



Digital capability and teaching excellence:
an integrative review exploring what infrastructure
and strategies are necessary to support effective use
of technology enabled learning (TEL)

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Dr Liz Austen, Helen J Parkin, Stella Jones-Devitt, Kieran McDonald and Brian Irwin
Sheffield Hallam University

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This report is on the topic of digital capability, teaching excellence and the effective use of technology enabled learning (TEL). It was submitted to QAA by Dr Liz Austen, Helen J Parkin, Stella Jones-Devitt, Kieran McDonald and Brian Irwin of Sheffield Hallam University.

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Foreword

I studied at university in a different time. I can remember - admittedly particularly (or perhaps 'only') during examination periods queueing to get into the university library. I can remember compiling copious revision notes on colour coded index cards. But I can also remember something else. In my final year, I completed an undergraduate dissertation which involved trekking off not to the library but to an equally large and forbidding building - the university computer centre. There, I laboriously turned abstruse seventeenth century probate documents into coded 80-column punched cards so that they could be 'processed'. I carried these punched cards around with me in a shoebox. For several years after I graduated, the punched cards, by now useless, were used to scribble shopping lists on.

I didn't realize it, but I was part of a profound shift in higher education. I was developing (we didn't have the language for it then) 'digital capability'. A generation on, and that entire set of undergraduate experiences feels almost as remote as the experience of a medieval scholar using quill and pen. No-one queues for libraries any more: students expect to log in as and when they want to. They develop their notes and revision notes on any number of easily usable and available apps. And even the shopping lists now get keyed in to digital devices.

Higher education is still grappling with the breadth and depth of the digital transformation. The terms of trade for universities, as for colleges and schools, have changed in some fundamental ways. The relationships between teaching and learning, between academic staff and students, between the acquisition, analysis and understanding of content and the development of information retrieval and processing skills - all these and more have been, and are continuing to be reconsidered.

Yet at the core the purposes of universities and of advanced learning remain in many ways unchanged: developing understanding at the very highest level through the engagement with the most current knowledge about a field and the most sophisticated methodological tools available. One of the most pressing of questions for university academics is, therefore, to think in challenging and applied ways about the relationship between digital capabilities and teaching excellence. What makes that so interesting a question is the way it poses an enduring question - what does teaching excellence look like, in different contexts, - against contemporary and changing questions - how does digital capability develop and what does it look like. It is important to explore and to understand the ways in which the affordances of changing technologies can support teaching of the highest quality.

Those questions will always be approached in a number of ways - everyone who teaches in higher education will have views on them. This report does something important, and something which goes to the heart of the mission of universities: it treats the questions systematically, being rigorous about definitions and methods. At a time when UK universities are being asked to think more deeply than ever before about teaching excellence, it is an example of the importance of bringing seriousness and rigour to tough professional and practical questions.

Professor Chris Husbands
Vice Chancellor, Sheffield Hallam University

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1 Executive Summary

Context

This report is set within the evolving landscape of UK Higher Education (HE) in which an increasingly marketised HE economy has led to a changing relationship with students and wider stakeholders. The proposed introduction of the Teaching Excellence Framework (TEF) (Department for Business, Innovation and Skills, 2016) aims to recognise and reward excellent learning and teaching. This integrative review provides timely evidence concerning the relationship of digital capability and teaching excellence.

Methodology

An integrative review was chosen as the aim of this approach is to test and build theory through an iterative process of review and engagement (see Coren and Fisher, 2006). As the proposed methodology comprised a continuous dialogical process, the aim, objectives and overall scope were subject to modification from identified internal and external stakeholder groups as part of the research design process.

An integrative review was deemed more suitable than more traditional approaches due to the fluid and contested nature of the area under research; hence, the review was grounded on a continuous gathering of collective expertise and judgement of evidence in order to build theory.

Research process

The central research question for this project comprised: *How can digital capability promote teaching excellence?*

The aims encompassed to: identify which strategies have the most impact for teaching excellence; identify which features of institutional infrastructure maximise and ensure the effective use of Technology Enabled Learning.

The objectives were to: undertake an integrative review which assesses a range of literature and strategic approaches concerning the scope of digital capability to promote teaching excellence in UK universities; formulate sector-wide *Guidelines for Developing Digitally-Capable Teaching Excellence*; identify gaps in the evidence-base and make recommendations for further work

One of the first decisions concerned operationalising key concepts of the initial research question; hence, the definition of *digital capability* was informed by the work of Bennett and Folley (2015) and Beetham (2015). *Teaching excellence* was significantly more difficult to define strictly, with recent critiques and publications proving less useful due to the contested nature of this emerging construct.

The definition for individual excellence: *Evidence of enhancing and transforming the student learning experience* derived from the Higher Education Academy (HEA) National Teaching Fellowship Scheme's (NTFS) (2015) was used to operationalise the term 'teaching excellence' as it was deemed to have sufficient utility for institutional application.

The original research questions were operationalised into:

Which digital capability strategies have the most evidence of enhancing and transforming the student learning experience?

Which features of institutional infrastructure maximise and ensure the effective use of Technology Enabled Learning to enhance and transform the student learning experience?

The Review Protocol (Appendix A) outlines the framework and decision making processes undertaken, including search terms. Comprehensive scoping, piloting and internal moderation of the search terms were then undertaken. There was also a substantial discussion about types of artefacts deemed appropriate for this review.

Designated search strings yielded a total of 1,818 pieces of literature, of which 1,784 were excluded. Thirty-four were included in the final sample and this formed the evidence base for the findings. Independent application of the inclusion/exclusion criteria was supplemented by collaborative application of the criteria to increase the trustworthiness of the methodology.

Researcher reflections - in which justification for decisions made are conveyed alongside questions generated from further reflections - are included within Section 4.5 of this report.

Findings

When addressing findings emerging from the question '*Which digital capability strategies have the most evidence of enhancing and transforming the student learning experience?*' several aspects emerged: teaching with technology does not always transform learning; a broader conceptualisation of digital capability is needed to promote teaching excellence in higher education; digital capability can promote teaching excellence by avoiding technological determinism while putting pedagogy first; measurements of student satisfaction - and poorly constructed proxy measures - can (and will) be used to assess the digital capability of teachers; teaching excellence requires all teachers to engage with digital capability, rather than silos of digital specialists.

Findings emerging from the question '*Which features of institutional infrastructure maximise and ensure the effective use of TEL to enhance and transform the student learning experience?*' comprised: the promotion of digital capability for teaching excellence requires strategic ownership; digital capability strategies used to promote teaching excellence must address resistance to change; digital capability needs to be valued if it is to promote teaching excellence; the pivotal nature of professional development and pedagogy should be acknowledged.

Guidelines for Developing Digitally-Capable Teaching Excellence

The good practice guidelines are intended to provide discursive starting points for developing ideas concerning the effective integration of digital capability and teaching excellence into a unitary construct for the UK HE sector.

These ideas form a set of overarching principles - presented here as a set of statements - to shape relevant approaches between institutions, staff, students and wider stakeholders.

The *Guidelines for Developing Digitally-Capable Teaching Excellence* are purposely broad to enable wide transferability across the sector and also in facilitating meaningful application at subject and discipline level.

Overarching principles:

- 1 start with pedagogy every time
- 2 recognise that context is key
- 3 create a digital capability threshold for institutions
- 4 use communities of practice and peer support to share good practice
- 5 introduce a robust and owned change management strategy

- 6 develop a compelling evidence-informed rationale
- 7 ensure encouragement for innovation and managed risk-taking.

Recommendations

Institutions could look to replicate the studies of Owens (2012 and 2015) for the purposes of examining digital capability and teaching excellence as an integrated concept.

There is a need to evaluate teaching practice and to recognise complexities of practice and attendant terminology.

All stakeholders should consider assumptions concerning pedagogies and the potential influence of disruptive pedagogies.

Institutions should horizon-scan emerging technologies and new pedagogical ideas and consider their integrated application for developing teaching excellence.

Other researchers should consider the utility of the integrative review methodology when needing to build theory from emergent and/or contested areas.

The *Guidelines for Developing Digitally-Capable Teaching Excellence* should be enhanced by building-in further workshop elements to contextualise implementation of the overarching principles.

The *Guidelines for Developing Digitally-Capable Teaching Excellence* and findings should be linked to examples of existing good practice, resource-development and sector-wide partnership working.

Conclusions

There is an inherent difficulty when trying to use the words *digital capability* and *teaching excellence* as they are contested terms singularly and in combination.

This is an evolving area of research and the areas of teaching excellence and digital capability as an integrated construct are worthy of further analysis.

As an iterative process, integrative review is ideal if considering dynamic critiquing mechanisms for emerging concepts.

The aim: *To identify which strategies have the most impact for teaching excellence* has been met partly due to the considerable contestation of the areas under scrutiny.

Evidence found in assessing the aim: *To identify which features of institutional infrastructure maximise and ensure the effective use of Technology Enabled Learning* confirmed that priority was still given to developing digitally-capable individual practitioners above everything else.

Researchers interested in deeper analysis of the review findings should access the full database of sources (see Appendix G for further information).

This review and development of the *Guidelines for Developing Digitally-Capable Teaching Excellence* are proportionate to the timescale for completion of this commissioned research.

2 Context

Changes to the UK Higher Education (HE) system continue apace since the introduction of tuition fees in 1998. The sector has seen a shift from directly-funded provision to one which recognises an increasingly marketised HE economy and a changing relationship with students and wider stakeholders (Molesworth et al, 2011). The report by Browne (2010) *Sustaining a Future for Higher Education* recommended placing more funding responsibility on successful graduates, thus predicating a move towards identifying a range of metrics to enhance the informed choices of potential HE entrants. This position has now escalated with the proposed introduction of the *Teaching Excellence Framework* (TEF) (Department for Business, Innovation and Skills, 2016) which aims to recognise and reward excellent learning and teaching. This integrative review is set within this evolving context and aims to provide some timely evidence concerning the relationship of digital capability and teaching excellence.

Within this context, the key question for this project comprised: *How can digital capability promote teaching excellence?* To address this question, the following aims were devised:

- to identify which strategies have the most impact for teaching excellence
- to identify which features of institutional infrastructure maximise and ensure the effective use of Technology Enabled Learning.

A more detailed critique of the aims, objectives and ensuing methodology is located within Section 4 of this report.

3 Methodology

3.1 Integrative review process

An integrative review - rather than a traditional - systematic review process has been chosen as the aim of this approach is to test and build theory through an iterative process of review and engagement (see Coren and Fisher, 2006). It should be noted that - as the proposed principal methodology comprised a continuous dialogical process - the aim, objectives and overall scope were subject to modification from identified stakeholder groups as part of the research design process. These groups - referred to below as the Internal and External Steering Groups - were instrumental in enhancing the research process through guiding the development and refinement of the Review Protocol (See Appendix A). An integrative review was deemed more suitable than more traditional approaches for the somewhat fluid and contested nature of the area under research. One of the key challenges for an integrative review concerns the nature of the process which - as Victor (2008) acknowledges - is a more developmental method than traditional systematic reviews, grounded on a continuous gathering of collective expertise and judgement in order to build theory.

3.2 Integrative review framework

The following table - adapted from Victor (2008) - highlights the key differences between a traditional systematic review and the integrative review process chosen for the purposes of this research.

Table 1. A comparative toolbox: systematic and integrative reviews		
Summary of approach	Traditional Systematic Review	Integrative Review
	Primarily derived from clinical medicine where it was designed to reach rigorous conclusions about the effects of medical interventions	An emerging set of approaches based upon the view that knowledge should be accumulated in an integrative rather than an additive way
Key methodological features	A highly prescribed and staged methodology. It prioritises the inclusion of randomised controlled trials (RCTs) whose data is extracted via a standardised template, pooled and analysed through statistical meta-analysis	Centred upon theory development. A less prescribed, more iterative process which proceeds according to the researchers' and identified significant others' expertise and judgement. Purposive sampling and appraisal of evidence
Research questions addressed feasibly by this approach	Questions measuring the effect of an intervention	Any question about the social world concerned with building theory
Primary advantages	Findings have high validity and reliability. Other researchers can easily scrutinise the processes	Process can produce sophisticated theory allowing understanding to be related to diverse social

	used to judge quality	contexts
Primary disadvantages	RCTs may be difficult to conduct practically and ethically in the social sciences. Suitable only for a very restricted type of research question	Not necessarily comprehensive. The processes of quality appraisal may not be as clear. Likely to be less transparent, making it harder for others to judge the validity of findings

3.3 Internal Steering Group

As part of the integrative review process, the research team identified and facilitated input from a group of invited experts in the field from within the Host Institution, known as the Internal Digital Capabilities Stakeholder Group (IDCSG) (see Appendix B for full details of IDCSG Membership, meetings schedules and timelines). This Group acted as the first stage of sense-checking and was invited to scrutinise the milestone activities of the integrative review via an appraisal process which operated in both written and verbal forms. Milestone activities upon which the IDCSG fed-back included: establishment of the scope of the review; confirmation of key questions; confirmation of the protocol (Appendix A) for data selection; extraction and synthesis; full review of the key findings (substantive appraisal point, done jointly with the External Group) and development of a plan for communication and dissemination (Appendix D). The IDCSG was populated by representatives and critical friends from within the Host Institution, including: academics with a high internal profile - and in many cases a national profile - in learning and teaching, digital capability or both; representation from the local Students' Union.

3.4 External Steering Group

In addition to the IDCSG, an External Group was developed from outside of the Host Institution, comprising of experts with national profiles in learning and teaching, digital capability or both. This group was known as the External Digital Capabilities Stakeholder Group (EDCSG). (See Appendix C for full details of EDCSG Membership, meetings schedules and timeline). This group acted as an additional sector-wide set of invited experts, in order to offer further strategic gravitas and to scrutinise all milestone activities of the integrative review in exactly the same manner as the IDCSG. Crucially, the EDCSG acted as national thought-leaders for shaping the research. The Group also provided explicit links to an array of important grey literature resources, including national policy documents, sector-wide drivers for pedagogical change and offered an invaluable insight regarding future-proofing the research by offering clear processes for further dialogue and dissemination with key audiences within the sector.

4 Research process

4.1 Research aims and objectives

The central research question for this project comprised: *How can digital capability promote teaching excellence?*

The aims of this research encompassed:

- to identify which strategies have the most impact for teaching excellence
- to identify which features of institutional infrastructure maximise and ensure the effective use of Technology Enabled Learning.

Given the complexity of the terminology - including how each term should be measured and evaluated - it was deemed most productive that this research would look to the field to see what had been achieved in this area to date.

The objectives of this research were therefore derived as:

- to undertake an integrative review which assesses a range of literature and strategic approaches concerning the scope of digital capability to promote teaching excellence in UK universities
- to formulate sector-wide Guidelines for Developing Digitally-Capable Teaching Excellence
- to identify gaps in the evidence-base and make recommendations for further work.

The nature of an integrative review (see Section 3 above) enables the researchers to use their own expertise and judgement to assist in the research process along with drawing on expertise of other identified stakeholders. One of the first necessary decisions concerned operationalising key concepts of the initial research question; hence, the definition of *digital capability* was informed by the work of Bennett and Folley (2015) and (Beetham 2015). *Teaching excellence* was significantly more difficult to define strictly, with recent academic critiques and government publications regarding the pending UK *Higher Education and Research Bill* (Department for Business and Skills, 2016) providing less useful guidance due to the contested nature of this emerging construct. Consequently, the researchers - supported by critique offered by both Steering Groups - proposed that the following definition, derived from the Higher Education Academy (HEA) National Teaching Fellowship Scheme's (NTFS) (2015) stated criteria for individual excellence, should be used to operationalise the term 'teaching excellence' for the purposes of this integrative review:

'Evidence of **enhancing** and **transforming** the student learning experience'

Although this definition was designed primarily to recognise *individual* excellence, it was also deemed to have sufficient utility to be applicable for *institutional* excellence. Therefore, the operationalised research questions evolved into:

- which digital capability strategies have the most evidence of enhancing and transforming the student learning experience?
- which features of institutional infrastructure maximise and ensure the effective use of Technology Enabled Learning to enhance and transform the student learning experience?

4.2 Assessment of evidence

There have been a number of previous literature reviews which have focused on technology and teaching but none that have identified digital capability and teaching excellence as core themes (see Jump 2010, Price and Kirkwood 2011, Smith 2012, Kirkwood and Price 2013, 2014) or such reviews have focused on only one facet (see Gunn & Fisk 2013 for review of teaching excellence). In alignment with the stated methodology, this integrative review used these sources to provide a context to the research which helped to frame search terms and identified appropriate databases during initial scoping of project parameters.

The review protocol (Appendix A) outlines the framework and decision making processes undertaken for this review. Comprehensive scoping, piloting and internal moderation of the search terms - including feedback garnered from the Steering Groups - resulted in the following search terms, organised into three facets:

Facet 1: digital capability, digital literacy, digital fluency, digital technology, technology enhanced, technology enabled (the latter two terms with and without hyphenation)

Facet 2: teaching excellence, teaching best practice, inspirational teaching, transformative teaching, transformative learning, effective practice

Facet 3: higher education, university

These search terms, organised into adaptable search strings, were explored using educational databases, internet search engines, grey literature databases, and national policy databases. Hand searching and snowball searching of previous literature reviews and project resource lists were also carried out. Finally, an extensive list of artefacts provided by the Steering Groups was included as a source of data and searched accordingly. Database records were completed for all sources.

The agreed inclusion/exclusion criteria (Table 2) which guided the creation of the final sample of artefacts enabled the review to focus on the set research questions.

Table 2. Agreed inclusion/exclusion criteria	
Include	Exclude
2010 - present	
Higher Education	Primary, Secondary, Further Education
UK, Australasian and North American literature	
Written in English	
Taught provision	Research-based provision

All Higher Education stakeholders (e.g. students, staff, professional services)	
Specific reference to teaching practice (excellence, best, enhanced, inspirational, effective, transformative)	
Specific reference to digital technology/technology enhanced/enabled learning/e-learning	
Conceptual, academic critique, policy (non-empirical), research studies (including case studies, frameworks based on evidence)	

Date parameters were defined by socio-political changes in the UK national government and the landscape of higher education. It was also imperative that this review retained a contemporary focus, given the pace of change in digital technologies. On examination the final sample was skewed toward 2014-15 and many discussions published in 2010 were considered too historical for the nature of this review and were excluded in the later stages of the sampling process.

During appraisal discussions, the EDCSG queried exclusions based on geographical location. The rationale for the location filter - for any country - concerned the potential for examining broadly comparable educational frameworks and quality assurance processes offset against the constraints of proportionality within the given timeframe. Although there are differences in North American models of Higher Education, they are seen as increasingly influencing the current direction of UK Higher Education; however, it was felt that some disaggregation might be necessary between Canadian and American sources. The final sample revealed that this discussion had some merit as no artefacts from the United States were included in the final sample once relevant filtering criteria had been applied.

There was also a substantial discussion within the team and with the Steering Groups about types of artefacts deemed appropriate for this review. Given the scope of an integrative review, a broad scope of methodology and type of publication was considered as legitimate artefacts. This was again reflected in the final sample.

The remaining inclusion criteria were accepted as suitable to the scope of this research brief and the associated resources.

The following flow chart outlines the inclusion/exclusion process for this review.

Figure 1. Stages of data extraction



Using the designed search strings in the allocated databases, which included a modified search of grey literature sources and hand searching, a total of 1,818 pieces of literature were found. Independent application of the inclusion/exclusion criteria was supplemented by collaborative application of the criteria to increase the trustworthiness of the methodology. Due to the high number of references deemed applicable at the initial stages, an abstract relevancy score (ARS) (Appendix E) was designed and tested on an initial sample which was then applied collaboratively by the researchers. The scoring system enabled a value of between 0 and 4 to be attributed to each abstract using criteria aligned with the aims of this research. The abstracts which scored 3 (n=103) or 4 (n=6) were selected for the quality assessment stage of this review.

4.3 Quality assessment

A full text quality assessment was carried out on 109 artefacts. The assessment was based on the weight of evidence (WOE) of each and recorded accordingly. WoE assessments allow researchers to assess the generic and review-specific qualities of the included artefacts to inform decision making (Gough 2007) and is based on guidance by the EPPI Centre, Institute of Education, University of London (<http://eppi.ioe.ac.uk>). WoE indicators comprised:

A = Trustworthiness of the results judged by the quality of the study within the accepted norms for undertaking the particular type of research design used in the study (methodological quality, including the place of publication)

B = Appropriateness of the use of the particular study design for addressing the review's research question (methodological relevance, with specific reference to date relevancy)

C = Appropriateness of focus of the research for answering the review question (topic relevance with specific notes on digital capability, teaching excellence and institutional infrastructure)

D = Judgement of overall WoE based on the assessments made for each of the criteria A-C (which was recorded as red: revise to exclude, amber: requires further discussion or green: clear evidence to include)

In recording the WoE, the data extraction process benefited from a combined analysis of the following.

- 1 Numeric data: often these take the form of 'effect sizes' for inclusion in a meta-analysis, but numeric data also includes, numbers of study participants, intervention costs and numbers in specific sub-groups.
- 2 Categorical data: in which characteristics of studies can be summarised easily (e.g. by location of intervention or its theoretical framework).
- 3 Free-text narrative data: information which cannot be summarised numerically, and is too detailed and varied for categories to be useful. These data are extracted in 'free-text' form and may take the form of summaries of interventions, verbatim accounts of participant quotations or key concepts and themes that were identified by authors of the original studies.

Numerical data (e.g. sample sizes and SCImago Journal Rank (SJR) indicator 2014 figures) were recorded although due to the nature of this review, this data did not add significant weight to the overall assessment of quality. Categorical data (e.g. location of the intervention, methodological framework) was essential for constructing the summary characteristics of sampled artefacts (see Section 5.1) and for evidencing key themes. Free text narrative data dominated the quality assessment as the content reviewed varied in format and scope and formed the evidence base for the forthcoming findings.

4.4 Methodological analysis

The research process outlined here was judged to be the most effective given the time, resources, and scope of the project brief. The substantial terminological variations found when scoping this review - and the range of stakeholder positions on the possible focus of this study - resulted in a complex inclusion/exclusion process. To ensure high standards in both authenticity and trustworthiness, the researchers worked closely during the data extraction stage.

The quality assessment was initially premised on a blind assessment conducted by both researchers on half of the sample in order to set internal benchmarks. The remaining sample was assessed collaboratively to strengthen the trustworthiness of this methodology. The overall research process provided sound quality control throughout the inclusion/exclusion tasks and during the weight of evidence assessment. Segmenting the work and discussing the findings at each milestone ensured that both researchers produced aligned interpretations and managed unconscious bias throughout this project. Any disagreement in interpretation was thoroughly discussed and was referred to the wider research team, internal moderator and Steering Groups where necessary.

The researchers were confident that this process achieved saturation of the available data. This was complemented by hand searching of key references and by noting reoccurring citations of the sampled artefacts.

4.5 Researcher reflections

The following key exclusion decisions (Table 3) also informed the creation of the final sample during the data extraction stage - due to the number of potential artefacts - and the interactive nature of the review methodology. In the table below, justification for decisions made are conveyed alongside questions generated from further reflections.

Table 3. Key exclusion decisions		
Additional exclusions	Justification	Reflections
Date relevancy	Artefacts which referred to literature or data collection pre 2010 were noted as outdated	Should the date of inclusions have been narrowed to post 2013?
Teacher education and pre-service teaching	The context of digital capability was an application to school settings	Does the specific digital capabilities of the discipline/vocation need to be considered in future research?
Librarian as teacher	These discussions fell outside of the scope of teaching excellence	Do library services which require digital capability impact on measures of teaching excellence?
Learner focus	These discussions focused on student learning rather than excellent teaching	How are teaching and learning separated? Does excellent teaching always create specific types of learning?
Digital skills for employability	Artefacts which discussed students digital capability for engagement in a digital society/workplace were considered beyond the scope of this research	Could the teaching of digital skills for employability now be a marker of teaching excellence?

5 Synopsis of findings

5.1 Discussion of findings

The use of technology in teaching and learning is now ubiquitous but it is often assumed that technology can enhance learning (Kirkwood and Price, 2014; Littlejohn et al, 2012). Various authors argue that low digital fluency or confidence and skills in using technology, inhibits the development of academic practice which exploits the use of technology (Mirriahi, Alonzo and Fox, 2015; Torrisi-Steele and Drew, 2013). This integrative review explores the question 'how can digital capability promote teaching excellence?'

The appearance of the term 'teaching excellence' in this project brief signifies a new dimension in the discussions of digital capability and meaningful adjuncts. Therefore, before this review attempts to explicitly link the two concepts, an independent overview of each is needed.

Teaching Excellence

The contemporary definition of 'teaching excellence' has been greatly influenced by the terminology of the UK Conservative Government's 2015 Green Paper which proposes to 'make good teaching even better' (Johnson 2015). Previous iterations of this terminology during the mid-1990s to 2007 saw excellence often linked to quality via the effectiveness of implementing an equitable HE *process* with limited discussion of learning and teaching *outcomes*, per se (Little et al 2007). This approach continued to attract critique over the next few years (Skelton 2004, 2009). More recently, Gunn & Fisk (2013: 49) noted that teaching excellence was 'recognisably different from threshold and good teaching'. Jensen (2013) continued with this emerging notion of positioning teaching in a hierarchy by noting that teaching excellence contributes to the identification of inspirational teaching, in which inspirational teaching is the *outcome* of excellent teaching practices. One evident theme in these previous discussions concerned the notion of measurement and assessment of teaching quality. For example: National Teaching Fellowship Scheme (NTFS) criteria for excellence (from 2000), HEFCE-funded Centres for Excellence in Teaching and Learning (2005-10), HEA Professional Standards (2011), the QAA Quality Code (2012) and the recent Teaching Excellence Framework (2015). However, a workable definition or typology of practice accepted within the sector remains elusive. As stated in section 4.1, this review operationalises the term 'teaching excellence' as '*evidence of **enhancing and transforming the student learning experience***' (HEA NTFS, 2015).

Digital Capability

The HE sector has been exploring the necessary skills and capabilities required to deliver effective technology enhanced learning (TEL) for many years. Initially, the sector struggled to agree upon a term, and a common definition, for this notion. More recently, there has been a shift towards the language of 'digital capability' by leading sector bodies (e.g. JISC and UCISA) and JISC (2014a) define this as '*the capabilities which fit someone for living, learning and working in a digital society*'. Belshaw (2011, cited in UCISA, 2015) states that use of the term digital capability, rather than alternative terms such as digital fluency or digital literacy - deemed popular previously - reflects that digital capabilities are more 'a condition to attain than a threshold to cross'. For the purpose of this review, the term 'digital capability' will be deemed sovereign, but the literature presented here encompasses a variety of terms including fluency, literacy and competency.

Much of the early research into digital capability in higher education has focused on the skills and experiences of students. JISC (2015a) has proposed a digital capability framework which describes six elements that are required to equip staff and institutions with the skills

and resources to live, learn and work in the digital age. Clear evidence is needed to discover how these six elements are linked specifically to teaching practice. Furthermore, there have been a number of previous literature reviews which have focused on technology and teaching, but none that have identified digital capability and teaching excellence as core themes (see Jump 2010, Price and Kirkwood 2011, Smith 2012, Kirkwood and Price 2013, 2014) or have focused on only one dimension as discrete entities (see Gunn and Fisk 2013 for a literature review of teaching excellence or Bennett and Folley 2014 for a literature review of digital capability).

Overview of the sample

The final sample of artefacts included in this review was 34. The majority of the sampled artefacts were of UK origin, supplemented by those from Australia and Canada. There were no artefacts from the United States in the final sample. There is no overarching explanation for this omission, other than the US sources did not fit within the set inclusion criteria. In summary, these artefacts were excluded based on limited evaluation or evidence, narrow contexts, and incidental links to either digital capability or teaching excellence. The spread of the dates of publication were clustered around 2015 (12 publications) and 2014 (8 publications), with 5 from 2016 and the remaining from 2010-12. Many artefacts published in 2010 were eventually excluded due to the dates of the literature/evidence cited being beyond the scope of this study. This was a particularly pertinent issue given the focus on digital technology.

There were a range of publication types and methodologies included in the sample, which highlights the distinctiveness of an integrative review. While the majority of artefacts were published in academic journals (14), the review included book(s) and book chapters, conference papers, blogs/webpages, reports and online guides. The methodologies were both qualitative and quantitative and included discussion pieces based on previous literature or case studies of practice.

Within the sample of 34 deemed worthy of examination, only 4 artefacts were assessed as ARS 4 (see Appendix E) highlighting the variable quality of the evidence base. This reaffirms the assumptions made about the complexity of the key concepts and how they have been operationalised in this review. There were no articles which used both the concepts stated in the research question (digital capability AND teaching excellence) and evidence of significant terminological variation was found throughout this study. Therefore digital capability was inferred (based on the need of the teacher/instructor to be a competent user of the technology they have used, or will use, in the future) AND teaching excellence was inferred based on the operational definition of transforming and enhancing learning.

The findings of this integrative review - which considered the overarching question: ***How can digital capability promote teaching excellence?*** - are presented in the following sections by re-examining the original operational questions posed, concerning:

- which digital capability strategies have the most evidence of enhancing and transforming the student learning experience?
- which features of institutional infrastructure maximise and ensure the effective use of TEL to enhance and transform the student learning experience?

What follows is a thematic critique of the findings of this review, evidenced via a narrative account of the artefactual base. Each theme is supported by an evaluative statement affirming the interpretations of the researchers. Table 4 at the end of this section summarises the key points made in addressing the research questions.

Which digital capability strategies have the most evidence of enhancing and transforming the student learning experience?

- Teaching with technology does not always transform learning

This review considered various search terms to construct a sound evidence base for discussions of teaching excellence (teaching best practice, inspirational teaching, transformative teaching/learning, effective practice) and found that the term 'transformational' was dominant in the included literature (2010 - present) and was often used to describe *effective* practice. It was therefore considered to be synonymous with teaching excellence for this time period. However, it should be noted that this finding is time-bound and specific to this research. The research team postulates that any forthcoming publications will favour the term 'teaching excellence' due to the importance that the term has assumed since the proposed introduction of the Teaching Excellence Framework in the UK (Department for Business, Innovation & Skills, 2016).

Although 'transformative' learning and teaching was the focus of a number of the sampled studies, there was evidence of disparity in its relationship with technology enabled learning (TEL). While highlighting that TEL has the potential to enhance and enrich student learning, Torrisi-Steele and Drew (2013) Henderson et al (2015) and Kirkwood (2014) all had reservations about its evident transformative nature. Evidence from this review indicates that the use of technology within higher education can be primarily for efficiency and effectiveness. It can also accentuate traditional teaching methods such as transmissive, didactic practices of 're-hosting' in which views or beliefs about effective practice are not adapted to digital environments, rather than a reconfiguration of existing pedagogy and practice. The reviewed evidence implies that the use of digital technologies is often *not transformative* for student learning. Rather, the potential to transform is acknowledged, but there are concerns that this is not being realised. Laurillard (cited in Beetham and Sharpe, 2013, p. xx) note '*We have ambition. We have technology. What is missing is what connects the two.*' The need to evaluate the relationship between the digital capability of staff and their use of technology enabled learning is therefore evident if the intended outcome is teaching excellence. Furthermore, an awareness of which TEL strategies are not transformative is as important as acknowledging those that are (McGill 2011).

- A broader conceptualisation of digital capability is needed to promote teaching excellence in higher education

This review has considered a range of publications that showcase excellent teaching with technology which enhance or transform student learning. JISC (2014b) also see McGill (2011) and the QAA (2016) feature case studies of effective digital practice within institutions, although few examples (notably Beetham and Sharpe 2013) specifically discuss digital capability in a teaching context. The JISC '*6 elements of digital capability*' (2015a) provides a framework to equip staff and institutions with the skills and resources to live, learn and work in the digital age. Of the 6 elements mentioned below, teaching excellence is clustered primarily under only two of the elements, referring to 'participating' (in digital practice) and 'learning' (to develop digital practice). The supporting evidence for this claim is provided below.

'Digital communication, collaboration and participation (participating)': outlines the importance of establishing effective teacher presence and effective learning communities in online settings (Brenton 2015, Barber et al 2014) the role of students in enhancement activity (QAA 2016 Spotlight on iChamps, University of Southampton) transforming learning via improved accessibility and inclusivity (JISC 2015b) scalable technology-enabled interventions for blended learning (Jefferies and Cubric 2013) and the importance of

adopting a constructivist pedagogy when teaching with technology (Mirriahi et al 2015, Owens 2015, Barber et al 2014, McLoughlin and Alam 2014, Laurillard 2010).

'Digital learning and personal/professional development (learning)': identifies the need to support early adopters so that excellent practice is embedded successfully (Jefferies and Cubric 2013) link digital capabilities to professional accreditation to promote teaching excellence (Beetham 2015), build in 'time to experiment' and risk free practice to professional development to promote excellent teaching (Beetham 2015)

Interestingly *'digital creation, scholarship and innovation (creative production)'* was not a reoccurring theme in this teaching-focused sample. While Bennett (cited in Bennett and Folley, 2014, p. 7) attributed a *'digitally confident practitioner'* with *'willing to experiment with technology'* and *'convinced by the potential of technology to enhance and transform learning'*, this current review supports the notion that excellent teaching practice does not dictate either creativity or innovation. The remaining elements of the JISC digital capabilities framework, *'ICT proficiency,' 'information, media, 'data literacy (critical use)'*, and *'digital identity and wellbeing (self-actualising)'* were not thematically linked to the scope of this study, possibly as these were deemed to be accepted norms which focused on standards rather than achieving excellent practice. On this basis, this review concludes that a broader conceptualisation of digital capability is needed to promote teaching excellence in higher education. This might involve a bolder consideration of the 'why' alongside the 'what' and the 'how'. An inclusion of an underlying pedagogy, for example, could cement the link between digital capability and teaching excellence by grounding capability in an understanding of purpose and intended outcomes. This will be discussed further in the themes below.

- Digital capability can promote teaching excellence by avoiding technological determinism while putting pedagogy first

Examples of effective TEL also promoted a student-centred approach to learning (Brenton 2015, JISC 2015b, Mirriahi et al 2015, Owens 2015, Barber et al 2014, McLoughlin and Alam 2014, Owens 2012). This consensus in the evidence concerning the pivotal role of the student critiqued the teacher led/teacher centred transmission model as ineffective for enhancing learning in this context. Importantly, *'expert teachers'* as defined by Owens, are more likely to have student centred beliefs and practices *but 'do not practice these beliefs to the same extent in online environments'* (2015, p. 88). In addition, students themselves often fail to appreciate the role of technology in student centred approaches, expressing support for logistical benefits and hygiene factors (Henderson et al 2015, Torrisi-Steele and Drew 2013) rather than *'creative, collaborative, hyper-connected practices'* (Henderson et al 2015 p 10). Therefore, excellent teaching needs to assess tipping points when introducing new ways of learning, described by Hutching et al as the *'optimum disruption of the student experience'* (2014, p. 154) and Beetham and Sharpe (2013, p. 4) as a disruption of norms to *'usher in completely new forms of learning activity'*. The move to independent learning in online environments is cited as a pertinent example (Henderson et al 2015).

While the dominance of constructivist pedagogy and student-centred approaches is particularly noteworthy, it is with caution that this review suggests a uniform pedagogy for TEL. Rather, this discussion should be surmounted by the overall preoccupation with 'pedagogy first' discussions within the sampled literature (Brenton 2015, Owens 2015, Hutchings et al 2014, Kirkwood 2014, McLoughlin and Alam 2014, Beetham and Sharpe 2013). This review therefore presents a critique of technological determinism in the pursuit of teaching excellence, where *'technological determinism endorses the notion that using technology for teaching will in and of itself lead to enhanced or transformed educational practices'* (Kirkwood 2014, p. 215). This implies resisting the notion that technology is the principal motivation for change rests with both teacher and institution. Furthermore, both Jefferies and Cubric (2013) and Comas-Quinn (2011) suggested that institutional support

should be available to develop new or adapt existing pedagogies. Without this acknowledgement, the focus of change (for example, an adoption of blended learning approaches for all approaches in an institution) becomes the rapid development of ICT proficiency and digital skills rather than a robust examination of the '*pedagogical possibilities*' (Comas-Quinn 2011, p. 228) of the chosen technology.

McGill, when presenting the outcomes of the JISC Curriculum Delivery Programme, noted that '*this was not a programme where technologies were implemented for their own sake but because the technologies had particular affordances that support curriculum and learner support goals*' (2011, p. 4). However, while the projects in the programme were cited as transformative and learner centred - rather than technologically determined - this report favoured technology over pedagogy and even recommends a defence of technology for efficiency, contending '*it is important to look beyond pedagogy and to consider the full experience of a student's relationship with the institution*' (ibid, p. 7). In addition, McLoughlin and Alam (2014) also discussed learner-centred approaches and '*pedagogical scaffolding*' for transformative learning but essentially presented a discussion of a technologically determined learning space.

It is evident that the relationship between digital capability and TEL is complex with various stakeholders in the sector championing distinct aspects of this association. It is also clear that the pedagogy alone will not create excellent teaching. This review proposes that the digital capability framework (JISC 2015a) has some potential to be adapted specifically for a teaching context; however, it would need to include a more distinct focus on developing digital pedagogy. If the pursuit of teaching excellence requires a sound pedagogical foundation, online or blended learning or the use of digital tools within a classroom, should also adhere to this principle. This could be stated explicitly as an expectation of the digitally-capable practitioner.

Some consideration of whether digital capability and teaching excellence should be promoted at a local disciplinary level or across subject boundaries is required. JISC (2014a), Bennett and Folley (2014), Kirkwood (2014), Littlejohn et al (2013) and Owens (2012) all signify that context-specificity is vital for effective development of capability and practice. This accounts for how TEL is embedded or situated within specific disciplines and the context for both staff and students. However, '*pedagogical patterns*' can be shared across disciplinary boundaries (Laurillard 2010, p. 68) and this will be revisited below as part of the findings concerning mobilisation of institutional infrastructure.

- Measurements of student satisfaction - and poorly constructed proxy measures - can (and will) be used to assess the digital capability of teachers

If the student is placed at the centre of TEL then it follows that their voices, or success measures, would carry weight in any assessment of effectiveness. This point was raised by the EDCSG and JISC endorses this agenda. Undoubtedly teaching which fails to appreciate the '*optimum disruption*' (Hutching et al 2014) when using technology is at risk of creating dissatisfied students. As student satisfaction is now linked inherently to teaching excellence in UK higher education, the negotiation of this balance requires a digitally-capable teacher. Some of the sampled artefacts specifically discussed student satisfaction and student expectations (JISC 2015b, Beetham 2014, McGill 2011) and several acknowledged the sensitivities of the *student as consumer* ethos (Henderson et al 2015, Hutching et al 2014). However, the metrics of satisfaction are difficult to align with teaching practice. For example, measures of perceived 'usefulness' (Henderson et al 2015) were used as proxies for effective TEL and, as noted, students tended to report preference for the logistical benefits offered by technology while saying little about how the technology enhanced or transformed their learning. This highlights an overarching issue in the evidence base used to inform TEL,

which is noted by Kirkwood as a reliance on 'assertions, hyperbole and reductive interpretations' (2014, p. 207).

It is anticipated that this theme will develop significantly in the near future, and this review expects forthcoming publications to focus specifically on the relationship between digital capability and student satisfaction.

- Teaching excellence requires all teachers to engage with digital capability, rather than silos of digital specialists

The found artefacts evaluated the perspectives of various stakeholders to suggest how existing practice could be improved. In order to promote teaching excellence, the need to address the digital capabilities of staff as a holistic strategy - rather than one which focuses on pockets of innovation or early adopters - is essential (Brenton 2015, Jefferies & Cubric 2013). Furthermore, while Owens (2015) recommends that the expert teacher (notable by their NTF status and commendation for excellent teaching) should take a lead in developing effective practice, Laurillard (2010) contends that *all teachers* are best placed to drive change in the effective use of TEL, rather than software designers or learning technologists or those labelled '*digital specialists*' (Beetham 2015). This highlights the need to address '*underlying conceptions of teaching and learning*' (Owens 2012, p. 391) while appreciating that the journey for many '*involves stages of 'fear and uncertainty,' exploration, affirmation and connection with current knowledge and eventually a 'new perspective of the impact of using technology*' (Torrissi-Steele and Drew 2013, p. 379). This tension creates challenges for the infrastructure of any institution attempting to develop digital capability for teaching excellence. The next section reviews many of these anticipated challenges.

Which features of institutional infrastructure maximise and ensure the effective use of TEL to enhance and transform the student learning experience?

Beetham (2015, p. 13) argues that the digital environment and infrastructure '*determine whether staff capability can be expressed in day-to-day practice*'. The search terms used by the researchers were not specifically designed to consider which features of institutional infrastructure maximise and ensure the effective use of TEL but many of the papers examined did give consideration to the issue. This was characterised by attention to four key areas: strategy, change management, resources and professional development.

- The promotion of digital capability for teaching excellence requires strategic ownership

This review has considered a range of publications that highlight the need for appropriate strategy for the successful implementation of technology to support teaching and learning (QAA, 2016; Beetham, 2015; Gregory, 2015; Kirkwood, 2014) alongside a commitment from senior management to achieve mainstream commitment and longevity of services (McGill, 2011).

Torrissi-Steele and Drew (2013) synthesised the most commonly reported elements of successful strategies which comprised: a university-wide approach which integrated independent efforts; an emphasis on a pedagogically-led approach (rather than one grounded primarily in technological determinism - see above); provision of adequate support and development including readily available technical support; proliferation of good practice case studies; and recognition of good practice from management.

Kirkwood (2014) noted that strategies should consider wider issues relating to the adoption of technologies for teaching rather than by simply applying technical solutions to such issues. He proposed that existing strategies should be evaluated to ensure that they are fit for purpose in light of the rapidly developing technological world and that strategies should

also be responsive to change. Beetham (2015) supports the argument that strategies need to be more responsive to change and observes that there is often a 'lag' between the introduction of new technologies and subsequent changes to policies and strategies to enable these to be embedded into the mainstream.

Gregory (2015) suggests that overall responsibility for the development and implementation of pedagogically sound, technology enhanced, teaching practices is rarely discussed in the literature. Accountability for the development and implementation of such practices is fundamental for the success of such projects as without strong leadership and coordination, projects are likely to have limited impact (JISC, 2016a).

The literature emphasized the importance of preparing the workforce to successfully embed digital pedagogies into practice. Beetham (2015) notes that investment in infrastructure often occurs before considering necessary staff development that would enable effective use of new technologies that could be embedded successfully into practice.

The sources cited above focused on strategies for the introduction of technology at institutional level to enhance teaching and learning. This review found very few references to strategies for developing a digitally capable workforce. However, there were clear links between the thoughtful introduction of pedagogically considered technologies and the necessary development of staff to successfully engage with them. It is apparent that strategies for the effective introduction of technology - and associated staff development - need to be 'fit for purpose', responsive to change and take a pedagogically-led approach underpinned by support from senior management.

- Digital capability strategies used to promote teaching excellence must address resistance to change

Approaches to change management were the focus of a number of the sampled studies. Jefferies and Cubric (2013) provided useful guidance on their approach to change based on their experiences of the introduction of a university-wide online system introduced to support assessment and feedback. Guidelines for ensuring success for change management projects addressed the broad issues of: building and maintaining of the technical infrastructure; provision of appropriate initial and continuing user support; and the management of the impact of change. Similarly, JISC (2016a) and Kirkwood (2014) also outline change management approaches which focus on improving learner engagement through effective innovation, which include supporting the digital capability of staff and students.

Hutchings et al (2014) proposed a model for challenging resistance to change. They argued that institutions must acknowledge '*resistance, reluctance and pedagogic diversity*' in order to successfully and sensitively negotiate change. They proposed that by generating purposeful disruptions as tensions and challenges, transformative learning can be stimulated. Hutchings and Quinney (2015) described the 'triple helix' model of change in which they initiated '*optimum disruptions*' to facilitate outcomes in student-centred learning, role transitions and organisational change. The triple helix model supports these three outcomes with empirical data and an awareness of institutional policy (research orientations, educational strategies and technological affordances). This is an insightful model, reflecting the key challenges in implementing change within the domain of this research.

A 'hearts and minds' approach to empowering staff to change their practice and adopt new technologies was advocated by some authors (Bennett and Folley, 2015; Hutchings and Quinney, 2015; McGill, 2011). Bennett and Folley (ibid, p. 5) argued that when staff have '*agency and ownership*' they are more likely to make changes than if there is a perceived requirement to do so through audits and appraisals. This approach is in contrast to the JISC

Digital Capability Framework (2015a) which described various skills needed by staff in order to be considered digitally capable. Hutchings and Quinney (ibid) suggested that use of good practice case studies could be a good way to win over 'hearts and minds' and encourage staff to try something new. McGill (2011) also advocated this approach and suggested that the use of appreciative inquiry with curriculum teams could help to identify good practice thus enabling staff to reflect on the strengths of their actions.

- Digital capability needs to be valued if it is to promote teaching excellence

The found literature considered the resources required to incorporate technology into good teaching practices. Money was seen as a key factor in securing effective infrastructure (Laurillard, 2010; Jefferies and Cubric, 2013). The latter noted that the introduction of systems to support assessment and feedback at their university required a '*major institutional investment*' (ibid, p. 157). While there was often a major upfront cost when acquiring new systems and technologies, others noted that there was an ongoing cost associated with maintaining systems (McGill, 2011) and this also applied to the staff development required to engage effectively in evolving systems (Laurillard, ibid). It was also clear that it was necessary to consider the cost-benefit implications in order to make decisions about which technologies to support institutionally (McGill, ibid).

Time was seen as a major barrier to the development of the skills required to successfully incorporate technology into good teaching practices. Gregory (2015) proposed that it was essential to devote time to the development of skills and resources to successfully integrate technology into teaching practice and that consideration needs to be given as to how to accommodate this process. He argues that when staff are allocated dedicated time on their work plan for such developmental activities, this leads to higher uptake and a more positive experience for both staff and students.

Adequate resource also needs to be allocated to appropriate staff development activities. The literature implied that when staff development was available, this was often focused on ensuring staff could access basic functions (Beetham, 2015). As part of a JISC-funded project 'Developing Digital Literacies', Beetham (ibid) found that people tended to rate themselves as digitally competent and therefore did not identify themselves as requiring development or support, unless they were put into novel situations which highlighted any skills gaps.

To aspire to teaching excellence, this review found that staff development should move beyond achieving a basic ICT competency to consider pedagogic practice with technology (QAA, 2016; JISC, 2016b, Kirkwood, 2014; McGill, 2011). Torrisi-Steele and Drew (ibid) suggested that staff were familiar with the skills needed to promote discussion and reflection in face-to-face situations, but that transferring this into a digital setting required some redefining of their roles from instructor to facilitator.

- The pivotal nature of professional development and pedagogy should be acknowledged

The discourse around professional development focused on four key areas: ICT proficiency to promote excellent teaching; embedded pedagogy within CPD to promote teaching excellence; approaches to staff development such as communities of practice; and professional identity.

Owens (2012) suggested that programmes which focused on the development of ICT skills were not well received by staff, but this did not mean that such programmes were not necessary for those who did not already possess the often assumed basic level of skills. Torrisi-Steele and Drew (2013) argued that the goal of appropriate professional development should be to '*facilitate the integration of technology into the core of the teaching strategies*',

which aligned with some of the literature outlined above suggesting that pedagogy should come before technology (Owens, 2012; Comas Quinn, 2011). Owens (2012) added strength to this argument by suggesting that training programmes which focus on pedagogies associated with online learning can act as a 'Trojan Horse' to getting staff to engage actively with technology and its effective use.

Several of the studies cited here proposed specific approaches to staff development. Mirriahi et al (2015) suggested that CPD in this area should '*embody the principles of blended and online learning*', so required the use of the tools that were the focus of the training within the training itself. Laurillard (2010) advocated the use of peer support and communities of practice to enable peers to share their skills and experiences. McGill (2011) considered that central support teams were a fundamental element to support academic teams to develop their practice and to provide a link between front line staff and institutional policies, systems and strategies.

Professional identity was also a key theme within the literature in this area. This study has explored digitally-capable practitioners *and* excellent teachers, but found that much of the literature identifies with - and therefore discusses - one or the other of these identities. For example Bennett and Folley (2015) discussed digitally-capable practitioners as those who displayed a range of attributes related to confidence, willingness to explore and resilience to failure, arguing that these characteristics identified them as capable practitioners rather than being defined by their technical skills alone. Owens (2012) is credited with bringing together both identities and for discussing teaching excellence in the context of digital capability. In its entirety, this author's work is credited as the most relevant to the overall scope of this integrative review.

Table 4. Summary of key findings	
<p>Which digital capability strategies have the most evidence of enhancing and transforming the student learning experience?</p>	<ul style="list-style-type: none"> • Teaching with technology does not always transform learning • A broader conceptualisation of digital capability is needed to promote teaching excellence in higher education • Digital capability can promote teaching excellence by avoiding technological determinism while putting pedagogy first • Measurements of student satisfaction - and poorly constructed proxy measures - can (and will) be used to assess the digital capability of teachers • Teaching excellence requires all teachers to engage with digital capability, rather than silos of digital specialists
<p>Which features of institutional infrastructure maximise and ensure the effective use of TEL to enhance and transform the student learning experience?</p>	<ul style="list-style-type: none"> • The promotion of digital capability for teaching excellence requires strategic ownership • Digital capability strategies used to promote teaching excellence must address resistance to change • Digital capability needs to be valued if it is to promote teaching excellence • The pivotal nature of professional

	development and pedagogy should be acknowledged
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5.2 Limitations

The following potential limitations emerging from this integrative review are provided so that other researchers and policy-makers can take them into account when building upon this body of evidence and on the work of others in the domain.

- Blended/online/distance learning were now included in the search terms so that the search was not skewed in favour of one type of delivery mode; however this should be noted as a potential limitation.
- Excellent teaching was interpreted subjectively by the researchers at various stages of this review. To counter possible bias - rather than owned subjectivity - the research followed a quality process which was high in trustworthiness, comprising: clear inclusion/exclusion, abstract relevancy criteria, and collaborative quality assessment.
- Many contemporary examples of excellent practice have not yet been published. Some were evaluated in unpublished state and this recognises the importance of grey literature as part of integrative review but therefore increases the complexity of applying the WoE.
- Collating the results of diverse methodologies is complex and could lead to a potential lack of rigour and bias; however this was mediated by the judicious application of WOE.
- This integrative review is time-bound as the sector - and specifically the assessment of teaching excellence - is in a period of significant change.
- Given the subjective nature of the integrative review process, the composition of both the research team and the Steering Groups will have influenced the construction of the agreed research protocol and possible interpretation of the ensuing findings.
- The review is primarily UK-centric in reporting and this context is also reflected in the final sample of artefactual evidence.

6 Guidelines for Developing Digitally-Capable Teaching Excellence

The following good practice guidelines - extrapolated directly from evidence emerging out of this integrative review - are intended to provide discursive starting points for developing ideas concerning the effective integration of digital capability and teaching excellence into a unitary construct for the UK HE sector. It is intended that these ideas form a set of overarching principles - presented here as a set of statements - to shape relevant approaches between institutions, staff, students and wider stakeholders. The *Guidelines for Developing Digitally-Capable Teaching Excellence* are purposely broad to enable wide transferability across the sector and also in facilitating meaningful application at subject and discipline level.

Overarching principles and key questions:

- 1 Start with pedagogy every time**
 - Do the proposed approaches align with strategic values and add value?
 - Have the appropriate pedagogies been applied across all subject areas and disciplines while retaining contextual distinctiveness?
 - Do the pedagogical underpinnings work for all stakeholders?
- 2 Recognise that context is key**
 - What infrastructure needs to be in place at the outset and will it support the situated nature of current practices?
 - Is the process inclusive across the institution?
 - Is the approach complementary to the disciplinary modes and associated learning?
- 3 Create a digital capability threshold for institutions**
 - What does a basic capability threshold look like at all institutional levels?
 - How does effective engagement occur to gain stakeholder buy-in and wider agency?
 - Are incentives and reward-schemes, performance indicators and appropriate development opportunities agreed and in place for all, prior to inception?
- 4 Use communities of practice and peer support to share good practice**
 - How can existing governance structures be used to develop relevant communities of practice and support a culture of teaching excellence underpinned by digital-capability?
 - Who leads the communities of practice and how will responsibility be devolved and sustained?
 - Will there be protected time for development and enhancement activities?
- 5 Introduce a robust and owned change management strategy**
 - How will the concept of optimum disruption be introduced in order to avoid resistance?
 - How will buy-in be maximised to avoid commonplace notions that adoption will only stem from technologically adept practitioners?
 - How will success be determined, led and evaluated at all levels?
- 6 Develop a compelling evidence-informed rationale**
 - Who is responsible for collecting evidence, interpreting research and evaluating impact in this domain at institutional level?

- How accessible are good practice case studies and guidance and which forums are available for sharing and spread of adoption?
- Can all stakeholders engage in opportunities to create compelling evidence in the domain?

7 Ensure encouragement for innovation and managed risk-taking

- How does the envisaged infrastructure support and manage staff and students to experiment, and is 'play' encouraged across all areas of the institution?
- How will innovations be shared, monitored and escalated?
- Is there an equitable system for assessing and rewarding impact on practice at all levels?

7 Recommendations

- Institutions could look to replicate the studies of Owens (2012 and 2015) as this body of work provides a link back to the highest quality of evidence deemed useful within this review, for the purposes of examining digital capability and teaching excellence as an integrated concept.
- There is a need to evaluate teaching practice and to recognise complexities of practice and attendant terminology such as transformation, enhancement of learning, etc. as this review found many unresolved aspects within the nomenclature used to describe teaching excellence.
- All stakeholders should consider assumptions concerning pedagogies, including an examination of new theories of how people learn and the potential influence of disruptive pedagogies.
- Institutions should horizon-scan emerging technologies and new pedagogical ideas and consider their integrated application for developing teaching excellence; this might include proof of concept testing before mass implementation as this was deemed lacking within the found artefacts.
- Other researchers should consider the utility of the integrative review methodology as a very useful, iterative approach when needing to build theory from emergent and/or contested areas.
- To maximise impact, the *Guidelines for Developing Digitally-Capable Teaching Excellence* should be enhanced by building-in further workshop elements - such as scenario-modelling - in order to contextualise meaningful implementation of the overarching principles.
- Next steps for escalating further work in this area concerns linking the *Guidelines for Developing Digitally-Capable Teaching Excellence* and findings to examples of existing good practice and in pursuing more resource-development and sector-wide partnership working.

8 Dissemination of findings

The communication and dissemination plan below outlines the various ways in which this review should be promoted. Feedback from the Internal and External Digital Capabilities Steering Groups has guided this approach.

- Internal dissemination by project team: *Student Engagement, Evaluation and Research* and *Learning Enhancement and Academic Development* Directorates (Faculty committees, internal conferences, internal media communication).
- Soft 'launch' at the end of the project at the host institution. All DCSGS members and other interested stakeholders to be invited.
- Publication of output on QAA website/Spotlight on Digital Literacy www.qaa.ac.uk/research/projects/spotlight.
- External and Internal DCSG members to promote via own networks.
- Newsletters, blogs, email promotion and face to face meeting attendance (ALT fortnightly, HEDG, JISC mailing list and blog <https://digitalcapability.jiscinvolve.org/wp/>, Student Experience Experts group www.jisc.ac.uk/rd/get-involved/learning-and-teaching-experts-group Heads of E Learning Forum, UCISA Digital Capability Group, TSEP network).
- Twitter promotion via #QENetwork, #QAASpotlight, @JISC, @A_L_T etc and the Directorate's own Twitter feed @SHU_StEER and blog.
- Promotion to practitioners via HEA networks, NTFS networks, Office for Students (if operational).
- Promotion to PVCs either directly or via HEA PVC network.
- Conference presentations and attendance by project researchers.
- Open access to raw data to allow continued analysis of the topic area.

9 Conclusions

- There is an inherent difficulty when trying to use the words *digital capability* and *teaching excellence* as they are contested terms singularly and then in combination, especially when there is minimal consensus within the sector.
- This is an evolving area of research - as found in this review - and the areas of teaching excellence and digital capability are emerging concepts which are not yet unified, so their development as an integrated construct is worthy of further analysis.
- Given the dearth of information when strict parameters were applied - and the highly contested nature of the concepts under scrutiny - the integrative review process was a timely methodology as it afforded robust critique of grey literature, artefacts and conceptual pieces, in addition to finding more traditionally-academic publications. As an iterative process, integrative review is ideal if considering dynamic critiquing mechanisms for emerging concepts.
- The aim *To identify which strategies have the most impact for teaching excellence* has been met partly - given the notion that much of the reasoning is inferred - due to the considerable contestation of the areas under scrutiny.
- Evidence found in assessing the aim *To identify which features of institutional infrastructure maximise and ensure the effective use of Technology Enabled Learning* confirmed that priority was still given to developing digitally-capable individual practitioners above everything else. Principally, there was a focus on hygiene factors and IT accessibility rather than change-management.
- More nuanced conclusions can be found within the body of this work and researchers interested in deeper analysis of the review findings should access the full database of sources (see Appendix G for further information).
- This review and the development of embryonic *Guidelines for Developing Digitally-Capable Teaching Excellence* are proportionate to the timescale for completion of this commissioned research and should be considered within such context.

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11 Appendices

Appendix A: Integrative research protocol

Summary

Sheffield Hallam University Directorates of *Learning Enhancement and Academic Development* and *Student Engagement, Evaluation and Research* are leading an integrative review to explore the evidence base which links digital capability and teaching excellence. The key research question asks 'How can digital capability promote teaching excellence?' The objectives of this review are: to assess the sector wide literature and strategic approaches on this topic area; to formulate sector-wide guidelines for developing digitally-capable teaching excellence; to identify gaps in the evidence-base and make recommendations for further work.

At the end of this Protocol, there are a series of prompt questions for the Digital Capability Steering Groups (DCSGs) to address. Collated responses will be recorded and shared across the groups and research team to enable an iterative process to occur, which will inform this integrative review accordingly.

Background

Bennett and Foley (2015) note that digital literacies have often been overly-concerned with curriculum design without considering attitudes, practices and skills. The Jisc Digital Capabilities framework (Beetham 2015) recognises that leadership, innovation and identity are crucial in building practices and infrastructure for *digitally-capable organisations*, requiring a change from *literacies* to *capabilities*. This shift indicates moving away from a skills-based emphasis to a more holistic one in which inclusive practice is deemed crucial in developing all students' effective technology-enhanced learning (*Flexible Learning Framework*, HEA, 2015). This notion is confirmed in the Host Institution's *Digital Learning Strategy* (Sheffield Hallam University 2015-) which advocates 'experimenting with and exploring the potential of digital technologies and deploying the best of what we find to support students and staff in learning, teaching, research and working' (p. 7).

This proposal navigates this changing landscape through an integrative review - which is a process of identifying and synthesising available literature, emergent models and strategic approaches - then steered as part of a continuous evaluation process by wider expert reference group(s). It is anticipated that good practice guidelines for developing digitally-capable teaching excellence will be established as an outcome of the project.

Context

The appearance of the term 'teaching excellence' in this project brief signifies a new dimension in the discussions of digital capability and meaningful adjuncts. Therefore, before this research attempts to explicitly link the two concepts, an independent overview of each is needed.

Teaching Excellence

The contemporary definition of 'teaching excellence' has been greatly influenced by the terminology of the UK Conservative government 2015 Green Paper which proposes to 'make good teaching even better' (Johnson 2015). Previous iterations of this terminology during the mid-1990s to 2007 saw excellence often linked to quality in terms of equity of treatment with limited discussion of learning and teaching (Little et al 2007) and continued to attract critique over the next few years (Skelton 2004, 2009). More recently, Gunn & Fisk

(2013: 49) note that teaching excellence is 'recognisably different from threshold and good teaching'. To continue this hierarchy, Jensen (2013) notes that teaching excellence contributes to the identification of inspirational teaching, where inspirational teaching is the *outcome* of excellent teaching practices. One evident theme in these previous discussions is the notion of measurement and assessment of teaching quality for example: National Teaching Fellowship (NTF) criteria for excellence (from 2000) HEFCE-funded Centres for Excellence in Teaching and Learning (2005-10), HEA Professional Standards (2011), the QAA Quality Code (2012) and the recent Teaching Excellence Framework (2015). However, a workable definition or typology of practice remains elusive.

Therefore this research needs to define teaching excellence so that the relationship to digital capability can be evaluated. This definition needs to be manageable for the scope of this project. It is proposed that the following definition, taken from the NTF (2015) criteria for individual excellence, is used to operationalise the term 'teaching excellence' for this literature review:

'Evidence of **enhancing** and **transforming** the student learning experience'

Although this definition has been designed to recognise individual excellence, it is also perceived of as applicable for institutional excellence too.

Digital Capability

Technology enabled learning (TEL) is now a common and embedded aspect of pedagogic practice in higher education (QAA, 2015). The sector has been exploring the necessary skills and capabilities required for this to be delivered effectively for many years. Initially, this exploration was undefined, but in recent years the language applied to the field has developed.

In 2008, the Host Institution formalised this effort and introduced the 'Digital Fluency Initiative', characterised by the fluencies necessary *'to live, learn and work in the digital age'* and encompassed information literacy, IT competency, online interaction and critical thinking. Digital fluency was not a term which was exclusive to Sheffield Hallam University (see White, 2013 for example). Hence, it became clear that much of the sector had adopted the term 'digital literacy'. JISC (2015) defines digital literacies as *'the capabilities which fit someone for living, learning and working in a digital society'*. Many institutions have been working with the term 'digital literacy', and JISC have collated much of the work in the area to produce case studies and develop guidance for how to develop digital literacies in students (www.jisc.ac.uk/guides/developing-students-digital-literacy).

More recently there has been a shift towards thinking about 'digital capability'. UCISA (2015) use the same definition for digital capability as the definition given above for digital literacies, though state that the use of digital capability rather than digital literacy reflects that digital capabilities are more 'a condition to attain than a threshold to cross'.

This research asks 'how can digital capability promote teaching excellence?' For the purpose of the research, the term 'digital capability' will be deemed sovereign, but searches will encompass a variety of terms including fluency, literacy and competency to reflect the evolving nature of the language associated with the field.

Digital Capability AND Teaching Excellence

This integrative review attempts to bring together two concepts which have a history of fluidity. Therefore careful consideration and assessment of this terminology and subsequent eligibility criteria is required by the researchers and the internal and external appraisers (DCSGs) throughout this project.

Key research question(s)

How can digital capability promote teaching excellence?

Supplemented by:

Which strategies have the most impact for teaching excellence?

- Operationalised as: Which digital capability strategies have the most evidence of enhancing and transforming the student learning experience?

Which features of institutional infrastructure maximise and ensure the effective use of TEL?

- Operationalised as: Which features of institutional infrastructure maximise and ensure the effective use of TEL to enhance and transform the student learning experience?

Objectives:

- to undertake an integrative review which assesses a range of literature and strategic approaches concerning the scope of digital capability to promote teaching excellence in UK universities
- to formulate sector-wide *Guidelines for Developing Digitally-Capable Teaching Excellence*
- to identify gaps in the evidence-base and make recommendations for further work.

Interpretation

As part of this integrative review, the research team will organise and facilitate input from a group of invited experts in the field, known as the Internal and External Digital Capabilities Stakeholder Group(s) (DCSGs). These groups will be invited to scrutinise the milestone activities of the integrative review via an appraisal process which will operate in both written and verbal form. Milestone activities include: establishment of the scope of the review; confirmation of key questions; confirmation of the protocol for data selection; extraction and synthesis; full review of the key findings (substantive appraisal point) and the development of a plan for dissemination. The Group will be populated by representatives from national higher education institutions and wider agencies and internal representatives/critical friends from within the Host Institution. Examples of representation on these groups include the Association of National Teaching Fellows (external), Higher Education Academy (external), Students Union (internal) and academic staff (internal and external) amounting to approximately 20 members in total.

Scope and methodology

An integrative review comprising of the following stages:

1. Definition of review scope, key questions and protocol

Scoping Method

A scoping exercise has been conducted by the two lead researchers. This was an independent and interpretivist investigation to test the key search terms which arose from the project brief and Expression of Interest form. Various search strings were constructed using Boolean methodology and each researcher tested a range of sources. For example:

('digital capab*' OR 'digital fluen*' OR 'digital litera*') AND (teach* excellen*) 2006-16 filter

Findings were recorded in separate files using a pre-arranged format.

Reference	Study design/ methods	Focus	Population studied	Terminology	Citation tracking	Notes

Researching Digital Capability and Teaching Excellence

The findings of the scoping exercise are as follows:

RESEARCHER 1

Various databases were independently searched to test the viability of key terms and search strings. These included the Library Catalogue (general), Education Databases on ProQuest, Emerald, Eric, British Education Index and hand searching of references in articles found.

Tested terminology included:

- digital capability
- digital literacy
- digital fluency
- teaching excellence.

The search highlighted difficulties in finding papers related to both areas i.e. digital capability *and* teaching excellence. It was concluded that due to historical factors associated with the language used, it was unlikely that both terms were in popular use concurrently. For this reason, a brief history of the language used with the associated concepts has been detailed above and a number of decisions require comment from the DCSGs at the end of this Protocol.

RESEARCHER 2

Varied sources were independently searched to test the viability of key terms and search strings. These included Google Scholar, hand searching of previous literature reviews, one test educational database (ERIC) and one repository of grey literature (Higher Education

Academy). Date filters were applied (2006-16) to assess potential volume. Tested terminology included:

- digital capability
- digital literacy
- digital fluency
- teaching excellence.

The selected literature all included research data or reflections on practice in the form of case studies. The range of literature predominantly included the experiences of lecturers/educational developers, rather than student reflections, which could reflect the scrutiny of *teaching* rather than *learning*.

The generated results showed that digital capability and teaching excellence are rarely found together in a UK context. Broadening the search to include Australasian and North American sources - deemed to be influential in these domains - would widen the body of literature to these comparable countries which often cite the work of UK scholars.

BOTH

The selected studies in the scoping exercise also provided evidence of significant coterminous notions for both core concepts:

- technology enhanced learning (TEL), technology-enabled learning, online learning, e-learning, blended learning, information literacy, learning technology, digital technologies, digital natives, pedagogy of online learning, digital competency
- good practice, effective teaching, effective use of (technology), innovative teaching, innovation, best practice, inspirational teaching, quality teaching, transformative learning, enhancement.

2. Searching and selection of evidence

Literature will be identified from the following sources which will provide a range of appropriate evidence:

- meta engines (web searching)
- educational research databases and research indexes
- main bibliographic databases
- citation tracking and indexes
- dissertations and theses databases
- grey literature databases
- national policy databases
- full-text journals available electronically
- journals and other non-bibliographic-database sources
- hand-searching
- conference abstracts or proceedings
- other reviews and reference lists as sources of studies
- unpublished and ongoing studies.

Search strategy

- Controlled vocabulary and free text key terms to maximise coverage. These key terms will be scrutinised by the internal and external stakeholders (DCSG)
- Boolean operators and key word truncation will be applied and tested from the scoping exercise and continuously through internal moderation

The following search terms will be used:

- digital capability, digital literacy, digital fluency, digital technology, technology enhanced/enabled
- teaching excellence, teaching best practice, inspirational teaching, transformative teaching/learning.

The search strategy will be applied to each identified source/database and recorded in a shared document between the lead researchers.

Inclusion and exclusion criteria

Inclusion and exclusion criteria will be applied successively to full reports obtained for those studies that appear to meet the search criteria, or where there is insufficient information to be sure. These criteria will be scrutinised by the internal and external stakeholders (DCSGs) Those full reports that do not meet these initial criteria will be excluded but will be recorded as such within RefWorks bibliographic software.

Suggested criteria (after initial scoping) are as follows:

Include	Exclude
2010 - present	
Higher Education	Primary, Secondary, Further Education
UK, Australasian and North American literature	
Written in English	
Taught provision	Research-based provision
All Higher Education stakeholders (e.g. students, staff, professional services)	
Specific reference to teaching practice (excellence, best, enhanced, inspirational, effective, good)	
Specific reference to digital technology/technology enhanced/enabled learning/e-learning	
Conceptual, academic critique, policy (non-empirical), research studies (including case studies, frameworks based on evidence)	

3. Quality assurance processes for the search

This review will follow the guidelines of the Evidence for Policy and Practice Information and Co-ordinating Centre (EPPI) and will include the following:

Internal review appraisal

The Internal Digital Capability Steering Group has been selected to include colleagues at the Host Institution who have expertise in teaching practice and digital technology. This team will provide critical comment throughout the research in face to face and virtual meetings.

External review appraisal

The External Digital Capability Steering Group has been selected to include external stakeholders identified throughout the scoping exercise. This team will provide additional critical comment and sector-wide relevance throughout the research in virtual meetings.

Good processes

The two lead researchers will apply internal moderation processes at various stages of the review. Each researcher will apply inclusion and exclusion criteria independently and then compare for consistency at interim periods during the data collection, including reflections on a pilot search. At pilot search stage, a third researcher will add an additional layer of moderation to augment confidence in the robustness of process.

Maintaining database records

When each database/search is conducted, the records will be stored on a shared document as follows:

Database/Source	Dates covered	Date searched	Search strategy	Hits	Notes	Results in filename

Data management

References for each search will be recorded using RefWorks. This will include full lists of all hits before inclusion and exclusion criteria have been applied. The researchers will create a shared RefWorks account, a detailed system for collating excluded and included literature, and for identifying duplicates. This system will enable transparency and will provide useful information for other researchers who may update or progress this work in the future.

Live data (records and database tracking) will be saved on the Host Institution internal Q drive on a weekly basis for the duration of the project. This drive provides secure access and an automatic backup to an external server.

4. Data extraction and synthesis

Data extraction will combine analysis of the following data.

- **Numeric data:** often these take the form of 'effect sizes' for inclusion in a meta-analysis, but numeric data also includes, for example, numbers of study participants, intervention costs and numbers in specific sub-groups.
- **Categorical data:** in which characteristics of studies can be summarised easily (e.g. by location of intervention or its theoretical framework).
- **Free-text narrative data:** information which cannot be summarised numerically, and is too detailed and varied for categories to be useful. These data are extracted in 'free-text' form and may take the form of, for example, summaries of interventions, the verbatim accounts of participant quotations, or key concepts and themes that were identified by authors of the original studies.

Once the inclusion and exclusion criteria have been applied to all searches, a final database of included literature will be then be analysed according to the principles of the 'weight of evidence model' (EPPI).

Source	A: Quality	B: Relevance	C: Topic	Teaching Excellence	Digital Capability	Infrastructure

A = The trustworthiness of the results judged by the quality of the study within the accepted norms for undertaking the particular type of research design used in the study (methodological quality)

B = The appropriateness of the use of that study design for addressing the review's research question (methodological relevance)

C = The appropriateness of focus of the research for answering the review question (topic relevance)

D = Judgement of overall weight of evidence (WoE) based on the assessments made for each of the criteria A-C

The findings from each of the included studies will be pooled under each research question and analysed further in order to understand the array of factors that influence teaching excellence, digital capability and institutional infrastructure.

- 1) Which features of institutional infrastructure maximise and ensure effective use of TEL?
- 2) Which strategies have the most impact for teaching excellence?

The reviewers will explore what each study contributes to answering each question and how answers to questions are interrelated.

5. Reporting and dissemination

The following outputs have been agreed with the research funder:

- 1) Short form electronic Executive Summary
- 2) Synopsis of findings, including formulation of *Guidelines for Developing Digitally-Capable Teaching Excellence*

3) Full report with appendices

In addition it is suggested that the research team will hold a launch at Sheffield Hallam University in Autumn/Winter 2016, subject to QAA dissemination schedules. All DCSG members will be invited.

Anticipated Challenges

- The fluidity of the key terms used in this project may well add complexity to the review. This will need to be monitored and appraised by the researchers and the steering group for the duration of the project.
- While offering a coherent overview of teaching practices, the nature of this review will mean that excellent teaching will be interpreted subjectively by the researchers and this could make judgements of validity difficult. Following a quality process which is high in trustworthiness will counter these concerns.

Limitations

- The literature review is time-bound as the sector, and specifically the assessment of teaching excellence, is in a period of significant change.
- The review is primarily UK-centric.

Key questions for DCSGs

As a result of independent scoping and discussion between researchers, the following decisions required comment from the DCSGs:

- Should the inclusion criteria adopt a strict focus on teaching excellence (consider the context and background to the terms and results of the scoping exercise) i.e. do we only look at teaching practice which has been assessed as excellent?
- How can the researchers assess teaching excellence if the studies do not specifically refer to the term i.e. using our operationalised definition?
- How should the interchangeable terminology on digital capability be managed?
- Can the group comment on the suitability of the suggested search terms?
- Should the link to 'institutional infrastructure' be included in the search terms or can this be a secondary assessment of selected studies (using, for example, JISC benchmarks)?
- Are the researchers correct in their exclusion of non-empirical studies? This decision was based on the need to create evidenced good practice guidelines as a result of the literature review.
- Is the primary focus on UK literature - supplemented by Australasian and North American sources - appropriate?

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White, Gerald K. (2013) *Digital fluency: skills necessary for learning in the digital age*. Melbourne: ACER.

Appendix B: Internal Digital Capabilities Steering Group membership

Name	Institutional Area
Alison Purvis	Health and Wellbeing (HWB)
Luke Desforges	Development and Society (D and S)
Sue Beckingham	Arts, Computing, Engineering and Science (ACES)
Dave Greenfield	ACES
Julian Ryan	D and S
Jayne Revill	Sheffield Business School (SBS)
Hassun El Zafar	Sheffield Hallam University Student Union
Deb Harrop	HWB
Jeff Waldock	ACES
Colin Beard	SBS
Claire Craig	ACES
Mel Lindley	HWB
Anne Nortcliffe	ACES
Guy Merchant	D and S
Christine O'Leary	SBS
David Eddy	HWB

Appendix C: External Digital Capabilities Steering Group membership

Name	Organisation
Viv Rolfe	Association of National Teaching Fellows (ANTF)
Nikki Spalding	Higher Education Academy
Sue Watling	UCISA & University of Hull
Sarah Knight	JISC
Rhona Sharpe	Oxford Brookes University
Katharine Reedy	The Open University and QE Network
Liz Bennett	Huddersfield University
Ellie Russell	NUS/TSEP
Rebecca Galley	The Open University

Appendix D: Communication and dissemination plan

The project brief outlines the following outputs.

- **Short-form electronic Executive Summary** of key points to engage key decision-makers.
- **Synopsis of Findings**, providing policy-makers with emerging theoretical framework(s), including good-practice guidance and recommendations for future work.
- Full **Report with appendices**, assessment of evidence, quality assessment, methodological analyses and researcher reflections.

The communication and dissemination plan outlines the various ways in which this output will be promoted. Feedback from both Steering Groups will guide this promotion.

- Internal dissemination by project team: *Student Engagement, Evaluation and Research* and *Learning Enhancement and Academic Development* Directorates (Faculty committees, internal conferences, internal media communication).
- Soft 'launch' at the end of the project at the host institution. All DCSGS members and other interested stakeholders invited.
- Publication of output on QAA website/Spotlight on Digital Literacy: www.qaa.ac.uk/research/projects/spotlight.
- External and internal DCSG members to promote via own networks.
- Newsletters, blogs, email promotion and face to face meeting attendance (ALT fortnightly, HEDG, JISC mailing list and blog <https://digitalcapability.jiscinvolve.org/wp/>, Student Experience Experts group www.jisc.ac.uk/rd/get-involved/learning-and-teaching-experts-group 12th October, Heads of E Learning Forum, UCISA Digital capability group, TSEP network).
- Twitter promotion via #QENetwork, #QAASpotlight, @JISC, @A_L_T etc.
- Promotion to practitioners via HEA networks, NTF networks, Office for Students (if operational).
- Promotion to PVCs either directly or via HEA PVC network.
- Conference presentations and attendance by project researchers.¹
- Open access to raw data to allow continued analysis of the topic area.²

¹ QAA to be contacted to check embargo or any other restrictions on publication.

² QAA to be contacted to check embargo or any other restrictions on data sharing.

Appendix E: Abstract relevancy scoring

Abstract Relevancy Scoring

The two key themes of this review (teaching excellence and digital capability) are the most fluid inclusion criteria. To aid the creation of a sample of literature, the following relevancy scores were used by the researchers. The scoring system was piloted on 30 pieces of literature and amended as necessary before application.

0	1	2	3	4
Did not meet exclusion and/or inclusion criteria	Focus is skewed towards teaching practice (digital is negated)	Some reference to teaching practice in HE	Clear reference to effective teaching/best practice in HE	Specific reference to teaching excellence in HE
	Focus is skewed towards digital capability (where teaching practice is negated)	Some consideration of how teachers use digital technology	Clear discussion of digital technology	Specific reference to digital capability/literacy
	Focus is skewed towards digital capability and student learning (student focus)	Links between digital technology by teachers and transformative or enhanced student learning are inferred by the researcher	Some discussion of digital technology by teachers and transformative or enhanced student learning	Clear discussion of digital capability of teachers to transform or enhance student learning
		No abstract is available, it is not clear whether the content is relevant from the title	No abstract is available, title appears relevant	

Appendix F: List of included artefacts

	Abstract Relevancy Score (ARS)	Country of origin	WoE Overview
JEFFERIES, A. and CUBRIC, M., 2013. Planning for Success in Introducing and Embedding Technology to Enhance Learning, Oct 2013 2013, Academic Conferences International Limited, pp. 156-XIV.	4	UK	Two case studies (one HEI) discussing the success of technological change (based on a previous evaluation of EVS). Critical success factors evaluated and used to guide teaching excellence (uses 'enhances learning' definition) and considers the introduction of digital capabilities 'at scale'. Reference is made to appropriate infrastructure.
OWENS, T., 2015. Practising what they preach? An investigation into the pedagogical beliefs and online teaching practices of National Teaching Fellows. International Journal for Academic Development, 20(1), pp. 76-92.	4	UK	This paper reports the results of an empirical study of NTFs (UK wide sample n=36) with expertise in online learning, which measured their pedagogical beliefs and online teaching practices. Teaching excellence is defined by those that have received a National Teaching Fellow award. Digital capability is operationalised by 'online teaching practices' so assumes that online teaching practice requires some level of digital capability.
OWENS, T., 2012. Hitting the nail on the head: the importance of specific staff development for effective blended learning. Innovations in Education and Teaching International, 49(4), pp. 389-400.	4	UK	Survey of 529 UK University lecturers from 54 higher education institutions. 18 paired questions (total of 36) re pedagogical beliefs and online teaching practices based on Norton (2005) survey. Study is concerned with developing the digital skills of academic staff to enhance teaching practice and considers the impact of pedagogical beliefs on online teaching practices. Does discuss infrastructure implications i.e. staff training and correlation with effective online teaching practices; issues noted in promoting teaching excellence over

			researcher identity.
BARBER, W., 2014. Digital Narratives: Examining Evolving Teacher-Learner Roles in Authentic Online Communities, Oct 2014 2014, Academic Conferences International Limited, pp. 48-55.	3	Canada	Narrative exploration of the changing roles between teachers and learners in online communities. The author uses arts-based narrative inquiry to examine how Digital Moments and Digital Narratives create an authentic online community in which the student-teacher relationship is key (one HEI, classes of 20-25 students). Teaching excellence inferred via transformative learning in online environments; digital capability of teacher is inferred as part of the design and collaboration of digital movements.
BARBER, W., TAYLOR, S. and BUCHANAN, S., 2014. Empowering Knowledge-Building Pedagogy in Online Environments: Creating Digital Moments to Transform Practice. Electronic Journal of E-Learning, 12(2), pp. 128-137.	3	Canada	Narrative of the chronological journey of one teacher and the move to teaching in an online environment. It also analyses how and why this strategy moves beyond simple constructivist thinking to the complexities of teaching in the digital world. Mirrors the content of Barber 2014 (one HEI, one course). Qualitative student feedback included - author has won teaching excellence awards.
BEETHAM, H., 2015a. Deepening digital know-how: building digital talent Key issues in framing the digital capabilities of staff in UK HE and FE. Bristol: JISC.	3	UK	This report covers findings from a project funded by Jisc to review how the digital capabilities of teaching and professional staff are currently framed in UK HE and FE. Semi-structured interviews with various stakeholders across UK further and higher education sector (note lack of teaching staff). Infers excellence in discussions of digital specialism; digital specialists have the ability to innovate and are needed in each subject area to help 'enhance and transform practice'; specific discussion of the necessary infrastructure required to

			support.
BEETHAM, H., 2015b. Thriving in a connected age: digital capability and digital wellbeing. Available at www.jisc.ac.uk/blog/thriving-in-a-connected-age-digital-capability-and-digital-wellbeing-25-jun-15	3	UK	Overview of JISC/Beetham work on staff digital capability. Blog post but references previous work which provides the research base (literature review and interviews). Staff capability impacted by digital wellbeing; inferred links to good quality teaching; loss of teacher contact also stated by students as part of digital wellbeing. The accompanying resources are also useful to provide context and should be considered as part of this reference.
BEETHAM, H., 2014. Students' experiences and expectations of the digital environment. Available at www.jisc.ac.uk/blog/student-experiences-and-expectations-of-the-digital-environment-23-jun-14	3	UK	Overview of a study exploring students experiences of study in a digital environment. The focus is on student experience with technology but this content does make links between the student appraisal of teaching practice and digital capability ('confidence of teaching staff has a strong impact on students' satisfaction with the use of technology'). Review of studies included but methodology not clear.
BEETHAM, H. and SHARPE, R., 2013. Rethinking pedagogy for a digital age: Designing for 21st century learning. Routledge.	3	UK	The book is a collection of pedagogical strategies that can be adopted in contemporary higher education. Defines the difference between teaching and learning in an online context with strong links case studies and associated pedagogy. Focus on the role of the teacher and designing learning. Infers excellent practice through a discussion of transformative learning.
BENNETT, E. and FOLLEY, S., 2015. D4 Strategic Project: Developing Staff Digital Literacies. External Scoping Report.	3	UK	Literature review of digital literacy, presenting an overview of terminology, developmental models and organisational case studies. The report advocates the use of technology to

			enhance teaching and learning. Teaching excellence links are sparse but are inferred via the discussion of good/best practice. The ability to transform and enhance teaching via the use of digital technologies and the development of digital literacies for teaching is also central. It also covers infrastructure in terms of the support required to develop digital capability in staff.
BRENTON, S., 2015. Effective online teaching and learning. A handbook for teaching & learning in higher education: Enhancing academic practice, pp. 139-151.	3	UK	This piece provides reflections on practice and offers some principles for effective learning design for both face-to-face and online learning. The chapter argues that the principles of effective online teaching are not so different from those of other modes, and that the medium itself offers opportunities to build on these principles to increase student engagement in beneficial ways. Discusses the staff role online and pedagogic approaches but provides a limited discussion of digital capabilities and infrastructure.
COMAS-QUINN, A., 2011. Learning to teach online or learning to become an online teacher: An exploration of teachers' experiences in a blended learning course. ReCALL, 23(03), pp. 218-232.	3	UK	This paper evaluates the shift to blended learning (one course, one HEI) measured via engagement in training, feeling prepared, usefulness and student participation. It infers characteristics of effective online teachers and the necessary infrastructure needed to support them. The paper also discusses how the use of ICT (and the digital capability of the teacher) requires a shift in understanding the pedagogical affordances of technology.
FIELDING, G., MCCREADY, R., CAMERON, I., WEBB, A.,	3	UK	Overview of the UCISA User Skills Group survey (2014) on how UK HEIs are developing

ADAMS, J. and WHALLEY, G., 2015. UCISA Digital Capabilities Survey 2014-Results. <i>EUNIS Journal of Higher Education</i> .			and supporting staff and student digital capabilities (156 HE institutions in the UK and Ireland approached, a response rate of 41%). Digital capability explicitly referred to. Teaching practice, staff and student digital practice commented on and infrastructure included. No explicit link to teaching excellence but inferred via links to practice.
GREGORY, M.S. and LODGE, J.M., 2015. Academic workload: the silent barrier to the implementation of technology-enhanced learning strategies in higher education. <i>Distance Education</i> , 36(2), pp. 210-230.	3	AUS	Paper considers barriers to implementation of technology enhanced learning strategies based on findings from literature and experience in sector. No new research evidence provided. Staff digital capabilities are discussed in the context of the infrastructure required to implement technology enhanced learning strategies. Teaching excellence inferred by reference made to excellent student experience.
HENDERSON, M., SELWYN, N. and ASTON, R., 2015. What works and why? Student perceptions of 'useful' digital technology in university teaching and learning. <i>Studies in Higher Education</i> pp. 1-13.	3	AUS	Drawing on a survey of 1,658 undergraduate students (one HEI), the paper identifies 11 distinct digital 'benefits' including flexibilities of time and place. The non-transformative nature of TEL is highlighted as a critique. Direct links to the operational definition of teaching excellence is provided with the digital capability of staff inferred through provision of digital technology. Infrastructure issues are touched upon.
HUTCHINGS, M., QUINNEY, A. and GALVIN, K., 2014. Negotiating the triple helix: Harnessing technology for transformation, Proceedings of the International Conference on e-Learning, ICEL 2014, pp. 76-85.	3	UK	Rich data from student questionnaires and staff focus groups is drawn on to highlight individual and organisational barriers (one HEI). Innovative blended learning adopted and evaluated with a consideration of 'optimum disruption' in transformative practices. Technology strategies are part

			of the 'triple helix' but not the core focus. Best practice for infrastructure concerns are highlighted.
HUTCHINGS, M. and QUINNEY, A., 2015. The Flipped Classroom, Disruptive Pedagogies, Enabling Technologies and Wicked Problems: Responding to 'the Bomb in the Basement'. Electronic Journal of E-Learning, 13(2), pp. 106-119.	3	UK	Same content at Hutchings, Quinney & Galvin (2014) with additional narrative.
JISC, 2016a. Design and pedagogic models. Available at www.jisc.ac.uk/guides/curriculum-design-and-support-for-online-learning/pedagogic-models	3	UK	A practice guide which addresses three questions relating to design and pedagogic models using case studies from HEI's which are learner focused; 1. Is there a pedagogic argument for delivering the course via online learning? 2. Which pedagogic approaches and models in your current curriculum can benefit from online technologies? 3. Do you need to change your current pedagogic approaches for an online context?
JISC, 2016b. Digitally enable your team to improve learner engagement. Available at www.jisc.ac.uk/guides/digitally-enable-your-team-to-improve-learner-engagement	3	UK	Quick guide with links to further reading and evidence which should be included in the review. Focus is on digital capability within the context of higher education. Weak links to teaching excellence but good coverage of infrastructure.
JISC, 2016c. Jisc digital capability codesign challenge blog. JISC. Available at https://digitalcapability.jiscinvolve.org/wp/	3	UK	Digital literacy as a marker of excellence is touched upon - working with the QAA (Beetham blog) and Digital Capabilities Teacher Profile has relevance can be linked to the scope of this review. The main focus is the infrastructure to support digital capability with some links to practice.
JISC, 2016d. Student experience experts group. Available at	3	UK	Slideshows and comments from case studies of practice and group members which

www.jisc.ac.uk/rd/get-involved/learning-and-teaching-experts-group			focus on digital capability are available. Formerly the learning and teaching experts group so the link to excellence can be inferred by membership. To note the limited evaluation contained within this artefact.
JISC, 2015. Support students and staff to work successfully with digital technologies. Available at www.jisc.ac.uk/guides/enhancing-the-digital-student-experience/support-students-and-staff	3	UK	JISC Guide to supporting students and staff to work successfully with digital technologies. Case studies of HEI's are included as evidence where appropriate.
JISC, 2014a. Developing digital literacies. Available at www.jisc.ac.uk/guides/developing-digital-literacies	3	UK	The resources is a 'How to' guides for practitioners. Supporting staff and strategy is noted but not explicitly linked to teaching excellence; 20 top tips for course teams are inferred links to effective teaching.
JISC, 2014b. Jisc Digital Student: Investigating students' expectations of the digital environment (Exemplars). Bristol: JISC. Available at https://digitalstudent.jiscinvoive.org/wp/exemplars/	3	UK	This artefact provides 50 exemplars of effective practice in support of students' digital experiences in Higher Education. Relevant exemplars include; deliver a relevant digital curriculum; take a strategic, whole-institution approach to the digital student experience.
KIRKWOOD, A., 2014. Teaching and learning with technology in higher education: blended and distance education needs 'joined-up thinking' rather than technological determinism. Open Learning: The Journal of Open, Distance and e-Learning, 29(3), pp. 206-221.	3 (revised to 4)	UK	Conceptual piece with supporting literature. Strong critique of technological determinism. Discussion of institutional aims; improvements in learning (operational definition) which are supported by literature support claims to best practice. Also includes a specific discussion about teaching with links to professional practice.
LAURILLARD, D., 2010. Supporting teacher development of competencies in the use of learning technologies. ICT in Teacher Education, pp.	3	UK	Positions digital capability of staff (without explicitly using the term - note date) as key in effective use of technology. Teacher focused throughout. Discussion piece with

63.			supporting literature.
LITTLEJOHN, A., BEETHAM, H. and MCGILL, L., 2013. Digital literacies as situated knowledge practices. Literacy in the Digital University: Critical Perspectives on Learning, Scholarship and Technology, pp. 126.	3	UK	The focus here is on the JISC programme to promote digital literacies. Includes varied phases of data collection and reviewing previous literature and data from multiple HEIs, providing a robust methodology. Specifically linked to the practices of academics and their influence on learning; implications for practice presented which could be positioned within guidance.
LITTLEJOHN, A., BEETHAM, H. and MCGILL, L., 2012. Learning at the digital frontier: a review of digital literacies in theory and practice. Journal of Computer Assisted Learning, 28(6), pp. 547-556.	3	UK	This paper describes a literature review, institutional audit and analysis of practice in the area of digital literacy provision, based on research across the UK Higher Education sector. Specific reference to best practice is made in the supporting evidence. Concludes with implications for institutions, staff and students. Mirrors the content on the 2013 publication above.
MCGILL, L., 2011. Curriculum innovation: pragmatic approaches to transforming learning and teaching through technologies. Transforming curriculum delivery through technology programme synthesis report	3	UK	Presentation of outcomes from the JISC Curriculum Delivery Programme, 2008-10. The aim was to examine how specific curriculum developments impact on learning and teaching experiences; methodology of projects included. Specific benefits to transformative learning, enhancement and effectiveness are noted and includes recommendations to institutions, learners, curricula and for using technology.
MCLOUGHLIN, C.E. and ALAM, S.L., 2014. A Case Study Of Instructor Scaffolding Using Web 2.0 Tools To Teach Social Informatics. Journal of Information Systems	3	AUS	Evidence presented from one HEI, UG/PG mix course and covers qualitative student perceptions of web 2 tools; note the students may be biased by their course (social informatics). A model of

Education, 25(2), pp. 125-136			scaffolded e-learning is presented with some guidance for instructors, which aligns with digital capability (where capability includes an understanding of pedagogy).
MIRRIAH, N., ALONZO, D. and FOX, B., 2015. A blended learning framework for curriculum design and professional development. Research in Learning Technology, 23, pp. n/a	3	AUS	Literature review and qualitative data assesses the scope of blended learning in higher education. The authors then propose a BL framework which contains criteria for effective delivery (the indicators of the ability of academics in designing and delivering a BL course, and standards that define the quality of practice). This suggestion links digital capability and quality and aligns with the scope of this review.
MIRRIAH, N., ALONZO, D., MCINTYRE, S., KLIGYTE, G. and FOX, B., 2015. Blended learning innovations: Leadership and change in one Australian institution. International Journal of Education and Development using Information and Communication Technology, 11(1), pp. 4-16	3	AUS	Case studies of professional development activity to enhance the digital capability of teaching staff are presented with a sound theoretical base. They focus on how to develop staff digital capability. This includes PRINCIPLES OF EFFECTIVE ONLINE AND BLENDED PROFESSIONAL DEVELOPMENT which could be linked to our guidelines. Not evaluated but a strategic overview is provided.
QAA, 2016. Digital Literacy - QAA Spotlight. Gloucester: QAA	3	UK	A range of case studies are presented as best practice in digital literacy within higher education. This specifically links to the key concepts in this project. On review, some of the case studies have links to transformational learning (e.g. Northampton).
TORRISI-STEELE, G. and DREW, S., 2013. The literature landscape of blended learning in higher education: the need for better understanding of	3	Aus	A literature review is presented with a clear methodology. Interesting categories of types of literature e.g. student focus, how to... Notes lack of literature on academic practice and

<p>academic blended practice. International Journal for Academic Development, 18(4), pp. 371-383</p>			<p>'Widespread adoption of effective, transformative blended practices is proving a challenge'. A specific discussion about professional development and skills of academics to support BL is also included.</p>
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Appendix G: Access to full research database

Access to selected research materials is available on request to support future research projects in this domain. Available materials include an overview of the inclusion/exclusion process via database reference lists and annotated Weight of Evidence records.

These materials are currently archived within our internal data repository and access can be provided by contacting Liz Austen (l.austen@shu.ac.uk) or Stella Jones-Devitt (s.jones-devitt@shu.ac.uk).

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Southgate House, Southgate Street, Gloucester GL1 1UB
Registered charity numbers 1062746 and SC037786

Tel: 01452 557050
Website: www.qaa.ac.uk

Sheffield Hallam University

Digital capability and teaching excellence: an integrative review exploring what infrastructure and strategies are necessary to support effective use of technology enabled learning (TEL)

AUSTEN, Liz <<http://orcid.org/0000-0002-2837-8297>>, PARKIN, Helen, JONES-DEVITT, Stella, MCDONALD, Kieran <<http://orcid.org/0000-0001-6501-5439>> and IRWIN, Brian

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