recruited from industry to fill the school's lecturing positions in HE, having been recruited

for experience in vocational areas of engineering and management. They teach groups of six to twelve mature military students on degree programmes, who learn to design, construct, project manage and maintain infrastructure such as hospitals, airfields, water treatment and electrical distribution. Pedagogical issues of TEL are generally first introduced to these lecturers during their preparatory training for their positions, which includes undertaking postgraduate certification in HE with a partnered collegiate university. Their continued endeavours at developing TEL activity take place during their design of teaching and learning, in response to feedback from managers, peers and learners, and during formal professional development if they seek it.

In designing the research, I applied purposive sampling to a group of these lecturers at the school who had volunteered for the study. Purposive sampling selected participants for their representation, value and variation. My intent in asking for volunteers and then purposively sampling them was to balance variation with critical cases, limiting my own bias and the potential for artificial distinction (Cohen, Manion, & Morrison, 2011). Purposive sampling is typical of phenomenographic studies, in contrast to pursuing saturation through a large sample size. I accepted a sample size of nine for this study, because it comprised variation of personal characteristics and traits in spite of being below the generally accepted ten to twenty for phenomenography (Åkerlind, 2005). This smaller sample size gave me the opportunity for a deeper approach in the study's field work, and it allows me in this paper to explore contextual shared experiences, yet it does constrain the paper's generalisability.

4.2 Gathering and interpreting data

Data collection was conducted in semi-structured and open-ended interviews with each participant. Interviews comprised conversational open questioning techniques pertaining to notions of scholarship, theory and TEL. These discursive exchanges led to specifically focused questions to expose personal experiences, perceptions and conceptions. I made significant and conscious effort to avoid the carryover of my bias into the problem space, and thus into the subsequent outcome space (Creswell, 2013). Opening discussions of scholarship enquired what each lecturer conceived of their scholarly identity and what typical activities were undertaken in the name of scholarship. Open-ended questioning identified and discussed historically recent activities in scholarship, with follow-up enquiries in response. The second notion of theory and the third notion of TEL were examined in similar ways, applying conversational segue as required. Conversation was guided between the three notions to relate them to the others, in latter stages merging

all three for coinciding and associative experiences.

The data informed the discretisation of conceptions for the subsequent structuring of categories of description and dimensions of variation. Completed transcripts were iteratively analysed to progressively reveal shared conceptions across the group. Reed (2006) describes two analytical methods at this stage: the first, generally in European research, identifies pools of meaning with commonality across the group relatively early; the second, more prevalent in Australasia, preserves individual responses until as late as possible. My analyses used the former; I coded transcripts while removing irrelevant text, progressively identifying congruent experiences and variation of meaning. Boundaries between participants were discarded, as common categories of description were identified (Marton & Booth, 1997). Numerous iterations and reinterpretations eventually revealed an outcome space (Svensson, 1997) which was assessed for important criteria of quality in phenomenographic studies (ibid.): illustration of something distinctive about how phenomena are understood; logical and structural relatedness; and parsimony (meaning faithful illustration of variance, communicated as concisely as practicable).

5. Findings

The outcome space in Sub-section 5.1 shows categories of description in order; the first conception is the least complex and inclusive, and the final conception is the most complex and inclusive. It is important to note that my phenomenographic findings in this paper present only one of many potential outcome spaces. It is also stressed that these categories are not equitably distributed between participants; they represent conceptions across the group as one whole. The categories of description are first introduced, then presented in Sub-section 5.2 as structural and referential representations, and then exemplified in Sub-section 5.3 with quotes from the pools of meaning.

5.1 Outcome space

In this instantiation, there are four qualitatively different conceptions of the group's scholarly interactions with theory in TEL. The group conceived that their scholarly interactions with theory enabled them to:

Category 1. Understand their own competence in TEL.

Category 2. Exhibit their own competence in TEL.

Category 3. Critique the TEL change endeavours of others.

Category 4. Undertake their own TEL change endeavours.

The outcome space is inclusively *hierarchical*, yet *not developmental* (see also Ashwin, 2006). To explain, Category 1 does not include experiences of any other categories, whilst Category 4 includes experiences of all other categories. The outcome space is not progressive or step-by-step, because participants at any one time have assumed any one conception; they have not needed to progressively move through each in turn, from Category 1 to Category 4.

5.2 Structural and referential aspects

The outcome space can be alternatively presented as in Table 2, with structural and referential aspects of scholarly interactions with theory in TEL (described in Marton & Pong, 2005; Yates et al., 2012). Structural aspects represent *importance* to the group. In this study, structural aspects of scholarly interactions with theory in TEL relate to internalisation (individual understanding of factual and relatively isolated concepts) and externalisation (societal understanding of more contextually applied concepts). Referential aspects represent *meaningfulness* to the group. In this study, referential aspects of scholarly interactions with theory in TEL relate to competence, criticality and enhancement.

5.3 Exemplification of the findings

Each of the conceived categories of the outcome space is exemplified below, in the tone of the phenomenographic tradition; not by describing phenomena, but by describing experiences of relationships between participants and phenomena. The authenticity of language has been preserved in the examples, with swearing and taboo references included as they were expressed. These expressions were appropriate in the context and comfort of speaker-listener relationships. Any offence or impoliteness is unintentional "on the part of the speaker" (Timothy & Janschewitz, 2008, p. 270) and is my sole responsibility.

5.3.1 Category 1. Understand their own competence in TEL

Challenges in individual sense-making for notions of competence such as confidence, proficiency and capability were frequently identified in the pools of meaning. Navigating an understanding of competence in TEL scholarship appeared to be considered by participants as a foundational utility for their interactions with theory. Theory seemed to be experienced as some means for them to understand: *others'* expectations of competent TEL scholarship; *their own* expectations of competent TEL scholarship; and *gaps* between the normative judgements of others and their own

judgements of their competence at that point in time. The following examples show experiences related to understanding their competence in TEL scholarship.

"Being capable and all that means using it [theory] to work out what [managers] want from us, kind of set expectations, aspirations maybe … what good enough looks like to them … like a known skillset … common language with [peers and colleagues], knowing the theoretical stuff and feeling a bit better for it, rather than worse off for it, not be scared … not being embarrassed and incompetent, like what to try and not to try in TEL and whatever that is …".

"I wouldn't feel a bit confident … if people were saying stuff and I didn't know what they were on about. A bit of theory … lets you crack the code, you can read stuff … know what people are on about … it [theory] can help you work out TEL that [learners] might need, if you're worried about them getting pissed off in a lab … or on site or a classroom, [theory] might help you work out what might happen, what might not be worth a go …".

5.3.2 Category 2. Exhibit their own competence in TEL

The external and shared meaning-making of theory was considered by the group as essential to their negotiation and exhibition of competence in TEL, particularly in managerial interactions, collaboration with peers and teaching-learning interactions. With reference to the structural aspects of the outcome space, the pools of meaning show that internal sense-making to *understand* competence was considered discrete from external meaning-making to *exhibit* competence. Varied motives for exhibiting competence were evident, apparently adapted to suit the stakeholders involved. The extracts below illustrate the participants' conceptions of exhibiting their competence in TEL, successively including understanding competence in TEL.

"A lot of using it [theory] I suppose is about not looking a dick … at first we do it [interact with theory] for things like getting a [postgraduate certificate in HE] out of the way, and getting through probation periods, but then it turns from not making dicks of ourselves to … doing TEL whatever it might be and making TEL better. It makes you look at least a bit capable in their [colleagues' and managers'] eyes, being proficient … to know and show you know your theory … But I'm convinced we don't really think much about it [theory] until we're worried about looking or sounding stupid, then we need to show other people what we know …".

Table 2. Structural and referential aspects of scholarly interactions with theory in TEL

		Referential		
		Competence	Criticality	Enhancement
Structural	Internal	Understanding competence in TEL		
	External	Exhibiting competence in TEL	Critiquing TEL change endeavours	Undertaking TEL change endeavours

"… coming at it [TEL] from some theory or other makes people think, they'll think you know what you're doing, and [students] they'll feel in safe hands, line managers will know you mean business … it's [theory] got a shitter reputation than it deserves … sometimes it comes across as "either-or" [air quotes with fingers] … either theory or practice like that [chopping motion with hand], a line's drawn … funny thing is if you design say fire pumps you'd be saying and writing, maybe d'Arcy's and Bernoulli's and Pascal's, laws and theories all over the place, but with TEL you don't, you jump straight in … you wouldn't design fire pumps by saying 'just piss about with them and we'll see if they work later' but we do when we're designing TEL, unless we're talking to other people then suddenly we give a shit …".

5.3.3 Category 3. Critique the TEL change endeavours of others

In the pools of meaning, the ability to competently critique change was usually directed at the endeavours of hierarchical line managers. Theory was experienced by participants as intrinsic to their informed and credible critique of such change endeavours. Scholarly interactions with theory in TEL seemed to be experienced as empowering, lending some authority to their critique, with understanding and exhibiting competence in TEL expressed as precursors to critiquing change endeavours. Two examples are shown below, which also illustrate successive inclusion of the previous conceptions. With regard to the referential aspects of the outcome space, and the dimensions of variation, the pools of meaning highlight criticality as being discrete from exhibiting competence. Variance appears to be experienced by capacity to reject, confront, adapt and exchange ideas based on expressing differences of opinion.

"… you wouldn't turn up to find new smart boards on your walls or iPads on your desks and just go 'that's shit' or 'that's ace'. At least I hope not. But if you know what they're [managers] trying to achieve with them you can do some swotting … make sure you know what you're on about and how to tackle them … say 'what exactly will this do … what's going wrong that this'll solve exactly, why are we throwing tablets at people, how do we make learning better with this?'. If you can say that using a bit of grown-up talk, some theory here and there, it's miles better than just bleating how shit their ideas are".

"You can push back on things they [managers] want to change … maybe model what might happen … theory's good for that, maybe get to grips with what the [problem] was in the first place, theory's good for that … telling them 'this won't work, it's shit, spend the money on more people or a vending machine instead' isn't exactly helpful, but analysing and talking with [theory] is … if or when things go tits up you can go 'look it never worked in study x or study y either, but it's not TEL it's just buying a load of iPads, but this other stuff might work' … you can use theory for that, offer solutions that will work not just saying 'it's shit I'm not doing it, it won't work' … ".

5.3.4 Category 4. Undertake their own TEL change endeavours

The final inclusive conception of the outcome space describes participants' interactions with theory to conceive, design and undertake their own TEL change endeavours. Descriptions in the pools of meaning built upon the previous three conceptions. In the referential aspects of the outcome space, and in examining the dimensions of variation,

the extracts show how enhancing TEL was experienced as discretely meaningful from, yet inclusive of, critique. Differentiation of undertaking change endeavours refers to participants taking ownership of recognising the impetus for change, diagnosing the requirements for change, and then designing and undertaking change. The following examples describe how this appeared to be their most complex and inclusive conception.

"We'd use it [theory] for having a go at something different, or should anyway … things to try in seminars, labs, on sites, even just for working out if you know enough to try it, wondering what'll happen, to ask [colleagues] if they reckon they [students] might go with you, or if they might be thinking 'she just hasn't thought this through, fuck this'. I can't remember what I did before I knew what it [theory] was good for, not for TEL anyway … maybe I just tried and guessed and sometimes got lucky … but when you know it and use it [theory] … it's hard not to think about it for your own changes, it saves a bit of time and effort when you're having a go … better than a stab in the dark … at least you can have a read and a think and a chat with other people whether something might work or not …".

"If you're changing things it's to make things better, not worse, so you need enough [theory] flying round, else you're going to look a right dick if it's an epic fail, and you'll take them [learners] down with you. Imagine someone saying 'you said the gaffer's ideas were crap, so do tell us what you tried instead' … then you go 'oh I never had a plan I just thought it'd be worth a go, it's gone tits up never mind [apparent sarcasm] it's only a whole [cohort] can't do their jobs now poor bastards'. There's an incentive to get your "theory proficiency badge" [air quotes with fingers] for TEL before trying to change stuff, or just a "making sure you don't look a dick" badge… if it fails then you've got productive failure if you can use theory to redesign and explain what happened … but you've got a plain old fuck up if you can't use theory to explain it … they'll [learners] thank you one day if you can tell them what went wrong by using a bit of theory, but if you can't they'll just think you're a dick, and they'll probably be right …".

6. Discussion

Various implications for scholarly interactions with theory in TEL can be drawn from the outcome space, with my discussion here delimiting observations which inform debates of the status of theory. The implications of the

conceptions are first structured to suit the separate notions of scholarship, theory and TEL. I then amalgamate these three notions, to discuss implications for scholarly interactions with theory in TEL.

6.1 Implications for scholarship

The outcome space's structural and referential aspects illustrate what participants in the study perceived as important and meaningful for scholarship. Articulation was generally expressed through pedagogical concerns of scholarship, rather than other activities associated with scholarship. Categories of description relate to their use of theory, to negotiate their identity as teaching-focused scholars (from internal and external perspectives) and to understand and enact enhancing their teaching-focused scholarship. These conceptions go a small way to countering narratives in the literature of prevailing "orthodoxies and pseudo theories" in scholarly practice (Drumm, 2019, p. 12) and they present opposition to the empirical literature's foci on instrumentalist gains of scholarship, such as technology transfer with industry and commercialising knowledge. Yet it is important to re-state the limitation that participants of this study are teaching-focused lecturers, conflating their daily reality of scholarship with that of teaching and learning, explaining the pedagogical foci of conceptions. The setting and the participants thus limit generalisability of the findings, yet they do so whilst illustrating how phenomenographic research can yield important empirical results across a bounded group. Amidst claims that learning is displacing teaching, and that students and managers are displacing teachers (e.g. Murphy, 2016), the outcome space implies that some scholars can resist role displacement, and that theory informs their experiences of scholarly activities.

The successively inclusive and hierarchical categories show that theory informs scholarship's movement for the group from instrumentalist to humanistic perspectives, despite the latter being politically problematic (Mardis, Hoffman & Rich, 2014). On one hand, the 'exchange value' of scholarship in exhibiting competence in TEL is related to securing their wage and status. On the other hand, the 'use value' of scholarship in enhancing TEL is related to societal development. For this study's participants, sustaining scholarship's use value through a humanistic perspective is perhaps less hazardous than for most in HE; education in the defence sector is anecdotally characterised by ample resourcing, well-motivated students and job security (c.f. the United Kingdom's HE market and competitive scholarship in Watermeyer & Tomlinson, 2018). Yet the outcome space does expose a nascent lucrative contradiction, with categories of description which are recognisably related to

scholarship's use or exchange value. The dimensions of variation thus illustrate some potential for opposition to scholarship's commodification (by which I mean the process of "transforming use to exchange value", as in Mosco, 2009, p. 129). Aggravating such contradictions is beyond the scope of this paper's phenomenographic research, yet it may benefit future interventionist research (Bligh & Flood, 2015), suggesting lucrative opportunities for formative and agentic change of scholarship driven by participants themselves.

6.2 Implications for theory

The dimensions of variation are informative for the shared social meaning of theory, commencing with the structural representation of competence. The externalisation of exhibiting shared competence leads to successively meaningful experiences of critique and enhancement, the social negotiations of which are informed by theory. This study's collective group is clearly engaged with theory, although again generalisability is likely to be limited. They may have vested interests related to their postgraduate study of TEL, their relatively late entries into lecturing careers and their negotiations of new professional identities as scholars. There is another important caveat that I wish to raise, driven by a dialectic of distance, where the closer I examine the participants' interactions with theory the more ambiguous their implications seem to become. Such ambiguity is characterised in the examples from the pools of meaning, through confused interplay of terms and notions such as theory, theories, methodology and methods, exacerbated during detailed questioning. Further ambiguity exists regarding the group's organisational level. While phenomenography necessitates a relatively consistent sample of participants, there is shared recognition across the group of theory-related outside influence at macro, meso and micro levels (see also Tight, 2012; Crook & Sutherland, 2017). And yet this group's direct experiences are at one organisational level; further research of theory needs to recognise teaching and learning, but ought to also include representation of "the institution and larger society" (Anderson, 2008, p. 47).

By my preclusion of other stakeholders, and by examining experiences of *theory* rather than *theories*, this current paper evades engaging in debates of ideological perspectives, avoiding related traps described in seminal works: Passey's (2013, p. 198) elusive "unifying theory of learning"; Trowler's (2012, p. 278) concerns for "forcing evidence into a frame"; and Shaw and Crompton's (2003, p. 192) "misted theoretical spectacles". Given this paper's interpretivist paradigm I also miss opportunities to aggravate contradictions that theory is embroiled in: theory as a convenient "model of learning to frame teaching" (Drumm, 2019, p. 4), theory's

rejection in anti-intellectual endeavours (Ellis, 2011), and theory's relationship with emotionally laden changes of identity (van Veen & Lasky, 2005). This study partially exposes theory's contradictory nature to these participants, yet those contradictions remain un-aggravated: theory is recognised as complex, yet is sought to provide clarity; scholars secure a wage and status through theory's exchange value, yet use theory for societal benefit; and theory better informs their practice, yet separation of the notions is a false dichotomy to them (the Cartesian wrong turn described by Toulmin & Gustavsen, 1996). Theory in research of TEL is often marginalised for expedience (Bennett & Oliver, 2011) or findings are theorised only to marketise TEL and sustain education's "fetishisation of emergent technologies" (Hall & Stahl, 2016, p. 87). In some contrast this study's participants, whose expressions must be taken at face value, evidently value theory in social and cultural negotiations; others may have more conflicting and troublesome experiences, deserving follow-up research. Whilst debates of its exact nature are far from resolved, theory is thriving.

6.3 Implications for TEL

In research of experiences of TEL, much of the existing literature is dominated by post-hoc validation of implemented digital technologies, the resulting impact on developing staff and redesigning curricula. The socially transformative possibilities of TEL have been nascent for decades, yet empirical research is characterised by the procurement and retrospective acceptance of pre-ordained digital media and platforms (see e.g. Bates & Sangrà, 2011; Hew, Lan, Tang, Jia & Lo, 2019). This study's findings show that participants experience alternative conceptions of TEL, which differ across the group yet are commonly related to the technological mediation of learning and to social negotiations of knowledge and its meaning. Participants foreground their competence in TEL as foundational for the successive critique of change and, in turn, their design and implementation of change. Their most successively inclusive conception, their enhancement of TEL, is described from a sociocultural perspective (as defined in Trowler, Saunders & Bamber, 2009). Despite these social negotiations, the pools of meaning consistently highlight divergence in how TEL itself is defined, with some open and explicit acknowledgements of uncertainty. This observation echoes the words of seminal writers in earlier sections; the very definition of TEL is itself problematic. The group's value judgements of the importance and meaningfulness of TEL are clear, despite TEL itself being less clear.

Examples of what constitutes TEL from elsewhere appear to variously interweave with the group's perceptions,

including: means by which teachers and learners interact (Beetham & Sharpe, 2013); tools and processes for pedagogical design (Laurillard, 2012); and conditions to develop scholarship (Passey, 2019). Shared recognitions of stubborn ontological and epistemological challenges of TEL research are also reflected in the study's pools of meaning. These include the manifestation of challenging encounters in the daily reality of TEL scholarship: countering the marketisation of TEL artefacts; resisting technological determinism; and rejecting the unmediated transmission of digital media for passive consumption (see also Bayne, 2015; Hall & Stahl, 2016; Jones & Czerniewicz, 2011). Whilst TEL lacks a stable definition in the group's pools of meaning (and to an extent that instability informs the dimensions of variation), there are consistent social and cultural learning-oriented perspectives to their experiences of TEL. As with the previous two notions, their experiences and perceptions of TEL may relate to vested interests, but their accounts must be taken at face value in this interpretivist study. As in the wider HE community, a debate of 'what TEL is' across the group appears to be very active, often emotional, and far from resolved. Their uncertainty of conceptions of TEL appear to warrant further research, again of a more interventionist nature.

6.4 Implications for scholarly interactions with theory in TEL

Results of phenomenographic research can be used to develop processes of education, such as the strategic use of variation in teaching to encourage effective learning (Tight, 2016b). The results of this study are likely to have a less direct path to developing TEL processes, yet amalgamating the three notions illustrates valuable findings for scholars beyond their use of theory to merely sustain digital artefacts (c.f. Flavin, 2017). Firstly, the representation of structural aspects implies some movement, from an individual goal of internalised sense-making in TEL, toward a more important societal motive of externalised meaning-making in TEL (described in Vygotskian terms by Aidman & Leontiev, 1991). Secondly, participants attribute and label meaningfulness to their successive competence, critique and enhancement of TEL. In a provocative call to reject theory in all educational research, Thomas (1997, p. 78) claims that "debate about theory is rarely accompanied by any discussion of its meaning". The structural and referential representation of the outcome space suggests that these participants reject Thomas's claim; the status of theory is highly meaningful to them. The categories of description and dimensions of variation also rebuff Thomas's additional claim (ibid.) that theory stifles creativity; data show varied, inventive and imaginative scholarly interactions with theory in TEL.

In a paper written over a decade ago, Laurillard (2008, p. 7) described education as "on the brink of being transformed through learning technologies; however, it has been on that brink for some decades". In a call for more theoretical work by Engeström (2014, p. 60), digital technology is described as having "not yet brought about significant change". Bayne (2015, p. 18) navigates theory and rhetoric to describe TEL as "black-boxed, under-defined and generally described in instrumental or essentialist terms". This paper illustrates that such claims are acknowledged by the study's participants, and yet they are dilemmatic to them, presenting contradictions which are deserving of further research outside the scope of phenomenography. For their scholarly engagement with theory in TEL there are dialectics at play, beyond those of phenomenographic meaning and importance: participants recognise complexity in theory whilst seeking clarity through theory; they consider theory and practice separately but consider them inseparable; they present intellectual analyses which are countered by visceral reactions; and they attribute local difficulties to more systemic problems. Dilemmas are particularly notable in the most inclusive and complex of their conceptions, the enhancement of TEL, and they may be lucrative to agentic change (see e.g. Virkkunen, 2006).

In many studies which discuss scholarship, theory and TEL, managerial consensus can inhibit genuine change, through the pragmatic pursuit of "contrived collegiality" (Mulford, 2010, p. 197) and market-driven "bureaucratic rationality" (Brookfield, 2018, p. 7). Other scholars face the implementation of artefacts to replicate results observed elsewhere, with coercion and edict to pursue pre-ordained intentions (Gray, 2010). The current paper's findings instead illustrate potential for dialectical debates of theory in TEL, informed by this interpretivist research. A caveat is that generalisability of the results is limited. Although no research has "context-free meaning" (Sin, 2010, p. 309), the limitations of this paper deserve explication. Participants were selected to provide variance in "the collective mind" described by Marton (1981, p. 196) yet they are all from the same organisational level in the same HE wing of the same defence school; whilst these results aspire to be of use and interest, there can be no claims of saturation or fitness for extrapolation. The findings do, however, inform further research at this school and are perhaps of some modest interest or use to other researchers. For further research at this particular school, I plan to conduct interventionist research related to scholarly interactions with theory in TEL, led by participants themselves, supplementing these interpretivist findings by aggravating the contradictory social circumstances which have been exposed.

7. Conclusion

This paper describes a study of the nature of variance in how participants conceive of their scholarly interactions with theory in TEL. The outcome space, which is one of many possible outcome spaces, shows that participants conceived of interactions with theory enabling them to: understand their own competence in TEL; exhibit their own competence in TEL; critique TEL change endeavours of others; and undertake their own TEL change endeavours. The structural representation of the outcome space shows the variance in their importance of interactions with theory in TEL; from internal sense-making and understanding competence in TEL, to external meaning-making and exhibiting competence in TEL. The representation of referential aspects shows increasing meaningfulness of their interactions with theory in TEL, attributed to: their competence in TEL; critique of change in TEL; and undertaking their own change endeavours in TEL.

These successively inclusive, hierarchical, and complex categories indicate potential for movement in the participants' interactions with theory. The movement from understanding and exhibiting competence in TEL, toward the sociocultural enhancement of TEL, counters many instrumentalist and business-driven perspectives of theory in existing literature. The categories and dimensions of variation also refute claims that theory is void of meaning, or is somehow oppositional to the reality of practice. This study's participants engaged with theory to confront their role displacement in TEL, and they foregrounded sociocultural perspectives of TEL's enhancement. Importantly, they did so in dilemmatic ways, recognising and negotiating differences in the use and exchange value of their own scholarly interactions with theory in TEL; whilst not using those terms, they presented experiences of tensions between wage and status on the one hand, and change through sociocultural enhancement of learning on the other hand.

This dialectic of use versus exchange value is one of many contradictions exposed in the study which are related to theory. Others include: value judgements of theory in TEL, despite shared ambiguity of a definition of TEL; local difficulties with theory, presented as symptoms of systemic problems; intellectual analyses of theory, countered by visceral reactions; using theory to inform practice, whilst describing both as inseparable; and recognising the complexity of theory whilst seeking its value in clarification. Research to further expose and aggravate these contradictions is beyond the scope of phenomenographic interpretation of meaning and importance; they can be better examined through further research of an interventionist nature, informed by this interpretive study, and driven by participants themselves. To close the paper, the most important outcomes of phenomenographic research, the qualitatively different categories of description, show that for these participants the status of theory in TEL is very much thriving.

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