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Getting to grips with technology enhanced learning literature: Wading out of murky waters

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Abstract

Gathering data on campus-based research-intensive university teachers’ thinking and use of Technology Enhanced Learning (TEL) theory is a challenge and under researched. This article will report on the first stage of a research project involving university teachers and their TEL literature thinking and use whilst studying an optional blended learning design module of a Postgraduate Certificate in Higher Education (PGCHE) course at a UK research intensive university. The findings of the first stage of the research will help refine the research approach for the second stage of the project and aims to minimise any bias or assumptions about university teachers’ thinking and use of TEL theory. A descriptive and content analysis of the bibliographic citations of 32 design and development reports provides an insight into how university teachers approach TEL literature and which types of literature they find useful. It concludes that, whilst university teachers engaged with a wide range of published academic literature from four distinct fields, there is variance in the type of literature they found to be the most useful. These research findings provide a robust foundation for the second stage of the project which will explore the thinking behind how university teachers go about making their literature choices and why. The analysis presented in this paper illustrates the beginnings of an encouraging picture where it is possible for TEL theory to be in a mutualistic symbiotic relationship with TEL practice.

1. Introduction

1.1 Rationale for the study

In the PGHCE modules I convene and teach, participants are given the opportunity to stand back from the everyday reality of their teaching and develop a critical awareness of what they do and why (Ashwin et al, 2015; Trigwell et al, 2000).

Their personal experiences are valued. Participants engage in tasks where they are required to make links between theory and their practice, learn to theorise through practice, and engage with theory to provoke reflection and hopefully enhance their practice. They are practitioners first and foremost, however evidence is crucial and rigorous analysis and reflection is essential (Dewey, 1933; Stenhouse, 1975; Schön, 1983; Brookfield, 2017).

Theory is not seen in opposition to practice. Theory is explored as a means to inform action and used as a vehicle to reflect on their tacit and implicit learning and teaching and disciplinary beliefs, knowledge and expertise as they evaluate their teaching practices (Argyris, 1993; Argyris & Schön, 1978; Brown & McIntyre, 1993).

Participants are able to build their own personal theories about learning and act on such theories as they seek meaning about their practice. This personal theory building activity guides them in their professional judgement and decision making as they progress through the course where they attempt to resolve conflicts to ensure congruence between their conceptual thinking and their practice (Schön, 1983; Cooper & McIntyre, 1996; Tripp, 2011; Daniel & Harland 2018).

This theorisation by university teachers is a form of capacity building. They are engaging with and critiquing TEL literature which requires them to rethink the way they design and teach. The ubiquitous presence of technology in higher education inadvertently challenges the core values and traditions of the university profession itself. There is a gradual shift in conceptual thinking where the shift in focus is moving away from 'teaching as an activity' towards 'learning as a process' (Beetham & Sharpe, 2013; Collis & Moonen, 2001; Ellis & Goodyear, 2010; Laurillard, 2002).

I have pursued this research project which builds on previous work (Sweeney et al, 2019; Sweeney, 2019; Sweeney, 2017) around the thinking behind university teachers' practice. This works aims to deepen my own professional

knowledge and be a researcher of my own practice. My ultimate aim is to provide a relevant evidence-informed and evidence-based work-based learning PGCHE offering for university teachers (McLean & Ashwin, 2016; Smith, 2016).

This case study of 32 university teachers (who are also PGCHE participants on an optional blended learning design module) aims to provide a tool for TEL researchers and practitioners to construct and assert hypotheses and gain an understanding about the challenges university teachers face when engaging with learning and teaching in higher education and TEL theory (Yin, 2015).

This in-depth analysis of PGCHE participants' biographical citations aims to shed some light on possible ways TEL researchers can more effectively communicate their findings. University teachers from a range of disciplinary backgrounds use a range of TEL literature in the PGCHE assessments. However, we TEL researchers and authors have a role to avoid any obfuscation or trivialisation of TEL theory nor resort to writing in ways that may sound impressive but are hard to understand for some readers.

1.2 Context and background to the study

There is an expectation that university teachers have a good understanding of the value of TEL and are able to incorporate learning technologies effectively into their teaching practice (Carter et al, 2011, HEA, 2011; Sharples et al, 2016).

However, TEL literature considers the extent to which learning technologies have impacted on teaching and learning practices to be minimal (Conole, 2004; Kennedy et al, 2011; Laurillard, 2007; Selwyn, 2011; Walker et al, 2016) and university virtual learning environments are predominately used as a vehicle for information transmission and document repository (Armellini et al, 2012; Walker et al, 2016).

Much of the research conducted has been concerned with distance learning and newer, more teaching-focussed universities and less about university teachers' experiences of using educational technology in campus-based research-intensive universities. This is changing and my research aims to add to this new knowledge as the study was conducted with university teachers from a UK research-intensive university (Jones et al, 2000; Goodyear et al, 2005; Ellis & Goodyear, 2010; Sweeney, 2017).

According to Brookfield, '... reading educational literature can help us investigate the hunches, instincts, and tacit

knowledge that shape our pedagogy. It can suggest different possibilities for practice as well as help us understand better what we already do and think' (Brookfield, 2017, p.171).

The 32 university teachers in this case study are mostly novice 'social scientists'. They usually do not have an extensive experience or knowledge of TEL literature. As part of their engagement with the module, they learn about a dominantly qualitative inquiry approach and can struggle with the apparent lack of elegance and simplicity of the scientific method that they are so familiar with. They also need to address their own bias (unconscious or conscious) towards TEL literature that might on the surface appear to be unreliable, somewhat subjective, and unable to be replicated.

It is through their critical engagement with a range of TEL literature during the module that they begin to learn to see the research in a different light (Daniel & Harland, 2018, Yin 2015).

1.3 Theoretical perspectives that underpin my research

My thinking in relation to learning and TEL has been informed by a number of theoretical perspectives. These include conceptions of learning and teaching using a phenomenographic approach; the sociocultural perspective and teaching practice as reflective practice.

The aim of phenomenography is to identify the qualitatively different ways in which different people experience, conceptualise, perceive, and understand various kinds of phenomena' (Richardson, 1999, p.53). The phenomenographic experience is relational, it is not purely objective or purely subjective and is independent of people and the world (Prosser & Trigwell, 1999).

Research on studies of university teachers' experiences of e-learning (Ellis & Goodyear, 2010, González, 2010) using in-depth phenomenographic interviews is located in a broader field of research into university teachers' thinking, knowledge and beliefs (Hativa & Goodyear, 2002).

The second theoretical perspective that informs my research is the sociocultural theoretical perspectives that takes a particular approach to human learning and development that emerged during the 1990s from an appreciation of research on the relationship between language and cognitive development carried out by the Russian psychologist Lev Vygotsky earlier in the 20th century.

In broad terms, sociocultural perspectives seek to

understand relationships between social, cultural, historical and institutional contexts that shape and are shaped by agents' cognitive development and the biological processes of change that occur within the individual (Mercer, 1995; Mercer, 2010; Vygotsky, 1978; Wertsch, 1985; Wertsch & Tulviste, 1998).

Central to Vygotsky's theory is that human beings through their creation of language are a unique species and this is what separates us from other animals. He argues that the uniqueness of the social milieu with regards to socio-cultural settings is what determines our development of higher mental activities. Vygotsky's focus on the individual in a sociocultural context is highlighted by his concept of the zone of proximal development (ZPD), that is, the range of potential each person has for learning within a social context.

The third theoretical perspective that informs my study is the model of teaching practice as reflective practice (Argyris & Schön, 1978) and the research in school settings by Cooper & McIntyre (1996) about the strategies, craft knowledge and perspectives developed by teachers on the basis of their direct and experience of teaching.

This practical knowledge is not fully understood, is tacit, and therefore not always amenable to sharing. University teachers need the opportunity to reflect on and attempt to articulate their experience. They need to realise the value of this knowledge and contribute to their own growth by having a critical perspective of their practice. This perspective also focusses on the 'theory-in-use' work of Argyris and Schön (1978), which can be a vehicle to explain what university teachers do in a given situation in order to achieve an intended outcome.

1.4 Compatibility of theoretical perspectives

Instead of wanting to assert one theoretical perspective over another my study has synthesised insights offered by all three theoretical perspectives I have outlined above. The approaches to learning and teaching theoretical perspective complements the socio-cultural theoretical perspective and the teaching practice as reflective practice theoretical perspective as all three have a similar focus on how a teacher's teaching practice and task design creates an environment for learning (McLean & Trigwell, 2006).

Table 1. Research Design Overview

Research Questions	Methods of Data collection			
What TEL literature do university teachers find useful?	Stage 1: Descriptive Analysis	Stage 1: Content Analysis	Stage 2: Generalised interviews	Stage 2: Contextualised Interviews
What are the differences and similarities between university teachers' literature use?	Stage 1: Descriptive Analysis	Stage 1: Content Analysis	Stage 2: Generalised interview	Stage 2: Contextualised Interviews
To what extent does their disciplinary background influence their choices?		Stage 1: Content Analysis		Stage 2: Contextualised Interviews

2. Research Design and Methodology

2.1 Research strategy

I believe that my research project places a high regard for the reality of and influence of the inner world of university teachers that explores their critical engagement with TEL literature as part of their PGCHE studies. Whilst this may not be the prime focus in Stage One of my research, it still is an important element. I view knowledge as being both constructed, and based on the reality of the world we experience. (Robson, 2011).

In order to successfully gather useful data in response to the research questions I had developed, I have adopted a mixed method research design as outlined in Table 1 below. This research design overview outlines both Stage 1 and Stage 2 of the research and the methods being used to gather data. Stage 2 of the research project incorporates a differentiated interview strategy comprising generalised and contextualised interviews. This paper will not explore this part of the research design.

In light of this, I have developed the following research questions which frame my study.

- What TEL literature do university teachers find useful?
- What are the differences and similarities between university teachers' literature use?
- To what extent does their disciplinary background influence their choices?

2.2 The learning context

The optional PGCHE blended learning design module

is taken by university teachers new to teaching who vary in understandings around educational technology use in teaching but are interested in learning more about TEL and furthering their design and development skills.

As part of this module, participants explore TEL theoretical and conceptual frameworks. Most participants have successfully completed 30 credits of the PGCHE before commencing this module. They have engaged with learning and teaching in higher education literature in the previous modules. As there is a diverse mix of disciplines whilst all participants have much in common the one difference between them is their discipline training. This is usually not a social science one.

Participants who successfully complete the module gain Associate Fellowship of the Higher Education Academy (AFHEA) (HEA 2011) This is one of three optional modules that participants can select on the PGCHE course.

The aim of the module is to enable participants to become capable designers and developers of student-centred blended learning environments that are appropriate for a research-intensive institution that values interactive and collaborative learning and a research-led learning experience.

2.2.1 Module learning outcomes

This 15 credit module has five module learning outcomes:

1. Conceptualise a sound integration of the virtual and face-to-face learning environments in their blended learning design.
2. Engage in an educationally-led process of design, development, delivery, review and evaluation of blended learning environments.

3. Develop a student-centred blended learning experience that promotes collaborative and interactive learning and inclusive curriculum design approaches.
4. Relate their blended learning experience to sustainable and appropriate collaborative and interactive assessment and teaching strategies.
5. Critically review their blended learning experience from a scholarly perspective using blended learning quality and evaluation frameworks.

Participants are asked to critically review their learning designs from a scholarly perspective. This means they need to engage with TEL theory and conceptual frameworks in a meaningful way. They need to reflect on and critique their choices and design decisions and evidence this in their summative assessment.

2.2.2 Summative assessment

The module assessment has two elements. Participants are required to build and evaluate a blended learning experience of no longer than 2 hours of duration (40%) and produce a 1,800 word design and development report (60%) which documents the design, development and evaluation of their blended learning experience. Participants are able to submit 'supplementary material' which is not included in the word count. This will include the relevant module specification, module redesign documentation, their learning design storyboard, background details about the participants and the context in which their blended learning experience is implemented. I will also include appropriate design and development milestones examples, evaluation tools and data and, feedback given to the contributions to the 'design and development milestones' by other module participants or colleagues.

2.3 Participants

The participants in this study were 32 university teachers enrolled in one of four cohorts of a blended learning design postgraduate module at a large research intensive English University. These university teachers are mainly in research and teaching roles where they need to excel in both areas. As this is an optional module the level of engagement is high.

The external examiner has complemented the PGCHE team on the high quality of the module submissions and in particular the way that participants have been able to articulate how their engagement with the literature has enhanced their learning design skills and knowledge. The disciplinary background of these participants was varied. University

teachers were identified to belong to one of the five faculties as outlined in Table 2 below.

Table 2. Disciplinary background by Faculty of research participants

Faculty	Total
Engineering	10
Arts	6
Science	6
Social Science	6
Medicine and Health Sciences	4
	32

2.4 Instruments

2.4.1 The design and development report

I used the reference list of the design and development report, one element of the summative assessment for the module for my study. The report constitutes 60% of the assessment and is a written report of 1,800 words.

Participants must ensure that their design and development report is supported by a range of relevant literature in both TEL and teaching and learning in higher education. This requirement, which is specifically mentioned in the assessment criteria enables participants to demonstrate their ability to use evidence-informed approaches and the outcomes from research, scholarship and continuing professional development (V3 of the UK Professional Standards Framework) (HEA 2011).

2.4.2 Data collection procedure

For this research I followed the human research ethical guidelines in the University to invite voluntary participation from participants who were enrolled in the module. For this part of the project participants were asked permission to access their design and development report reference list. Ethics approval was received by the University.

2.4.3 Data analysis

To identify and explore the different types of literature participants cited in their design and development reports I carried out two analyses (a combination of quantitative and

Figure 1. Data analysis approach

qualitative data analysis) which allowed me to see the integrity of the results from multiple methods. First, descriptive analysis was performed to identify the mode, frequency and range of the bibliographic citations. Second content analysis was performed to develop a framework where data was coded and indexed. Patterns and connections were made.

An overview of the data analysis approach I undertook is outlined below in Figure 1. The aim of this data analysis process was to maintain a chain of evidence (Yin, 2009) throughout the data analysis process as a means to increase the reliability of the evidence collected and my data analysis procedure.

2.4.4 Criteria for judging the quality of my research and findings

To ensure that the credibility and dependability of the research I have reported in this paper and subsequent publications is trustworthy I have implemented a number of criteria (Shenton, 2004; Creswell 2009; Silverman, 2013; Thomas, 2016).

Triangulation

The purpose of triangulation in my research is to optimise the quality of data by developing data through the use of different complementary methods. Stage one of my research deals with the design and development reports submitted as a summative assessment by 32 university teachers. The purpose of combining the data from the descriptive and content analysis with the two different interview methods to be employed in the second stage of the research is to develop an empirical basis for representing and understanding different facets of the thinking governing the university teachers' TEL literature use.

I aim to develop a methodologically coherent and pragmatic framework that does not privilege one set of data over another. I am open to different possibilities. There might be apparent inconsistencies between the data generated from the descriptive and content analysis and the proposed generalised and contextualised university interview accounts of PGCE participants.

Member checking

As I conduct interviews in the second stage of my research, I will ensure that the accuracy of my interpretations of the interview data collected are then member checked by those who have been interviewed (Creswell 2009; Silverman 2013).

Thick description

I have attempted to describe in detail the context of my research study and the events that have occurred thus far. I aim to provide a thick description (Flyvbjerg, 2011; Lincoln & Guba, 1985) to help the reader identify with the research setting and context. This will be further articulated in the second stage of the research.

Peer scrutiny

I have had the opportunity to present my research in a number of fora. I have presented the findings from the first stage of my research to Science colleagues as part of an educational inquiry network event.

Self-reflection

Throughout my PGCE teaching I have kept a detailed notes. This has been where I reflect on particular literature I have read. I have made notes in response to participants' response to classroom activities and tasks.

It is through these opportunities for scrutiny that I have been able to challenge some of my assumptions, refine my research project and strengthen my lines of argument in light of the fresh perspectives, constructive feedback and comments I received from colleagues.

Ethical considerations

During the data collection phase of my research project, it was made clear to all university teachers who participated in the study that what information they revealed to me in the role of researcher, would not be disclosed with other participants in the study.

Permission for research to be conducted with employees of the University was sought from the Research Ethics Committee in the School of Education in the 2019, using the required Ethics Review Form.

The research I conducted adheres to the University of Nottingham's research code and research ethics and was conducted in a responsible and ethical manner and I operated to the required high ethical standards.

3. Stage One Research Project: Results

The bibliographic citations from all 32 design and development reports were collated and added up to 412 separate items. Through the preliminary descriptive analysis process, four distinct fields of literature were identified. TEL literature, module specific TEL literature, disciplinary specific literature and, learning and teaching in higher education literature.

For the purposes of this study, the TEL literature was categorised into two separate categories because module participants were introduced to specific TEL literature as part of their task work in the module. Particular book chapters were set as readings and participants were required to engage with the reading, respond to set trigger questions and then respond by posting their thoughts onto a 'dealing with the literature' online blog.

The four fields of literature categorisations are identified in Table 3 below. It is important to note that the number of bibliographic citations from the 32 design and development report reference lists identified were reported by more than one participant, in particular the module specific TEL literature that was selected by the module convenor.

Table 3. Results of literature field descriptive analysis

Literature Field Categorisation	Bibliographic citations
Teaching & learning in higher education literature	124
TEL literature	119
Module specific TEL literature	92
Disciplinary specific literature	77
	412

3.1 Results of literature field categorisation and literature type descriptive analysis

The 412 bibliographic citations were further analysed and categorised. Specific types of academic literature were identified and four distinct types of academic literature emerged.

The first category 'Books' included academic literature that had been published by an academic publisher and usually in an edited collection or monograph.

The second category 'Conference Proceedings' included academic publications usually from an international conference. These proceedings went through a peer review process and these conferences were usually associated with an established professional body or society.

The third category 'Journal Article' included academic literature that was published by academic publishers, this also included some open source journals.

The fourth category 'Other' included literature that did not fit neatly into one of the other three types. This literature included professional reports, staff development guides, magazines, and multi-media resources. This literature was different to the other three types of literature as it did not appear that the 'academic peer review' process had been applied.

Each of the 412 bibliographic citations was categorised into one of these four types of academic literature as outlined in Table 4 below.

3.2 Results of bibliographic citation content analysis

As identified in Table 4 the two most common bibliographic citations were for books and academic journal articles. To acquire a deeper understanding of why there were 170 book bibliographic citations it is imperative to analyse in detail the module specific TEL literature. The reference lists from 32 design and development reports identified a total of 92 bibliographical citations from the 10 module specific TEL literature readings module participants read as part of their coursework.

Table 4 outlines the number of times each of these readings was cited by individual participants. It needs to be noted that there were two core reading texts provided to participants via the online reading list. Participants were required to read 8 specific chapters of books and post their thoughts about the readings to the blog. This coursework

Table 4. Results of literature field and type descriptive analysis

Literature Field and Type	Book	Conference Proceedings	Journal Article	Other	Total
Teaching & learning in higher education literature	52	6	56	10	124
TEL literature	26	15	43	35	119
Module specific TEL literature	92				92
Discipline specific literature	5	6	59	7	77
	175	27	158	52	412

task is a key element of the course and participants are able to reflect on the readings, post their thoughts and read each other's' blog posts. The posts are valuable for participants as a means to inform their design and development thinking and decision making throughout the module. Participants are able to discuss what literature influenced their thinking as part of an in class presentation as well as in their written design and development reports.

Whilst, the number of teaching and learning in higher education books cited was 52 which may add an interesting dimension to the study, this will not be an avenue that will be explored in more detail in this paper. Much of this literature participants have engaged with in previous PGCHE modules, and whilst it may bear some relevance to their blended learning designs is not the focus of this part of the study. However, as outlined in Table 5 the module specific TEL literature introduced to participants in their module will be further analysed.

3.3 Results of module specific TEL literature content analysis

The three most often referenced bibliographic citations were: Conole, (2016), Phillips et al, (2012), and Ellis & Goodyear (2010). The first two chapter readings support university teachers with design and evaluation of their blended learning design and development whilst the third reading is a recount of empirical research around university teachers' conceptions of blended learning. These three readings articulate TEL conceptual and theoretical frameworks differently as a result of their intent and how explicitly they guide university teachers in regards to theoretical and conceptual frameworks. Each chapter distils and operationalises key learning and teaching in higher education and TEL theoretical and conceptual frameworks.

Two of these chapters Conole (2016) and Phillips et al. (2012) state they have been influenced by the Conversational Framework (Laurillard, 2002) and other theories (see Table 6 for more detail). The results show that participants were engaged with these two chapters the most. Participants were able to read Laurillard's work as it was available for them to read via the online reading list. Only one participant cited Laurillard's work in their reference list.

It interesting to note that Laurillard's Conversational Framework (2002) has been influenced by the Reflective Cycle (Kolb, 1984) Conversation Theory (Pask, 1976) and

Table 5. Results of module specific TEL Literature content analysis

Module specific TEL literature: Book	# citations
Conole, G.(2016) Chapter 6 in Dalziel, J. (ed)	20
Phillips, R., McNaught, C. & Kennedy, G. (2012) Chapter 3	15
Ellis, R. & Goodyear, P. (2010) Chapter 6	13
Salmon, G. (2011) Chapter 2	11
Collis, B. & Moonen, J. (2001) Chapter 5	10
Garrison, R. (2017) Chapter 6	9
Walker, S. & Kerrigan, M.J.P (2016) Chapter 4 in Dalziel, J. (ed)	7
Laurillard, D. (2002)	4
Garrison, D. R. (2017) Chapter 10	2
Beetham, H. & Sharpe R. (2013)	1
	92

Social Development Theory, one of the foundations of constructivism (Vygotsky, 1962). Participants do engage with these educational theories in other modules of the PGCHE. They are concepts that participants engage with as they are rethinking their design and development of the TEL resources.

Table 6 identifies the key theories and conceptual frameworks that each of three chapters identify as being influential.

3.4 Results of TEL academic journal content analysis.

I conducted a content analysis of the academic journal bibliographic citations from the TEL literature. There were

43 TEL academic journal bibliographic citations in total. In the 32 design and development reports analysed, 22 different TEL academic journals were identified.

The seven most cited TEL academic journals are presented in Table 7. 'Computers and Education' was the most often cited journal. There were nine unique bibliographic citations identified. The second most often cited academic journal was 'The Internet and Higher Education'. There were two unique citations. It was noted that one of the journal articles was cited by four participants. The third most often cited academic journal was 'British Journal of Educational Technology'. There were four unique bibliographic citations identified.

Table 6. Results of module specific TEL literature further content analysis

Author	Date	Aim	Conceptual/theoretical frameworks
Conole	2016	The chapter outlines the '7Cs of Learning Design framework', (conceptualize; create; communicate; collaborate; consider; combine; consolidate). The framework aids teachers/designers to make pedagogically effective design decisions and use digital technologies appropriately.	Conversational Framework (Laurillard, 2002) Computer-Supported Collaborative Learning (Silverman, 1995) Social learning theory (Vygotsky, 1978) Learner self-regulation (Nicol & Macfarlane-Dick, 2006; Gibbs & Simpson, 2004) Discovery model (Bruner, 1961) Kirkpatrick's Evaluation Model (Kirkpatrick, 1996)
Phillips et al.	2012	The chapter outlines the LEPO (Learning Environment, Processes, Outcomes) framework. LEPO conceptualises three components of learning: the environment which facilitates learning (learning environment), the activities which are part of learning (learning processes) and the knowledge, behaviours, skills or understanding demonstrated (learning outcomes).	3 P Model - Presage, Process, Product (Biggs, 1989) Conversational Framework (Laurillard, 2002) The Learning-centred Evaluation Framework (Bain, 1999) Interactive learning on the web (Reeves & Reeves, 1997) Problem space of educational design (Ellis & Goodyear, 2010)
Ellis & Goodyear	2010	The chapter summarises recent research on university teachers' experiences of teaching in situations where their students are expected to make significant use of e-learning, integrated with various face to-face activities.	Research into students' and teachers' experiences of learning and teaching in higher education (Biggs, Booth, Entwistle, Kember, Laurillard, Marton, Prosser, Ramsden, Säljö, Svensson and Trigwell) Relational concept (Marton & Booth, 1997) Ecological psychology (Gibson, 1986) Perception (Ingold, 2000; Bateson, 1973) Relational thinking (Giddens, 1984)

Table 7. Results of academic journal content analysis

Academic Journal Title	# citations	# unique citations	impact factor
Computers and Education	9	9	5.627
The Internet and Higher Education	5	2	5.284
British Journal of Educational Technology	4	4	2.588
Computers in Human Behaviour	3	3	4.306
International Review of Research in Open and Distributed Learning	2	2	1.734
International Journal of Technology Enhanced Learning	2	1	1.30
Educational Technology	2	1	n/a

Of the 18 bibliographic citations, participants came from a range of disciplinary backgrounds. Five were from Medicine and Health Sciences, five from the Social Sciences, four were from Engineering, two were from Science and one was from Arts. Of these 18 participants, 11 of them were from the Sciences whilst six were from the Social Sciences and Arts.

The impact factor data in Table 7 was gained from the academic journal publisher website of each of the journals. This data was gained by specific annual journal citation reports published by different analytic organisations. I have presented this data to consider if university teachers were aware of the perceived correlation between impact factor and quality. This point will be further explored in stage 2 of the research project.

Participants from three of the four cohorts of the module had access to two de-identified design and development reports as example submissions. These were made available on the Module virtual learning environment site. The reference lists from these two submissions cited two of these journal articles.

It appears that other module participants have identified

these particular bibliographic citations as being useful and included them in their own design and development report reference lists.

3.5 Results of disciplinary background content analysis

A further content analysis was conducted to identify which disciplinary background found what type of literature the most useful. In Table 8 each of the five faculties and their use of different types of literature is identified. The results identify that the faculties of Arts and Social Sciences found book chapters from the module specific TEL literature to be the most useful. Whilst Engineering and Science on the other hand, identified discipline specific academic journal articles to be most useful.

4. Discussion

The purpose of my study was to investigate how 32 university teachers use TEL literature in their design and development reports and which kinds of literature they find the most useful.

It was also to begin to develop understandings about the thinking behind which kinds of TEL literature university teachers consider the most useful. The second stage of this research will focus on this point in detail.

The following three research questions were formulated in light of my exploration of the TEL literature which shaped the design of first stage of my study. Each of these questions will be addressed individually in relation to my research findings presented in Section 3 of this paper.

Research Question 1:

- What TEL literature do university teachers find useful?

In regards to TEL literature use, the 32 design and development reports identified academic journal articles to be the most useful. The second most often cited literature type was books.

Of the 22 TEL academic journals identified the three most often cited were:

- Computers and Education
- The Internet and Higher Education
- British Journal of Education Technology

18 participants who cited these three TEL academic

Table 8. Results of disciplinary background content analysis

#	Faculty	Literature Field	Book	Conference Proceeding	Journal Article	Other	Total
10	Engineering	Module specific TEL literature	14	-	-	-	14
		TEL literature	8	3	9	7	27
		Disciplinary specific literature	-	2	18	1	21
		L&T in HE literature	14	3	15	1	33
6	Arts	Module specific TEL literature	20	-	-	-	20
		TEL literature	9	3	6	6	24
		Disciplinary specific literature	5	2	7	-	14
		L&T in HE literature	15	1	12	1	29
6	Science	Module specific TEL literature	20	-	-	-	20
		TEL literature	2	2	5	4	13
		Disciplinary specific literature	-	1	21	4	26
		L&T in HE literature	7	1	7	2	17
6	Social Science	Module specific TEL literature	30	-	-	-	30
		TEL literature	5	6	13	8	32
		Disciplinary specific literature	-	1	3	-	4
		L&T in HE literature	10	-	11	1	22
4	Medicine & Health Science	Module specific TEL literature	8	-	-	-	8
		TEL literature	2	1	10	10	23
		Disciplinary specific literature	-	-	10	2	12
		L&T in HE literature	6	1	11	5	23
32			175	27	158	52	412

journals came from a range of disciplinary backgrounds. Five were from Medicine and Health Sciences, five from the Social Sciences, four were from Engineering, two were from Science and one was from Arts. Of these 18 participants, 11 of them were from the Sciences whilst six were from the Social Sciences and Arts.

The three most often cited module specific TEL literature were:

- Chapter 6: 'The 7Cs of Learning Design' by Grainne Conole, in *Learning Design: conceptualizing a framework for teaching and learning online*, edited by James Dalziel and published in 2016.
- Chapter 3: 'The learning environment, learning pro-

cesses and learning processes (LEPO) framework' by Rob Phillips, Carmel McNaught and Gregor Kennedy in their book, *Evaluating e-Learning, guiding research and practice*, published in 2012.

- Chapter 6: University Teachers' Experiences of e-learning in higher education: the ecology of sustainable innovation by Rob Ellis and Peter Goodyear in their book, *Students' Experiences in e-learning in higher education: the ecology of sustainable innovation*, published in 2010.

Whilst these three readings were selected by the module convenor and were set readings, not all 32 university teachers cited the module specific TEL literature in their design and development reports. The faculties with the most

citations were Social Sciences and Arts with a total of 50 citations. There was slightly less bibliographic citations from the Sciences and Engineering where there was a total of 41 citations of module specific TEL literature.

By engaging with the module specific TEL literature, university teachers are able to reflect on their TEL concepts and resolve the dilemmas and challenges they face in adapting their teaching to one where the focus is much more on what the students do. They develop tasks that encourage their students to collaborate together in small groups, to converse online both synchronous and asynchronously and to reflect on their experiences as means to gain insight on their actions. These tasks demonstrate that there is a shift away from using virtual learning environments only for knowledge transmission and information repositories and more towards one of knowledge construction and information sharing.

Research Question 2:

- What are the differences and similarities between university teachers' literature use?

A variance in the use of different types of literature (books, conference proceedings, academic journal articles and other) was identified across the 32 design and development reports analysed.

Differences

There was variance in which types of literature participants found useful. Some participants found books extremely useful whilst others were much more reliant on academic journal articles. There were 175 book citations whilst 158 journal article citations. There were 27 conference proceedings cited and 52 other publications of teacher guides and reports.

There was variance in the use of module specific TEL literature. Some participants relied heavily on this literature whilst others did not cite any of this literature at all. There were 92 bibliographic citations of module specific TEL literature.

Similarities

The majority of literature cited was from the learning and teaching in higher education literature field and not specifically from the TEL literature field. This literature focussed on learning and teaching in higher education theory and conceptual and theoretical frameworks. Participants were familiar with much of this literature as a result of their previous participation in other PGHCE modules.

It was a surprise and assuring to see that this was the most often cited field of literature. Does this mean that the 'pedagogy before technology' moniker has now been evidenced? Do university teachers find this literature the most useful when navigating the 'murky waters' of TEL literature? The second stage of this research will seek to gather further data to explore this point.

Academic journal articles were the predominant type of literature used. TEL academic journal articles and discipline specific academic journal articles were the most cited. This finding will assist in the question formation for the differentiated interview strategy to be used in the second stage of the research.

Research Question 3:

- To what extent does their disciplinary background influence their choices?

Clear disciplinary differences were identified in the content analysis of the 32 design and development reports.

Those participants from the Arts and Social Sciences found book chapters from the module specific TEL literature to be the most useful. They also engaged with book chapters from the field of learning and teaching in higher education as well. Why is this the case? Could this be due to the social science conventions of publishing monographs and edited books that dominate the TEL and teaching and learning in higher education fields in particular? Do these university teachers find books from these two literature fields easier to engage with and make sense of the ideas and concepts explored as a result of their disciplinary background being grounded in the social sciences?

Conversely, those participants from Engineering and Science identified discipline specific academic journal articles to be most useful. It is interesting to note that the starting point for literature selection appears to be within their own discipline. Why is this the case? Do they feel that can navigate a discipline specific field of literature more confidently? Do they think that they can judge the quality of the literature more assuredly due their familiarity with the discipline? Is this about the way the articles are structured and written? Or is this more related to the idea of being able to see its relevancy and applicability to transfer into my practice?

What does this tell us as TEL researchers? What do we need to do to gain a wider readership regardless of their disciplinary background? How do we engage these readers?

5. Conclusion

This is the first stage of a larger research project. The rationale of this stage of the research is to gather evidence to inform the research questions and research strategy of the second stage of the research study. The second stage of the study will comprise in-depth interviews with university teachers using a differentiated interview strategy to investigate the thinking behind how useful they have found the TEL literature they have used in their design and development reports.

Further investigation is needed for both TEL researchers and teachers on how we select, introduce and frame TEL literature with university teachers on postgraduate certificate in higher education courses and other post graduate programmes.

The findings from this first stage of my study identify that the module specific TEL literature that was found the most useful was more applied in nature and was influenced by a number of key educational theories that university teachers were previously familiar with such as Kolb and Vygotsky. The TEL theory and conceptual frameworks that were identified as useful supported collaborative and interactivity between their learners yet appear to contradict findings of university teachers using virtual learning environments as repositories and information transmission.

In framing the interview schedule for the second part of my study it would be worth exploring more deeply how university teachers go about seeking useful literature and if they have a sense of being welcome to the field of TEL literature and can confidently discern quality TEL literature whilst studying as part of a PGCHE blended learning module.

The descriptive and content analysis in this paper brings to light some of the different types of TEL literature university teachers found useful in their PGCHE studies. This analysis offers a lens to examine more closely those TEL theoretical and conceptual frameworks university teacher found to be the most useful. This will be conducted in the section stage of the research project. This analysis presents a mutualistic symbiotic relationship where both TEL theory and TEL practice are beneficiaries.

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