Facilitating pedagogical change in online learning in higher education through professional development

Facilitating pedagogical change in online learning in higher education through professional development

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This work or any part thereof has not been presented in any form to the University or to any other body whether for the purposes of assessment, publication or for any other purpose (unless otherwise indicated). Save for any express acknowledgements, references and/or bibliographies citied in the work, I can confirm that the intellectual content of the work is the result of my own efforts and of no other person.

Signature………

Date…………… 28.06.2021

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ABSTRACT

The onset of Covid-19 gave rise to a huge wake-up call across the higher education sector as it switched to what has been termed 'emergency remote teaching' during 2020. This unprecedented rise in the uptake of online learning accentuated the need for lecturers to develop pedagogically-informed online teaching practices. This research used an appreciative inquiry methodology during the first wave of the pandemic to explore enacted TPACK (technology, pedagogy and content knowledge) knowledge of in-service teachers. The research makes an original contribution to research, addressing a gap in knowledge arising from the literature review relating to the use of TPACK to support in-service lecturers. As practice-based research, findings illustrated how teaching practices can be developed using professional development strategies to uncover the potential of online learning to deliver a transformative learning experience. Key findings of the research included a set of indicators for student-centred online teaching practices, examples of core and advanced teacher competences, and a mapping of technology affordances to support student-centred learning (SCL) pedagogies. The findings highlighted the importance of lecturers having permission to experiment, and the relevance of TPACK to support the development of a collective knowledge of SCL pedagogies to create innovation and reflection within communities of practice. The findings include a conceptualisation of the TPACK framework for use by lecturers and programme teams to support the design and development of SCL online pedagogies. In addition, recommendations arising from the research include a framework for supporting communities of practice develop contextual TPACK indicators using appreciative inquiry, and the need for strategic leadership through institutionally-led initiatives that take into consideration elements within the conceptualised TPACK framework.

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Chapter 1: Introduction

1.0 Introduction

Higher education lecturers need support in how they integrate technology into their teaching practices as online learning is often poorly designed and fails to engage learners, due to low levels of student and lecturer digital capabilities and lecturer pedagogical knowledge (Laurillard, 2012; Beetham, 2013). Undertaking a pedagogically driven approach to integrating technology has been a challenge for teachers (Beetham and Sharpe, 2013); the dissonance between research and practice was accentuated further during the Covid-19 pandemic (JISC, 2021a). This research challenges the negative perception of online learning as inferior, or as a replication of face-to-face teaching (JISC, 2021b), and seeks to develop understanding of online teaching practices. Teaching strategies and the selected pedagogical approaches for online teaching should be designed to support the changing needs and expectations of learners as outlined in the JISC (2021b) report entitled ‘Teaching and Learning Re-imagined'. This thesis focuses on teacher knowledge and competences associated with delivering student-centred learning pedagogies, to support the development of “21st Century Skills” referring to the core competences needed to help students thrive in today’s world (Joynes *et al.,* 2019 p.5).

1.1 Pedagogical change

The research design uses the TPACK (technological, pedagogical, and content knowledge) framework in conjunction with appreciative inquiry (AI) as a means of facilitating pedagogical change within my own institution. AI is a strengths-based approach to leadership and organisational change, and focuses on uncovering the ‘positive core’, with a view to build on strengths of current teaching practices. Within this research the TPACK framework is used to articulate the competences needed by teachers to implement student-centred learning (SCL) pedagogies, viewing professional development as an enabler of change, as discussed by Laurillard (2013). An AI methodology was selected for its transformative potential, to support teams in developing a sustainable approach to change as identified by Cooperrider and Srivastva (2013).

1.2 Introduction to the TPACK framework

The TPACK framework builds on Shulman’s ideas of teacher knowledge (1987) which informed the seminal work by Mishra and Koehler (2006). Their framework presented the integration of technology in teaching through the intersection of the domains of TPACK, as illustrated in Figure 1.1. below:

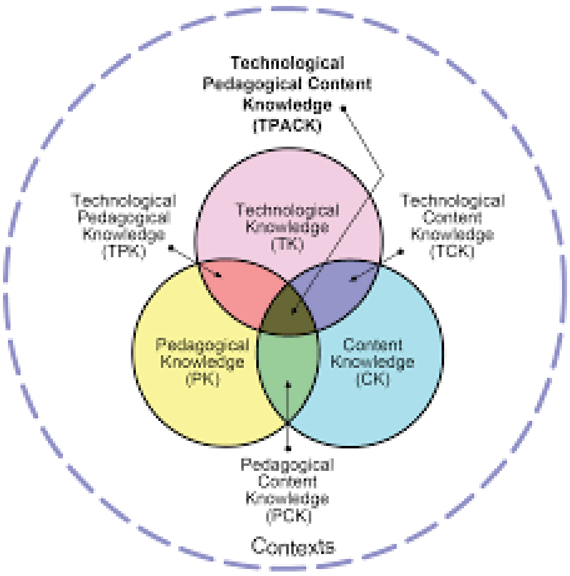


Figure 1.1: TPACK Framework (Mishra and Koehler, 2006)

The addition of technology resulted in the addition of four new domains, namely technology knowledge (TK), technological pedagogical knowledge (TPK), technological content knowledge (TCK), and the intersections of all domains as the principal component (TPACK). TPACK has been used by teacher educators and researchers to conceptualise the integration of technology into teacher educator programmes and is grounded in the need for teachers to understand the integration of the distinct types of knowledge, instead of thinking about them as separate domains.

1.3 Context of the research

This practice-based research examines current online teaching to provide a better understanding of the knowledge and competences needed by lecturers and students to engage in student-centred pedagogies within online learning. For this research, the term in-service lecturer refers to those currently engaged in teaching as their main work activity. The terms in-service teachers, and pre-service teachers are frequently used in TPACK research and relevant when discussing strategies to build TPACK competences to acknowledge the difference between the research conducted with new or experienced teachers. An important aspect of the TPACK framework is its situated nature, and this research aims to develop an understanding of how teacher knowledge can be developed within a community of practice which is grounded within a specific context (e.g., a curriculum area). The methodology section outlines the approach to data collection, and the unique opportunity provided by Covid-19 to learn about online teaching practices, during this accelerated time of experimentation. During this period lecturers used newly introduced technologies and adapted the design of their four-hour timetabled face-to-face session for online delivery to fit around their students' needs. The study is set within a private university specialising in online and blended higher education for over 30 years, experienced in the development of online content, and delivery of online learning. The learner profile at the university included a high proportion of Black, Asian and minority ethnic (BAME) students, with both modes of study attracting non-traditional higher education students, many returning to education after a long break.

The research is practice-based and conducted whilst I was within a senior management role for the university, leading in online teaching and learning, academic professional development, and digital learning. As a researching-practitioner, I have sought synergy between my doctorate research and professional practice, throughout this time developing as a reflective practitioner. The doctorate provided opportunity to identify, examine, and shape behaviours and support a scholarship of practice that supported change in my own and others' deeply held theories (Osterman and Kottkamp, 2004). The university introduced blended learning in 2015, and since 2019 has re-focused on online learning which has permitted the research to be more closely aligned with the current direction of the university, which in turn has influenced the focus of the research into online learning.

Approaches to teaching, learning and assessment at the institution were based around widening participation and providing learning opportunities for those who may need more flexible options for study, and cannot attend full time on-campus learning. Supporting the ethos of access to higher education, academics were supported to understand, and develop strategies which met the needs of adult or non-traditional learners. Prior to the pandemic, all students had access to online learning resources for their module, made available at the start of their studies. To supplement the online module institutionally led approaches aimed at providing a student experience with consistent levels of online support for the module outcomes, academic skills development, and pastoral support.

The curriculum portfolio enabled pathways from foundation through to masters, via blended or online, across faculties of business, law, social sciences. Key programmes areas were represented within the study and included lecturers who taught from foundation level to level 6 in: psychology, healthcare management, law, business, graphic design, and computing.

Since the beginning of the pandemic there has been a wide scale adoption of online teaching with the closure of schools, colleges and universities and increased use of online platforms to retain contacts with family and participate in leisure pursuits. Education research, heavily situated in practice and therefore highly contextual is affected by these wide-scale societal changes, especially the increased use of online technology for personal and professional uses and moving teaching online for all educational establishments, resulting in a heightened interest in online learning during the pandemic (JISC, 2021a). As a result, these changes in the adoption and wider use of online learning and associated technologies and the changing landscape of online learning have been captured as part of the narrative of this research.

1.4 Research questions

1. How have lecturers used the TPACK framework to implement student-centred learning pedagogies?
2. How could the TPACK framework be conceptualised to support lecturers' capabilities for the design and development of student-centred pedagogies?
3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?

1.5 Significance of the study

The study presents examples of student-centred online learning practices and how these can be enacted within online spaces using the technology affordances of webinars and virtual learning environments for both synchronous and asynchronous learning. Using the first three phases of the appreciative inquiry methodology (discovery, dream, design) devised by Cooperrider (1985), high points of teaching practice were identified and shared with other practitioners to increase awareness of the design and creation of an online experience which is flexible and adapts to students' needs. Throughout the research sharing it has been demonstrated that developing understanding of SCL pedagogies can be created collectively through reflective practice. Developing a common language is a key element of forming a professional learning community, facilitated through the AI process, and a central element of the community of practice concept (Lave and Wenger, 1991). The use of AI in this study enhances the growing body of literature exploring uses of the TPACK framework to support teacher development with technology, as an innovative approach for situated professional development. The appreciative inquiry process adopted within this study and the identification of high points of teaching practices is of interest to leaders, lecturers and TPACK researchers to help understand how TPACK can be used for online teaching in higher education using SCL pedagogical approaches. The research contributes to the TPACK literature on teacher competences (Foulger, 2021) and teacher development rubrics (Chai *et al.,* 2019; Koh *et al.,* 2017) by presenting a set of online teaching indicators and corresponding core and advanced teacher competences. Building on the work of Angeli and Valanides (2019) the research provides a map of technology affordances of SCL pedagogies that is transferable across online teaching contexts. The research extends thinking about strategies for building TPACK using professional development through the use of communities of practice (CoPs) which reinforce the development of contextual and situated practices and reflective thinking (Phillips, 2014; Mouza, 2016).

1.6 Organisation of the thesis

This thesis consists of five chapters. The first chapter introduces the research by outlining the contextual background, the research questions, and the contribution to practice and associated bodies of literature. The second chapter reviews the literature relating to SCL pedagogies and digital literacy frameworks to support their implementation. The literature review also examines strategies for building technological, pedagogical, and content knowledge using the TPACK framework. The review of TPACK literature focuses on qualitative approaches for in-service teachers. Chapter 3 explains the appreciative inquiry research design and its implementation, detailing the research methods, implementation of the online data collection tools used and use of thematic analysis. Research findings and subsequent key themes are presented and discussed within Chapter 4 for each of the research questions. Chapter 5 presents the conclusions and recommendations for the delivery stage of the AI process and outlines opportunities for future use of the TPACK framework to support the development of teacher knowledge and practices. The final chapter suggests a conceptualisation of the TPACK framework, which has arisen from the research, which is aimed at supporting those involved in designing and developing SCL pedagogies online to deliver a transformative learning experience. A recommended framework for use by leaders, programme teams forming communities of practice, and lecturers provides a mechanism for how AI can be used to support TPACK within their own context.

Chapter 2: Literature Review

2.0 Introduction

The aim of this research is to explore how TPACK can be used to implement SCL pedagogies in online teaching and support lecturers develop their pedagogic and technological expertise to enhance their online teaching practices as identified by (Conole, 2008; Laurillard, 2012; Beetham, 2013). The literature review places the research within the context of technology enhanced learning (TEL) at the time of writing, and acknowledges the challenges around TEL literature and the influence of external factors including the increased access to the internet, introduction of smart phones, and the impact of Covid-19. Technology provides opportunities for the development of new ways of teaching and learning, however there are difficulties implementing pedagogical approaches associated with online learning environments (Brown, *et al*., 2015; Kirkwood and Price, 2014; Salmon, 2014). Despite the acceleration of digital transformation strategies and investment in the digital environment and infrastructure by universities, more resource is needed to support and develop pedagogically informed teaching practices (JISC, 2020a) and there is a need to develop high quality online teaching practices that meet the changing needs of learning in a way that is systematic, and sustainable, meeting the needs of future learners (JISC, 2020b). Universities need to re-design their approaches to digital teaching and learning, to fully utilise the potential of learning technologies moving beyond replication of face-to-face teaching to deliver the transformative learning opportunities required by 21st-century learners (Barber, 2021). Transformative learning requires students to engage in critical reflection and seeks to change perspective, attitude, or student behaviours. Although SCL pedagogies encourage reflection, there the design of learning to facilitate the critical thinking to undertake personal discourse can be challenging to achieve in online learning. Online learning has become more important during Covid-19; whilst the advantages of flexibility of online learning are being experienced globally, existing challenges include how to meet basic conditions required by online learning for socially disadvantaged groups (Ferri *et al.,* 2020). This chapter starts with a review of student-centred pedagogical approaches for 21st-century learning its impact on the development of student digital capabilities. The second section ‘pedagogical change’ examines the use of the TPACK framework to facilitate the shift from teacher-centred to student-centred pedagogies and its relevance as a conceptual lens for the integration of technologies within online teaching practice in higher education. The concluding section, professionalism of the online educator, explores changes to the lecturer role for online teaching and how they can be supported in developing pedagogical knowledge and digital capabilities.

2.1 Student-centred pedagogical approaches in online learning

This section reviews student-centred learning pedagogical approaches and explores how they support 21st-century learning experiences. The middle section reviews skills, competences and digital capability frameworks, followed by a concluding section exploring the role of technology in enabling the support of student-centred learning pedagogical approaches within the context of online learning.

2.1.1 Changing perceptions of online and digital learning

Covid-19 has changed our perceptions of online learning, and also the nature of teaching and learning, according JISC (2020b). Before March 2020, university teaching was predominantly delivered face-to face, yet in 2020/21 lectures were mainly delivered online. The distinction between online, hybrid, and blended learning have been widely discussed as universities sought consensus in how terms representing modes of delivery are used. There has been a greater need for this as a result of the pandemic to enable cross-sector discussions, and consultation with students (Quality Assurance Agency, 2020). This research adopts the descriptions used within the QAA, 2020 report:

“Online learning, is an umbrella term, and in common use beyond the UK higher education sector; it focuses on the connectivity of the learning, teaching and support delivery methods that may be employed by a provider”.

“Hybrid learning and blended learning are often used interchangeably by providers when describing different models of delivery which use a mix of methods to engage students in learning”.

QAA (2020, p.2-3)

Despite the use of terms interchangeably, as mentioned in the quotes above, online learning is used within this thesis as covering any learning that takes place on the basis of online connection. For the purpose of this research it is not associated with a mode of delivery, for example distance, hybrid, blended, accepting that online learning may take within any mode of study.

During what has been termed an ‘emergency response’ or ‘emergency remote teaching’ (ERT) (Ferri, *et al.*, 2020), for the initial period following lockdown in March 2020, many universities had a similar approach according to JISC (2020a), with the re-design of courses, upskilling of staff and digitisation, or creation of new teaching materials. Despite the challenges for staff, students, and leaders, Covid-19 provided an opportunity for a change in teaching and learning as outlined by JISC (2020). The quotation below summarises the perceived opportunity to revise the vision of online learning, commonly defined by mode (online, hybrid, blended), to be more flexible and responsive to student needs:

> "What we will see is an acceleration of the greater integration and comfort with online learning and pedagogy and technologies, such that we will get to a place where we'll stop making this tired distinction between online and traditional. We will just have fluidity. Students will learn in whatever modality students want, in any given day or hour."
>
> JISC (2020b, p.19)

The potential to offer flexibility has been one of the main advantages of online learning, reported by students and staff in a report by universities in response to Covid-19 (JISC, 2020a). By including flexibility in teaching, learning and assessment there is a greater potential to provide a learning environment that encourages elements of transformative learning by encouraging students to be: self-motivated, self-governing, rational, collaborative, and empathetic (Mezirow, 1978). The transformation of teaching and learning in HEIs (higher education institutions) is often associated with the affordances of digital technologies, however, according to Henderson, Selwyn and Aston (2017), while digital technologies are clear in the students' experience of undergraduate university education, and digital technologies are clearly not transforming the nature of university teaching and learning.

2.1.2 Developing a 21st-century learning experience

Joynes *et al*. (2019), on behalf of the Department for International Development, pointed out that there is general agreement that a new form of learning is needed to take on global challenges which enable the development of skills to meet 21^{st}-century demands. According to Joynes *et al*. (2019), there is not a universally adopted definition of 21^{st} Century skills, and refer the issue of lack of difference between these and other skills, and a concept relating to multiple, or subcategories of skills. However, within definitions skills set which extend professional attributes which relate to competitiveness, in the 21^{st} Century workforce, and development of skill sets to adapt to societal and workforce changes. A 21^{st} century learning experience, would consider those key themes cutting across different skill sets outlined in the Joynes *et al*. (2019) including communication and collaborative skills, individual approaches to learning and autonomy, and ICT and digital literacy.

The need for a systematic approach to development of these skills has been flagged up Coonen *et al.* (2018), in response to the Industrial Strategy 'Building a Britain Fit for the Future' (2017), and numerous 21^{st-}century skills frameworks developed to prepare students with a set of skills, knowledge and competences in the face of changing workforce demands. The response by universities to prepare students for 21^{st}-century learning is found within university strategies including learning and teaching plans (JISC, 2020b). This has resulted in investment by some universities in digital transformation strategies and exploring future needs of industry including opportunities for lifelong learning, with increased focus on aligning to the workplace as noted above. Core competences and sector-specific capabilities, along with digital transformation, are playing a key part in UK universities' institutional strategies, influenced by the government's (2017) Industrial Strategy.

According to Coon and Pratt-Adams (2018, p.5), in their report Building Higher Education Curricula Fit for the Future, “HE providers have a vital role to play in the design and delivery of curricula that support their students and realise their ambitions”. The report’s headline recommendations identify the need for government, industry, and higher education to work together to develop a lifelong skills approach considering the technical, conceptual, reflective and innovation capabilities across the workforce. The recommendations acknowledge the role of higher education in developing transferable skills and calls for further research into how the sector is employing innovative teaching methods for integrating academic and applied learning. The report also calls for further research on how these teaching methods actively foster the skills and attributes of employers, by connecting with employers within a landscape that is rapidly changing.

Sharma *et al.* (2019), add to this by stating that digital education is expected to be used to support social change including support for developing the labour force which requires fundamental changes to teaching and learning, with digital skills becoming the fourth most important ability. Online learning offers unique potential to develop skills through flexible ways of developing new knowledge, work habits and soft skills required to be effective lifelong learners and contributors to society and the workforce (Jones, 2019). Through the embedding of digital learning strategies, universities need to ensure their curriculum, delivery and assessment enable future graduates to successfully integrate into employment and wider societal activities. Universities are expected to meet the needs of the 21st-century learner with revisions to current learning experience. Additionally, key changes that are expected to the curriculum, mode of study, and role of students and lecturers, can be afforded by the changing use of technology (JISC, 2020a). Coonen *et al*. (2018), highlight the requirement for softer skills that cannot be automated, including creativity and flexibility.

Sector research reports the low levels of digital skills (Nania *et al.,* 2019) and the scale of the challenge, and acknowledges the transformation required including upskilling lecturers, investment in infrastructure and planning for global and local skills priorities - recognising that although there are generic skills there are some that are highly contextual (JISC, 2020a). The rapid changes in technological advances require an ongoing commitment to staff development; a recent report ‘Gravity assist: propelling higher education’ (Ofs, 2021), reviewing the shift towards digital learning and teaching as a result of the Covid-19 pandemic, recommends that universities support staff in developing their digital skills through incentivising excellence and continuous improvement. In conjunction with support for staff, the Ofs (2021) report also recommends the need for students to be able to track their digital skills, and the need for clear communication, highlighting the increased strategic importance of digital skills for staff and students.

2.1.3 Preparing for Education 4.0

What has been termed the 4th industrial revolution (4IR), transformation is expected in most sectors; according to Coonen *et al*. (2018), 60% of occupations are predicted to have at least a third of their activities automated. Changes resulting from the 4IR include: a focus on graduate attributes and competences; educational portfolio; interdisciplinary approaches to develop resilient, flexible and agile learners; and the design of improved teaching to reduce traditional teaching methods to facilitate the ‘fusion of technologies’. Developing 21st-century learning has been also coined as Education 4.0; the World Economic Forum (2020), reports this to be the largest transformation of higher education and driven by the need for a connected and collaborative way of working. Education 4.0, is outlined by the World Economic Forum, transforming education through the development of education models which prepare children for disruption in jobs, the demand for skills and the need to develop global citizens and workforces of the future. Their definition includes skills associated with 21st century learning, expressed as characteristics of education. These education characteristics align to the features of SCL pedagogies discussed below, for example problem-based and collaborative learning, accessible and inclusive learning, lifelong learning and personalised learning.

In contrast, many current online learning programmes followed teacher-led approaches before embracing web 2.0 technologies which enhanced the ability of learners to interact with online materials (Salmon, 2019). The adoption of web 2.0 technologies and centralised development of Virtual Learning Environments (VLEs) has helped to support new forms of learning by many universities including blended learning, enhanced by social media, and increased interest in mobile learning through increased internet accessibility. Although at its initial stages web 3.0 uses the idea of a Semantic Web since 1999, providing opportunity to analyse all the data on the Web - the content, links, and transactions between people and computers, when it does emerge it is expected to:

> "effect the day-to-day mechanisms of trade, bureaucracy, our daily lives will be handled by machines talking to machine to impact using machine learning through more connected and access to learning which is personalised and adaptive at any time."

Stojanovic, *et al* (2001, p. 23-27)

The development of web 2.0 and 3.0 technologies has enabled less focus on transmission of information within distance education and greater emphasis on the active engagement of students to develop their skills which have been organised into literacies, competences, and character qualities (Grossec, 2009). A core aspect of Education 4.0 is the use of adaptive learning systems with a data-driven approach to adjust the path and pace of learning through the increased use of teaching tools and intelligent systems which can offer personalised learning at scale (World Economic Forum, 2020).

Adaptive technologies, which offer personalised approaches to learners, are claimed to enable better interaction with students to meet their specific needs and to promote the use of personal learning goals, to focus on teaching individuals instead of the class. According to Hussin (2018), these technologies will enable learners to cope with more difficult tasks as more opportunities for further practice will be provided by machine and adaptive learning. It is expected that this type of learning experience will support the development of new digital skills which will enhance learners' career growth. Technology enhanced learning has been challenged to respond to changes in the technological developments through web 1.0, 2.0, 3.0 (Salmon, 2019). The mapping of these phases against the continuum of development of industrial revolutions, and the availability of web technologies for wider societal uses, the uptake of some of these technologies has been slower for online learning purposes. The alignment of phases of industrial revolution, stages of technology and educational phase against web 1.0. 2.0, 3.0, and 4.0 education are illustrated on the timeline developed by Salmon (2019) in Figure 2.1 below.

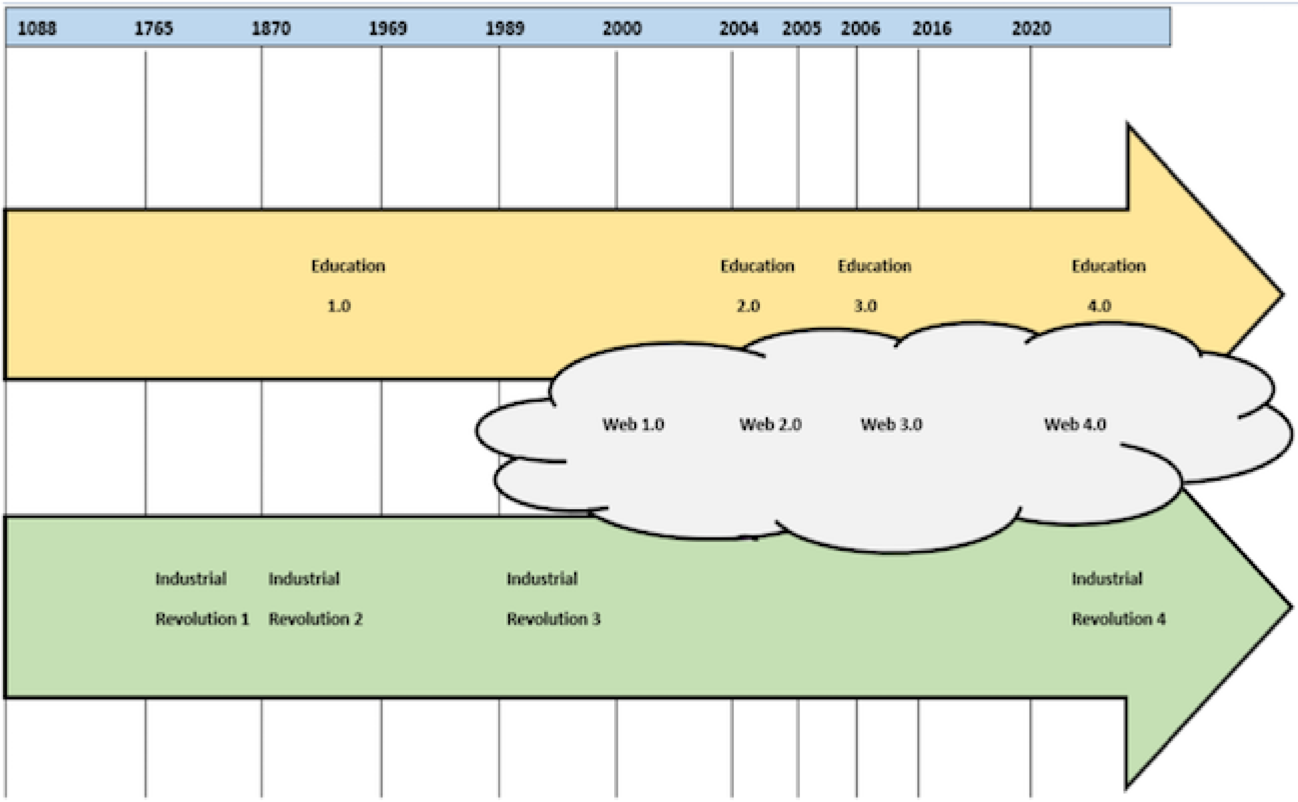


Figure 2.1: Moving Towards the 4th Era (Salmon, 2019)

As stated above a current challenge for the sector is the digital transformation needed by universities to change the current systems to provide a seamless, connected system that offers flexibility and convenience (JISC, 2020b). This report, commissioned by JISC, assesses the impact of Covid-19 on students, and summarises the lecturer key takeaways as follows:

1. The level of online delivery is growing rapidly, and blended learning is becoming the standard model for learning and teaching in UK (United Kingdom) higher education.

2. Lecturers want and need to rethink learning and teaching practices to take advantage of advances in online learning approaches, especially as lecturers' confidence and awareness grow.

3. Given the uncertainty created by Covid-19 and the speed of change, not surprisingly, lecturers would like increased clarity about their university's plans for delivering learning and teaching.

4. Lecturers are under significant pressure to adapt and deliver online and blended learning and are often time-poor.

5. But they are growing steadily more confident about delivering digitally.

JISC (2020b, p. 14-15)

2.1.4 Student-centred learning pedagogies online

SCL within this thesis is an umbrella term for a range of pedagogical approaches which are tailored to individuals, consider prior knowledge, and provide some element of choice over curriculum, assessment, learning outcomes and outputs. Pedagogies related to student-centred learning are based on constructivist modes of learning, developed over time from early behaviourist approaches. The concept of SCL pedagogies has been traced back to 1905 to Hayward and subsequently within Dewey's work. Within the wider literature SCL approaches include: active learning; problem-based learning; flexible learning; experiential learning; flipped learning and personalised learning, these terms often referred to interchangeably causing some confusion with their implementation (Mkjize, 2016). Characteristics of these pedagogical approaches which lend themselves to online include: increased student choice; lecturer as 'facilitator'; student as partner and co-creator. Many of these pedagogies offer increased opportunity for social learning, which has been the basis of development of new EdTech platforms supporting SCL pedagogies (Dede, 2014).

Covid-19 has led to HEIs exploring hybrid learning approaches to offer flexibility for both the learner and the institution to enable adaptation to changing external pressures and the ability to what has been termed 'pivot' between face-to-face, and online learning. Concerns about the reputational damage of online learning have occurred as students have faced varying experiences due to widespread rapid introduction of online learning becoming known as emergency remote teaching (ERT), defined as:

> "the use of fully remote teaching solutions for instruction or education that would otherwise be delivered face-to-face or as blended or hybrid courses and that will return to that format once the crisis or emergency has abated."
>
> Hodges, *et al.* (2020)

Hodges *et al*. (2020) argue that there will not be a desire to return to previous teaching approaches following the pandemic, due to the flexibility and benefits offered to learners and their reluctance to come into the campus (WONKHE, 2020). This increased focus in remote, flexible learning has led to many universities adopting hybrid learning, the term used to describe the mix between classroom and online learning conducted remotely. The use of hybrid for ERT has been driven in response to government restrictions to on-campus learning, yet there is a pedagogical rationale for adopting variations of hybrid learning. The hyflex course design model introduced by Beatty (2017) offers the flexibility of attending sessions online, remotely, or both, with a choice of attendance mode of either weekly or by topic. The concept characterises hyflex through the student perspective, focusing on the educational values of learner choice, equivalency, reusability, and accessibility. There are several definitions of hyflex, this definition is a simplified version of earlier attempts:

"Hybrid classes (blending online and classroom participation modes) to provide flexible learning paths and allowed students to decide for themselves which path was “best” for them on a daily or weekly basis.”

Beatty (2020, p.12)

A common theme of the hybrid and hyflex approaches is the notion of flexibility, arising during Covid-19 partly in response to concerns about a digital divide resulting from some students’ lack of access to technology. Rose and Meyer (2002) acknowledge the link between accessibility and flexibility calling for flexible learning to provide accessible learning by all users. This was picked up by Cornelius *et al.* (2011), who recognised that flexible learning can be highly beneficial to adult learners who have competing priorities, allowing them to make choices. In a recent document produced by the QAA (Quality Assurance Agency) entitled ‘Building a Taxonomy for Digital Learning,’ their glossary of terms developed in response to Covid-19 defines flexibility as an enabler of providing students elements of choice, allowing them to prioritise their learning around other commitments. This concept of learning relates to adult learning and the original work of Knowles (1984) on adult learning principles, framed as the concept of ‘andragogy’ which comprises the development of skills and abilities and self-directed learning.

During Covid-19 emerging pedagogical opportunities have related to self-directed learning and the creation of a learner environment associated with the andragogy theory to provide a safe environment that supports individual needs (Knowles,1984). The relevance of flexibility to SCL pedagogies includes the increased autonomy and choice across the entire student experience, and the shift of power to students. This approach to flexible learning has been presented by the Flipped Learning Network (2014) as a means of managing spaces, and the element of choice for students in where and when to learn, and flexibility by educators in terms of timelines for learning and assessments (Flipped Learning Network, 2014).

A report produced on behalf of the Higher Education Academy recognises the empowerment of individuals by offering choice, which is framed with a pragmatism in terms of the balance of choice that is sustainable and cost effective and meets this 'conceptual' idea of flexibility.

> "Advance HE believes that flexible learning is about empowering students by offering them choices in how, what, when and where they learn: the pace, place and mode of delivery."
>
> Higher Education Academy (2015)

Flexible learning requires a balance of power between institutions and students and seeks to find ways in which choice can be provided that is economically viable and appropriately manageable for institutions and students alike.

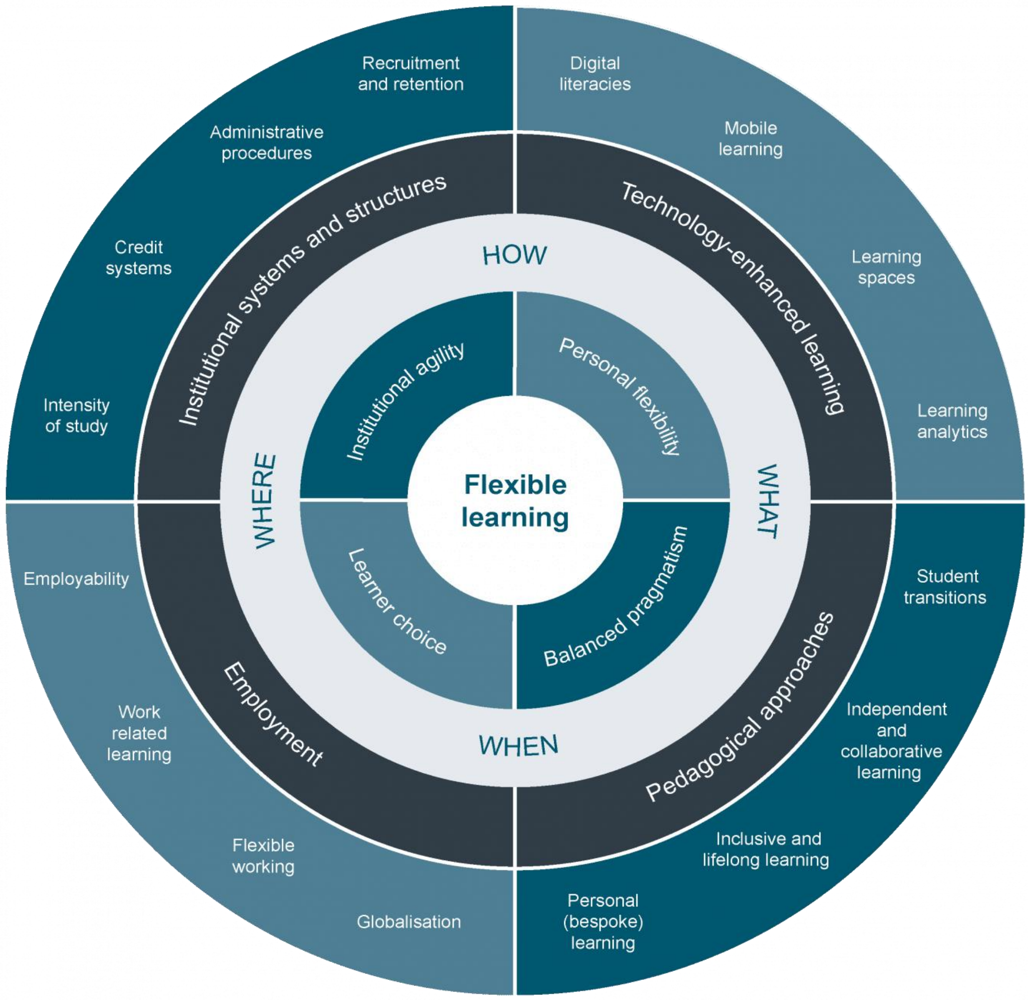


Figure 2.2: Flexible Learning Framework (Higher Education Academy, 2015)

The figure above, see Figure 2.2, shows the framework within which flexible learning approaches can be used as a means to incorporate technology enhanced learning, and acknowledges the interconnections with contextual factors including employment and institutional systems. The framework also illustrates some influences on pedagogic choice including the role of inclusive and lifelong learning, and the provision of independent and collaborative learning opportunities. Tooney (2000) adds to this by acknowledging the impact of curriculum on the design of learning to facilitate an approach which is experiential, personal, and relevant.

Toohey's approach is implemented through the writing of learning outcomes and focusing on what the students need to do instead of coverage of module content. Pedagogies associated with SCL have been defined as an approach to learning, where learners choose not only the way to study but also how and why the topic may be of interest (Rogers, 1983).

SCL, as stated above refers to a range of pedagogical approaches and has been presented within this thesis as offering a transformative effect on learning due to its potential to be tailored to individuals, considering prior knowledge, favouring student choice and flexibility over curriculum, assessment learning outcomes and outputs. Common themes of SCL include the focus on the learner, instead of teacher-centric approaches with opportunities for technology enhanced learning, providing personalised learning which assumes a level of interaction online that the student can engage with. Lea *et al*. (2003) refer the origins of SCL as a means to provide student choice, others see it as being about the student doing more than the lecturer (active versus passive learning); while others have a much broader definition which includes both concepts but, in addition, describes the shift in the power relationship between the student and the teacher.

The element of choice referred to in many definitions implies that SCL provides learners with increased opportunity and accountability on the part of the student. Kember (1997) helped conceptualise teaching as either teacher-centred, content-orientated or student-centred learning-orientated, (see Figure 2.3) the role of the lecturer as a facilitator of knowledge construction. A high degree of student-centred learning would be the involvement of students at the course design stage, where they are consulted with outside of the institution and prior to the course start (Gibbs, 1995).

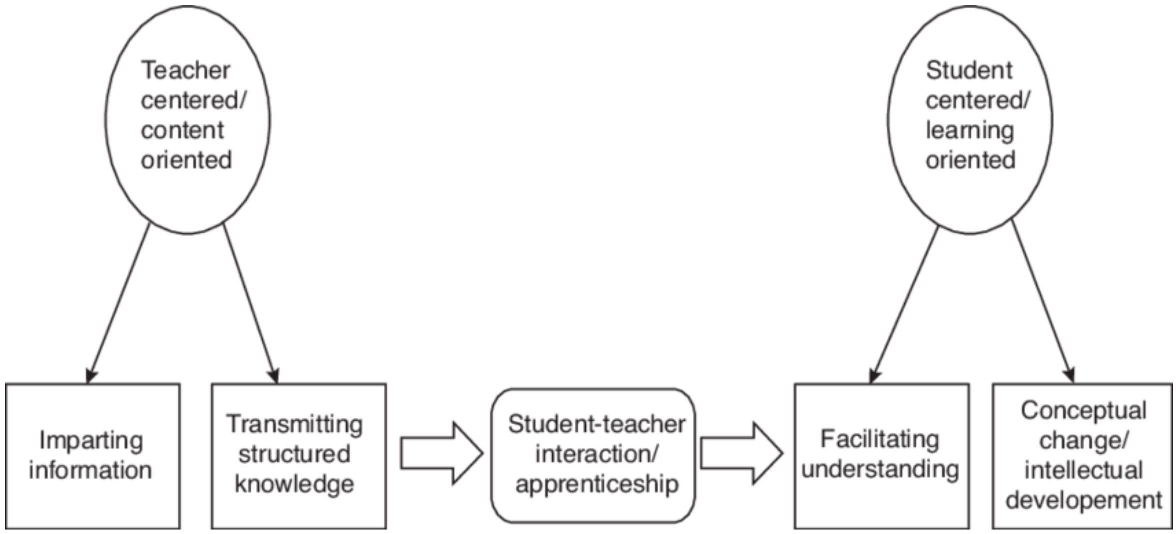


Figure 2.3: Two Conceptions of Teaching (Kember, 1997)

Within the literature a common thread exists about the shift of power from the expert teacher to the learners, to prevent passive learning where students become apathetic and bored (Burnard, 1999; Rogers, 1983). A further shift away from teaching to learning has also supported this transfer of power, an important distinction that moves away from teacher-focused transmission approaches, with changing structures of information and communication technologies (ICT) being a catalyst for this development (Barr and Tagg, 1995). The lecturer as facilitator talks about more equal power with opportunities for growth development, with the use of affective and cognitive domains leading to the learner seeing themselves differently as a result of the learning experience (Brandes and Ginnis, 1996).

Situated learning, originating from Lave and Wenger, 1991, is used within adult learning, and can be defined as learning providing a clear link between constructing knowledge and creating meaning from the real activities of daily living, where learning occurs relative to the teaching environment. Examples include field trips where students actively participate in an unfamiliar environment, cooperative education and internship experiences in which students are immersed and physically active in an actual work environment. For music and sports (physical education), situated learning replicates the actual setting of these events, e.g., orchestras, studios, and training facilities. These examples illustrate that students are actively involved in addressing real-world problems, as the practice implies, the student is "situated" in the learning experience and knowledge acquisition becomes a part of the learning activity, its context, and the "culture in which it is developed and used" (Oregon Technology in Education Council, www.niu.edu, 2007). Students form or "construct" their own knowledge from experiences they bring to the learning situation with the success of situated learning experiences relying on social interaction and kinaesthetic activity.

Active learning can be defined by Bonwell and Eison, 1991, as a range of learning methodologies including problem-based and experiential-learning which engage students with meaningful activities. Active learning online embraces the benefits of flexible learning as discussed above, by offering students more choice and power over their studies developing the self-regulation skills as required by 21st-century learning. Institutes are preparing learners to develop diverse sets of skills and attributes by implementing teaching and learning approaches associated with active learning (Coonen and Pratt-Adams, 2018). SCL approaches, including active learning, engage students in creating knowledge, rather than the passive learning associated with traditional teaching approaches like lectures. These SCL approaches develop skills, behaviours, and transferable skills as learners are engaged with activities outside of their immediate subject area. The use of group-work and problem-solving activities engages learners in work-related activities with project work used to expose them to challenges and situations faced within the workplace. This approach to teaching and learning calls for a change to re-think how we re-frame learning outcomes focused on knowledge transmission which drive a particular way of learning.

These active learning strategies using real-world problems and challenges encourage the development of the curricula which fosters experience, reflection, curiosity as well as an innovative mind-set, according to (Coonen and Pratt-Adams, 2018). In their report they argue that implementing new teaching and learning approaches can benefit the learners, as they will have a valuable learning experience which is evident through their subject-based professional knowledge and their behavioural capabilities. It is expected that by promoting lifelong-learning, they will be able to problem-solve creatively, communicate effectively, and respond flexibly and innovatively to the rapidly changing circumstances predicted in the Industrial Strategy. The need for more collaborative and multidisciplinary approaches is articulated in the Industrial Strategy as blurring the lines between physical, digital, and biological worlds. This is likely to lead to alternative modes and pace of study, new pedagogies to serve these, as well as developing agile workers who are flexible and have the technical and subject expertise combined with the soft skills of creativity, problem solving, and critical thinking allowing for application of these to new contexts (World Economic Forum, 2016). Institutes are preparing learners to develop diverse sets of skills and attributes by implementing teaching and learning approaches associated with active learning (Coonen and Pratt-Adams, 2018).

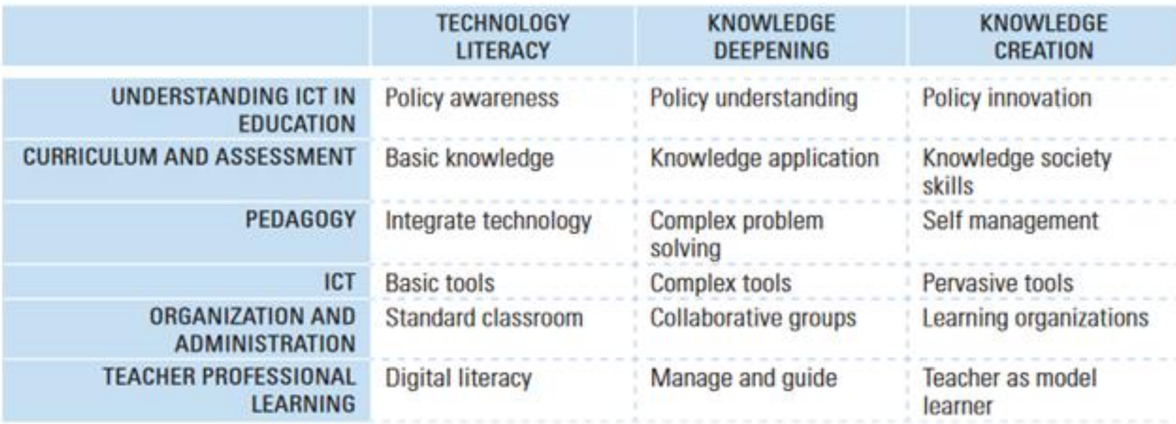
2.1.5 Developing digital skills, literacies, and capabilities

A key recommendation in the report authored by Coonan and Pratt-Adams (2018) for AdvanceHE, is the development of a shared language in terms of employability skills, attributes, and values. They also commented on the lack of detail on the types of skills needed by the workforce in the Industrial Strategy. There is recognition within the report for the generic language of employability to be developed into a more nuanced set of abilities and attributes which go beyond subject, professional and technical expertise to 'advanced' skills and meta competences. From their research they were able to identify 'families' of softer skills, which showed similarities to the skills identified by the World Economic Forum (2016) as displayed in figure 2.4 below:

	in 2020		in 2015
1.	Complex Problem Solving	1.	Complex Problem Solving
2.	Critical Thinking	2.	Coordinating with Others
3.	Creativity	3.	People Management
4.	People Management	4.	Critical Thinking
5.	Coordinating with Others	5.	Negotiation
6.	Emotional Intelligence	6.	Quality Control
7.	Judgment and Decision Making	7.	Service Orientation
8.	Service Orientation	8.	Judgment and Decision Making
9.	Negotiation	9.	Active Listening
10.	Cognitive Flexibility	10.	Creativity

Figure 2.4: Skills Required for the Future (World Economic Forum, 2016)

Generation Z, has been used to categorised those born between 1995-2010, despite difficulties to generalise generation traits, some are likely to have more advanced digital capabilities, where they have been immersed in technology. This next generation of learners as they move into higher education could start to experience a blend between physical and natural environments using immersive technologies and augmented reality. According to Strauss (1991) they are expected to have a different expectation of their engagement with the learning process, and individual needs to be met through personalised learning using adaptive learning technologies and machine learning. The term digital literacies encompasses behaviours and practices and moves us beyond a set of competency skills for teachers to enable them to integrate technologies into their teaching and develop their skills in pedagogy, through frameworks like the UNESCO ICT Competence Framework for Teachers (2018), see Figure 2.5, to something that is situated in academic and professional practices.



	TECHNOLOGY LITERACY	KNOWLEDGE DEEPENING	KNOWLEDGE CREATION
UNDERSTANDING ICT IN EDUCATION	Policy awareness	Policy understanding	Policy innovation
CURRICULUM AND ASSESSMENT	Basic knowledge	Knowledge application	Knowledge society skills
PEDAGOGY	Integrate technology	Complex problem solving	Self management
ICT	Basic tools	Complex tools	Pervasive tools
ORGANIZATION AND ADMINISTRATION	Standard classroom	Collaborative groups	Learning organizations
TEACHER PROFESSIONAL LEARNING	Digital literacy	Manage and guide	Teacher as model learner

Figure 2.5: ICT Competency Framework for Teachers (UNESCO, 2018)

JISC (2012) defines the term 'digital literacies' as those capabilities which fit an individual for living, learning, and working in a digital society. The JISC digital literacies expanding beyond a set of ICT competences to incorporate behavioural competences, represented in a seven-stage model, the elements often used as a basis for local frameworks which are adapted and contextualised by institutions and organisations, see Figure 2.6.

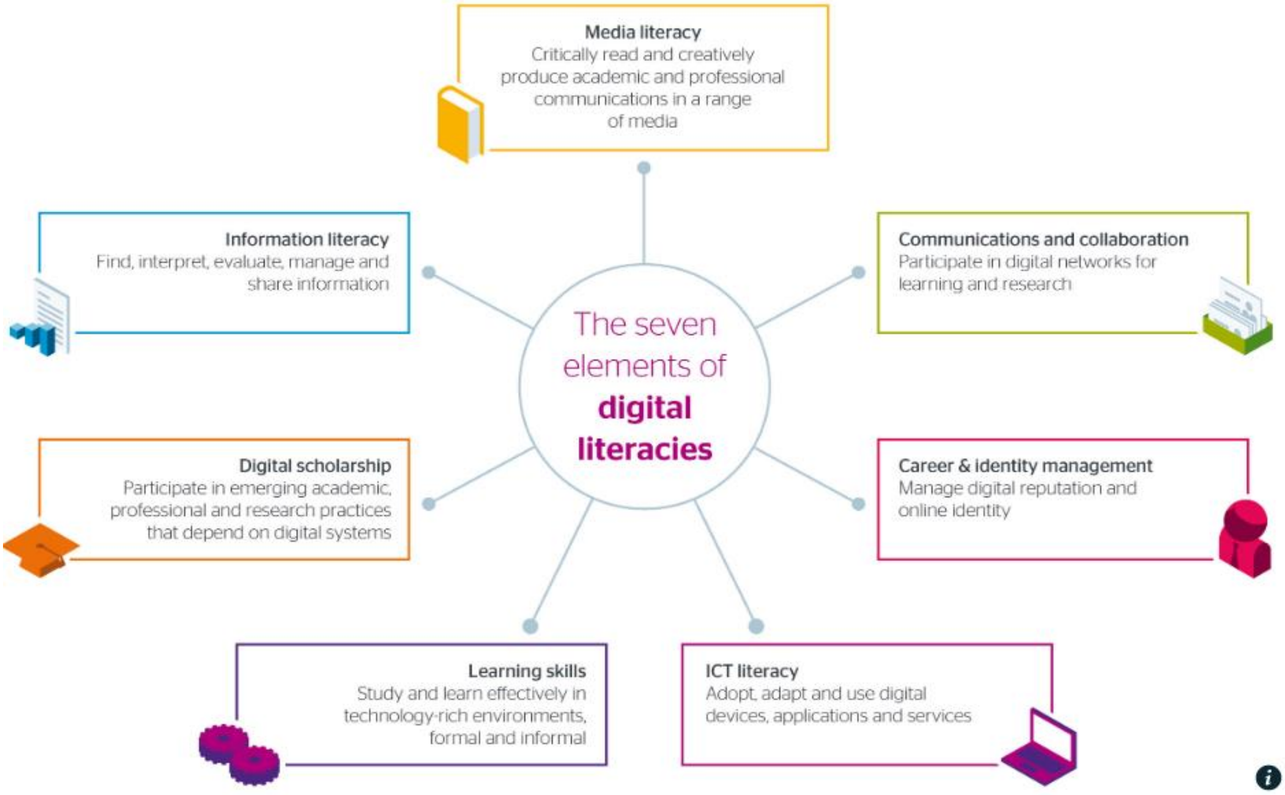


Figure 2.6: Seven Elements of Digital Literacies (JISC, 2012)

In terms of the implementation of digital literacy, Beetham and Sharpe's (2010) Literacy Development Framework, describes literacy as a development process, see Figure 2.7. Their framework illustrates how a student will move from having access and functional skills to higher level capabilities and identity. In this pyramid model it recognises that the level of literacy will depend on the context and can be used to understand how individuals can develop their digital literacies and reflect on their skills and practices.

Figure 2.7: Pyramid Model of Digital Literacy Development Model (Beetham and Sharpe, 2010)

The JISC digital capabilities framework provides a separate profile for teachers and students, designed to be used along with the JISC discovery tool to help staff and students reflect on their digital capabilities, and areas of strength and development. The profiles are aimed to be contextualised at the institution or organisation, to support either individual CPD (Continuous Professional Development) or institutional digital strategies.

2.1.6 Designing student-centred learning

Pedagogical approaches in online learning are based on constructivism; this approach views knowledge as created through understanding, using the initial work of Vygotsky, as explained in Daniels (1996). Vygotsky's work formed a basis for the concept of social-constructivist approaches based on co-construction of learning, and engagement of learning in the learning process as seen in situated learning, communities of practice, and collaborative learning which encourage an elevated level of student engagement. This type of learning can impact favourably on student outcomes as SCL approaches combining technology can result in deeper learning (Dede, 2014). Student participation in online programmes can be a challenge as many students work full time and are balancing competing demands. Qasim and Makhareez (2014) suggest a scaffolding approach to supporting students using problem-based learning with a high value placed on the role of peer support and collaboration to facilitate this within online learning. Within the literature the work of Beetham and Sharpe (2013) and Kukulska-Hulme (2010) outline the potential of online learning as supporting flexible learning, critical thinking, and the development of the softer skills associated with lifelong learning. However, they acknowledge that there are difficulties in implementing this type of approach with and evaluation mechanisms for teaching and learning which is accessible to teachers.

Laurillard's Conversational Framework (1993) incorporates the ideas of social constructivism embracing the idea of teaching as dialogic and the framework illustrates links between learners using the theories of instructionism, social learning, constructionism, and collaborative learning. The framework supports pedagogies based on constructivism and experiential learning, stages in the model as shown in the figure below highlight the dialogic nature of the interactions between the students and the tutor, and where these take place at a practical and theoretical level, see Figure

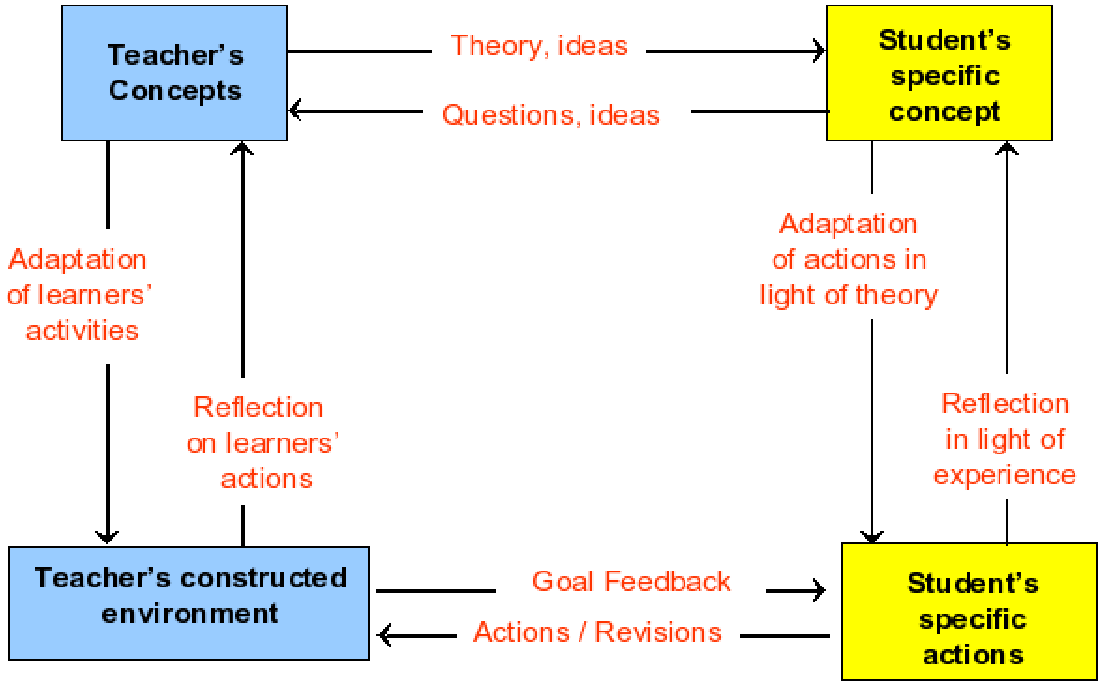


Figure 2.8: Conversational Framework (Laurillard, 1993,2002)

As stated above the literature supports constructivist learning principles; there is an issue with defining pedagogies, due to terms being used interchangeably. However, a common theme within these pedagogies is that they enable learners to contribute to the learning experience, build learning collaboratively and become curators of information (Sharples, 2014). Literature within online learning also emphasises the role of learning design in supporting the underpinning of teaching and learning within online environments with sound pedagogy. Recognising difficulties experienced by teachers in implementing pedagogies without a dedicated resource Conole (2012) suggests that using a learning design framework enables educators to bridge the gap between the current limitations of their learning model, to embrace a collaborative approach to learning design; encourage reflection; scholarly practice; and promote sharing and discussion. This engagement with all stakeholders involves teachers in the design of online learning activities and assessment and results in learners being encouraged to become more engaged and develop their softer skills and digital literacies. Using a multi-stakeholder approach to course design facilitates the development of a programme that is authentic, and enables the students to develop the appropriate skills, using the learning and teaching methodologies of the institution. As part of course design constructive alignment facilitates a link between the learning outcomes of the learning process and the assessment.

Davies *et al.* (2018), see Table 2.8, utilised the strategies identified through John Hattie's 'Visible Learning: A synthesis of over 800 meta-analyses relating to achievement of classroom-based learning strategies' as a basis for creating active learning strategies that most closely related to online learning strategies as displayed in the table below. The summary of key active learning strategies arose through a systematic review of innovative online learning strategies. Although it represents a review of extant literature, the work presents a categorising of active learning strategies for further discussion, see Table 2.1.

An underlying aim of the outlined learning strategies is the enhancement of student outcomes with a focus on identifying each of the range of variables that can be impacted through experiments. It should be emphasised that any experiment should acknowledge that the learning will support the generation of new knowledge, as opposed to test a theory. For this reason, initiatives which support the development of online SCL would aid the development of knowledge about online students in areas like learning transfer, engagement, taking ownership of learning, self-efficacy and persistence. While in the beginning online instructors often just posted lectures previously delivered in traditional classrooms, now many practitioners have discovered innovative, discussion-based constructivist methods for teaching online (Palloff and Pratt, 2007).

A key role of online teachers is not only the accessing relevant sources of information, but also encouraging students to become discerning purveyors of information, to develop “critical digital literacy,” the capacity to effectively and critically navigate the databases and myriads of potential sources (Poore, p.15, 2011). A key aspect of the role is to help students navigate the sheer magnitude of the information available to them which can be so overwhelming that they find it difficult to keep organised and evaluate their search results.

Melkun (2012) asserts that online students have a far greater need for collaboration than traditional students, yet they are unlikely to engage online due to the skills needed. He argues that collaborative learning strategies for certain modules and students may be unrealistic and the development of the learning environment and students’ preparedness for the programme would need to be developed. Part of successful student-centred learning depends on the importance of self-regulation, and a focus on the learning process by the teacher and the learner rather than the output (grades). Access to a growing number of internet resources offers the opportunity for teachers to guide learners across peer networks of learning which presents a ‘connectivist’ approach to recognising the importance of informal learning, as outlined by Siemens (2005) where self-regulating helps to support the knowledge process.

Salmon (2001) provided an insight to the challenges of dealing with poor interaction by suggesting changing the role of a tutor to a facilitator role, focused on designing activities and encouraging engagement within the online learning environment. This work helped to define and implement teaching online through the sharing of a series of tools to support the design and evaluation of teaching activities. Salmon's work has been instrumental in identifying several progressive stages in online learning, indicating that factors including access and motivation need to be realised before higher stages of learning can be achieved. Salmon (2001) recognised the skills needed by learners to engage in online activities and since its introduction her 5-stage model has remained influential in promoting active online learning strategies, see Figure 2.9.

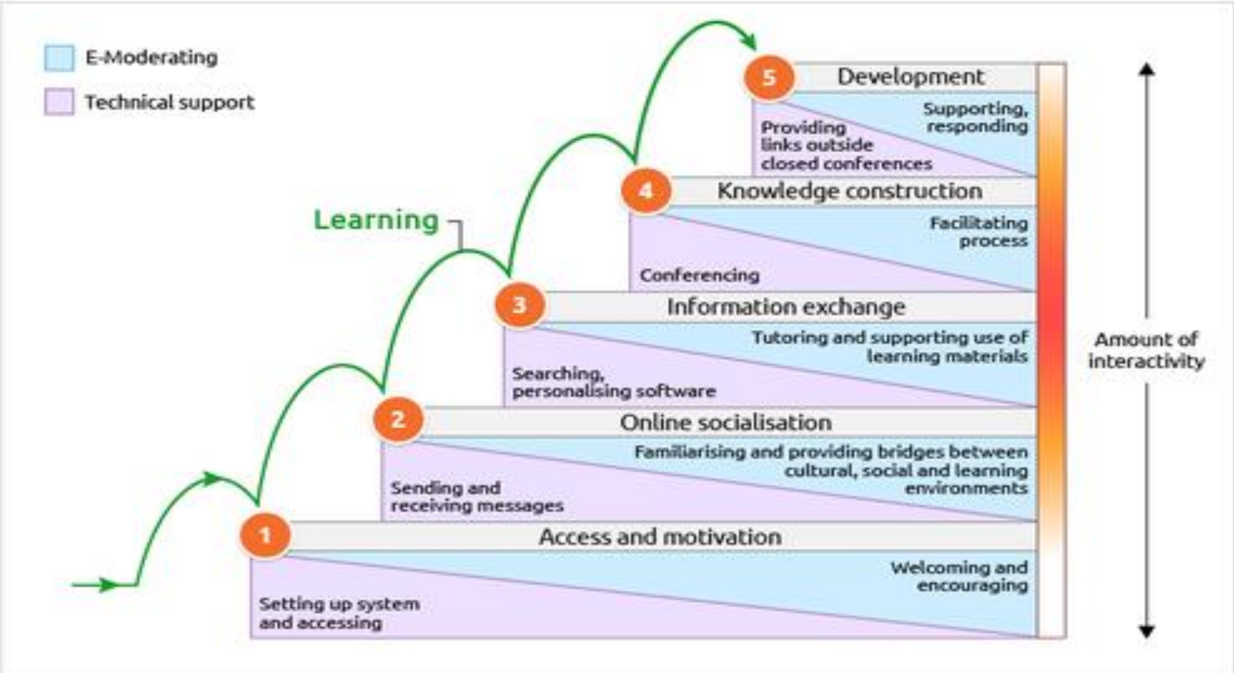


Figure 2.9: Five Stage Model (Salmon, 2005)

What constitutes innovation within a given setting will not necessarily be innovative in another. Svenja *et al*. (2012) working definition of pedagogic innovation: pedagogic innovation refers to new, context-dependent developments in teaching practices and methods, and variations of existing methods. The massive online open course has been said to be an innovative pedagogy (Sharples, 2014), MOOCs (Massive Open Online Courses) represent a particular type of the online courses currently prevalent in the educational landscape (Johnson and Becker, 2015). Armellini and Rodriguez (2014) state that many MOOCs seem to perpetuate mistakes associated with earlier online learning initiatives, by failing to incorporate best practices in distance learning (Hollands and Tirthali, 2014). The current dominant approach to MOOCs tends towards xMOOCs and can resemble old models of online learning based on video lectures, reading texts, and quizzes with automated feedback (Yuan *et al.,* 2014). Criticisms on the pedagogy of these MOOCs (xMOOCS) and their lack of innovation have emerged (Baggaley, 2014; Bates, 2012; Stacey, 2013). In response to this innovation George Siemens considers that big MOOCs providers “are simply repackaging what is already known rather than encouraging creativity and innovation” (Par, 2013).

2.1.7 Summary

Future online learning is expected to provide a more responsive personalised environment, aimed at delivering more individual learning experiences situated in academic and professional practices to develop capabilities and behaviours for 21st-century learners. SCL pedagogical approaches articulated for Education 2.0 continue to have relevance for future innovative online teaching and learning approaches to meet the needs of Education 4.0 (Sharma *et al*., 2019). The next theme will discuss the development of teacher knowledge using the TPACK framework and its use building teacher knowledge for in-service teachers.

2.2 Development of teachers' technology, pedagogical and content knowledge

This section reviews studies relating to strategies for supporting teachers to build the teacher knowledge required to integrate technology effectively into teaching practices as expressed in the TPACK framework. Following an introduction of the TPACK domains this section explores TPACK enactment and how the framework has been used to identify TPACK characteristics in the classroom and professional development of in-service teachers. The concluding section will consider the role of context within TPACK studies.

2.2.1 TPACK Domains

Teachers are being required throughout different educational systems and environments to develop their understanding of the interrelationship between technology, content, and pedagogy (Swallow and Olofson, 2017). According to Mishra 2006, TPACK has a role in addressing this challenge by developing understanding of the domains of technology, pedagogy, and content knowledge, and the integration of these domains within their practice for specific contexts. The TPACK framework is based on the seven domains of knowledge that are needed to address this challenge as outlined in the table, see Table 2.1:

Table 2.1: TPACK Domains (Schmidt *et al*., 2016)

TPACK DOMAINS	DOMAIN DESCRIPTION
Technology knowledge (TK)	Technology knowledge refers to the knowledge about various technologies, ranging from low-tech technologies such as pencil and paper to digital technologies such as the Internet, digital video, interactive Whiteboards, and software programs.

Content knowledge (CK)	Content knowledge is the “knowledge about actual subject matter that is to be learned or taught” (Mishra and Koehler, 2006, p.1026). Teachers must know about the content they are going to teach and how the nature of knowledge is different for various content areas.
Pedagogical knowledge (PK)	Pedagogical knowledge refers to the methods, processes of teaching, and includes knowledge in classroom management, assessment, lesson plan development, and student learning.
Pedagogical content knowledge (PCK	Pedagogical content knowledge refers to the content knowledge that deals with the teaching process (Shulman, 1986). Pedagogical content knowledge is different for various content areas, as it blends both content and pedagogy, with the goal being to develop better teaching practices in the content areas.
Technological content knowledge (TCK)	Technological content knowledge refers to the knowledge of how technology can create new representations for specific content. It suggests that teachers understand that, by using a specific technology, they can change the way learners practise and understand concepts in a specific content area.
Technological pedagogical knowledge (TPK)	Technological pedagogical knowledge refers to the knowledge of how various technologies can be used in teaching, and in understanding that using technology may change the way teachers teach.
Technological pedagogical content knowledge (TPACK)	Technological pedagogical content knowledge refers to the knowledge required by teachers for integrating technology into their teaching in any content area. Teachers have an intuitive

	understanding of the complex interplay between the three basic components of knowledge (CK, PK, TK) by teaching content using appropriate pedagogical methods and technologies.

The integration of technology into teaching, through the intersections of the TPACK domains, is used within literature reviewed to provide a lens for looking at teacher education. Whilst early studies focused on the development of pre-service teachers there are increasing TPACK studies relating professional development for in-service teachers (Harris, 2016). The TPACK framework has been criticised due to reported difficulties in interpreting these individual constructs and a lack of consensus within TPACK research about the interaction between the constructs. The lack of clarity within research regarding the constructs both individually and their interactions has affected the reliability of the reporting of TPACK levels according to researchers (Koehler *et al*., 2014; Brantley-Dias and Ertmer, 2013; Graham, 2011). In addition, the role of context can be problematic and lead to lack of clarity as ‘context’ is viewed as another of the key constructs and often leads to approaches that are very highly situated in context. Although TPACK was developed to be grounded in context according to Swallow and Olofson (2017), there is a limitation with the interaction between different educational contexts, and content knowledge and practice, and further research has been undertaken to discuss the role of context within framework (Phillips, 2014; Porras-Hernadez and Salinas-Amescua, 2013).

Early TPACK research, referred to as first generation TPACK, focused on defining and conceptualising the seven constructs of TPACK and used validated survey instruments to assess teachers' levels of TPACK against these constructs. These instruments have been a key component of studies in the assessing of TPACK knowledge primarily in pre-service teachers using self-reported knowledge prior and post engagement in association with a training programme (Koehler and Mishra, 2005; Schmidt, 2009; Archambault and Crippen, 2009; Chai, Koi and Tsai, 2010). Studies engaging surveys to report on each of the TPACK constructs have reported higher levels of reported confidence in pedagogic knowledge (PK), content knowledge (CK) and pedagogic content knowledge (PCK) following a teacher education programme (Koehler, 2014). These studies report less confidence in the domains of technological content knowledge (TCK), technological knowledge (TK) and pedagogic content knowledge (PCK) which relate to the integration of technology (Archambault and Crippen, 2009). Self-reported data, used within these first-generation studies, provides useful information on teacher perceptions on their levels of confidence, yet there are limitations to using this information as there can be errors when participants are recalling their experience (Kilickaya, 2009). There is also the limitation that this does not capture actual technology integration in the classroom (Chisholm and Padgett, 2004).

Within a second generation of TPACK studies the focus has shifted to using the framework to comprehend teachers' knowledge of integrating technology (Schmidt-Crawford *et al.,* 2016). Some of the second-generation studies include qualitative approaches to understanding TPACK studies to explore the impact of training and development approaches on teachers' TPACK levels (Harris and Hofer, 2011; Niess *et al*., 2009). The use of validated instruments to examine teachers' TPACK development including the use of performance assessment rubrics (e.g., Angeli and Valanides, 2009; Harris, *et al.,* 2010; Grandgenett and Hofer, 2010) and open-ended questionnaires (So and Kim, 2009). Teacher interviews commonly supplement the use of observation (e.g., Harris *et al*., 2012: Mishra, Peruski and Koehler, 2007; Williams, Foulger and Wetzel, 2010). Whilst early studies focused on self-reported data Harris *et al.* (2010), expressed the need for research efforts to be focused on multiple data sources to help develop understanding of teachers' TPACK through strategies.

Whilst first generation TPACK research focused on pre-service teachers, more recently the development of in-service teachers has been explored; these studies are reported to remove issues identified with pedagogic development, allowing a focus on the integration of the technology constructs of TK, TPK, TCK (Phillips, *et al*., 2016; Schmidt-Crawford *et al.,* 2016). The use of in-service teachers also helps reduce issues with the integration of content and pedagogy into their teaching practices as in-service teachers are more likely to report good subject content knowledge (CK) and pedagogical content knowledge (PCK). Early studies place importance on self-reported data, yet there is an acknowledgement of the difference between espoused and enacted teaching practices and an inability to capture the complexities of teachers and their espoused and enacted knowledge of pedagogic content knowledge, and varied levels of technology and pedagogic content expertise. Due to the difficulties between espoused and enacted knowledge TPACK has been criticised as having limited application to practitioners (Brantley-Dias and Ertmer, 2013; Graham, 2011; Voogt *et al*., 2013).

2.2.2 Teachers enactment of TPACK

As noted above, the second generation of TPACK studies explores different methods to understand the TPACK constructs and how they interrelate to create

TPACK. In more recent TPACK studies enactment of teacher knowledge is explored by conducting research with in-service teachers (Doering *et al*., 2000, Phillips *et al.,* 2016; Kohler and Rosenburg, 2016). Observation of teaching practice has been used to develop understanding of each component of the TPACK framework, support the development of teachers’ self-assessment of their own performance and to improve levels of TPACK adoption. Ertmer *et al.,* 2012, assert that teachers' belief about technology has had the largest influence on the success of technology integration, with teachers' perceptions of their role as a teacher, the use of technology and their own beliefs on pedagogy all factors which hinder enactment (Philips *et al*., 2016). In addition to the teachers’ belief another key hindering factor is the lack of support with technology (Ertmer *et al*., 2012). The prior beliefs held by pre-service teachers can limit the vision and willingness to try new technology-supported strategies (Niess *et al.,* 2010).

PCK to TPACK strategies are used to develop pedagogic practices before teachers learn how to use technology to support these approaches. Harris and Hofer (2009) devised a strategy to develop PCK through learning activity types following an evaluation of professional development strategies to be used by in-service teachers. They found that through the use of learning activity types teachers’ decision making became more ‘conscious, strategic, and varied’. Some teacher preparation programmes, in contrast, focus on building TPK knowledge and developing understanding of the pedagogical affordances and constraints of technologies available and how these can be applied within teachers’ own learning and teaching contexts. The development of the technology is one of these strategies developed by

Angeli and Valanides (2009) through technology mapping as a means of connecting the properties provided by technologies to student-centred learning pedagogies.

2.2.3 Strategies for building TPACK

There are numerous strategies used by teacher educators which have attempted to build the TPACK capabilities of pre-service and in-services teachers. Several methods have been developed to evaluate and develop understanding of the impact of these strategies on teachers' TPACK capabilities and confidence in embedding technology enhanced learning into their teaching practices. The assessment of TPACK includes measuring TPACK confidence using self-report validated surveys (Mishra and Koehler, 2006), performance assessments (Schmidt *et. al*., 2009) and supporting TPACK development through instructional design, for example collaborative design-based lesson planning (Papanikolaou *et al.,* 2017). A range of professional development approaches to aid the development of TPACK have been devised, including the use of TPACK-based rubrics (Chai *et al.,* 2019; Koh *et al.,* 2017).

A key feature of many TPACK studies is the measuring of change using self-perceptions before and after development, and some TPACK studies involved pre-service teachers using statistical methods to measure TPACK development through quantitative approaches and analysis of self-reported confidence against each domain. Kereluik *et al.* (2010) reported that although self-reported surveys provide valuable information about an individual’s TPACK awareness, such data is limited to measuring individuals’ beliefs. Schmidt *et al*. (2009) used a Survey of Pre-service Teachers’ Knowledge of Teaching and Technology consisting of 47 self-report items that assess pre-service teachers’ knowledge of 7 subscales of TPACK. Open-ended questionnaires have been used by pre-service and in-service teachers to gain insights into their overall experiences within training or professional development. A study by So and Kim (2009) coded pre-service teacher responses related to the strengths and weaknesses of their experiences relating to integrating ICT (Information and Communication Technologies) tools into a problem-based learning (PBL lesson). Schmidt *et al.* (2016) have developed approaches to understanding TPACK competences identified through observation of teachers' practices, and interviews to develop a coding scheme that has been grounded in the TPACK framework.

Angeli and Valanides (2009) first introduced design-based performance assessment to assess: the rate and extent the teachers identify suitable topics; identify appropriate representation to transform content; identify teaching strategies and select appropriate tools and pedagogies. Several authors support the use of observation, including Kereluik *et al.* (2010) who referred to observation as the next logical step when observing how a teacher applies TPACK while conducting a lesson. There are several ways performance assessment has been used, in conjunction with observation or in isolation, including the creation of artefacts for evaluation including lesson plans (Graham *et al.,* 2009) and the development of reflective practice journals (Mouza, 2011).

Professional development approaches using curriculum-based strategies include the work by Harris *et al* (2012) who created a comprehensive set of taxonomies of learning activity types for the curriculum content areas which they have made available in their wiki. The taxonomies were developed collaboratively between educators and researchers and developed to support the use of education technologies based on their pedagogical rather than technological emphasis. The scaffolded TPACK lesson design offers a further example of how an instructional design approach can support the development of teachers' design capacity, identified as a barrier for ICT integration (Chai and Koh, 2016; Tsai and Chan, 2012), see Figure 2.10

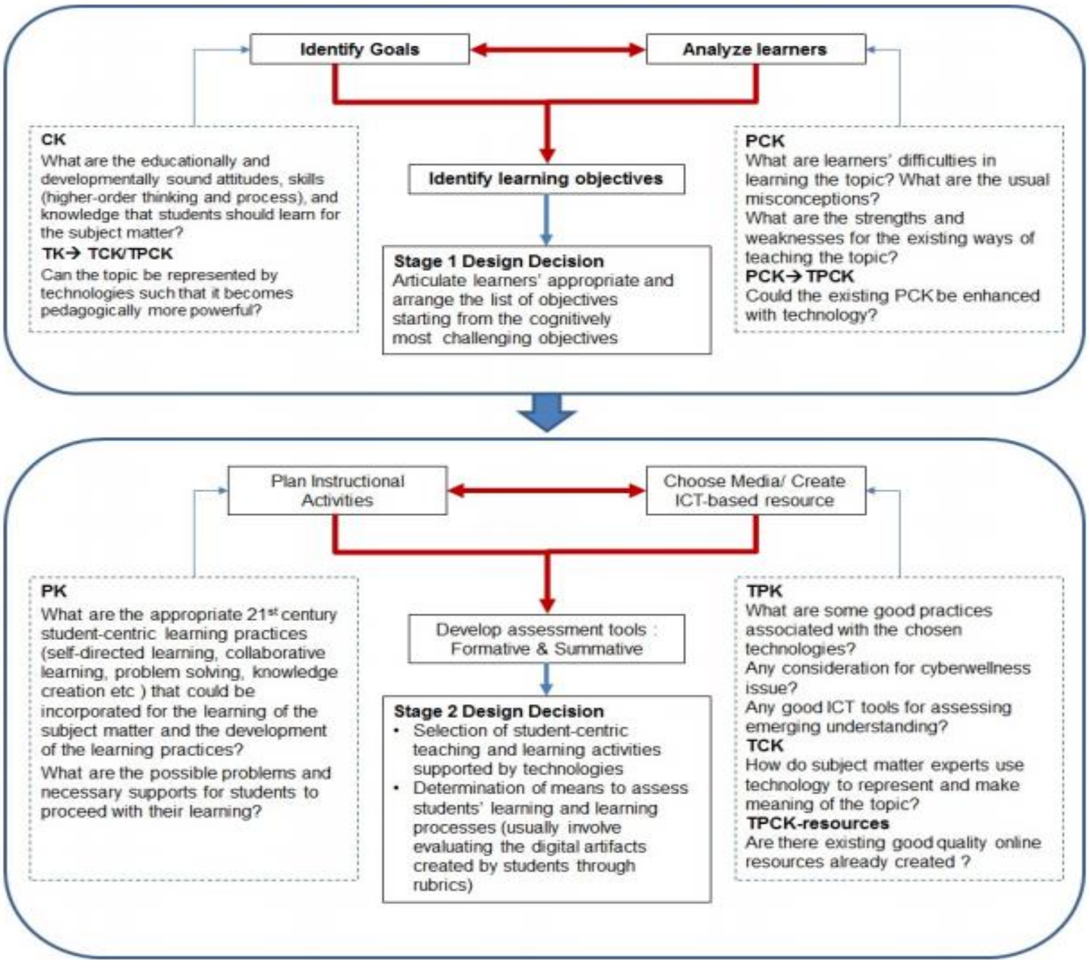


Figure 2.10: Scaffolded Learning Design Model (Chai and Koh, 2016)

The use of the Scaffolded Learning Design Model (SLDM) approach includes design-variables, recognising the association between a teacher's belief and how this influences the teacher's TPACK (Boschman, McKenney and Voogt, 2015). This study in particular assesses design beliefs and challenges these through the design process, the enhancement of teachers' design capacity and beliefs is supported within TPACK literature (Angeli & Valanides, 2009; Tsai & Chai, 2012; Voogt & Mckenney, 2017).

There has been some research on the topic of leadership to support the integration of the TPACK framework, although according to Graziano *et al*. (2017), this hasn't been widely researched, and it is less clear how leaders can be supported to implement TPACK initiatives. The transformational leadership framework identifies key areas that teacher education leaders should consider as they make plans for the effective integration of TPACK into their teacher preparation programmes. The TPACK leadership Theory of Action Framework presents critical areas for teacher education leaders to consider in their plans for effective technology instruction and help identify how the change is expected. Using the concept of theory of action (Argyris and Schon, 1974) the framework identifies (a) how change is expected to happen; (b) what is within the control of the leaders; and (c) what leaders might wish they could control (Herring *et al.,* 2014).

According to Harris (2016), the opportunities for professional development to provide a sustained and collaborative nature of TPACK has led recently to personalised and curriculum-based approaches to give researchers and educators a growing awareness of TPACK as a highly contextualised construct. Harris also supports the idea that there are numerous legitimate approaches to generating growth opportunities for educators, among these situated approaches are growing in popularity. These approaches to TPACK development have arisen due to increased awareness of the role of context as a construct of TPACK (Phillips, 2014; Porras-Hernadez and Salinas-Amescua, 2013), discussed further in the next section.

2.2.4 Role of context in TPACK development

A moving-forwards approach to developing TPACK according to Harris (2016) requires a highly contextual professional development strategy recognising what is good, and acknowledges the impact of complexities on teacher development. She argues that preparing teachers needs integration in authentic contexts, and TPACK research has called for more integration of designing courses that connect TPACK theory and practice, e.g., Angeli and Valanides (2009) who state that TPACK does not lead to automatic growth. They argue that context must be acknowledged when looking at enactment of TPACK as teaching practice is highly dependent on contextual factors including education system, e.g. tertiary education, nationality, institutional support, and teacher beliefs. Rosenberg and Koehler (2015) state that although the TPACK framework has been viewed as being embedded in context, this has been conceptualised in diverse ways. TPACK research increasingly includes contextual considerations according to Swallow and Olofson (2017), including different interpretations of context.

Angeli and Valanides (2009) also argued that the teachers' epistemological beliefs, their lived classroom experiences, and expectations shape how they design learning experiences, including technology, and are all contextually bound. It is also noted that whilst many researchers comment on the importance of context, many do not include this as part of their research (Rosenberg and Koehler, 2015). When TPACK was originally devised, context was viewed as part of the framework, represented by the outer ring of the diagram (Mishra and Koehler, 2008). TPACK is also often situated in the subject knowledge, for example early studies focused on subject areas with studies in Mathematics, ICT (Information and Communication Technologies) development. The role of pedagogic expertise means implementation of technology or content is dependent on lived experience and level of experience; important contextually is the place of the teacher in their development e.g. pre-service, or in-service.

The work of Porras-Hernandez and Salinas-Amescua (2013) described context as a teacher narrative as occurring at Macro, Micro and Meso levels. Swallow and Olofson (2017) state that this two-dimensional framing has allowed for context to be viewed in a more systematic manner, rather than as an ambiguous concept. Studies focusing on institutional considerations include micro-level influences that can be classified as student or teacher characteristics according to Rosenberg and Koehler (2015). These micro-components are highly influential aspects and are micro or classroom related (Doering, *et al.,* 2009). Porras-Hernadez and Salinas-Amescua (2013) also verify the importance of teacher elements of the actor dimension of this micro-level element in their framework. TPACK context has also included the state of teachers' own development, for example pre-service, or in-service with recognition of years of teaching. Despite recognition of contextual considerations, issues between TPACK and the context still persist (Koehler *et al.,* 2014; Rosenberg and Koehler, 2015).

2.2.5 Limitations of the TPACK model

One of the significant limitations of the TPACK framework cited amongst the literature has been its neutrality, within broader goals of education. Some studies focus on specific subject areas to understand how the TPACK framework can support the teacher development within a curriculum area. However, researchers have highlighted that students require a great level of focus on higher order thinking skills, collaboration, and creativity (Mishra and Kereluik, 2011). There has been emerging work in this direction through a review of the role of TPACK in developing 21st-century trans-disciplinary skills (Mishra, Koehler and Henriksen, 2011).

Despite the growth of research on TPACK and its measurement and methods of development as outlined above, several studies indicate that there is more to be done, especially in measuring how TPACK works in different disciplinary contexts. Several TPACK studies report low levels of confidence in the instruments used and there is a call for further refinement (Mishra, 2006). Concerns exist in how the TPACK can support teacher development to encourage teacher autonomy with the ability to incorporate recent technologies within the design of their lessons, emphasising the role of teacher as designer (Koehler and Mishra, 2008; Mishra, Koehler and Kereluik, 2009.

There is some discussion about whether it is a form of knowledge that is objective and generalizable (Hasweh, 2013) or a set of private and personal “content specific” both general and “story-based” “pedagogical constructions” (p.121). There have been attempts to provide a general set of knowledge competences. The Teacher Educator Technology Competences (Foulger, *et al.,* 2017) provided a list of 12 competences which were based on the list of skills, knowledge, and attitudes to be included within teacher education, to support teachers in the use of technology with their teaching. It is thought that the development of these competences by teacher educators will provide preparation for future interruptions as experienced within the pandemic.

Critiques of the TPACK framework call for consensus on agreement on the use of 'TPACK' constructs and further research to understand espoused and enacted TPACK. Increased use of qualitative methods using triangulation with the use of the TPACK survey to understand the constructs is still prevalent with self-report data as part of many studies. There is also some discussion whether TPACK is a temporary construct (Cox and Graham, 2009) and as technology becomes embedded into classrooms and schools along with the pedagogic and content knowledge there will be less need for the focus on technology. However, Cox and Graham (2009) argue that there will be a need for TPACK if there are emerging technologies that haven't become part of the teaching profession's repertoire of tools. A key aspect of the TPACK framework has to do with teacher autonomy and seeing teachers as designers, particularly with technologies that change at a very rapid pace (Koehler and Mishra, 2008; Mishra, Koehler *et al*., 2009).

2.2.6 Appreciative Inquiry

To understand enacted TPACK, Appreciative Inquiry (AI) offers an alternative approach to developing teacher competences. Using the 4-D framework (discovery, dream, design, destiny) based on discovering collective strengths to uncover the 'positive core', appreciative Inquiry (AI) is being increasingly used as a method for education enquiry relating to change. It has a systems approach to change and has been termed a holistic, collaborative, strengths-based approach to finding solutions by searching for what gives 'life' to an organisation:

> "The best in people, their organizations, and the world around them. It involves the discovery of what gives 'life' to a living system when it is most

> effective, alive and constructively capable in economic, ecological and human terms”
>
> Cooperrider, *et al* (2008, p.3).

AI has evolved since its inception in 1986 by Cooperrider and colleagues at Case Western Reserve University and its origins as a research process in grounded theory. Starting as a philosophical approach it is currently a widely-accepted change process within organisational development through the framework known as the 4D AI cycle (Cooperrider and Whitney, 2005). The adoption of the framework within organisational development and research resulted in the generation of ideas which Cooperrider (1985) stated are the most potent force of change. AI, whilst widely used as a tool for change management within organisational development, is increasingly used in education research.

2.2.7 Summary

As a conceptual framework TPACK has been used to identify the domains of knowledge required by pre-service and in-service teachers to successfully integrate each of these domains. Studies with in-service teachers are providing insights into enacted TPACK support by the forward-thinking approaches to professional development focusing on the development of teacher competences through collaboration elements and the forming of communities of practice (Tondeur *et al*., 2016; Neiss, 2011). There is potential for innovative technologies to look beyond current methodologies to develop novel approaches to capturing and analysing new phenomena for subject-based TPACK as it evolves, going beyond extant instruments and measures for TPACK (Mishra *et al*., 2011). The use of strengths-based research, using Appreciative Enquiry would provide a systems based approach to uncovering current practices by establishing the ‘positive core’ and to inform future practices. The following section reviews approaches to professional development to support the development of teachers' digital literacies and teaching practices.

2.3 Professionalism of the online educator

In response to changing uses of technology within education and the wider society, as discussed within this chapter, there is a need to understand that online teaching requires a different teaching paradigm altogether (Harasim, 2000; Palloff and Pratt, 2007). The increase in online learning due to Education 3.0 has also been compounded with Covid-19 with economic and political forces resulting in most universities now regarding online education as a vital component of their course offerings. The need to develop digital and pedagogic skills has been widely documented (JISC, 2020 a,b,c) and there has been an increased focus on the opportunities afforded by online learners. The increased uptake of online learning resulting from universities moving online has created increased dialogue for embracing online learning at a wider scale. Therefore, a key aspect of consideration is the preparation of educators and development required to support students for online education. The next section explores the role of the higher education lecturer teaching online as a professional educator.

2.3.1 Defining the professional educator role

Early online learning referred to teaching staff as 'instructor' responsible for posting lecture style delivery replicating teaching approaches used in traditional classrooms, but now many practitioners have discovered innovative, discussion-based constructivist methods for teaching online (Palloff and Pratt, 2007). There is a need to learn from early mistakes as in some cases online learning did not come into being because educators found a more effective way to teach, but because they were forced to adapt due to the political and economic interests that pushed and promoted it in their institutions. The Flipped Learning Network (2014) defines the role of the professional educator as someone who is actively engaged in individual and peer reflective practice, to connect with others and learn about transforming their practice. During flipped learning, the professional educator plays a facilitator role, observing and providing real time feedback to their learners, and as a result is less prominent than within traditional instructor-centric approaches. It is recognised that lecturers will need to adopt a change in pedagogical belief, often cited as a major barrier to pedagogical shift (Ertmer *et al*., 2015). Coupled with a change in role, educators engaged with online teaching practices also need to develop technological expertise in order to develop the digital capabilities of their students and provide an online learning experience that meets the needs of 21st-century students (JISC, 2020a). Looking beyond emergency remote teaching, institutions and faculty need to develop their role as a dual professional, skilled in both subject expertise and pedagogic knowledge. To facilitate this new role there are some enabling factors required as educators shift their role and are given permission to act outside their current role boundaries, and being given permission to act as a facilitator of the learning process. Using the notion of the professional educator (Flipped Learning

Network, 2014), there is a shift in role to one that focuses on creating a flexible learning environment, based on a learning culture, where the educator uses reflection and feedback in response to student needs see Figure 2.11.

F	FLEXIBLE ENVIRONMENT Educators create flexible spaces in which students choose when and where they learn.
L	LEARNING CULTURE Features a learning-centred environment where class time is dedicated to exploring topics in depth.
I	INTENTIONAL CONTENT Educators determine what they need to teach, and what students should explore on their own.
P	PROFESSIONAL EDUCATOR Professional Educators are reflective in their practice and provide students with relative feedback.

Figure 2.11: Four Pillars of F-L-I-P ™ (Flipped Learning Network, 2014)

2.3.2 Developing digital capabilities

There is a requirement for teachers to develop their digital capabilities in terms of digital literacies to support their pedagogical knowledge and to have access to a range of learning strategies they will be able to adapt to their learners and key aims. Lecturers will need to be creative and one step ahead of their students in terms of digital literacy to lead the development of student digital literacies. Leading on institutional wide change, there is a need for institutions to develop and adapt their framework of digital literacies which align to their vision but one would expect to see defined expectations for delivery to include the notion of plurality of literacies rather than consider one type of digital literacy (Ng, 2012). As a result, when defining digital literacies it is useful to explore elements of cognitive and practical skills situated within the context where they are being applied and the use of tools and techniques to facilitate thinking differently about the world. A revised info kit guides evolved work with higher education institutions (JISC, 2014), there is a need as expressed above to develop a contextual approach to this, which would need to be at institutional and subject level.

2.3.3 Supporting pedagogical change

According to Niess (2008), as educators are tasked with training the next generation, teachers must be able to rethink and relearn the things they already know, to adjust, to review alternatives and to adopt new patterns of behaviour. It has been acknowledged that systematic change is not a linear process, and that it does not consist of a predictable set of specific events (Fullan *et al.,*1996). Weinberger (2018) identifies two principles of pedagogical change. The first principle, using Fullan *et al*.'s 'Breakthrough Model', suggests implementing such flexibility through interconnected components of personalisation, precision and professional learning (Fullan *et al.*, 2006). 'Personalization', the second principle, is required to identify the specific needs people involved in the change, including students and teachers who will be charged with implementing it. 'Precision' involves a targeted and effective response, rather than a 'pre-packaged' blanket solution. The third component, 'professional learning', is an essential aspect as personalisation and precision cannot occur unless teachers engage in a continuous process of professional learning.

There are increasing expectations of HE lecturers, to be pedagogical experts and have good pedagogical knowledge and within online learning they will need to not just transfer this across to online teaching, but to recognise what pedagogical practice looks like online. Their metacognition needs to be developed so that knowledge is not locked in the context as well as enactment of teaching practices within the online. Lecturers will need to develop the ability to adapt to new pedagogical approaches and develop their understanding of the digital pedagogies to respond to the changing needs of students as discussed. According to Haugsbakken *et al.* (2019), this can be achieved using different digital tools associated with the delivery of online courses and each of these tools can serve multiple purposes. Understanding the potential of each of the tools is central to developing pedagogical knowledge, which places greater importance on the pedagogical knowledge required by educators. According to Luckin *et al.* (2012 p.15), "what is clear is that no technology has an impact on learning in its own right; rather, its impact depends upon the way in which it is used". There are some factors outside the control of the educator, but they do play a key role. The approach taken to develop the educator's knowledge may also be hindered as many educators have not taken online courses as students and are unaware of the many challenges that are faced by students in these environments and the need for scholarly activity to widen pedagogic understanding and develop pedagogic beliefs.

Kirkwood and Price (2012) commented on the impact of the way that academics conceptualise teaching and learning to have significant and interrelated impacts upon the students' experience of learning. Haugsbakken *et al.* (2019) highlight that there are other factors contributing to the success of the online course including the perceived role of the technology and its use, for example if it is used as a tool to support administrative tasks, such as distributing content or communicating with students. Beliefs about teacher-centred pedagogies can also be a barrier to pedagogical change. There are reported differences between self-reported and enacted practices in literature and differences in pedagogical beliefs with teacher centred and technology in actual observed teaching practice; this leads us to think self-efficacy needs to be included in teachers' pedagogic development.

In the design and implementation of online learning the roles of academics teaching online courses are referred to as pedagogical, social, managerial, and technical. The role of the educator within the ‘learning system’ needs to be understood as some are working within rigid systems, and some operating with systems that have navigation as a website of the 90s, with too many clicks and dead ends, with many features not being understood by participants. There are also issues with the demands on the system of uploading resources, and how their experience varies on different devices. Some approaches to professional development include teachers as students, as a means of developing understanding of the student experience; pedagogical belief is influenced by their own experience as a student and the desire to replicate this. The use of reflective teaching practice to support pedagogical change was explored by Armstrong and Asselin (2017), as they identified the process of self-examination and self-evaluation as a means of gaining insight into improving the teaching-learning experience. Through the process of reflection on practice (Schon, 1991), there is the opportunity to challenge beliefs, and engage in critical thought whilst immersed in the situation.

2.3.4 Supporting Community of Practice through a culture of innovation and learning

Innovation can support pedagogical change according to Weinberger (2018), by implementing a top-down leadership and decentralised bottom-up initiative, to facilitate systematic change through research-informed decision-making. To develop organisational learning a shared vision needs to exist; teachers are seeking direction from managers about what is meant by technology enhanced learning (TEL) to understand its potential (Dahlgren, 2005; Marton and Säljö, 2005). According to Kirkwood and Price (2014), managers need a clear articulation of what is meant by TEL to understand its achievements better.

2.3.5 Summary

This section has explored the role of the educator within online learning contexts and highlighted the need for pedagogical development, support for digital capabilities, and the challenges of professional educators being expected to act as dual professionals. The importance of professional development to support sustainable and continuous approaches to CPD has been identified, as educators are challenged to adopt new approaches which may not align with their own pedagogical beliefs, or context. The literature highlights that developing an approach to professional development needs to take into consideration that one size does not fit all, and whilst strategies can be implemented to encourage reflection on practice there is a need for strategic approaches by managers to support their teams with the extent of change required to adopt the scale of change, as discussed above.

2.4 Chapter summary

The purpose of this chapter is to review studies which review the nature of current online learning. It is clear from the research that there is significant change required by lecturers to adopt new approaches to teaching and learning to explore the transformative potential of online learning, and a need for developing a systematic approach to those characteristics associated with 21st-century learning (Coonen *et al.,* 2018; Joynes *et al*., 2019). Covid-19 has accelerated online learning practices which will support 21st-century learning, and further research is required to understand the features of this learning experience and the need to take strategic approaches for developing staff in digital skills (Barber, 2021; Ofs, 2021). Despite the existence of rubrics and competences (Foulger, 2017; Harris *et al.,* 2016, Schmidt *et al*., 2016) strategies to build TPACK for in-service teachers are most effective when situated within their own practice (Porras-Hernández, and Salinas-Amescua, 2013; Harris, 2016). This provides the opportunity to challenge existing pedagogical beliefs (Ertmer, 2005) and explore the differences between espoused and enacted teaching practices. Professional learning communities provide opportunities for sustainable communities of practice which can provide ongoing continual professional development (Phillips, 2014). This field of inquiry is important in encouraging communities to develop their own practices, due to the highly contextual nature of teaching and the need for lecturers to develop their own practices, using TPACK resources, to identify good practices, reflect on their own practice (Mouza, 2016), and develop the ability to respond to changes in available technologies (Mishra *et al.,* 2011).

Suggested research questions arising from the literature review:

1. How have lecturers used the TPACK framework to implement student-centred learning pedagogies?
2. How could the TPACK framework be conceptualised to support lecturers' capabilities for the design and development of student-centred pedagogies?

3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?

Chapter 3: Methodology

3.0 Introduction

This chapter presents the research design and discusses the implementation of the appreciative inquiry methodology chosen. Given that the professional doctorate is situated within the researcher's own professional practice, the chapter begins by exploring the positionality which informed and influenced the design of the study. The second section explains the appreciative inquiry stages of the 4D process, and its use to explore the TPACK framework, followed by discussion of the data collection tools and analysis techniques used. The final section concludes the chapter with a discussion of ethical issues considered in the construction and implementation of the research design.

Research questions:

The overall aim of this thesis is to explore how lecturers can enhance the integration of technology into their online teaching to deliver SCL pedagogies using TPACK. This will be achieved through the following research questions:

1. How have lecturers used the TPACK framework to implement student-centred learning pedagogies?
2. How could the TPACK framework be conceptualised to support lecturers' capabilities for the design and development of student-centred pedagogies?
3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?

Following the inclusive ethos of appreciative inquiry, full-time lecturers who were currently teaching online were invited to participate in the study, 24 participants representing a sample from each of the key subject areas consented. Due to the distributed nature of participants, online data collection methods supporting the principles of appreciative inquiry were selected which encouraged open channels of communication, providing the opportunity of being heard (Whitney and Trosten-Bloom, 2003). Conversations during the data collection acknowledged and valued what was working well at the time, building on existing professional relationships to foster professional learning communities (Senge, 1990) as a means of encouraging collaborative learning about their online teaching practices and developing a shared vision. Interviews and focus groups were conducted online via webinar and collaborative online spaces including the use of virtual Whiteboards and discussion forums.

3.1 Practitioner-researcher

Practitioner research offers the opportunity to develop and enhance professional practice through systematic inquiry, helps to create learning communities and supports the development of evidence-based research-informed practices. Campbell and Groundwater-Smith (2010) distinguish it from traditional forms of education research because it is undertaken by practitioners as part of their daily work. Key challenges of undertaking practitioner research within the workplace can be described as enabling or constraining factors (Ellis and Loughland, 2016). The opportunities and challenges have varied across the period of the research project, which at times presented a complex landscape to navigate. As the doctorate was studied part-time, over 5 years, the boundaries of my own practice have changed, and there has been a reflexive dialogue due to the changing institutional and personal factors that have influenced the direction of the research. As a result, a reflexive approach has helped the professional practice element become more attuned to the research practice and facilitated the navigation needed between the balance of researcher versus practitioner influence (Orr and Bennett, 2009). During the period of this study constraining factors have arisen due to changes in the university and academic leadership, and strategic direction resulting in changes to the educational context, which needed to be reflected within the study. One of the recent enablers to the research was the wholescale switch to remote teaching for blended learning and global interest in digital learning which has led to increased focus in online learning practices. Undertaking the dual role of practitioner and researcher has been a challenge throughout the study as the practitioner element can become too situated in the researcher's own practice. Alternatively, it can be too focused on the contribution to research, failing to provide the insights required for professional learning. Practitioner research involves careful negotiation of the relationship between the participants and the researcher which has been a key consideration in the research design. A significant challenge throughout this study has been the alignment of the research with professional practice requirements, and the timeline of implementation of key findings to align with the universities' strategic initiatives. During the study, there was a significant change in strategic direction by the university as it launched blended learning in 2015, followed by a change in focus back to online learning in 2019. By adopting a flexible approach to the design, the research title, methodology and research questions have been constant despite institutional and wider contextual factors. Covid-19 provided the opportunity to engage participants in data collection to develop understanding of what constitutes good online teaching and through the research align the practice and research needs.

3.2 Appreciative inquiry methodology

Appreciative Inquiry (AI) was chosen for this research for its solution-orientated and participative features and for its transformative potential on the participants and the potential to deliver sustainable change. Participants who take part in the AI process undergo change through the generative conversations and are empowered to change future practices within their own subject area and context (Whitney and Trosten-Bloom, 2019). The nature of engagement in AI involves participants sharing in-depth insights providing opportunities to explore inter-subjectivity through the ability to see the world from others' standpoints (Bryman, 2012).

This research uses the AI process to uncover the interchange of conscious and unconscious thoughts and feelings of the participants. By uncovering the positive core participants can acknowledge the collective strengths and assets that can be used to design future practices. Knowledge is generated through the facilitation of the appreciative inquiry process as they explore the ‘best of what is’ as participants develop an appreciative mindset. During this study lecturers were engaged in conversations about technology and pedagogy to learn from each other and provide a space for reflection on their own development.

To shift from what they termed deficit orientated approaches a core principle of AI is that the mindset of a problem cannot be solved within the mindset of the problem itself. AI claims to go beyond providing solutions and helps organisations enhance the life-giving potential through sustained change according to Cooperrider and Whitney (2005). Within the research it was important to create an environment which supported participants in developing an appreciative mindset to uncover the positive aspects of current teaching practices.

Capturing the ethos of the AI approach, Cousin (2009) acknowledges AI as a spirit rather than a method and emphasised that although initially used in business, it has been of equal use in researching learning environments within the genre of self-development. The situated nature of the AI method and identification of the positive core and ’what gives life here’ offered opportunity to discover enacted TPACK through identification of examples of good practice across each of the TPACK domains. Bushe (2011) also views AI as a spirit rather than a set of instructions, citing the lack of textbooks on the methodology due to Cooperrider's desire during the 1990s to preserve AI as a philosophy. Bushe stated that it is best thought of as a set of principles rather than a process, with the following assumptions:

1. In every society, organisation, or group, something works well.
2. What we focus on becomes our reality.
3. Reality is created in the moment and there are multiple interpretations of reality.
4. The act of asking questions of an organisation or group influences the group in some way.
5. People have more confidence when they carry the past (what they know) into the future (the unknown). If we carry the past forwards, it should be what is best about it.
6. It is important to value difference.
7. The language we use shapes our reality.

Hammond, S (1998, p.20-21)

Based on these assumptions AI was adopted for its ability to help shape educational change through the belief that every organisation and individual has talent, and the future is created by social interactions amongst group members. Giving a voice to the participants was an important aspect of the research, through the asking of questions to influence the direction of the research.

The implementation of the 4D process has become more varied with different techniques, which although remaining true to guiding principles can harness the positive force of action by adapting the approach to different contexts. Since its inception AI has become a well-developed technique utilising learning from a community of AI practitioners. Bushe and Kassam (2005) reported AI as liberating individual and collective power, which in turn creates a momentum for perpetual change. AI is a well-established organisational development practice, and within several types of organisations it has enabled change transformation through employee participation in large- and small-scale change initiatives. The transformative ability of this technique to support innovation and capture what organisations and people do best has been explored by Whitney and Bloom (2003). Their study recognises the wider benefits of AI in supporting members within an organisation to be capable of creativity and learning, and develop a culture of innovation. They also acknowledge the capacity of individuals to positively influence the future by liberating power and creating life-centred organisations capable of sustainable change.

AI is underpinned by scientific ideas about the complexity of the mind and the body and of human interaction (Cousin, 2009). Its framework combines empirical research with an exploration into the capacity of the mind with human imagination (dream phase) as part of its field of inquiry (Cousin, 2009). Cooperrider (2001), drawing on Sloterdijk's (1998) critique of reason, argues that we all have internal dialogues collectively or individually and these dialogues draw on and contribute to cognitive environments which determine what we regard to be important, thinkable, and possible. The cognitive environments can therefore equip us with a language that facilitates or limits our thinking. Academics have been singled out as problematists and problemaholics (Sloterdijk, 1988 in Cooperrider, 2001). Cooperrider (2006) suggests some people have a natural appreciative intelligence with a cup half full and see a set of possibilities rather than obstacles, they are good at vision and inspiration. Applied to research, appreciative intelligence can yield powerful insights precisely because it moves beyond the confidence of the past and of a problem-centred focus. AI has been recently viewed as a change management tool, not a research tool, although Cousin (2009) states that AI can provide a distinctive way of gathering and analysing data and theory building, and as such qualifies as a research method.

Using constructionism learning theory, there is a premise that building knowledge occurs best through building things that are tangible and shareable (Ackerman *et al.,* 2009). Within learning and teaching, Cousin (2009) presents constructionism as people learning effectively through making things; in her definition of constructionism she acknowledges the researcher influence on knowledge creation "as approaching so in the limits of our existing knowledge, views, expectations, languages, values and interactivity with research participants." During this AI process methods were sought to provide means of visualising the ideas created during the dialogue to support gaining of shared understanding, accepting that language can be a barrier. Constructionism research can be viewed as a process of negotiation with our own and other people's meaning, with reality as a co-created outcome of this negotiation. Within this approach we can accept that we rarely have unproblematic, direct access to the truth in the field of human research. In constructionism, the questions we ask produce co-created responses. AI was chosen to overcome what has been termed a deficit vocabulary to describe our organisations, as participants naturally draw on that to answer questions (Cousin, 2009). During the research, each question creates a line of inquiry, and participants engaged within this research viewed the AI process as generating not one truth but generative and fresh truth. The AI facilitation and framing of questions shapes the outcome of the research according to Cooperrider and Whitney (2005) and for this research it was accepted that the questions asked would determine the nature of responses provided.

As the research is aimed at supporting changes in teaching practice, it was important that participants viewed themselves as part of that change. New mentalism is a school of thought created by neuroscientists and social scientists who believed that what we think, imagine, and envision can have a powerful impact on our physical well-being. The concept results in the ability to anticipate and influence what happens as also seen in the Pygmalion Effect which is related to the notions of internal dialogue and cognitive environments (Cooperrider, 2001). Cooperrider states that AI does not accept a mind and body dualism and argues that they are dynamically linked and mutually fateful. He also claims that we do not know about these linkages, but we know that if we think or will something to be true, it will be true in its consequences at some level. Within education the Pygmalion Effect is evidenced in research where effects of telling teachers that students in their classes possess academic potential enable a dynamic creating a self-fulfilling prophecy (Rosenthal, 2010).

3.3 Interpretivist paradigm

This research aims to uncover innovative online teaching practices and sets out to explore data which uncovers innovative ideas and new ways of thinking. The research design acknowledges the researcher's professional role as this is practice-based, situated research. The conceptual lens and world view of the researcher has impacted on the methodological decisions and the researchers' ontology which is based on an interpretivist approach to an inductive approach to the research design, data collection and interpretation. The role of the researcher, and nature of interaction with the participants is a key part of this study and following an interpretivist methodology it involves social phenomena researched "through the eyes of the participant" rather than the researcher (Cohen *et al.,* 2007).

The interpretivist paradigm has a set of shared values, concepts, practices and assumptions which guide the research and reflect the beliefs of the researcher (Guba and Lincoln, 1994) and accepts the influence of the researcher's beliefs and human construction of meaning from the data (Denzin and Lincoln, 2005). The paradigm and philosophical influences therefore have shaped all aspects of this research design and the choice of appreciative inquiry in supporting the researcher's positionality with regards to epistemological and ontological beliefs.

Guba (1990) states the paradigms within research are discussed in terms of their: ontology (What is reality?), epistemology (How do you know something?) and methodology (How do you go about finding out?). Ontology, in research, can be defined as the study of beliefs and how to determine if something exists, and how we view reality. To a researcher, the adoption of an interpretivist paradigm assumes that social reality is not singular or objective, instead it is shaped by human experiences and social contexts. This study regards reality as socially constructed with multiple realities possible with both the participatory data collection and analysis as features of the methodology. The research does not aim to uncover a single reality of 'good online learning teaching practice' or expect that we will decide on one truth that will be applicable for a range of educational contexts. This view contrasts with a positivist approach, which suggests there is one objective truth awaiting discovery, with the researcher quite independent from the research and the participants, with research viewed as objective and adopting a deductive approach (Crowther and Lancaster, 2008).

Within an interpretivist approach knowledge is constructed inductively, building on knowledge through observation and arising from the need to seek understanding and create theoretical perspectives. An interpretivist approach provides a contrasting approach to positivism and rejects the study of the social world using scientific methods with an openness to new knowledge. It recognises the impact of the researcher's priorities and how they have influenced the research (Van Manen, 1995). An interpretivist approach as written by Shultz (1962) rejects the positivist paradigm and accepts that there may not be absolute truth but considers instead the meaning of human actions, by 'human actors.' This research involves creating an environment where the shared meaning of human action can help us seek understanding of current and future realities of online teaching practices with the participants.

Using the principles of interpretivism to generate knowledge from making meanings can be supported by using a naturalistic approach to data collection. This study uses structured interviews and focus groups with a view to understanding social phenomena in terms of the meanings people bring to them (Denzin and Lincoln, 2005). Within this interpretivist approach, the priorities and the direction of the research have been determined by the researcher and are based on a view of knowledge which is socially constructed, subjective, and influenced by culture and social interactions, as outlined by Creswell (2007). Appreciative inquiry distinguishes itself from other types of action research as it focuses on asking positive questions to instigate a dialogue and action within the human system it operates within (Cooperrider and Srvisatva,1987).

Interpretivist approaches are criticised as not being applicable to a wider audience and the field of study required for academic value (Reason and Bradbury, 2007). In addition, the researcher's involvement with participants and cited lack of objectivity, are reported as failing to yield theories that can be generalised to larger populations (Grix, 2004). However, when researching social phenomena, the interpretivist paradigm offers the opportunity to explore the complexity of contextualised environments where there are multiple realities to be uncovered by the participants. This study seeks applicability to wider audiences by adding to the body of knowledge of strategies of building TPACK for in-service teachers' research and the use of appreciative inquiry to learn about the development of online teaching practices using communities of practice.

Using the AI process to uncover different meanings, this research rejects the need to establish trustworthiness through triangulation by collecting data (Patton, 1999) and uses different data collection methods as a way of generating a comprehensive understanding of the phenomena being researched. The dependability of qualitative research, and the consistency and reliability of the findings, can be explored through the ability of others to follow, audit, and critique the process (Sandelowski,1986; Ploit *et al.,* 2006; and Streubert, 2007); and establishing if the findings are consistent with the raw data collected (Lincoln and Guba, 1985). In order that findings can be generalised and are transferable to other settings, Lincoln and Guba also argue that transferability within qualitative research can be gained through purposeful sampling. This study used a homogeneous sample of experienced lecturers to gain rich information of TPACK practices; the participants provided rich data analysed using thematic analysis to provide findings that can be generalised and applied to other settings.

The data collection methods used focused on measuring the impact of interventions on levels of TPACK competences for in-service teachers (Koehler and Mishra, 2005; Schmidt, 2009; Archambault and Crippen, 2009, Chai, *et al.,* 2010). These studies focus on observable TPACK differences through quantitative approaches to data collection and interpretation, to demonstrate an objectivity to data collection which is observable and measurable. The measuring of TPACK using the presence of the constructs results in difficulties developing understanding behind the application of TPACK competences codes, to help understand how to build it in the future. Many of these studies use a validated TPACK instrument to gather self-reported TPACK competences and are based on self-perception of competence which is often different to actual competence. The measuring of TPACK levels, following interventions, can be limited in developing knowledge of TPACK constructs due to the high level of contextual knowledge not captured and judgements in reporting codes criticised as being unreliable (Brantley-Dias and Ertmer, 2013; Graham, 2011; Voogt *et al*., 2013). These early studies adopted a positive approach, as the traditional scientific or quantitative approach, often referred to as the gold standard (Denzin and Lincoln, 2005) where research methods focus on quantitative methods of surveys, and experiments. These first generation TPACK studies use a philosophical stance based on the relationship of theory with research and deny previous observations or knowledge as part of the testing of the theory (Dwyer, 1982).

In contrast, the use of an interpretivist paradigm associated with researching phenomena as an emergent process, is often achieved using a qualitative research approach (Creswell, 2007). The use of quantitative data can support the measurement of an action research intervention, yet the use of quantitative data alone does not consider the contextual factors, which can be central in providing better understanding, or the evaluation that an interpretivist approach offers.

3.4 Qualitative research (Online)

The research, conducted online, selected communication methods and data collection techniques which provided the in-depth narrative from participants to gain a detailed understanding of the phenomena researched. The data collection took place during the first Covid-19 national lockdown and followed the original methodological framework as participants were distributed across the UK (United Kingdom) and working for an online university and familiar with communicating regularly with colleagues online. Qualitative studies require close contact with participants, and interaction between the researcher and participants was facilitated by making use of available technologies to allow synchronous and asynchronous attendance to facilitate the depth required.

An inductive approach was used to generate theory and build concepts as outcomes of the research process (Creswell, 1994) with a research design using an iterative process and adjusting the research questions according to what was learned though the pilot and initial stages of data collection. Thematic analysis was undertaken during each of the data collection points to provide opportunity for identifying and reporting on patterns within the data through analysis of participants' thoughts, experiences, and motivations (Braun and Clarke, 2006).

Patton (2015) views qualitative research as a line of inquiry that is humanistic, socially critical, and sceptical of traditional notions of objectivity and causality. Favouring this humanistic approach to education research, the research aimed to develop new knowledge about the teaching-learning situation using systematic data approaches to improve educational practice as identified by Pring (2015). Using appreciative inquiry enabled a systematic collection of data to this educational research using a variety of methods to investigate student learning, teaching methods, teacher training and classroom engagement. As a result, the research is exploratory, having an emergent design which is open-ended and supports emerging concepts and theory building. The suitability of AI to education research is its situated nature and its ability to support practice-based inquiry as it provides the opportunity to facilitate change which involves key stakeholders (Cooperrider and Whitney, 2009).

3.5 Ethical considerations

The key ethical considerations presented during this study have been summarised as: power and influence, insider-researcher positionality, practitioner-researcher and consent and confidentiality.

3.5.1 Power and influence

Appreciative inquiry was selected due to its participatory nature, with eligibility to join the study from all permanent lecturers, avoiding any hierarchical limitations in terms of job role. A benefit of participatory action research is the active engagement of participants through participatory listening, and the use of visual tools within the initial stages of the research process (Veale, 2005). Using the principles of appreciative inquiry during the research it was important to create a safe space, where participants could speak openly, and explore ideas through appreciative conversations. For this reason, to avoid power boundaries, for the small group interviews subject teams were constructed for people at the same level, and who worked closely together. During the first interview to build familiarity of appreciative thinking, conversations were supported by the facilitator and the interviews focused on encouraging and supporting participants by acknowledging the value of their contribution and using groups of three or four members to uncover the positive core using appreciative storytelling. The approach of scaffolding support and focusing on uncovering positive aspects of online teaching helped to create an environment of trust.

Given my role as the institutional lead for digital learning and teaching quality, a power dynamic existed which was addressed through providing participants a safe space to talk about experimental approaches, and by giving permission to fail. For this reason, I decided not to observe teaching, as it would have been difficult to separate the researcher and practice roles. I also decided not to record the conversations, to encourage participants to engage in dialogue and alleviate any concerns associated with capturing, storing and analysing individual responses. The research was instead focused on recording the responses through a virtual whiteboard during the discussion, by capturing responses to appreciative questions to enhance future practices drawing from their valued experience. Participants were grouped into subject areas, it was decided for ethical reasons not to provide comments as part of the analysis, as these responses were anonymised. Although, there had been some innovation in teaching practice, I needed to develop the appreciative approach, and it was felt that capturing the responses and presenting collectively was within the ethos of appreciative inquiry. This approach enabled an acceptance that the online teaching practices discussed were not being judged against quality assurance criteria, or checking consistency across teams, instead focusing on ‘the best of what currently is’. With the ethos of inclusivity participants were invited to participate from across the permanent staffing team, without any parameters around duration of service, teaching qualifications or existing pedagogical or technical knowledge. Whilst the level of pedagogical and technological knowledge had restricted range of observable TPACK examples in the pilot study, participants were encouraged to join on the potential of the AI process to impact on participants, through increased dialogue and discussion of online teaching practices.

3.5.2 Insider-research

For an insider-researcher undertaking research based on professional practice there is opportunity to access specialised knowledge and people to enhance the knowledge. Situatedness in learning according to Lave and Wenger (1991) arises from the interplay between the agent and the set of circumstances (and your position within it) and the context. It requires the development of social and cultural influences and the multiple perspectives needed for understanding provided by the context. When researchers are insiders, they draw on this knowledge and the actions and their perceptions of colleagues impacts how they interact with the communities researched. There is an increased need for sensitivity when dealing with colleagues and acknowledgement of how self can influence, in order that its situatedness does not impact on the scholarship of the project. As a key aspect of the research is the positive impact of engaging with a community of practice, the research will need to be sensitive to the challenges of insider-research. Participants need to have some freedom to choose their level of engagement with the research. Reducing the impact of a top-down approach, the research aims to capture the peer-mentoring and developmental qualities of AI. As an insider-researcher, I have been conscious of my influence through my professional role and leading the AI process, and conscious that the outcomes should be determined by the participants. There can be some difficulty in navigating the AI process, with some loss of control experienced through this research methodology, and the challenge to meet both the doctoral aims and the needs of participants.

3.5.3 Practitioner research

As a practitioner-researcher the potential areas of conflict with the professional role within the research are acknowledged. To avoid a conflict with the research and practitioner roles I kept the two identities separate whilst keeping close alignment of both; the largest risk was the impact on timeline and deadline for outputs, for which the doctoral requirements took precedence. This enabled the researcher stance to be more prominent from the collection of data through to data analysis. Other difficulties identified include the anonymity and confidentiality of colleagues, challenging the value system of the workplace and teaching practices, and adopting roles within the research process which may be intimidating to those new to research. A reflexive distance was kept ‘professional’ to ensure that the integrity of the research was not compromised.

3.5.4. Consent and confidentiality

Informed consent was sought with sensitivity to the additional time and workload the project incurred for the participants, with a clear outline of the timescales and level of engagement required articulated in the participant information sheet (Appendix 1). Clear guidance on withdrawal from the project or write up was provided in the participant consent sheet and consent process. The participant briefing outlined the benefits to participants for their own development and that of their teams and presented as the opportunity to improve teaching practice using technology to support online teaching. Participants could also experience a research design that incorporated appreciative inquiry, online data collection and visual representation. The research design carefully considered the amount of engagement required by participants which did impact on the design, acknowledged in the analysis section, due to undertaking the research during the first lockdown period as discussed below.

Anonymity was observed in the discussion about teaching practices to alleviate any potential harm caused by collecting data and using this in further discussions. Confidentiality and anonymity of data within the research process has been observed and achieved by coding participants. The recording of data in group interviews also protected the identity of the contributors. Group communication using online forums took place in a secure site, using an office 365 Teams site which has not been accessible to non-members. Within written documents and subsequent publications anonymity has been protected, with due care to ensure that participants cannot be identified, especially with regards to subject discipline and location.

Data created as part of the research process, including interview transcripts and focus group discussions, were stored using a password protected computer. During the appreciative inquiry process data was not shared with any participants, without checking that confidential details were not shared. During the project the data was stored on an encrypted laptop. After publication of the thesis the project data will be deleted from the laptop and stored on an encrypted USB stick. Permission has been gained for use of the data in future research articles.

3.6 Research methods

This research focusing on the current uses of technology to support SCL adds to the growing body of TPACK studies which take a qualitative approach to developing teacher knowledge and competences. However, those qualitative studies discussed in the literature review used the TPACK survey as a key measure of pedagogical change, with many TPACK studies including the TPACK survey, which reports on self-perception of teaching (Harris and Hofer, 2009; Mishra and Koehler, 2009). More recent studies (Tai, 2015; Maor, 2013) consider the impact of teacher actions and interventions on how they achieved TPACK. Most studies use triangulation and include some qualitative methods, but quantitative analysis is still core to the research. The body of literature around TPACK studies, as stated in chapter 2, has evolved from measuring pedagogical change through university teacher training programmes to a second generation of TPACK, focused on the development of in-service teachers.

3.6.1 Research design

The research design uses AI methodology and its core principles and freedoms as outlined above. Participants' engagement in creating solutions to inform future practice is a key aspect of the design, in line with the ethos of AI methodology and participatory research approaches. As part of the design the TPACK framework is utilised in discussion of teaching practice to identify each of the domains, and the intersection of TPACK. The uncovering of good online teaching practice through discovery interviews formed the foundation of the 4D AI cycle, supporting the subsequent envisioning dream and destiny stages. A consideration of the research design was how to engage participants within an online environment to promote creativity, high levels of engagement, and allow time for conversation as face-to-face interactions can encourage greater dialogue than would have occurred in an online workshop. Salmons (2012) stated that a key challenge of collecting data online is finding suitable methods which encourage trust and rapport to research the phenomenon in question. The online data elicitation used synchronous and asynchronous data methods, and visual representations to encourage 'synchronicity'. This synchronicity was defined by Dennis *et al.* (2008) as having a high level of mutual focus and attention, to support individuals working together through a shared pattern of behaviour.

As a collaborative and participatory approach, the choice of methods within the AI 4D cycle necessitated the promotion of engagement, in each stage of the cycle, to encourage the quality of response required. Due to all participants being involved in supporting lecturers who had moved online they had all observed teaching practice and had recent experience of mentoring other members of staff. The interviews, described as the most crucial aspect of AI (Cooperrider and Whitney, 2005), provided the opportunity for rich engagement and deep conversation. AI views language and words as the basic building blocks of social reality (Cooperrider and Whitney, 2005). The online focus group and online discussions were facilitated to maximise participants' contributions. Each method included questions designed to strengthen the system's capacity to identify, anticipate and heighten positive potential (Cooperrider and Whitney, 2005). A key difference between AI interviews and traditional interviews is rather than soliciting facts and opinions, AI interviews seek examples, stories and metaphors (Stavros *et al*., 2018).

3.7 The Appreciative Inquiry 4-D Cycle

As the rationale for choosing AI is outlined above, this section outlines the 4D process, referred to by Cooperrider and Whitney (2005) as a narrative-based process of change. Within the first stage, participants move through a cycle of interviews and deep dialogue about the strengths, resources, and capabilities to uncover the positive core. The process moves through the four stages of the cycle, with a series of activities engaging participants in envisioning the future through propositions which guide the design and delivery of their co-created future vision. The process comprises four complementary phases: Discovery, Design, Dream, Destiny. This research uses the first three cycles in the main study, with the Destiny forming part of the recommendations and conclusions chapter.

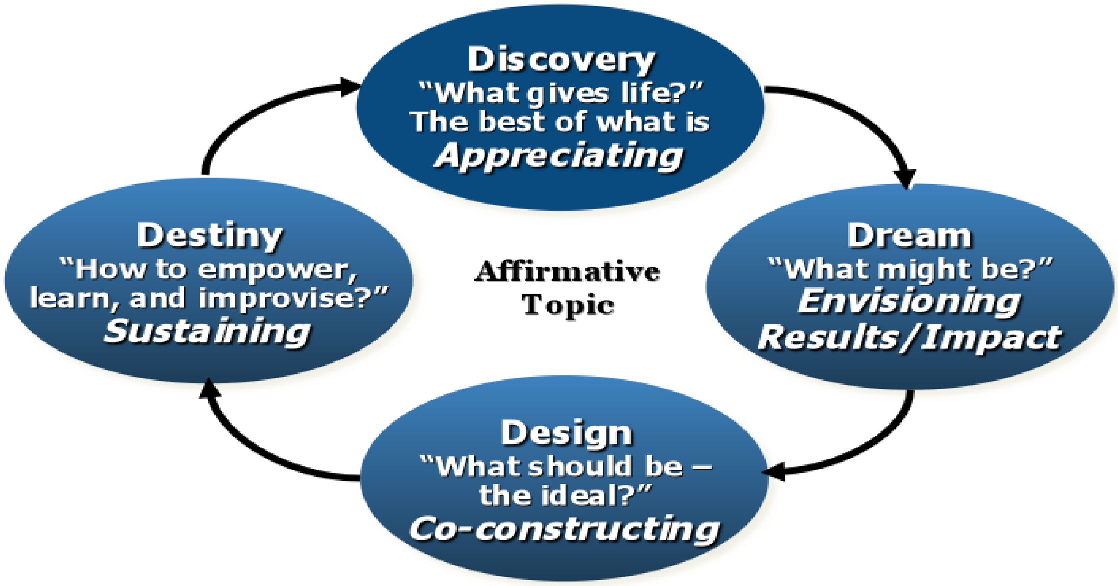


Figure 3.1 4D Model of Appreciative Inquiry (Cooperrider, 2020)

Define

The AI process starts with Define, see Figure 3.1, added to the 4D process in recognition that an affirmative topic needs to be chosen before the start of the inquiry process. The section of the affirmative topic influences the direction of the inquiry through its questions written into the discovery process (Cooperrider and Whitney, 2005).

Discovery

The use of appropriate methods is important to capture the positive core and the appreciation of the best of 'what is' and is based on a dialogue, as a way of finding what works. Although there are many methods to uncover the positive core, the online data collection methods selected aimed to create a safe space for sharing and discussing ideas that would be gained within a face-to-face environment. The online facilitation was aimed at rediscovering and remembering the organisation's or community's successes, strengths, and periods of excellence (Cooperrider and Whitney, 2005). Within the Discovery phase all participants were involved in interviews, to engage members equally (Bushe, 2011). The sharing of outputs as they were collected helped to gain trust of the researcher and gave transparency of how their inputs would be used. As the first stage in the process, it was important to create a collective energy and capture the ethos of positivism and start to develop the participants' ability to engage in appreciative conversation.

Dream

During this stage participants were then invited to review the themes from the discovery interviews and to share stories of the peak experience uncovered during the Discovery phase. In this stage, participants were encouraged to imagine 'what could be', building on the foundations from the previous stage using past achievements and successes to collectively envisage a preferred future. Participants identified their dreams for online teaching having discovered 'what is best' and had the chance to project it into their wishes, hopes and aspirations for the future. Throughout the 4D process the researcher became less present, to allow participants to have more freedom to construct their own reality.

During the design stage participants determine 'what should be' (Cooperrider and Whitney, 2005); within this research participants worked together to craft propositional statements about what should be, to provide some 'possibility statements' (Cooperrider, Whitney and Stavros, 2008, p.165-168). Stories from the discovery stage with the imagination and creativity from dream were used to bring the 'best of what is' together with 'what might be,' to create 'what should be – the ideal' (AI Commons).

Destiny

Having created the vision through earlier stages this stage identifies how the design is delivered, and how it is embedded into groups, communities, and organizations. The original approach to AI termed this ‘delivery,’ based on more traditional organizational development practice. There is less consensus on how this was achieved (Bushe, 2011) with ‘destiny’ being more prevalent now (AI Commons). According to Cooperrider and Whitney (2005) instead of focusing on developing action plans and monitoring progress, this stage is handed back to groups to enable the transformation to emerge. Recommendations arising from the research findings relating to research question 3 will suggest strategies to support the development of TPACK through communities of practice using an appreciative inquiry framework.

3.6.1 Six freedoms of appreciative inquiry

The ethos of appreciative inquiry is an important aspect of the research design; according to Whitney and Trosten-Bloom (2003), there are at least six conditions for the liberation of power, which are called the six freedoms. The authors state that the power of appreciative inquiry is the way in which it unleashes all the six freedoms within one 4D cycle, definitions of each of the freedoms are found in Table 3.1 below:

Table 3.1 AI Freedoms and their Summary Definitions (Whitney and Trosten-Bloom, 2003)

AI Freedom	Brief definition
1. Freedom to be known in relationship	All too often in work settings, people are related to as their role rather than as a human being. AI interrupts the cycle of depersonalization that masks people's sense of being and belonging.
2. Freedom to be heard	Being heard requires someone to listen with sincere curiosity, empathy, and compassion. AI makes a space in which people are free to be open to know and understand another person's story.
3. Freedom to dream in community	Visionary leadership means unleashing the dreams of people at all levels of the organisation. AI pens the opportunity for people to be free to dream and share their dreams, in dialogue with one another.
4. Freedom to choose to contribute	Freedom of choice liberates power, but it also leads to commitment and a hunger of learning. AI establishes an environment where people are free to choose to contribute.
5. Freedom to act with support	When people know that others care about their work and are anxious to cooperate, they feel safe to experiment, innovate, and learn. AI provides the context for people to be free to act with support.
6. Freedom to be positive	People often allow themselves to be swept away in collective currents of negativity. AI opens the way for people to be positive and proud of their working experiences.

Table 1. Whitney and Trosten-Bloom's (2003) freedoms and their summary definitions.

The use of AI in the study supported contributions from participants by encouraging a positive sense of self as outlined by the freedom to be known in a relationship; this concept encourages people within the workplace to be known by not their role, as their identity is based on what they do other than who they are. This can impact negatively on the sense of self, affect how they contribute to the organisation, how we become ourselves in an organisation and contribute to others in our relationships at work (Bushe and Kamman, 2005). AI reduces this limitation by helping people know themselves, affirming their relationships, building bridges across power boundaries, and making their ideas become more accessible.

Freedom to be heard is different to being listened to**:** AI encourages relational hearing, drawing the best out of a person which encourages meaning and identity through hearing others' stories. Hearing about their area of expertise leads to people feeling recognised, and gives a voice to contribute ideas, and innovation, creating a rich context for knowledge creation and exchange. This collective thinking enables creation of knowledge, sharing and exchanging of ideas on their practice, encouraging a culture of personal respect and satisfaction.

Using the freedom to dream in a community, leaders are highly influential in realising the potential of their teams. The use of AI provided opportunity through the interviews and sharing stories to open people up to the idea of change. Providing choice and freedom to contribute, or not, enabled participants to follow their interests and passions, which can lead to enhanced contributions. Even a minimal level of interaction with the process will have a positive impact, so for the purpose of enabling a change it will be beneficial to get people involved. It is believed that it is the capacity of choosing the nature and extent of contribution which results in its impact being significantly enhanced.

Participants need to be given freedom to act with support. At the start of a project people may not engage if they do not feel safe or are not given space to experiment and innovate. The researcher needs to provide support for the project to ensure participants view it as worthwhile and beneficial. Freedom to act helps to raise confidence and hope, and having influence over future projects is important and could be beneficial to participants, for example empowering lecturers as champions as they have been involved in devising initiatives. Part of this is recognising that it does not fall within the current job role and giving people the opportunity to experiment and fail in a non-judgemental way. The freedom to be positive is important to deal with any issues with deficit discourse.

3.7.3 The pilot study

The pilot study to test the use of observation in the discovery phase was conducted between March-May 2018, a further pilot was conducted in January 2020 to pilot the dream phase of the AI process. An overview of the scope, and purpose of pilot study is provided within Table 3.2., accompanied by an explanation of the key outcomes and the impact on the resulting research design. Within the initial pilot a lesson observation instrument, validated by the TPACK community (Schmidt *et al.,* 2009), was trialled and demonstrated that there was a gap in knowledge, relating to the technological knowledge domains expressed as TPK, TK and TPACK, identifying a need for future practitioner research. Using the instrument identified some issues in the coding of teacher knowledge, as many domains were over-reported and whilst a validated instrument was used, it was felt that this needed to be further contextualised. The use of pre-set codes was also problematic as it appeared too formulaic and failed to capture the high points of a lesson. Use of a checklist can have a negative effect as the observation can fail to recognise the high points of a lesson which were of more interest. Although there can be an intent for a developmental approach to lesson observation, use of a checklist can fail to capture the strengths and seem to be deficit-focused. This was a key finding from the pilot and informed the decision to not to use a lesson observation, or a related instrument in the actual data collection, see Table 3.2.

Table 3.2 Overview of the pilot study

<table>
<tr><td colspan="4"><u>Pilot Study</u></td></tr>
<tr><td>Phase</td><td>Date</td><td>Purpose</td><td>Method</td></tr>
<tr><td>Discovery</td><td>March-May 2018</td><td>Using observation to explore presence of the domains of TPACK present in a blended learning teaching session</td><td>Observation of teaching, in person</td></tr>
<tr><td colspan="4">Outcome
The data showed over-reporting of TPACK codes, and the need to develop a codebook, or coding that had contextual meaning, rather than apply codes from other research. This led to exploration refinement of research questions in order that the observation allowed the reporting of the codes of how TPACK is observed in order that this can then be shared with others. Also changed the methodology to AI, as there was a value to learning from current teachers, to inform future practice without putting them through a training programme and testing TPACK levels before and afterwards, as found in first generation TPACK studies.</td></tr>
<tr><td>Phase</td><td>Date</td><td>Purpose</td><td>Method</td></tr>
<tr><td>Discovery</td><td>March-May 2018</td><td>To trial observation using video, to facilitate remote peer observation, inductive coding of TPACK, and presence of student-centred learning</td><td>Observation of teaching, video</td></tr>
<tr><td colspan="4">Outcome
The data provided information about how each of the TPACK domains were demonstrated within the lesson. The interview protocols were trialled, the pre and post observation template were adapted with some briefing guidance for the peer observers.</td></tr>
<tr><td>Phase</td><td>Date</td><td>Purpose</td><td>Method</td></tr>
<tr><td>Dream</td><td>January 2020</td><td>To inform the facilitation protocols of a learning summit</td><td>Focus group following the ethos of the Appreciative Inquiry

Learning Summit</td></tr>
<tr><td colspan="4">Outcome
The summit trialled the method, as effective facilitation is a key part of the appreciative inquiry process. The generative questions were effective at encouraging participation and gaining detailed information.</td></tr>
</table>

As stated, the pilot aimed at trialling the use of the TPACK framework and lesson observation as a data collection method to understand 'actual online teaching practice' for the classroom element of blended learning. The assessment tool had been validated by previous researchers and a recommendation from the pilot was the need for it to be adapted, and further guidance needed if used in participatory research. The coding of the field notes using the codebook developed by Baran *et al.* (2012) led to some inaccurate recording of codes as the practice observed was reported against the nearest code, and further trial of the lesson observation instrument was undertaken and trialled with participants.

The TPACK lesson observation instrument facilitated the recording of all domains of pedagogical knowledge and content knowledge. Using the TPACK framework helped identify the impact of each domain and how they supported good practice in teaching and learning. The gap in knowledge, reported by all participants, was the embedding of technology-enhanced learning (technology knowledge) as outlined by Mishra and Koehler (2006). As technological knowledge is needed to achieve TPACK, this was an area for further consideration; from the literature review it was clear that all domains need to be evidenced to achieve TPACK. Recording the lesson activities using detailed field notes and units of analysis relating to the application of TPACK enabled evaluation of teaching practices. The final objective investigated good practice in blended learning, and analysis of the lesson observations highlighted the internal and external factors affecting the quality of teaching. The pilot study also highlighted that teacher personality and behavioural competences were the most influential factors in creating a successful learning environment. It was evident that the tacit knowledge of lecturers was also not recognised by the lecturers in follow up interviews.

My presence within the research as a participant-observer was trialled in the pilot as I wanted to gather rich qualitative data and understand how the lesson observation instrument could fit into the research design and selection of methods for the research project. A concern that my role in the organisation would impact on the observation process was unfounded as participants were very receptive, and I was viewed as a novice researcher and co-researcher, instead of a senior manager. For the research project, participants as co-researchers would be articulated as part of the research methodology, and ethical considerations that were present in the pilot study would be outlined in the research proposal. Participants would be encouraged to try new techniques which could take time to build confidence. To embed the principles of communities of practice a recommendation from the pilot was for future observations to be carried out using peer and personal reflection, instead of a top-down approach, to a community of practice, as outlined by Kennedy (2005).

The pilot highlighted the presence of competences in an observed lesson and the challenges in mapping these against TPACK pre-set competence lists found in the Schmidt *et al*. (2009) lesson observation instrument. A key reflection from the pilot study was the need to contextualise the lesson observation instrument and have emerging coding to interpret and analyse the data. The observation needed to have clearer boundaries, and limitations, for example integration of a new pedagogy, supported by technology. A range of competences were recorded and analysed as part of the data analysis and I was keen for the observation process to avoid becoming a checklist. One reflection from the pilot study was the need to encourage the contextualisation of teaching practices, and the need to use inductive approaches to interpret and analyse the data to identify new examples of good practice, and to envision emerging areas of practice.

The pilot study opened decisions to be made on the implementation of the methods for the research project, for example the number of participants and duration of the professional development programme. Preferably it would be offered as a continual professional development opportunity, although ‘on-boarding’ was the original idea and suggested a shorter lifespan whereas a change would happen over a longer period (Williams, 2007). Before the pilot study the intent was to undertake a 10-week programme, to have a start and end point within the action research cycle, as an iterative cycle. As part of the reflection, I decided to use the AI methodology based on the focus on changing practice, and support development of pedagogic belief and integration of technology within their teams. This resulted in a change of research questions to adapt to using appreciative inquiry and move away from a case study approach.

Despite re-forming research questions this research will still contribute to knowledge through its methodology: implementation of TPACK through its qualitative approach; the use TPACK within the context of online learning practices in higher education. The pilot study provided some direction in further testing of a lesson observation instrument, and reconfirmation of the focus of the study towards the gap identified, resulting in the aim of the project being to explore the use of TPACK to support pedagogical development of teachers through professional development.

3.7.4 Implementing the 4D Appreciative Inquiry Cycle

The research questions were revised at the time of Covid-19 due to changes in delivery, but also because of increased attention to the online element of blended learning. Within blended learning exploring the role of the online element was difficult to research without exploring different models of blended learning which was proving to be problematic due to contextual factors, see Table 3.3.

Table 3.3 Overview of the research design

<table>
<tr><td colspan="3"><u>Discovery</u>
1. How have lecturers used the TPACK framework to implement student-centred learning pedagogies?</td></tr>
<tr><td>Date</td><td>Purpose</td><td>Method</td></tr>
<tr><td>May 2020</td><td>Discovery interviews to facilitate dialogue of what is good, and establish the positive core ‘best of what we are’</td><td>Group interviews</td></tr>
<tr><td colspan="3"><u>Dream</u>
2. How could the TPACK framework be conceptualised to support lecturers’ capabilities for the design and development of student-centred pedagogies?
3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?</td></tr>
<tr><td>Date</td><td>Purpose</td><td>Method</td></tr>
<tr><td>June 2020</td><td>Group share stories of what they found in stage1 to create a <u>vision</u> of ‘what could be’ based on the discovery stage.</td><td>Online focus group using virtual Whiteboard</td></tr>
<tr><td colspan="3"><u>Design</u>
2. How could the TPACK framework be conceptualised to support lecturers’ capabilities for the design and development of student-centred pedagogies?
3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?</td></tr>
<tr><td>Date</td><td>Purpose</td><td>Method</td></tr>
<tr><td>June/July 2020</td><td>Group co-construct propositional statements which are based on ‘what good practice looks like should be’ in order to commit to planning for the change identified in the dream stage</td><td>Online discussion forum/document</td></tr>
</table>

3.7.4 Data Collection and Analysis

The appreciative inquiry process started with a briefing of the aims of the research, and introduction to SCL pedagogies, appreciative inquiry and TPACK framework, inviting participants to contribute to the final data collection through the AI process. A follow-up email was sent with the participant information sheet (Appendix 1) explaining the aims of the research, and the nature of engagement by participants at each stage of the AI process, the theoretical basis of the project, and the relevance to developing their own professional practice. Within the information sheet assumptions were explained including the rationale for using SCL pedagogies and their role in supporting learners and staff for 21st century learning. The AI methodology was explained, focusing on the generative elements, and uncovering the positive core, and belief of the group to uncover solutions. On completion of the consent form participants were invited to join a restricted access SharePoint site to read the information sheet which detailed timelines and expected participant engagement, and access to an online participant consent form to be completed by a given date. Participants were then invited to join via email. An Office 365 Teams site for participants was used to communicate key concepts and store other key documents and provided online data collection channels for example online Whiteboard, focus groups, and restricted areas for storage of reflective notes and observation forms.

Stage 1: Discovery

1. How have lecturers used the TPACK framework to implement student-centred learning pedagogies?

The first research question examines current teaching practice and facilitates discussion around how technology is currently integrated into teaching within the lessons observed. Information was gathered on what is working well using appreciative interviews using the TPACK domains as: technology knowledge (TK), technological pedagogy knowledge (PK), content knowledge (CK), technological content knowledge (TCK), pedagogical content knowledge (PCK), technological pedagogical knowledge (TPK), Technology Content Knowledge (TCK) illustrated as technological pedagogical, and knowledge (TPACK) model in Figure 1.1.

The discovery interviews were semi-structured, and generative questions were asked to encourage dialogue and reflection-in-action (Argris and Schon, 1974) to encourage ‘sparks’ in others through the appreciative conversations (Stavros *et. al*., 2018). The narrative and exploration during the data collection provided opportunities for mutual learning throughout this initial discovery stage aimed at uncovering the positive core through using an appreciative interview guide (3).

Seven interviews were conducted with small groups of at least three participants in each group with a total of 24 participants. Questions were aimed at encouraging participants to develop an appreciative mindset and establish engagement with the six freedoms of appreciative inquiry, as a basis for future participation for the following stages of the AI process. Enacting the principles of appreciative inquiry through these initial interviews enabled participants to engage with the process, and to start developing their capacity to focus on possibilities, instead of problem-based thinking. During the interview, generative questions encouraged sharing of examples of how SCL was enacted, using the seven TPACK domains, and captured synchronously on a shared screen to show visual representation of the data as it was collected using an MS Whiteboard (appendix 4). The Whiteboards were used as the main source of data collection for the Discovery phase, using a visual method of data collection encouraged real time visibility of the data collected, which helped develop trust. The sharing of the data, at point of collection also helped to generate online engagement, as participants could see the outputs from the discussion which encouraged further dialogue and knowledge generation.

The interview responses were then extracted from the MS Whiteboard, within a spreadsheet format which then collated responses from each of the groups. On completion of all interviews a reflexive approach to thematic analysis was used starting with familiarisation of the data transcribed by reading and revisiting the data and providing a label for each example which related to each of the TPACK domains. This led to the identification of examples for each of the codes. Whilst coding the dataset, broader themes started to arise; these themes were re-visited throughout the coding process, as different hierarchies of codes began to arise. On completion of the coding, the examples provided were colour coded against each of the TPACK codes on the Whiteboards and reshared with each of the group (1 Whiteboard per group). Visibility of the coding helped participants identify the positive core, the 'best of what we do' and establish 'what gave life' through the TPACK domains. The data set was then further refined to provide example indicators of online teaching practices and core and advanced levels of TPACK.

Stage 2: Dream

2. How could the TPACK framework be conceptualised to support lecturers' capabilities for the design and development of student-centred pedagogies?
3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?

Phase two of the appreciative inquiry, referred to as 'Dream', involved building on the themes arising from the first phase (discovery) to collectively envision what the future teaching practice could look like. The broad themes arising from the discovery stage were shared on the virtual Whiteboard prior to the online focus group, participants were asked to validate the accuracy of the summaries made visible on the Whiteboard from the interviews and asked to suggest any additions. In the first part of the focus group participants shared stories with the whole group to reconnect with the positive core and revisit the assumptions of the projects. These included the view of SCL and current embedding technology, using TPACK in teaching practice and the vision of digital learning as a transformative process arising from the literature review. Using examples from the discovery stage the focus group started with articulation of 'high points' of teaching practice and what gave life to the sessions.

Participants were then invited to answer a series of generative questions within an online focus sub-group using a Whiteboard space for the participants undertaking the online focus group synchronously. Groups, within subject areas, were asked a further set of generative questions to provide stimulus for constructing their vision of the future to establish 'the best we can be' using the foundations from the discovery phase within the ethos of appreciative inquiry (appendix 5). A summary of key themes from the discovery stage was visible on a central space using a Whiteboard. The participants then used a MS Word document to work together in small sub-groups to provide a vision of the 'best we can be' using the foundations from our discovery stage. Whilst participants were required to be creative, they were encouraged to identify visions which could operate within the challenges they are faced with. One member from each group moderated each sub-group and took notes on the shared document as they shared the screen and recorded the focus groups, and the discussion was then coded. The findings were then validated by sharing with the wider group; these results were collated and shared back to the group as a mind-map, which captured all of the key ideas that had been presented for each of the broad themes arising from the discovery stage and shared on the virtual Whiteboard and as an image to all participants.

Stage 3: Design

3.What can the TPACK framework offer communities of practice in the development of situated teacher competences?

This stage involved asynchronous data collection starting with the initial themes to develop some outline statements (appendix 5) from which a series of vision statements could be developed by the participants to create a realistic vision to allow aspects of the dream stage to become a reality. Initially teams were asked to contribute via a discussion forum to enable participants to add comments and revise statements. This approach was unsuccessful as only a small number participated; it was decided to replace with a shared Word document as working collaboratively in this medium was familiar to participants across the university. A set of statements was developed then refined into key themes that arose and aligned to the themes arising from earlier stages in the AI process; the final document has been shared (appendix 6).

3.8 Impact of the Covid-19 Pandemic on the methodology

This section of the methodology will provide a reflective account of my experiences as a doctoral researcher researching the use of technology to provide SCL learning practices and the development of digital literacies at the time of the Covid-19 pandemic. As mentioned earlier the shift of all our blended learning provision provided an acceleration of learning by our lecturers and facilitated a culture of experimentation and innovation; the move online of a four-hour teaching structure for all timetabled classes enabled teachers to try new ways of teaching online. During this period new practices evolved and led to numerous examples against each of the TPACK codes and emerging sub themes around online teaching practice which had not arisen at the time of the initial pilot. At the start of the pandemic the research questions were adapted to provide a focus on the synchronous elements of blended learning which added value to the research as there was regular use of digital technologies with large numbers of students. For this research the online teaching has been redefined as the teaching practices that are used with any mode of teaching, for example online, blended or hybrid. This contrasted with my earlier view where I had seen a dualism between online, or blended learning, with a lack of clarity of the integration of technology and pedagogy within each of these contexts.

Considering whether the research could be moved to online led to a detailed examination of the focus of the research and impact on the research design and the extent to which it would change the focus of the research. This examination has enabled clarity of the research questions, and its focus to improve the online environment without becoming caught up in exploring definitions of blended and hybrid learning and how the online environment supported the implementation of these. Whilst the pandemic has resulted in widespread use of online learning there has been some criticisms. Concerns voiced include the impact of the pandemic resulting in emergency teaching, neglecting some fundamental aspects of online learning. This research has aimed to capture key learnings and best practices which resulted in the shift online for all teaching practice at the time of the data collection.

As a practitioner-researcher I have sought to synergise my doctorate research and professional practice. Working for a university with a long history in online learning, moving blended learning students online was something we were well placed to do. The benefits of re-focusing on online learning teaching practices has allowed the research to be more closely aligned with the current direction of the university which throughout the research process has influenced both my research and my position. Since the beginning of the pandemic, society has witnessed wide scale adoption of online teaching with the closure of schools, colleges and universities and increased use of online platforms to retain contacts with family and participate in leisure pursuits. As a result of these changes in the adoption and wider use of online learning and associated technologies these needed to be reflected in the research design. Initially I decided to take a break from the study, I then realised that the changing landscape of online learning needed to be part of the narrative. With the data collection stage planned March-June 2020, I initially decided to pause the data collection stage. During those initial days of government announcements, it was quite clear that the use of face-to-face teaching observations would be delayed indefinitely meaning I was unable to collect the data as planned. The discovery interviews were a central part of the design as the following stages in the appreciative inquiry (AI) process of dream, design and destiny are built on exploring the best of 'what is.' During the first week of the crisis, I explored changing the research design to replace observation with interviews in the discovery first phase of the AI. On reflection, the impact of the pandemic on the research design has clarified concerns about the context of the research and has helped to navigate the online aspect of blended learning, resulting in changes to the research questions. Despite initial concerns about the impact of the pandemic on the data collection (planned March and June 2020) it has provided an opportunity to refocus and reflect on the key aims of the research and its relationship to my current practice.

3.9 Chapter summary

This spotlight on online learning has revealed a rise in interest in online learning out of necessity, raising the profile of online learning, and opportunities for innovation, with wide-scale adoption. As educational research is heavily situated in practice and therefore highly contextual, it is affected by these wide scale societal changes taking place. The pandemic has impacted on data collection and due to the reduced availability of participants involved in the research. As a practitioner-researcher who has worked in online learning for over 20 years these unprecedented times within online learning need to be captured as they will influence the adoption of online learning for both teachers and the learners. This chapter has outlined each of the components of the research design used in this research. The choice of an interpretive paradigm, a qualitative research approach and the appreciative inquiry methodology have been discussed. The findings from the pilot study and their role in shaping the revised research questions have been outlined. Discussion of the use of the TPACK framework in the data collection and analysis has been included with examples of the data collection instruments. The chapter concluded with a discussion on ethical considerations including the role of the researcher. The next chapter will present the analysis of data from the appreciative inquiry process.

Chapter 4: Findings and Discussion

4.0 Introduction

The chapter analyses the key themes arising from the data which relate to the research questions aimed at developing understanding the implementation of SCL: delivering flexible learning, developing digital capabilities, culture of innovation, and supporting the development of communities of practice. Data from the appreciative inquiry phases is considered for each of these themes. The data collection took place during March-July 2020 and the impact of Covid-19 on the data collection will also be discussed. All research instruments used in the data collection can be found within the appendices. As stated in Chapter 1, this research set out to explore how technology could be integrated to support SCL pedagogies online using appreciative inquiry. Specifically, the research intended to investigate:

1. How have lecturers used the TPACK framework to implement student-centred learning pedagogies?
2. How could the TPACK framework be conceptualised to support lecturers' capabilities for the design and development of student-centred pedagogies?
3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?

Flexible learning was reported as a high point of current teaching practice through the AI process of uncovering the positive core by means of discovery interviews and dream focus groups. The mapping of teaching practice against TPACK categories highlighted the use of technology for current and future flexible learning practices through examples of advanced levels of TPACK. Student and lecturer digital capabilities arose in the data collection as examples were shared of the skills and behaviours needed to engage in online SCL. The lecturers' digital capabilities reported provided specific detail of the skills, behaviours and competences needed to develop a learning experience that engages students in developing skills relevant for their future career aspirations. Developing a culture of innovation arose as a theme, the data collection taking place during Covid-19 provided opportunity for lecturers to experiment in their online delivery, and then discuss this through the AI process. Finally, the chapter concludes with the theme of developing a community of practice, discussing how this can support lecturers to support their development of digital literacies and their knowledge and use of SCL digital pedagogies.

4.1 Developing online student-centred learning pedagogies

The following section presents and discusses high points of current teaching practices using the data gathered from the appreciative inquiry process within the discovery and dream stages. These examples use the TPACK framework resulting from appreciative interviews aimed at discovering the positive core of current practices (Cooperrider and Whitney, 2005) and identifying opportunities for future practices.

4.1.1 High points of current teaching practice using the TPACK framework

High points of teaching practice were captured with the use of virtual Whiteboards to understand how technology is currently supporting SCL digital pedagogies (Phillips *et al*., 2016, Schmidt-Crawford *et al.,* 2016). The indicators presented in the table below arose from thematic analysis of the data generated in the virtual Whiteboards, see Table 4.1.

Table 4.1: TPACK indicators - Current technological pedagogical knowledge from discovery stage of the AI process

TPACK INDICATORS	Examples TPACK indicators arising from the discovery stage of the AI process
Flexible and adaptable teaching online	Lesson design Preparation of resources Use of lecturer time Scaffolded learning Flexibility for attendance (synchronous and asynchronous) Moving across learning spaces
Positive online learning environment	Lecturer presence Lecturer authenticity Developing relationships online Personalised learning opportunities Supporting inclusivity Supporting accessibility Peer support Individual support by lecturers
Student participation, engagement, and collaboration online	Group work Sharing and discussing resources Questioning techniques Learning needs and preferences Student engagement to construct knowledge Scaffolding learning Co-construction of theory by learners Feedback on learning
Independent learning and self-regulation	Transparency of the learning process Scaffolding of learning towards assessment Integration of academic and digital skills Assessment support integrated into learning design Development of student self-regulation Developing independent learners
High value learning experience	Relevance of independent activities Use of lecturer time Personalised learning approach Relevance to learner and their goals

Using thematic analysis, examples of teaching practice arising from the data collected using the virtual Whiteboards (Appendix 4) were grouped into key areas, with subcategories of TPACK indicators relating to delivering SCL which included:

flexible and adaptable teaching online, positive learning environment, student participation and collaboration online, independent learning and self-regulation, high value learning, and assessment. As the research aimed to explore how TPACK was enacted, examples were further categorised into developing or advanced, gaining understanding of levels of adoption (Phillips *et al*., 2016, Kohler and Rosenburg, 2016). The reporting of examples of TPACK as developing or advanced provided insight into current strengths of delivery which could be adopted as either core practices or areas for future innovation.

Flexible and adaptable teaching online

Flexible learning practices identified within the appreciative interviews included examples of lecturer-designed webinars to incorporate a mix of synchronous and asynchronous activities. During Covid-19 lecturers experimented with the design, planning and structure of their sessions to enable adaptation to learners' needs. A recurring high point of teaching practices was the use of techniques to encourage inclusive teaching and learning. Teaching activity was reported as inclusive where teaching practices encouraged equal access for different student groups.

High points of flexible learning where TPK was noted as advanced (Appendix 7) included examples of where students started to become more independent and were able to move between synchronous and asynchronous activity and across learning spaces in webinars and online forums. Students were able to choose the spaces according to the task they were completing, for example collaborating on a shared document or having a group discussion. A peak example noted was the continuation of learning following a 'teacher-led' webinar into a discussion forum showing flexibility between learning spaces.

Technology knowledge (TK) was reported as supporting flexible learning through the ability of students to move between the Adobe Connect platform group area, to floating chat rooms, breakout rooms and across to VLE (Virtual learning environment) discussion forums. Participants reported the use of Adobe Connect to facilitate synchronous sessions which adopted different structures to facilitate sessions that included: assessment workshops, subject plenary sessions, workshops, and student presentations. The ability of students to access and download resources before and during a session increased accessibility for students.

Flexible and adaptable teaching online

- Lesson design
- Preparation of resources
- Use of lecturer time
- Scaffolded learning
- Flexibility for attendance (synchronous and asynchronous)
- Moving across learning spaces

The ability to be flexible was facilitated by preparation of the session by the lecturer and through the planning of their lesson design, and development of resources that could be shared, within the session, which also involved the preparation of online spaces to be flexible. As noted in chapter 2, providing a flexible environment is one of the core pillars of F-L-I-P ™ (Flipped Learning Network, 2014) where the educator provides flexible spaces in which students choose when and where they learn. Preparation enabled lecturers to adapt the planned activities to accommodate student needs, for example accommodating students who were late or missed a live session, to actively engage in the session. Moving across the spaces supported the element of student choice in how they participated in the session, and accessed other students, and resources. The notion of flexibility has been highly reported; the element of choice was important in enabling students to choose the spaces they engaged with and moving from a teacher-led to student-led environment. There were limitations on student choice as attendance was recorded through attending Zoom sessions at set times. During the synchronous session the lecturer could focus on the facilitator role (Flipped Learning Network, 2014) to facilitate a mix between synchronous and asynchronous elements to enable flexibility, and through the student-centred learning pedagogies. The importance of flexibility was highlighted as important for all students, not just those who found online learning difficult to access. There were limitations around the flexibility offered, as it did depend on the lecturer's knowledge and IT competence, as they were only able to provide this if they had the pedagogic and IT knowledge and examples.

The sessions which demonstrated advanced levels of TPACK could be replicated across different contexts once lecturers developed the resources, it is recognised that there is an increased amount of work for lecturers prior to the session, in planning and preparing resources for the session. There was also limited flexibility relating to assessment and attendance as these had been pre-determined by the university. A barrier to implementing SCL is pedagogic belief as participants weren't aware that flexibility and inclusivity in learning is good practice in online; they were using their experience to adapt the learning experience to replicate face-to-face teaching as identified by Ertmer (2005). As noted in chapter 2 there is potential to deliver a transformative experience for 21st Learning (Mishra *et al*., 2011) and a TPK first approach could support ICT teacher educator competences (Foulger *et al.,* 2020) to deliver flexibility and adaptability whilst in the session.

Positive online learning environment

During the appreciative interviews, each group of participants commented on techniques lecturers used to create a positive learning environment online. High points of teaching practice were reported in terms of building students' confidence and encouraging participation and engagement within attended sessions. Participants highlighted techniques used to develop their online presence, and the importance of this for gaining the trust of learners. Other high points included the ability to provide some aspects of personalisation which is not afforded through in-person teaching. Participants reported that technology enabled lecturers to respond to students at the point of need during a session including sharing resources and responding to individual messages during live webinars. Participants also referred to the positive impact of student services colleagues in supporting the online environment by offering social events online including coffee mornings, and institutional initiatives: student induction, academic skills sessions, mentoring and personal tutoring. Participants reported numerous examples of lecturers using effective classroom management techniques to provide a safe space for all learners, where authentic relationships were developed.

High points of teaching practice where TPK was reported included the ability of lecturers to use technology to gain group cohesion, for example the use of online icebreakers including introductory quizzes and use of film and music to bring a personal element into the webinar. Advanced TPK competences for this area were identified as the ability to use a range of strategies to develop group cohesion and facilitate a range of activities. The ability to conduct SCL required lecturers to have a strong presence, and confidence in their own digital capabilities and pedagogical knowledge to choose the most appropriate use of technology to support activities that were most relevant for their learners' context. Technology knowledge (TK) included examples of how the lecturer created a positive online learning environment to support students' participation and engagement with the webinar sessions. Where advanced TK is present, students were able to participate in a range of online collaborative activities and produce high quality outputs.

Positive online learning environment

- Lecturer presence
- Lecturer authenticity
- Developing relationships online
- Personalised learning opportunities
- Supporting inclusivity
- Supporting accessibility
- Peer support
- Individual support by lecturers

Creation of the learning environment, as within any setting, is important for the success of the session; lecturers need confidence in using technology in order to create a positive online environment, and as mentioned this involves planning and preparation to design the lesson online to allow this flexibility but also to give space so you can give attention to learners during a live session. Ability to provide support that is flexible gave space for students to have choice which created an environment supporting inclusivity and accessibility through good design. Lecturers need support in providing accessible learning and how to support this in online spaces, in order to support students with engaging in the SCL activities planned. There were several examples of developing a positive environment online although the participants didn't recognise this, this was recorded as an area for both pedagogical and digital skill development (TK, TPK, PK). The range of examples reported indicated a high degree of tacit knowledge, and the TPACK framework helped facilitate the language, to articulate this knowledge, through facilitation of the AI process. The appreciative inquiry supported recognition of the pedagogical knowledge within teams by encouraging collaborative reflective practice (Niess, 2005) on the situated experience of TPACK (Phillips, 2014; Porras-Hernández and Salinas-Amescua, 2013).

Student participation, engagement, and collaboration online

During Covid-19 many learners experienced disruption to their learning due to home-schooling, or other factors. The appreciative interviews revealed strategies for checking learning and ensuring students were able to participate and were progressing during March - July 2020 and lecturers developed strategies to do this online. High points were reported where students demonstrated higher levels of participation and engagement within the online environment than had been experienced in face-to-face sessions. Online participation and engagement practices used the features of Adobe Connect, which could be attributed to the wide scale implementation of training to academic faculty on the use of these features.

Widely reported examples of TPK started to evolve as core competences of staff, advanced examples of arising from the data where lecturers' had been able to build on these core competences to adapt their practice depending on the needs of their students. There are a number of lists of TPACK competences in existence for example (Foulger, 2020; Schmidt *et al*., 2009); as stated above the development of the competences through this research have provided the contextual, situated examples generated by programme teams. Building on the work of Phillips (2014), as Drummond acknowledges (2007), there is a need to move away from a focus on TPK approaches as it is important for lecturers to be able to transfer their knowledge to new technologies (Mishra, 2011). Learners' opportunities for collaboration were provided by lecturers within webinars and discussion forums, spaces primarily for group tasks within student and university spaces using teacher-led pedagogical approaches. High points included the opportunity for students to lead sessions or actively participate by undertaking student presentations and student-led session summaries or plenary sessions at the start or end of a session. Other high points of advanced levels of TPK included examples where collaboration was student-led and facilitated, which was not reliant on the technologies used within the study and could be transferred to other technologies.

Technology knowledge (TK) relating to participation and engagement arose from the features available within the Adobe Connect platform. The support for training for all staff shortly before Covid-19 had impacted on the increased use of Adobe Connect features and establishing core practices through ongoing mentoring and support. The upskilling of lecturers led to reported use of additional features like polls, quizzes, and break-out rooms as standard practice. During the interviews staff reported on features within Adobe Connect that had not formed part of the training, including adaptation of teaching online for students with special education needs. Tracking of student progress was visible to lecturers by viewing completion of activities within the VLE (Virtual learning environments), synchronous and asynchronous attendance, and monitoring formative feedback completion.

Technology knowledge (TK) relating to collaboration and curation was reported by participants as being demonstrated by students in their use of live documents: Word and PPT (PowerPoint Presentation), where small groups could work together to complete a task set by the lecturer. Buddying was made available to students using individual spaces to provide access to peers and lecturers. Another high point was the ability to share and access resources in real time when the lecturer or student introduced a new concept or resource.

Student participation, engagement, and collaboration online

- Group work
- Sharing and discussing resources
- Questioning techniques
- Learning needs and preferences
- Student engagement to construct knowledge
- Scaffolding learning
- Co-construction of theory by learners
- Feedback on learning

A key challenge of online learning is the low participation, and isolation. Technology enables students to actively engage through features like polls and breakout rooms, but there are criticisms that they don't replace the human interaction. There is a need for learning not to be passive, and to connect in real time with resources, peers and lecturers. There are several approaches to engaging students in SCL activities online (Kember,1997; Kebritchi, 2014); as reported many professional development approaches focus on TK first approaches and experimentation, yet this fails to acknowledge the subject pedagogic aspect (PCK).

Whilst it is acknowledged that teacher pedagogical beliefs (Ertmer, 2012) are a barrier to technology integration, there is an assumption that in-service teachers may not need the same level of pedagogic training as pre-service teachers. There had been training on use of new technologies that lecturers were experimenting with, in conjunction with students, to explore which provided opportunities to enhance online teaching practice as they did try and replicate face-to-face teaching. The findings suggest that there is a need to provide examples of pedagogical uses to develop and give confidence to those less experienced and share best practices to enhance lecturers' design-based capacity (Angeli and Valanides, 2009; Tsai and Chai, 2012;

Voogt and Mckenney, 2017), in association with support to develop teacher beliefs as advocated by Voogt *et al*. (2013) and Chai *et al.* (2016).

There are some variances to how student engagement is approached within the subjects, there are further opportunities to understand the type of learning that works within different levels of study, as within the sample students were on programmes on level 4-7, across different disciplines. This is a common aspect to SCL and links closely to the practice of SCL but there needs to be better understanding of the rationale for student participation for both lecturers and students, as this will impact on the level of planning and uptake by students if it is not seen as a high value activity. It was evident that lecturers had some understanding of the pedagogic opportunities offered by affordances of technology, these have been captured as part of the data collection, by mapping pedagogic affordances for lecturers as introduced by Angeli and Valanides (2009).

Independent learning and self-regulation

Participants reported on the development of independent learning and self-regulation skills through scaffolding skills around assessment, and the digital capabilities required to participate within the ethos of a flexible online environment (Higher Education Academy, 2015). The need for students to develop independent learning and development of digital capabilities was enhanced during Covid-19. Student self-regulation is an important aspect of adult learning (Knowles, 1984) and meeting 21st century skills (Coonen *et al.,* 2018). Examples of where students had engaged with student-centred learning demonstrated increased confidence in digital skills and the ability of learners to actively engage in sessions.

Technological Pedagogical Knowledge (TPK) included the development of student confidence by accessing the online learning environment. Participants gave examples of new ways to communicate and collaborate online. High points noted included the use of student-led activities which demonstrated elevated levels of student autonomy and independence and increased levels of confidence with digital skills. To support self-regulation, assessment support is integrated into the learning experience, with some scaffolded activities set for independent study.

Independent learning and self-regulation

- Transparency of the learning process
- Scaffolding of learning towards assessment
- Integration of academic and digital skills
- Assessment support integrated into learning design
- Development of student self-regulation
- Developing independent learners

The findings highlighted that a key challenge of TPK implementation is the pedagogical beliefs held by lecturers, with some lack of understanding of self-regulation and the need to scaffold learning and provide transparency of the learning process. This is a key element of student-centred learning, to support the shift of power to learners (Kember, 1984), however as pedagogic belief is a key barrier, a lack of clarity can then develop due to the mismatch between student and lecturer expectations. To shift power from lecturer to students, learners need to have more information about the learning process to encourage student engagement with the process, as outlined in the Flexible Learning Framework, Higher Education Academy, 2015, definition of the flexible environment where learners have a high degree of choice of what and how they learn. The integration of skills supports personalisation, and the value beyond the qualification, and is a core part of curriculum design, as a focus on content and outcomes does not support the development of skills. As the facilitation of learning skills is core to the development of 21st century online learning, lecturers could be supported through the curriculum design process to support student choice (Tooley, 2000) as a means of scaffolding learning and provide constructive alignment between core elements of the learning experience.

High value learning experience

The importance of clarity and purpose of the session and the sharing of this were evident within the findings. The lecturer was required to play a facilitation role as outlined and defined by the flipped learning network (Flipped Learning Network, 2014) to create a high value learning experience. As a facilitator of the online learning experience, the lecturer supported independent learning and self-regulation. Examples of TPK for this area included providing opportunities for students to share their experiences and interests and increased personalised approaches to help deliver relevant learning. Participants reported examples of enhanced utilisation of lecturer time, for example the additional opportunities for further feedback and discussion, meeting individual needs. In the cases where the advanced TPK was noted there were clear links between the student goals and aspirations.

The ability to deliver high value experience involved pre-planning of the session to utilise time with the lecturer and peers effectively. Examples were provided where the lecturer was able to share lesson resources and activities before the session resulting in opportunities for focused discussion and better use of lecturer time. High points included the use of pre-set layouts within Adobe Connect. The pre-set layouts were part of the training provided which lecturers found beneficial, providing the ability to use a range of activities during the session. Preparing the online classroom in advance led to lecturers' ability to focus on students during the session.

Lecturers' TPK knowledge also included the structuring of the session and sharing this with their students. Examples reported the sharing of session outlines and discussion of the learning outcomes, timings and learning objectives. Time with the lecturer was maximised using technology to plan, deliver and share resources, and the integration of discussions and feedback both synchronously and asynchronously. Advanced TPK was identified where lecturers demonstrated to learners' clear linkages between a taught session, and the student's career and academic goals and aspirations. Using the concept of 'intentional content' follows the ethos of the Flipped Learning Network view 'pillar' relating to intentional content, and to make use of lecturer time and develop a personalised approach as specified in the notion of flexible learning (Higher Education Academy, 2015).

High value learning experience

- Relevance of independent activities
- Use of lecturer time
- Personalised learning approach
- Relevance to learner and their goals

Influenced to some extent by the institution or manager there are some areas outside the control of the lecturer, as some of this is fixed e.g. use of lecturer time, personalised learning and relevance dictated by freedom under the lecturer's control. Key elements like assessment and online material content may be dictated by others, with opportunities mainly existing within the live sessions that could be shared. Providing a valuable experience, and personalised positive impact on student engagement was a key finding, and the importance of using this to demonstrate to students the relevance of the session to individuals as well as the group. The findings whilst reporting examples of personalised learning and adaptation to the learner goals are restricted by the amount of choice and control over the learning environment, working with core components of flexible learning including the institutional systems and processes and approaches to technology enhanced learning (Higher Education Academy, 2015).

4.1.2 High points of future teaching practice using the TPACK framework

This section explores the TPACK indicators arising from the discovery and dream stages of how the participants envisioned future SCL online teaching practices. Future practices have been presented in two broad themes of developing an online community and designing an online learning experience. Although participants focused on the TK (technology use) for both the discovery and dream phases there was identification of future SCL practices with some additions to examples for pedagogy components (PK, TPK and TPACK) of the TPACK framework, see Table 4.2.

Table 4.2: TPACK indicators - future SCL practices from discovery and dream stages of the AI Process

TPACK INDICATORS	DEVELOPING AN ONLINE COMMUNITY	DESIGN OF THE ONLINE LEARNING EXPERIENCE
Technology Knowledge (TK)	• Developing of study groups and online social spaces • Support for staff and students on developing 'use' of technology • Encouraging students to be more comfortable online • Tutor accessible online social learning spaces.	• Creating multiple layouts, and pre-populated online engagement tools • Creation of online resources • Diverse types of presentation • Students feel comfortable within the learning environment
Pedagogy Knowledge (PK)	● Creation of a safe space for learning	● Lecturers use of new teaching approaches e.g., peer teaching, experiential learning,

	• Students' ability to access individual support • Development of relationships and cohort cohesion • Lecturer online presence, and development of student identity • Use of distinct roles e.g., students as teachers, peer mentors • Reward systems for engagement and participation, and collaboration with others • Teaching strategies promote active online engagement, self-reflection and self-efficacy/digital capabilities, student led activities	virtual classroom strategies, simulations • Teaching approaches facilitate student-led activities and elevated levels of engagement • Lecturers and students have a high EI (Emotional Intelligence) and can respond to verbal and non-verbal cues • Tailored study skills sessions for specific groups e.g., critical writing • 1-2-1 sessions, Academic Skills Tutor support with self-regulated learning • Students given ownership of their learning • Allowing students to make mistakes
Technology Pedagogy Knowledge (TPK)	• Developing group identity and belonging • Online CoP • Teacher accessible social learning spaces • Digital wellbeing and support • Student training and support on how to maximise learning opportunities online • Developing student voice • Use of formal and informal learning spaces	• Creative use of learning spaces from the use of teaching tools like Padlet encourage collaboration • Introduction of professional spaces and links to alumni and industry • Use interactive resources e.g., interactive case studies, digital posters, escape rooms • Familiarity with the online learning environment and tools to support active online e.g., Mentimeter, Padlet, Kanban boards, countdown timers, Whiteboard • Allowing students to make mistakes and build confidence though scaffolding key tasks, practice and sharing good practice • Adapting approaches to formative and summative feedback: audio and video feedback

		● Individual and lecturer opportunity to track progress
Technology, Pedagogy and Content Knowledge (TPACK)	● Work-related tasks ● Scenario based learning ● Flipped classroom ● Live case studies ● Interviews/videos of industry experts ● Link teaching approach to subject needs and discipline ● Links to industry sources, people, case studies, and current events, databank	● Online teaching includes relevant teaching approaches e.g., role playing, study groups, class debates, student training ● Opportunities for peer, alumni and industry networking are integrated into the learning experience. Interactive video ● Use of learner analytics to support learning outcomes ● Study groups post summative analysis ● Peer discussion/previous cohort to discuss assessment feedback ● Automated feedback, feedback using different media

As noted above in the findings from the discovery and dream stages, participants focused on providing examples of technology knowledge (TK) and identifying teaching tools that they would like to use in their future practice. This focus on TK, resulted in the participants reporting primarily on the uses of technology and with a lack of PK, and PCK suggesting the need for further development of contextually based TPACK approaches to develop further understanding and move away from a techno-centric approach as emphasised within curriculum-based approaches (Voogt, *et al*., 2013; Harris and Hofer, 2011). TK knowledge was discussed for future practices and was extended to support the social aspect of learning online, development of the use of online teaching spaces, and support needed for staff and students. Participants provided some examples of new teaching strategies, and newly identified indicators for TPACK components, TPK, and TPACK.

Pedagogical knowledge (PK) examples were discussed in terms of new teaching approaches; participants identified opportunities for lecturers to develop an online environment which enabled students to become engaged in a range of activities and also identified some examples of how the lecturer could develop the online learning environment further, that had not been identified in the current teaching practices. Participants also recognised that learners need additional support to become reflective, independent learners. Some examples of different teaching strategies under the SCL approaches were mentioned, for example experiential learning, and peer learning. Technological, Pedagogical and Content knowledge (TPACK) examples arose from the dream focus group as participants started to recognise the affordances of technology to teach their subject. The examples provided relate to bringing currency and sector relevance into the teaching using strategies like work-related tasks and live case studies. Methods for students to practice employability skills online were also given including roleplaying and debating. The discussion of PK approaches arose from the dream stage of the AI process, as the discovery phase was dominated by examples of TK and TPK. The focus on TK first, could be an indicator of the level of pedagogic knowledge which could be supported further by the development of rubrics (Harris *et al*., 2010) by curriculum teams, or explored further using an institutional approach to professional development using the TPACK leadership diagnostic tool (Graziano *et al*., 2017).

Reflection and starting to build the CoP

Many TPACK studies rely on self-report data (Koehler and Mishra, 2005; Schmidt, 2009; Archambault and Crippen, 2009; Chai *et al*., 2010). The reflectivity afforded through the AI process enabled the participants to acknowledge successes of teaching practice they had observed. The use of reflection through meta-analysis with teams could support the development of lecturers, as used by TPACK authors Mouza and Wong (2009), and through collaborative research practices as outlined by Niess (2005). The use of reflective practice could also support the development of TPACK within situated contexts (Phillips, 2014; Porras-Hernández and Salinas-Amescua, 2013). The group reflective approach to developing TPACK provided a shared experience within the participant groups, and facilitation of sharing stories was timely as all participants had recently been engaged in observing current teaching practices online. The discovery phase of the AI process, through generative questions, encouraged participants to focus on strengths (Cooperrider *et al*., 2008) as seen in appendix 3, and was able to establish the positive core of current teaching practices. The discovery data provided TPACK indicators, not present in earlier pilots of online teaching practices. Facilitation of the AI process requires participants to have the freedom to speak as a core principle of AI (Whitney and Trosten-Bloom, 2003), and during the discovery phase participants discussed enacted TPACK examples and explored collectively opportunities for future practice.

During the dream phase, as participants had been introduced to the principles and ethos of appreciative inquiry (Whitney and Trosten-Bloom, 2003), they were able to discuss with team members the future learning experience. The dream focus group also used generative questions based on TPACK components (appendix F) to facilitate discussion of a future vision based on a summary of the themes arising from the discovery phase. The future practices presented under the TPACK domains may have hindered the ability of participants to think more freely as the dream phase data reported on the technology uses, and less on the integration of pedagogy. Some of the difficulties in articulating the vision could also be due to the lack of shared language; this AI research was the first time these CoP had formed and as a result they hadn't developed this shared language (Lave and Wenger, 1991).

TPACK studies which rely on self-report have similar issues of the participants being caught up in definitions of the constructs; participants when reporting own levels talked about use of technology and had not recognised the tacit knowledge that existed relating to lecturers. The creation of a positive learning environment and providing an inclusive experience were presented as strengths in current practice and formed part of the positive core of current practices. Within the dream stage discussion focused on new elements of teaching practice that they wanted to bring into the online experience related to replicating classroom experience rather than developing knowledge of online facilitation. TPACK indicators identified through the dream stage aimed at enhancing future practice, providing amplification to the high value learning experience identified in the discovery stage.

During the dream phase participants discussed the use of a wider range of technological features, and a wider use of pedagogies across the learning experience, to incorporate assessment and employability links. Although the tools suggested were already used by others, the discussion around the high points of the dream focus group centred on the opportunities for structuring activities and rethinking the selection of activities to align with adult learning principles (Knowles, 1984) and hyflex model (Beatty, 2007). The following section discusses findings reported on the affordances of technology that the AI process identified as supporting SCL, included to illustrate how technology can support lecturers.

4.1.3 Affordances of technology to support online student-centred learning pedagogies

Future affordances of technology arose from the discovery interviews captured during the generative question about the future, and during the dream focus group enabled participants to encourage examples across each of the TPACK domains. The uses of technology to support SCL approaches established from the discovery and dream phases have been summarised in Figure 4.1 below:

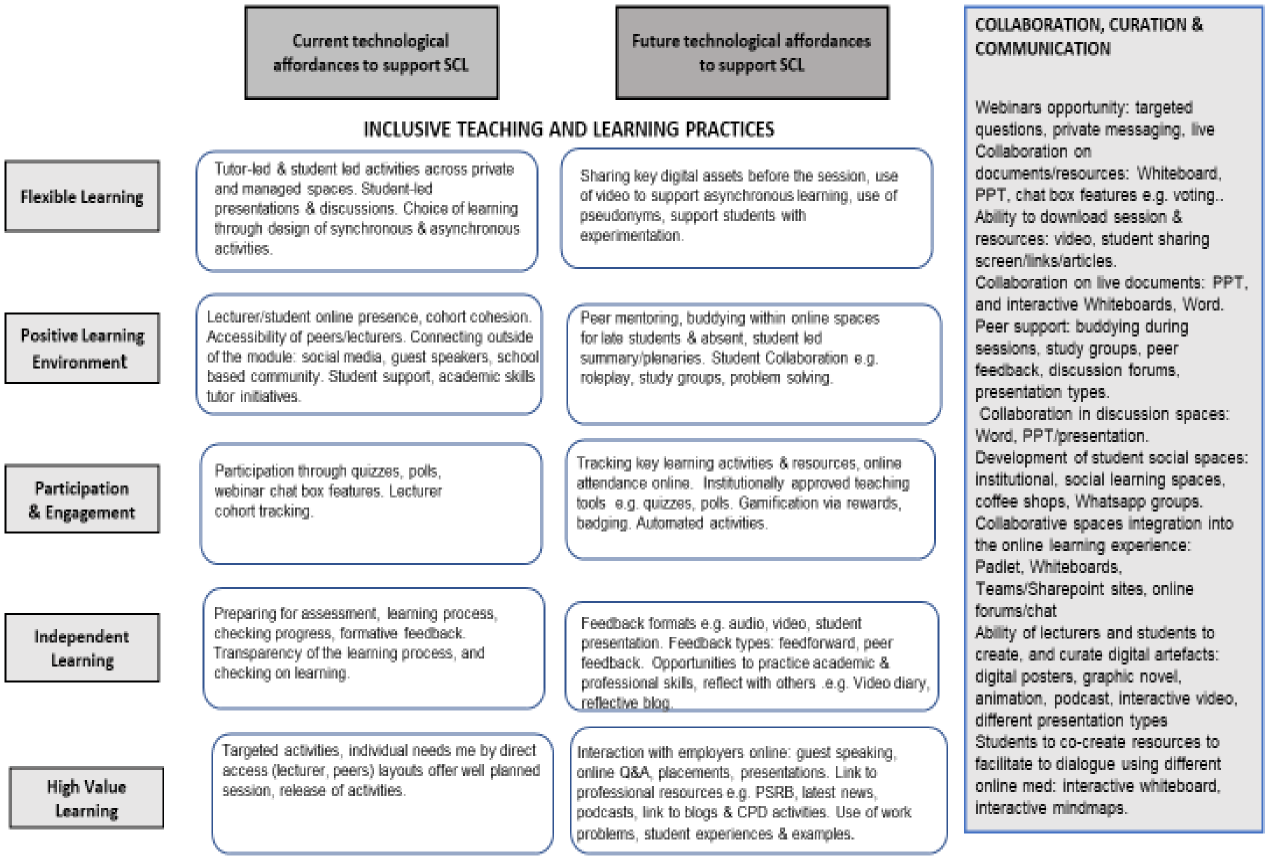


Figure 4.1: Current and Future Uses of Technology to Support SCL Pedagogies Arising from the Discovery and Dream Phases

Examples of current uses of technology were based on the use of webinar and features available within the Adobe Connect platform in which lecturers had recently undertaken training to develop understanding of these key features. The lecturers all had access to online materials within the institutional VLE where modules and lessons followed a standardised format which included the use of discussion forums, knowledge checks, and end of lesson multiple choice questions. During the discovery phase participants were encouraged to explore how they currently used technology within their teaching practice. Arising from the AI process as a recurring theme was the level of digital literacies required by lecturers and students and the importance of training and support to enable students and participants to become familiar and confident in the use of the online environment and associated teaching tools.

ICT-TPK provide a way of conceptualising the use of different technologies, rejecting the integrated conception, the use of technology mapping supporting the lecturer development as a situative methodology. As reported, this approach does require systematic efforts to plan and implement the development of teachers' knowledge (Angeli and Valenides, 2009). The development of ICT-TPK approaches provides an opportunity to embed standard features and opportunities across different ICT, and the tools are interchangeable. Yet there is often a focus on the TK and representing as a diagram to demonstrate how technology can support pedagogy is useful as an example. From the future TPACK codes and the future affordances captured there were examples to provide a learning experience that maps against the key high points within this research. Collaboration is a key feature of SCL for the purpose of knowledge construction, and there is a need for lecturers to develop their pedagogic understanding of how these tools support this type of learning across different learning spaces.

4.1.4 Summary

From the data analysis as reported above the TK and TPK codes were the most widely reported of the TPACK domains; this focus could be attributed to data collection coinciding with Covid-19 and the current focus of lecturers in improving these skills to teach fully online. The TPACK proficiencies reported as core and advanced (Appendix 7) outlined current practice, providing examples of how these can be contextualised with practitioners. The AI process helped establish new CoPs which could support TPACK understanding by promoting a sustainable approach to professional development that can facilitate the development of lecturers' current pedagogical beliefs and the concept of teacher as designer (Harris *et al*., 2010). The development of TPACK indicators provided an example of how a situated approach to TPACK development could be facilitated building on former in-service teacher qualitative studies using classroom observations (Schmidt-Crawford *et al.,* 2016; Harris and Hofer, 2011; Baran and Uygun, 2016). The combination of situated knowledge and acknowledgement of contextual factors would be needed to develop professional development approaches, which utilise a top-down, bottom-up approach to implementation to support the development of flexible learning as it is suggested this is limited without institutional support. Development of a shared language has been an issue across technology-enhanced learning. It is recommended that the establishment of CoPs are used to develop a shared language, and approaches that are highly contextual and align to sector terms as identified by QAA (2020) and JISC (2020).

This research has looked at the development of levels of proficiency and characteristics, moving beyond the categorisation and reporting of codes which are indicative. The use of TPACK has provided examples of enacted TPACK and supported future professional development by coding commonly-occurring codes across discipline areas which could be a basis for further contextualisation and adaptation within their own teams. The research builds on second generation TPACK qualitative studies using observation-based strategies to develop understanding of each component of TPACK (Harris and Hofer, 2011; Niess *et al*., 2009).

4.2 Flexible learning

As stated above flexibility arose as a key theme of the research. It is presented here in terms of how it contributes to the future vision of digital learning with the flexible learning framework (Higher Education Academy, 2015), well placed as a concept which encompasses the core elements required to deliver pedagogical approaches through its identification of the institutional agility, learner choice, balanced pragmatism and person flexibility.

4.2.2 Vision statements

The vision statements were created as part of the design stage of the AI process presented to identify the collective vision of flexibility within the online learning experience. There is an acknowledgement that the research is based on the belief that learning with technology should be transformative (Jisc, 2020a) and that we need to scaffold students into HE and provide transitional arrangements. Within Appendix 6, the vision statements offer a collective view of how this can be achieved through the development of a learning experience which embeds graduate attributes, academic skills, and digital capabilities, to develop lifelong learners. To facilitate this there is an assumption that lecturers are empowered to deliver a learning experience that balances the institutional need for consistency across multiple campuses yet is also adapted to their student needs.

The vision statements have been summarised in Figure 4.2 below:

VISION STATEMENTS: FLEXIBLE LEARNING
The learning experience is transformative, relevant, and current.
Development of digital capabilities, academic skills and graduate attributes is embedded into the learning experience.
Learning is activity-driven and produces meaningful outputs relatable to industry.
Online learning design maintains consistency of offering whilst providing choices of engagement (students) and delivery (facilitators).
Learning opportunities provided are relevant, current and of a high value to each learner.
The process of learning develops autonomous, independent, and confident lifelong learners.
There is a shift of power from teacher to students enabled in all aspects of the learner journey e.g., from programme design, delivery, assessment, and feedback.
Lecturers are facilitators of the online learning experience supporting learners through oversight of their ongoing development.
There is an emphasis on developing students' self-regulation and autonomy.

Figure 4.2: Vision Statements – Flexible Learning

The statements aim to move educators from a focus on learning outcomes and student outcome-based measurement of success, and desire to integrate several skills and attributes into the design of the programme. To deliver this type of learning experience, it is suggested that a holistic approach to design is required in order to develop transformative learning as discussed within chapter 2. There is some further discussion of the extent to which flexible learning, as outlined in the vision statements is similar to the flipped classroom. There are a several opportunities to provide flexibility within learning space, but still teacher led with some direction then by learners but only in high points, classes flexible in tasks and completion, high points where asynchronous learning occurred and had a similar experience, that was not widespread. The assessment of learning is still very fixed. Using the F1.F2.F3 criteria, the provision of learning spaces (F1) is facilitated, and organic use of these occurred to enable a level of autonomy and choice needed to deliver a four-hour session. The ability to respond to students' needs was a high point and provided examples of monitoring through the webinar and discussion forum tasks. There is further opportunity to engage in assessment of learning process with flexible learning, with achievement of this through purposeful design and training for staff.

4.2.3 Summary

Whilst the use of the flexible learning framework (Higher Education Academy, 2015) has helped to frame the findings, the extent to which this could be adopted should be explored further as there will be barriers to adoption to pedagogical approaches otherwise.

4.3 Developing lecturer and student digital capabilities

Whilst reviewing the high points of delivery for the discovery and dream sections the development of digital literacies of staff and students was widely reported within data. The development of the digital literacy of students and lecturers is a key factor in the implementation of digital pedagogies, affecting the ability of staff to design and lead a learning experience that students can engage in. By uncovering the positive core, the research was able to identify examples of staff and students' digital capabilities needed for current and future engagement with digital SCL pedagogies. The high points of current delivery gained from the AI process helped provide examples for some of the six elements of the JISC Digital Framework model

(2017) particularly relating to function skills, participation, and further development. In identifying future uses of SCL, participants identified digital capabilities associated with self-actualisation, critical use, and creative production, moving beyond functional skills and engagement and participation. Guiding statements created as part of the design process provide manageable and focused criteria which can be recommended for future development.

4.3.1 Developing lecturer digital capabilities

The table below highlights the three key areas that impacted on the key digital capabilities arising from the data collected through the AI process. Lecturer confidence and self-efficacy referred to digital teaching, and digital identity management of the JISC framework (2017) and especially the ability of lecturers to adapt their own behaviour to learners' needs and fostering a positive online presence. The use of technology refers to ICT proficiency and information literacy aspects of the JISC framework. Being able to experiment and provide an environment where students and staff can do this align to the digital learning and development, participation, and creative production as aspects of the framework.

Table 4.3: Developing Lecturer Digital Capabilities

Lecturer digital Capabilities	Strategies to develop lecturer digital capabilities			
1. Confidence and self efficacy	Resilience	Lecturers' online presence	Customisation of session	Adaptation to learners' needs
2. Use of technology to support teaching and learning	Development of core IT skills	Curation of resources	High quality presentation and resources	Preparation and planning
3. Experimentation with online tools	Digital leads (staff and students)	Permission to fail	Sharing success	Students as partners

The table above, see Table 4.3, provides the key themes arising in the data; for each of these themes a set of core capabilities required to teach SCL online have been identified. The findings gave some indication of priorities for staff development to enable digital teaching and learning, and the development of digital capabilities for their students as required by the workforce (World Economic Forum, 2016). The digital capabilities identified are closely related to the TK skills, however, they are presented as a separate set of skills, arising from the thematic analysis of the emergent codes relating to high points of SCL delivery, discussed further below.

Developing the lecturers' digital capabilities enables them to support their students in the use of technology to engage with the online learning experience, use their skills to scaffold learning, as recommended by Qasim and Makhareez (2014), to develop students into self-regulated online learners, and provide a positive learning environment for students to be able to maximise choice. Specifically, key aspects of delivery identified through the AI process included: lecturer confidence and self-efficacy, use of technology to support teaching and learning, and experimentation with online tools.

High points of delivery included the lecturers' ability to build relationships online and support learners, through their own online presence for which they need to have confidence. The development of lecturers' confidence and self-efficacy and reliance was identified as a key aspect of the digital teaching element of the JISC (2017) framework. Reported examples during Covid-19 indicated a desire for lecturers to adapt their current teaching practices and developing knowledge of online learning, demonstrated by their willingness to adapt the institutional ‘instructions’ to work within their own context and student cohort. The scale of change to teaching and learning digital practices experienced during Covid-19 impacted on the development of their digital learning and teaching capabilities to support the development of teacher practices (Beetham and Sharpe, 2014) supporting the development of their students' capabilities as they developed their own practice. During the first lockdown, lecturers' need for self-efficacy was heightened as they were challenged with developing their own capabilities at the same time as their students. The examples of lecturer adaptability, enabled flexible learning, through the development of lecturer confidence and self-efficacy. The development of a strong online presence was another high point of current teaching practice, relating to lecturer digital capability. Participants reporting on how this enabled flexible learning, is a core aspect of providing a positive learning experience and executing SCL digital pedagogies. The lecturers' confidence and resilience enabled them to deal with technological issues as they arose. To create an online presence, several creative ways were provided as examples, including use of music and online icebreakers.

Current practices that arose relating to the use of technology to SCL online pedagogies initially focused on the basic skills at the beginning of Covid-19 (March-July 2020). Data collection was conducted in the second cycle of teaching (May-July) and online teaching had less emphasis of passive approaches to webinar delivery than expected. Participants reported on use of technology to deliver an engaging learning experience. Training on the webinar platform coincided with this, and the use of features like breakout rooms, polling, quizzes etc were used, as noted above. A key area reported was the planning that took place to facilitate this type of delivery, and how resources were curated before and shared during the session to be key indicators of success, in the digital capabilities. The use of dialogue within online learning, and the facilitation of this, was captured as a high point, referring to the Laurillard Conversional Framework (1993) as a model of active learning where dialogue takes place within a number of levels.

Findings report that a high level of experimentation with online tools was experienced by all, as they were engaged in a different form of learning. High points included the use of peer-sharing of ideas within subject CoPs, support by peers through buddying, and informal lesson observations. Some participants gave examples of support provided by learners within the session, and the use of student-led sessions and presentations demonstrating a high level of digital capabilities from both staff and students.

4.3.2 Developing student digital capabilities

During the AI process participants identified opportunities for the support for students in the development of student digital capabilities through the discovery and dream stages in discussion about future delivery. The areas identified in the table below, see Table 4.4, also provided the opportunity to give examples of online SCL in practice for future design of the learning experience and to support lecturers in the design of future digital teaching and learning activities.

Table 4.4: Developing Student Digital Capabilities

Student Digital Capabilities	Strategies to support the development of student Capabilities		
4. Preparedness for studying online	Provide clear expectations	Opportunities to practice	Induction and study skill support
5. Support with using new tools	Familiarity with technical language	Provision of IT support	Timely access and opportunity to practice
6. Provide opportunities to build confidence	Scaffolded use of platform and tools	Introduce peer mentors	Transition into online learning

7.	**Student support for the online experience**	Well-being services	University community	Student voice and community channels
8.	**Student digital well-being**	Training for online safety	Developing resilience	Netiquette and self-regulation online
9.	**Student dissemination and networking**	Opportunities for student led sessions and peer discussion	Networking opportunities	Provision of informal online spaces
10.	**Identifying and embedding digital capabilities**	Assessment	Curriculum	Delivery

Opportunities exist to prepare for studying online by providing clear expectations of the learning environment and how students will be taught. Participants commented on the importance of induction and study skills and providing students with a safe space to practise. Participants provided examples of how this could be done to suit different digital competences, for example enhanced induction, accredited mini-modules, digital skills programme and online waiting area. Preparedness for studying online was acknowledged as a priority, as it provides opportunities to develop confidence with new tools and to gain familiarity. Institutional IT (Information Technology) support was identified as important, as new students during Covid-19 were provided with targeted support from academics, IT, and student support. Whilst Covid-19 provided some challenges for the provision of IT support, due to increased student and lecturer demand, it did exemplify areas where support was needed and resulted in additional resources being created in terms of videos, webinars, and channels for personal support. The opportunity to practice, and introduction of tools which were minimal risk, helped to manage expectations.

The findings reported that students during Covid-19 were able to access a range of student support with participants reporting on the positive impact of increased student support services to offer wellbeing services and development of the community through social events and increased student voice channels and opportunity to connect. There was increased support for use of recent technologies for example Adobe Connect and study skills sessions on netiquette and guidance on how to participate within an online classroom. Opportunities for future development included the maximising of student dissemination; some schools commented on use of student research publications through the newsletters. Participants also offered

VISION STATEMENTS: DEVELOPING DIGITAL CAPABILITIES
We engage with sector experts to ensure we are preparing our learners for their future goals
There are clear processes to embed digital into the curriculum effectively
Students and lecturers are proactively supported in their development
Faculty are highly reflective practitioners and have a high level of self-efficacy
Students are given opportunities to construct knowledge (independently and collaboratively) through innovative ways of using technology

several examples of how assessment, curriculum and delivery could be developed to increase embedding of digital capabilities, see Figure 4.3.

Figure 4.3: Vision Statements - Developing Digital Capabilities

Participants acknowledged the role of digital capabilities for staff and a key aspect of the future vision was the commitment to embedding these into the curriculum and engaging with sector experts to ensure they are embedded into the curriculum effectively as cited in the Industrial Strategy (Gov.uk, 2017). To deliver a learning experience that represents the Digital 4.0 agenda, participants agreed that faculty need to have high levels of self-efficacy and reflect on their own development with support from their institution to develop staff and students in core and advanced digital literacies (JISC framework, 2017). The development of digital capabilities, referring to the skills and behaviours, as identified in the JISC framework, should enable all to engage with collaborative ways of creating knowledge through innovative uses of technology, developing skills useful for future learning.

The vision statements were collectively designed to move towards a new way of learning that does not replicate traditional face-to-face teaching but which enables the transformative elements of online learning to be realised (Garrison and Vaughan, 2008). To provide contextualisation of the JISC digital skills framework future there is the opportunity to create a digital skills framework and digital learning taxonomy as well as providing programmes of professional development including a series of workshops and engaging with external services for example the JISC discovery tool. Participants were asked to trial teaching tools and other innovative practices through shared spaces for thesis CoPs and to create a learning community. They also identified that providing central spaces for their students, for example, programme spaces, was a good opportunity for students to connect as a wider community.

4.3.3 Summary

It became apparent that whilst professional development was viewed as an enabler of delivering SCL pedagogies, for both lecturers and students, it also forms a core part of online teaching and learning practices. Online learning has the ability to be a transformative aspect, to satisfy graduate employability skills (Garrison and Vaughan, 2008), but also to practice these professional skills in a safe place. The development of academic skills, within an environment that is transformative, allows students to practise these digital capabilities required for professional practice. This type transformative experience is associated with high levels of student interaction, and requires students and lecturers to have high levels of digital literacies. Whilst the data was collected within Covid-19, lecturers were developing their own digital literacies and commented positively on how the students responded and how they grew in confidence.

The findings identify key areas of focus for training and development which specifically relate to implementation of digital learning pedagogies. The findings can support contextualisation for embedding the six elements of the JISC digital framework (JISC, 2017) and can be used to inform both lecturer and student support, required by lecturers to contextualise the capabilities at the university. The research is aimed at focusing on professional development for lecturers, with the aim of developing student literacies through their increased competence in digital literacies combined with pedagogical knowledge, as conceptualised within the TPACK framework, and noted in the previous sections.

4.4 Culture of learning and innovation

During the discovery and dream phases of the AI process generative conversation took place with participants who had shared subject interests, to support the development of a learning culture using the concepts of communities of practice (Lave and Wenger, 1991). Within the generative conversations, participants were supported to consider new ways of supporting students in a range of teaching and learning activities to support a transformational learning experience. As the data was collected online, the online community of practice provided opportunities for promoting innovation through new ways of collaboration and engagement through the introduction of digital Whiteboards and mind-mapping software.

4.4.1 Impact of Covid-19 on facilitating a culture of innovation

The impact of the Covid-19 pandemic on creating an environment for innovation has been discussed in the above sections. Approaches taken by institutions have been reported widely, with publication and sharing of reports which have been developed to document their response to the pandemic focus. Re-booting Digital Learning report JISC, 2020, identifies the digital maturity and the immediate and long-term goals of digital learning. This research supports the development of reimaging the digital learning environment for future innovative practice, with one type of university as innovative and flexible with similar goals and identified institutional factors; from these the ability of lecturers to innovate and find approaches in partnership with their students. Whilst a culture of innovation can be seen as part of a digital transformation and change management programme across an institution, a local approach to innovation help to support this wider change through communities of practice. Participants did identify several examples where a culture of innovation had been embraced during the Covid-19 pandemic. The findings below outline aspects that enabled innovation to take place, so we can learn from this period.

4.4.2 High points arising from the appreciative inquiry process

Themes arising from the discovery and dream stages, relating development of a culture of innovation, are displayed in the table below include: transparency of the learning process, flexibility towards LTA processes, digital networks, and communities of practice, see Table 4.5.

Table 4.5: Developing a Culture of Learning and Innovation

Factors supporting a culture of innovation	Strategies identified to promote a culture of learning and innovation

1.	**Providing a culture of trust**	Providing permission to fail	Students as partners	Development of an open-door approach to sharing practice
2.	**Development of students as partners ethos**	Opportunities to become more active in design of LTA	Ability to learn together through shaping change and work on joint initiatives	Students permitted to have more flexibility and autonomy in how to engage with their learning
3.	**Flexibility towards LTA processes**	Ability to share resources across spaces	Ability to offer student choice in mode of attendance	Ability to offer choice in learning activities/ assessment mode
4.	**Digital networking and CoPs**	Learners and staff engage with internal and external networks	Building professional networks into learning	Development of online identity and presence
5.	**Developing and sharing innovative ideas**	Lecturers sharing practice and working collaboratively	Collaborative learning through peer interaction	Business tools to illustrate ‘thinking’
6.	**Providing opportunities for lecturers to innovate**	Institutional support for development of new teaching approaches and associated tools	Institutional support for practice and of digital skills and capabilities	Access to ‘expertise’ and peer support to develop own practice
7. 8.	**Providing** **Systematic support for innovative practice**	Invitation to institutional programmes and initiatives including design and evaluation	Providing roles to support lectures to encourage a quality enhancement perspective	Development of staff and student digital leads providing opportunities to share success

In the earlier section, creating a positive learning environment has been reported as a key aspect of teachers' knowledge; it was suggested as a key aspect of creating a digital learning environment that facilitates SCL pedagogies. Within the positive learning environment, it was stated that the lecturer should obtain a culture of trust and facilitate students as partners to encourage participation and engagement. Institutional factors arising from the data involved the permission for both lecturers and students to experiment without fear of negative judgment. Peer support was reported as a high point, in the use of recent technologies during Covid-19.

Participants using an open-door approach to observing each other’s sessions found that this collegiate way of working had enabled the ethos of community of practice, as when they came into the AI process they had already had conversations about teaching practices.

Within the findings the notion of flexibility is a recurring theme, as there are opportunities to provide innovation through changing approaches to learning, teaching, and assessment practices to meet the needs of flexible learning, as defined in the flipped learning definition (Flipped Learning Network, 2014). The results indicated that developing communities of practice facilitates a learning culture for both students and lecturers, to develop both their digital capabilities and their digital identity, part of the self-actualising element of the JISC Digital framework (2017). Through the AI process participants provided examples of where they had been able to develop and share ideas, and examples of new ways of teaching online, through sharing stories. Providing opportunities to innovate across the university and given ‘permission’ to explore new teaching tools and adapt their learning, was reported as a high point of their teaching. The widespread encouragement to be innovative was supported also through teaching and learning experts, peers, student support and IT (Information Technology), leading to collective energy and joint focus as prioritised during the lockdown period. This systematic level of support and institution-designed initiatives led to quality enhancement through reflective practice and evaluation of student and lecturer feedback. This systematic support helped colleagues in their dealings with students, and provided insights on how to support students remotely during an uncertain situation.

4.4.3 Using appreciative inquiry to support a culture of innovation

The AI process helped to facilitate the freedom for participants to be creative and through the six freedoms enabled a liberation of power which supported high levels of contribution to the process from individuals. The contribution of individuals was validated through making a note on the virtual Whiteboards during the discovery interviews (Appendix 3), and by collecting people in subject groups, they already had a sense of belonging (first freedom). The active listening in each of the interviews allowed participants to be vocal and innovative, as they then drew out the best of a person. This worked well as participants were very used to communicating online and had established online relationships which formed the basis of a community of practice that was taken forwards to the next stages of dream and design. The ability to extend this safe space to a wider group was then created for the dream stage and this helped to share experiences with the wider group. They were then asked to contribute and there was learning from any level of participation; it was the joining in rather than the final outputs that was a key part of the project, based on being used to being supported in having a voice, and to experiment and be creative in a systematic way with belief that ideas would be taken forwards. It was felt to be important to offer a tangible, more engaged and higher level of transformation. AI assumes that the answers were held within the participants, and although the dream stage didn't produce as many ideas across the TPACK domains as expected, it was important that the research represented the participants view and I did not want to be too present in leading the discussion.

The capturing of ideas on the Whiteboard, was a visual representation of ideas and validated ideas; sharing the results with the wider group in a visual summary of all ideas ensured all voices were heard and included. Visual representation of data was also used to represent the positive core and reinforce the message that the research was not focusing on issues. In keeping with usual AI practice, any barriers to implementation were acknowledged and utilised in the creation of proposition statements.

4.4.4 Vision statements

During the design stage of the AI process, it was decided that there needed to be a culture of innovation, and permission for lecturers to experiment, and for those involved in supporting students' digital teaching and learning practices to fail. Although we were not focusing on negative aspects, the current situation has been put in to illuminate where we are currently and provide a basis for future change and envision what the future would look like. Findings identified that to moving forward with innovation requires individuals to have the autonomy to do this, with the ability to instigate change over their teaching environment.

The statements raise the importance of a systematic approach to enhancing the learning experience, supported by leadership of digital learning, and provision of space to explore and experiment and vision of longer-term goals coupled with permission to explore outside of institutional practices and to be able to come back and share good practice and ideas as not 'going against the grain.' This approach is seen as facilitating impact on the student experience and to acknowledge the work being done by teams and links in to recognition and reward.

Using the AI process has reinforced the need for innovation to be generated from all avenues which is not specific to job roles, to facilitate the innovation of ideas coming from various levels, referred to within appreciative inquiry research, as a part of an innovation culture. This bottom-up approach supported with top-down measures ensures support is provided to individuals, without unnecessary controls being put in place. Individuals are trusted to be able to produce their own solutions, and an environment is provided where creativity is welcomed and innovative solutions can be acted on, and empowered (Whitney and Bloom, 2019). Opportunities to develop creative thinking and innovative solutions have been provided through IT support with the ability to have access to new ways of doing things, see Figure 4.4.

VISION STATEMENTS: PROFESSIONALISM OF TEACHING PRACTICE

There is a culture of innovation.

Permission to 'fail' and experiment.

Innovation is generated from all avenues and is not specific to role.

Innovation is supported by the institution using systematic approaches to enhance the learning experience.

Staff are given opportunities to develop creative thinking and innovative solutions.

Figure 4.4: Vision Statements - Culture of Learning and Innovation

4.4.5 Summary

Programme teams should be empowered to find ways of capturing their own good practice and sharing this within their own teams and engaging with the learning culture in a way that suits their own context and students. This can be done by encouraging innovation from any member of staff and finding ways to support this regardless of the job role. A culture of innovation needs to be enabled to allow for mistakes not just from peers and managers but also the students; it is important they work closely together.

4.5 Building a Community of Practice to support the professionalism of teaching practice

A key aspect of the research has led to informing how professional development can support the digital literacies of lecturers, to help embed SCL digital pedagogies. The professionalism of teaching practice was explored in the literature review to recognise the level of competences, behaviour, reflective practitioner and alignment to the professional educator facilitation role in the pillar of flipped learning (Flipped Learning Network, 2014). Through the AI process support for pedagogical development was identified, which provides some examples of the nature of the facilitation within digital teaching and learning. The concept of the professional educator incorporates reflective practitioner aspects, including cooperating with peers to support others and own continual development. The ability to be reflective and respond to feedback and criticism is required to develop their teaching practice and make change needed for transformative teaching in conjunction with others. A reflective practitioner also needs to develop the skills of self-efficacy and reflective practice and recognise the importance of peer observation and evaluation by students of their teaching practices.

During the AI process as participants shared their positive stories, recording and placing them as valuable helped to validate their experience as an online facilitator, and this was the first-time conversations had been undertaken with them, and views sought. The process provided a good opportunity to recognise their pedagogical expertise, through the community of practice, to support professional development and give an opportunity to be heard. As mentioned in an earlier section, lecturers had participated in more conversations during Covid-19 as peer observation had taken place.

4.5.1 High points relating to professionalism of teaching

Through the AI process, high points of teaching practice, relating to professional development of lecturers' digital capabilities, reflective practitioner skills, and pedagogical knowledge have been captured in Table 4.6 below.

Table 4.6: Developing Digital Pedagogy Practices

Digital pedagogy practices	Strategies to develop digital pedagogy practices		
1. **Checking on learning within online spaces**	Tools to monitor engagement within the VLE (Virtual learning environments)	Monitoring engagement within webinars	Discussion forum e-tivities set up and moderation
2. **Awareness of how to construct knowledge online**	Strategies for questioning e.g., Socrative	Understanding of pedagogical approaches e.g., constructivism	Use of online collaboration tools to support knowledge co-construction
3. **Design of online learning sessions**	Reducing teacher talk and understanding teaching strategies that work well online	Student input in the design of the learning approach	Ability to check learning through formative activities
4. **Collaborative learning techniques online**	Curation of online resources and ability to comment	Use of collaborative learning using new tools e.g., Zoom, Adobe, Office 365	Student-led collaboration using Whiteboards and shared documents
5. **How to develop student reflection online**	Session plenary and recap activities	Follow up activities	Tools and resources to aid student reflection
6. **Development of lecturer subject CoPs**	Sharing key resources and lesson plans	Shared examples of good practice	Development of pedagogic and subject research groups
7. **Classroom management online and adaptation of learning activities**	Dealing with lateness, attendance, and low-level disruption	Adopting design for learning and flexible learning principles	Scaffolding learning and adapting to students' prior knowledge and levels of attainment

The flipped learning educator role as a facilitator of a flexible learning environment that can manage their own learning environment, does rely on having the digital capabilities as well as the TPACK and the developing and advanced levels, and on being able to undertake an approach to culture of innovation. It is more demanding to be a facilitator and for this reason professional development is required (Flipped Learning Network, 2014). There are a range of characteristics needed and professional skills related to teaching practice, with reference to the TPACK framework identified in appendices, for example the ability to adapt teaching practices to enable the best interactions with students online, and respond to immediate demands, and adjust as referred to in F1,2,3 of the framework. There is a great amount of planning and structure to create a learning environment and there needs to be multiple ways of allowing students to develop knowledge and also show mastery of their subject as well as providing the opportunities to scaffold their development.

Through the flipped learning model, student-centred learning is achieved in active knowledge construction, and their learning is evaluated in a meaningful way. This will represent a change in practice for lecturers used to operating very teacher-centred approaches; despite many lecturers providing examples of active learning strategies, the environment is reported as teacher-led with some examples of student-centred learning. Within online teaching, there is opportunity to consider how a lesson is structured to construct learning that is student-centred, and design the learning to enable concepts to be learnt in the best manner that makes use of lecturer time, adapts to allow for active learning strategies and differentiates to make learning accessible and relevant for all students. The development of student and lecturer digital capabilities will enable the curation of digital resources to be used as intentional learning content (Flipped Learning Network, 2014), using a variety of formats combined with pedagogical knowledge as reported for advanced TPK. To support the development of subject expertise online, TPACK, but also reported as

PK, the use of subject CoPs was thought to be useful as good examples within some teams and they had shared several resources, especially where subjects were being taught by several lecturers across various locations at the same time. There is a need for consistency across lecturers but schemes of work and standardisation activities for assessment had been developed, including SWAY templates with suggested teaching activities. To provide adaptive teaching the use of online classroom management techniques was important during the first wave of Covid-19 as people spent extended periods online. The adaptation beyond a one-hour webinar meant it was important for people to be able to engage in the learning environment. There was some useful learning about how to deal with lateness through buddying, timers for breaks, and use of tools to check people are watching and not on email.

4.5.2 Vision statements

The vision statements constructed within the design stage of the AI process aimed at supporting the professionalism of teaching staff and identifying professional development as devised through the AI process, see Figure 4.5.

VISION STATEMENTS: PROFESSIONALISM OF TEACHING PRACTICE

- There is institutional buy-in for the professionalism of teaching staff and support for professional development.
- Professional development is seen as an enabler for change.
- The university has an established CPD framework to support the pedagogic development and staff digital capabilities.
- Communities of practice and peer networks are central in developing teaching and learning practices through exploratory approaches and sharing good practice.
- Academic teams are involved in shaping the learning experience and institutional approaches to teaching and learning.

Figure 4.5 Vision statements: Professionalism of Teaching Practice

Within the findings the participants recognised that institutional support is required to support lecturers to have control over their learning environment, and to help support the structure of learning to facilitate the flipped and flexible learning principles. Professional development was recognised as a key enabler of supporting the development of digital teaching and learning practices and the ability of staff to deliver SCL pedagogies, and belief in academic faculty to deliver a learning experience. There was a collective agreement that the learning experience should embed student-centred learning, digital capabilities and preparedness for future employment, including relevant learning opportunities. The participants also agreed that the development and support for both formal and informal communities of practice would help develop sharing of good practice and that institutions and managers should allow space and infrastructure to facilitate this through buddying, or other schemes, and provision of funding for initiatives. There was recognition that lecturers needed space to focus on pedagogic research initiatives as the research had provided a good level of conversation and Covid-19 had prompted a need for evaluation. The findings also acknowledged that there needed to be a continuing momentum with online teaching development to avoid lecturers getting fatigue with ongoing training and development.

4.5.3 Chapter summary

The findings highlight the potential for TPACK to support the development of teacher competences, the AI process uncovering a range of enacted TPACK competences which support SCL pedagogies. The engagement of lecturers and student with SCL depends on a number of factors, and this research identifies these as TPACK indicators which could support lecturers and programme teams, or leaders in their use of the TPACK framework. The indicators, identified however, are highly contextual, and although provide overview of how TPACK could be used, the enactment of these is dependent on a number of considerations which can be framed at the lecturer, programme and institutional level. The research highlights the nature of support that could be provided to support lecturers to develop their ability to design and develop SCL pedagogies, through increasing their awareness of TPACK competences, and how to design these and the establishment of their own situated TPACK competences within their own communities. Through the research the requirement for ongoing professional development has been identified in order that lecturers can continue to develop their pedagogic and technological knowledge and teaching practices and adapt to changing contextual factors. Participants expressed a desire to develop their own knowledge to develop subject pedagogic requirements, and whilst having the support by the institution, they had enjoyed freedom during Covid019 to experiment and create their own knowledge of what works well for their subject area.

CHAPTER 5: Conclusions and Recommendations

5.0 Introduction

This chapter concludes the research and makes recommendations by reflecting on the research aims, presents the key findings in relation to each of the research questions and discusses the contribution of knowledge and transferability of this study to TPACK literature. The key findings of the study have resulted in an adapted TPACK framework for use by leaders, programme teams and lecturers to support the implementation of SCL online pedagogies. Recommendations for further exploration arising from the research are discussed in relation to TPACK strategies, a suggested conceptualisation of the framework and associated framework for the implementation of AI to support communities of practice in developing their collective understanding of SCL approaches for online learning in higher education.

5.1 Summary of the research

As discussed in chapter 3 the research design used appreciative inquiry to explore the use of the TPACK framework to develop an understanding of online student-centred learning pedagogies in higher education. The research explored the development of online teaching practices and investigated how lecturers could use the TPACK framework to support the integration of technology and pedagogy. The following themes arose from the literature review and shaped the research design:

1) Lecturers need support in developing technology, pedagogic, and content knowledge (TPACK) to deliver SCL pedagogies online, and the development

of lecturer and student digital capabilities is instrumental to delivering SCL pedagogies online.

2) The belief that innovative teaching practices online can be generated within teams through uncovering the positive core and sharing good practice through the appreciative inquiry process and associated principles. The contextual knowledge of teaching teams will help individuals and teams develop highly-situated online practices and enable them to adapt their practice to changing uses of technology which will be of most benefit and relevance for their students.

3) Communities of practice, with support, can help develop a culture of learning and innovation and provide a sustainable approach to developing teacher knowledge and related TPACK competences, and the support required for in-service lecturers to develop their TPACK practices is ongoing. The TPACK framework supports CoPs to have a 'dialogue' about pedagogy and will support their pedagogic development through ongoing conversations which facilitate reflexivity and reflection-on-practice.

5.2 Gaps identified within the literature

The literature review identified that strategies to build TPACK are aimed at teacher educators, with few studies aimed at lecturers or leaders on how to develop strategies within their own context, for example using TPACK CoPs to develop situated TPACK competences (Porras-Hernández and Salinas-Amescua, 2013; Harris, 2016). Whilst a number of lists of competences and rubrics exist to support lecturers developing their TPACK integration, there is a difference between espoused and enacted knowledge, and there is a need for a method of developing reflective practice and encouraging dialogue between peers to incorporate subject pedagogies. The body of literature reviewed also acknowledged the influence of epistemological and pedagogic beliefs on the development of TPACK and the impact of this on designing learning experiences (Angeli and Valanides, 2009; Tsai and Chai, 2012; Voogt and Mckenney, 2017) with frameworks designed to help scaffold the development of TPACK through teacher educator programmes (Chai and Koh, 2016). The literature reviewed the requirements of SCL to support the development of future digital capabilities as required by a 21st-century learning experience (Coonen *et al*, 2018; Joynes *et al,* 2019). The research is based on the need to understand how lecturers can use TPACK to develop their use of SCL pedagogies to design a transformative learning experience as identified within the literature.

Communities of practice have been advocated as a means of developing sustainable approaches to in-situ ongoing professional development (Phillips, 2014). From the literature review the use of TPACK framework to support the development of a community of practice, and enable these communities to identify, share and reflect on their development was identified as an area for further research. There are limited studies which explore design-based professional development strategies supporting the development of knowledge needed by lecturers to teach successfully online using technology, as reflective practitioners as part of a community of practice.

5.3 Aims of the research

As stated, the research explored good practices in online SCL by using TPACK framework to help develop understanding of how to integrate technology, pedagogy and content to deliver a 21st-century learning experience. Appreciative inquiry was explored as methodology to generate changes in pedagogical practice within subject groups. Specifically, the research explored answers to the following questions:

1. How have lecturers used the TPACK framework to implement student-centred learning pedagogies?
2. How could the TPACK framework be conceptualised to support lecturers' capabilities for the design and development of student-centred pedagogies?
3. What can the TPACK framework offer communities of practice in the development of situated teacher competences?

5.4 Summary of methods

The methodological approach chosen to achieve the aims of the research and answer the research questions was conducted within the following stages:

Pilot study

This phase trialled the use of a TPACK-validated lesson instrument to capture enacted TPACK for future use in professional development. The reporting of codes resulted in capturing areas of weakness e.g. TK, and TPK, with limitations noted relating to the over-reporting of codes and a lack of insight of how well the technology was integrated into the lessons observed.

1. Discovery stage of the AI process

The use of generative interviews identified high points of teaching practice observed prior to the AI process. The interviews took place online and used MS Whiteboards to display examples that were generated by the subject teams which provided the opportunity for generative questioning. The facilitation of these used the ethos of AI to help build appreciative thinking that formed the basis of the following stages.

2. Dream stage of the AI process

Using the themes generated from the discovery phase, the participants identified the potential for future teaching practices, providing opportunity for sharing ‘stories’ before collectively envisioning the future using an online synchronous focus group.

3. Design stage of the AI process

Building the subsequent stages, the participants collaborated using a discussion forum and a shared Word document to collectively create a set of statements to provide a future vision of online learning. The statements built on the themes arising from the prior stages of the process using the TPACK framework.

5.5 Summary of key findings

The key themes generated through the AI process to provide a better understanding of SCL pedagogies using the TPACK framework included: delivering flexible learning, developing digital capabilities, supporting a culture of innovation, and the development of the professional educator through CoPs. These core themes formed the basis of the discussion of key findings within Chapter 4: Findings and Discussion and have been included within the conceptualised TPACK framework and the framework for adoption by CoPs. The key findings for each of the research questions are summarised below:

1) How have lecturers used the TPACK framework to develop understanding of student-centred learning pedagogies?

As reported in chapter 4, the discovery phase of the AI process resulted in the development of a set of TPACK indicators for designing online teaching (for SCL pedagogies). The indicators evolved through the data collection and initial analysis of current teaching practices, these were categorised and further refined through thematic analysis to provide SCL online indicators of: flexible and adaptable teaching online, positive learning environment, student participation, engagement and collaboration online, independent learning and self-regulation and high-value learning experience. Frequently occurring SCL-enacted teaching practices that occurred within each of the indicators were then further categorised as core practices that could become standard practices across the lecturers, with less frequently reported and future-facing competences labelled as advanced competences. High points of teaching practices and the achievement of advanced TPACK (high levels of competence across each domain) were evidenced where students were able to have a high degree of choice and flexibility in how they engaged with synchronous and asynchronous learning experiences across different learning spaces. This research found that the most common TPACK domains reported were the enacted teaching practices relating to TK and TPK competences. There were some examples of subject-specific PK and TPK, however, within this study most of the enacted teaching practices arising from the findings were multidisciplinary, and there was further opportunity for these to be contextualised by programme teams. The community of practice that evolved throughout the AI process recognised the need for subject pedagogies to be implemented, and made recommendations for further research and support for lecturers on developing their PK and PCK, in conjunction with strategies to develop TK and TPK.

High points of teaching practices reported in the data collection represented the ‘positive core’ of practices within the institution and captured the ‘best of’, which helped to share a future vision based on authentic learning experience evolving from the best practices reported.

One of the recurring high points was the ability for students to have more ownership of the learning process yet this was limited in application across different points in the student experience. Flexibility was reported as a key theme; although high points were reported these were not evident in the whole student experience as seen in the flexible learning framework presented by Higher Education Academy, (2015). The notion of flexibility emerged during the findings across different themes, with analysis acknowledging the importance of a whole-systems view to enable this to happen. From the research a rubric was developed outlining the core and advanced TPACK competences created by the participants as a way of creating situated examples from current teaching practices. Although there are a number of teacher competences in existence (Foulger, 2020), this was developed by faculty, and therefore contextual, which could be continually adapted by programme teams to suit student and faculty needs, and as a means of sharing good practices at a local level. It was developed through the analysis of TK and TPK knowledge.

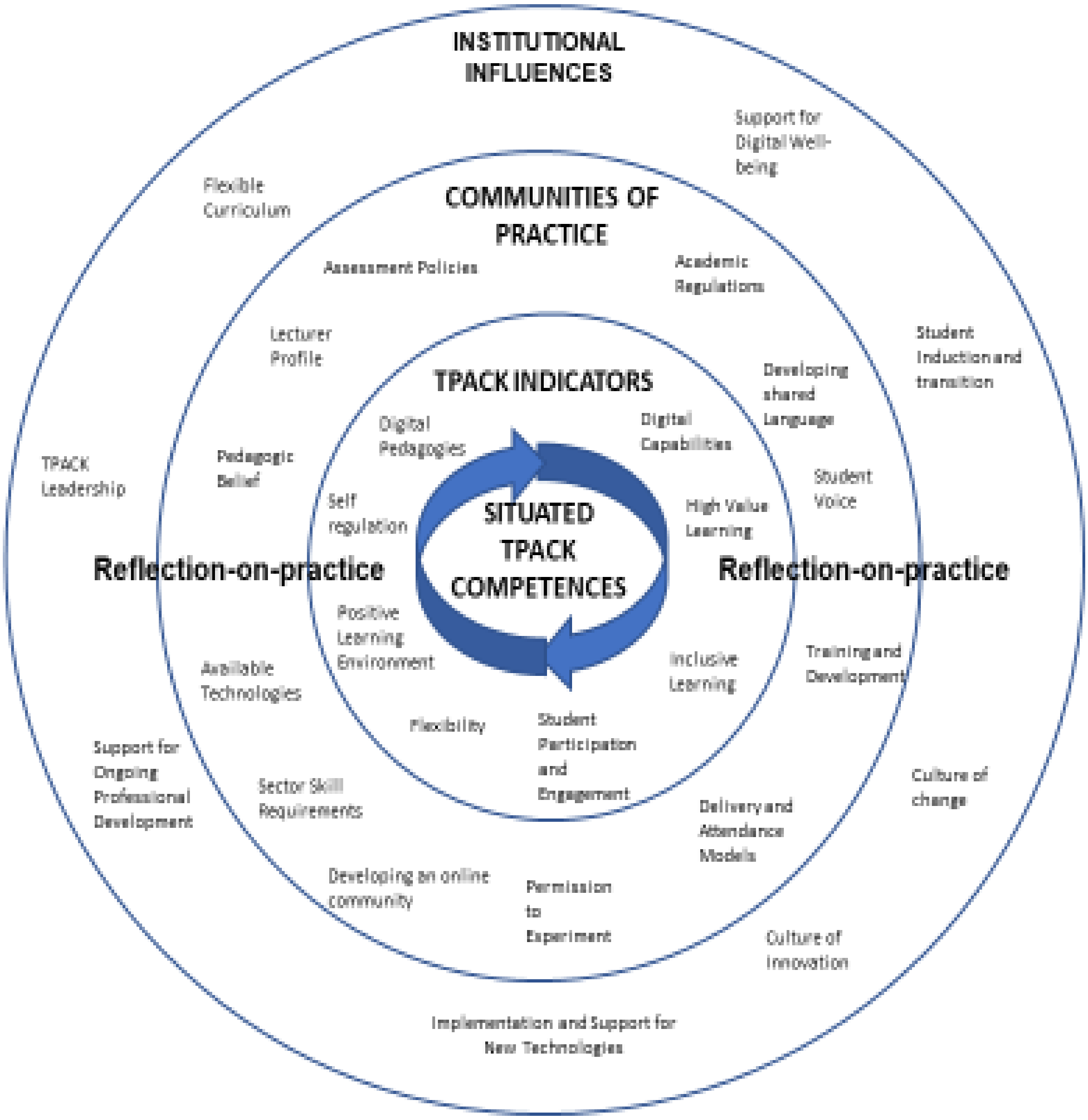
The development of future practices, uncovered during the dream phase, represented potential for future teaching practice online with examples across TK, PK, TPCK, and TPK and were separated into two broad themes of developing an online community and design of the online learning experience. The presence of a wider range of TPACK constructs was present as participants were encouraged to explore a range of examples for each of the constructs, yet there were far fewer examples than provided for TK and TPK as participants tended to focus on the affordances of technology instead of the pedagogical approaches that can be taken. Future affordances of technology were shared with the group, using the affordances mapping approach devised by Angeli and Valanides (2009). The ICT-TPK approach to developing teacher knowledge was used to map current and future affordances of technologies to provide a visual representation of how these could be incorporated into the learning experience. The ICT-TPK approach used in this study promotes a focus on developing technology skills which doesn't promote development across each of the domains. Although this research hasn't supported an ICT-TPK approach the findings suggest that to develop lecturer confidence TP and TPK knowledge is required to support the implementation of pedagogies through the creation of a positive learning environment and the ability to engage participants online, which can be seen in the core and advanced level competences within the rubric created.

2. How could the TPACK framework be conceptualised to support lecturers' capabilities for the design and development of student-centred pedagogies?

As explored within the literature review the TPACK framework has been widely adopted by teacher educators with a growing interest in how it supports in-service lecturers. The literature also acknowledged the need for programme teams and lecturers to develop design-based practices, acknowledging the challenges of designing good online learning experiences. The second research question explored how the TPACK framework could support lecturers' design and development of SCL pedagogies; the findings identified institutional, programme and lecturer contextual influences. To support the implementation of SCL using the TPACK framework, the findings have resulted in a suggested conceptualization for the TPACK framework.

As discussed throughout this thesis the TPACK framework is presented through the seven domains which include the three key domains of TK, PK and CK, and TPACK plus three others where these domains intersect. Arising from the research, a reconceptualised framework identifies the institutional, programme and lecturer contextual influences arising from the research findings when designing and developing SCL, illustrated in Figure 5.1 below:

Figure 5.1: Reconceptualising TPACK to support the design and delivery and delivery of SCL pedagogies



As mentioned above, the suggested reconceptualised TPACK presents the key contextual influences in relation to developing situated TPACK competences. The identification of these influences were influenced by the pandemic, as a highly unusual event within the development of online learning practices. Increased support for the implementation for new technologies, in combination for desire to support students with their learning led to conditions which provided a source of innovation and permission to experiment. Due to use of AI, the research captured examples of good practice, it is also recognised that each of the contextual influences identified could also be barriers to implementation where not present. The identification of the contextual influences at institutional, programme (community of practice) and lecturer (TPACK indicators) supports teams in adapting teaching strategies and developing their own TPACK situated competences.

The research findings illustrated the importance of acknowledging the time required by lecturers to design and prepare resources to create SCL experiences. As a result, professional development strategies to scaffold support for lecturers would need to be sensitive to these challenges. The findings highlighted that the effectiveness of the lecturer to deliver SCL competences will depend on their pedagogical belief, digital capabilities, and pedagogical knowledge of designing online learning experiences. Lecturers will need supporting through their CoP to design SCL pedagogies' implementation which considers the TPACK indicators arising from the research: inclusive learning, high-value learning, flexible learning, and culture of innovation. The findings suggest that there is potential for online learning to be more inclusive and adaptable than face-to-face learning, when planned effectively. Challenges exist in encouraging high levels of participation, engagement for different needs, and the support required for students to engage in SCL, which needs to be included in the design of SCL.

As discussed above the findings reported that TK and TPK were the most frequently identified TPACK competences suggesting further support for lecturers is required in the development of subject-pedagogy expertise. Although this was a specific finding through this research, the adapted framework considers that digital pedagogic expertise is likely to require development across different contexts due to the continual nature of change arising from external influences, including sector skills, and technology changes for this domain.

Throughout this research the programme team represents the core members of the recommended CoP, and is responsible for designing and developing SCL pedagogies. According to the findings, key influences at a programme level include the availability of technologies, student and lecturer profiles and their digital capabilities, and pedagogic belief of lecturers. The findings highlighted the use of affordance mapping to provide a systematic approach to TK and TPK, and to enable less emphasis on TK as a mechanism for innovative practice, instead promoting the exploration of new tools as through an agreed mechanism, that can be transferred across different settings.

The CoP within this study highlighted the tacit knowledge required in enacted TPACK practices, and provided insights on how CoPs can support the development of pedagogic belief, and explore the difference between espoused and enacted practices through the reflection-on-action and collaborative reflection. The role of reflection has been included within the reconceptualization of the framework, acknowledging the need for CoPs to practice reflection-on-action to develop their own contextual practices. The findings reported the need for ongoing sharing of examples and the power of the CoP to continue in dialogue about core and advanced practices. The CoP within the AI process was able to identify future innovative practices through online and other formats, providing insights of how the dream phase of AI can facilitate this.

The institutional factors as discussed can limit the element of choice, and as discussed earlier inhibit the amount of flexibility and choice that the lecturer is able to give to the learners. Institutional influences can support the systematic embedding of policies and practices; these will be augmented by regulatory, and sector skills considerations on the student experience including assessment strategies and the curriculum, which can reduce student choice. The institution can enable SCL pedagogies by provision of students' access to SCL pedagogies through support, induction, and support for digital capabilities, and support for lecturers for digital and pedagogic support and through enabling a flexible curriculum.

The use of TPACK for teacher development using their own professional learning community is based on using a community of practice (Lave and Wenger, 1991). The AI process supports the development of the CoP by providing the opportunity for reflection-on-practice (Mouza and Wong, 2009) and collaborative reflection within the programme team (Niess, 2005). The use of the situated reflection-on-practice approach, as written about by Phillips (2014), provided the opportunity for a dialogic approach, which was enabled by group reflective approaches and the development of a shared repertoire to discuss teaching practices (Lave and Wenger, 1991). The use of TPACK and the questions used within the AI process enabled a conversation about the integration of technology and pedagogy that was inclusive, and was able to facilitate appreciative thinking and generation of new ideas, through the questions based around each of the TPACK domains. The use of the TPACK image and domains formed the basis of conversations, enabling the identification of detailed examples of teaching practices across colleagues with varying understanding and different pedagogical beliefs, and uncovered innovative pedagogic practices, within the context researched.

With regard to pedagogic knowledge of staff, despite the uncovering of examples, using the AI framework, colleagues didn't recognise that they were talking about pedagogy e.g., creation of a positive learning environment. The role of the professional educator was explored highlighting the need for lecturers and teams to develop pedagogical expertise in order to adopt a teacher as designer role (Harris, 2016).

Participants gravitated towards technology examples, at the institutional level, or through a suggested framework to support the CoPs, finding that there will need to be a decision of whether to develop pedagogy knowledge (PK) first or technology knowledge as found within ICT-TPK approaches. Through the thematic analysis, and discussion of findings, technology knowledge and digital capabilities have been identified separately in acknowledging the extent of these required by lecturers and students.

As the data collection was undertaken within the first phase of Covid-19 it is acknowledged that the participants engaging within the research were at that time experiencing an acceleration in learning for themselves and within their programme teams, accounting for the presence of the theme of innovation and learning. As reported earlier, implementation of a sustainable approach within programme teams is needed, to facilitate a sustained change, in line with pedagogical change within curriculum teams, as identified by Harris *et al.* (2016). TPACK indicators and competences have some transferability; however, the research provides an opportunity for CoPs to adapt to their own situation, and to facilitate the AI process themselves.

5.5 Contribution to TPACK research

This study builds on previous qualitative studies focusing on professional development strategies for in-service lecturers (Harris *et al*., 2016; Schmidt *et al.,* 2009). This research demonstrates how AI can support CoPs' understanding of enacted TPACK, and highlights the need for lecturers and programme teams to use reflective practice to inform future TPACK practices, and acknowledges the need for highly contextual approaches to TPACK development (Phillips, 2014; Porras-Hernández and Salinas-Amescua, 2013).

The use of appreciative inquiry to facilitate generative conversations about TPACK provides an original methodological contribution to enhancing TPACK competences, and encourages increased scholarship within programme teams, especially within online and UK higher education. The development of SCL TPACK indicators and TPACK competences, using enacted TPACK and the development of a shared language to talk about high points of practice as reported within the indicators builds on work relating to taxonomies by Hofer and Harris (2011). The findings provide examples of how TPACK is enacted within each of the constructs, yet the high points of practice can be attributed only when all of the domains of TPACK are reported, in acknowledgement of the transformative potential of TPACK as its own construct instead of the sum of its individual domains (Koehler, 2014). The adapted framework arising from the research advances the conceptualisation of TPACK to explore core aspects of designing SCL teaching practices which could be core principles to be considered by lecturers and programme teams. The innovative use of MS Whiteboards for data collection, and its use within the research design contributes to research on qualitative online research methods and alternative facilitation of appreciative methodology using online focus groups.

5.6 Contribution to practice

For this practice-based research, the contribution to practice has been a core element of the research design, to support others in their identification and development of core and advanced TPACK competences as a contextual means of upskilling staff. Constant changes in technology provide a challenge to institutional-led professional development strategies, due the scale and the need for ongoing support for the use of technology within teaching practices. The use of CoPs has been suggested within this research in response to this challenge, to provide a sustainable approach for universities, and one that can respond to changes in the internal and external environment as identified within the suggested adapted TPACK framework above. As mentioned in chapter 3, the rationale for using CoPs to support professional development is their potential to empower teams. The findings from this research suggest that despite different levels of pedagogic expertise and different pedagogical beliefs, programme teams, when supported by CoPs, can uncover innovative teaching practices within their own contexts.

The TPACK indicators arising from this research could be adapted by other CoPs and support the development of their own contextual understanding of TPACK. The widescale reporting of student and staff digital capabilities arising from the data provided a set of capabilities that could be embedded into the design of online teaching. The adapted TPACK framework identifies the other areas of support required for students and lecturers to engage in SCL pedagogies, to be included within institutional approaches to professional development.

As discussed in chapter 2, the development of online learning practices can be difficult to achieve due to the complexities of meeting student needs, societal and employer needs, changes in technologies, and changing institutional demands. The research supports an approach to professional development, using CoPs, which is flexible and evolving to ensure it can make use of changes to the external fast-moving environment.

AI within its associated ethos offered a valuable research methodology which could then be used as a starting point from which other approaches e.g. leadership approaches could be widely adopted (Graziano *et al*, 2017). Whilst CoPs provide an opportunity for lecturers to develop a sustainable way of sharing practice, for widescale adoption they should be supported institutionally through centrally-led resources and toolkits, and support for new approaches such as AI.

5.7 Transferability and limitations of the study

The study through the AI process captured high points of online learning, within an established online university. The key indicators of online SCL pedagogies could be explored within other teaching contexts, as a basis for developing locally-based situated practices. Practitioners and researchers could replicate the approach taken and adopt the indicators and questions as a basis for forming their own SCL practices using the adapted TPACK framework.

There were some difficulties of collecting data during Covid-19 as lecturers were very restricted in the time they had available, however the coinciding of the shift online did provide a heightened interest for participants in the area of study and enthusiasm for innovation in online learning. A key challenge of the study was the pedagogical knowledge of lecturers and acknowledgement of this area of knowledge as a subject area owned by all; this cultural change needs a long-term view to address this and move perception away from a technology-first approach. As discussed, support for lecturers during the period of the data collection was focused on support with new technologies. If the study had taken place where there was less emphasis on technology, and not during the Covid-19 pandemic this may have resulted in fewer examples of different uses of technology during this period of experimentation taking place at a wider-scale in online learning to enable continuation of student learning. Before the wholescale shift to online learning, there was less awareness of the increased need for ensuring online teaching practices needed to be inclusive, which was a key theme of the findings. The design of inclusive practices, however was highlighted as a key factor of the design of SCL raised. The pandemic raised awareness of these unique factors, along with greater awareness of digital health and well-being. The approach could be replicated, these factors are now part of the narrative of online, but may not have been identified pre-pandemic.

The literature review, including recent reports on online learning experiences, acknowledged that institutions must facilitate the shift of power from teacher to student, yet it is assumed it is owned by the teachers in the first place and they have the power to shift this. It is also assumed that flexibility, as a core element of online learning, is in the right areas, for example, for the benefit of the student, and although good examples were reported these weren't present in terms of assessment. There are some barriers outside of the control of lecturers, which would impact on implementation of the research project in different settings. The need for student choice and flexibility, including the rigid nature of engagement, would require wider institutional change for the learners to have increased choice on what or how they study. It is recognised that the development and implementation of SCL pedagogies online should take into consideration the skills required by the sector, the vision held by programme teams and their ability to shape the pedagogic vision, versus the institutional level as there is a complexity where these decisions are taken and how to include student perspectives.

It is acknowledged that the use of TPACK has been based on literature originating from authors based in the United States, and has been narrowed to those researching TPACK strategies focusing on professional development for in-service teachers. Whilst the body of literature surrounding TPACK is from an international base, the research and the outputs have been focused mainly on the specific contexts and influences of UK higher education.

5.8 Recommendations

The research design for this study included the first three stages of the appreciative inquiry process. For the delivery stage of the AI process, a recommendation from the research is the use of an AI framework to support future CoPs, using the conceptualisation of TPACK as introduced above. It is suggested that the reconceptualised TPACK framework and its wider contextual considerations could be implemented by CoP for use by lecturers, and programme and module leaders to help promote ongoing conversations to support the building of TPACK, see Figure 5.2.

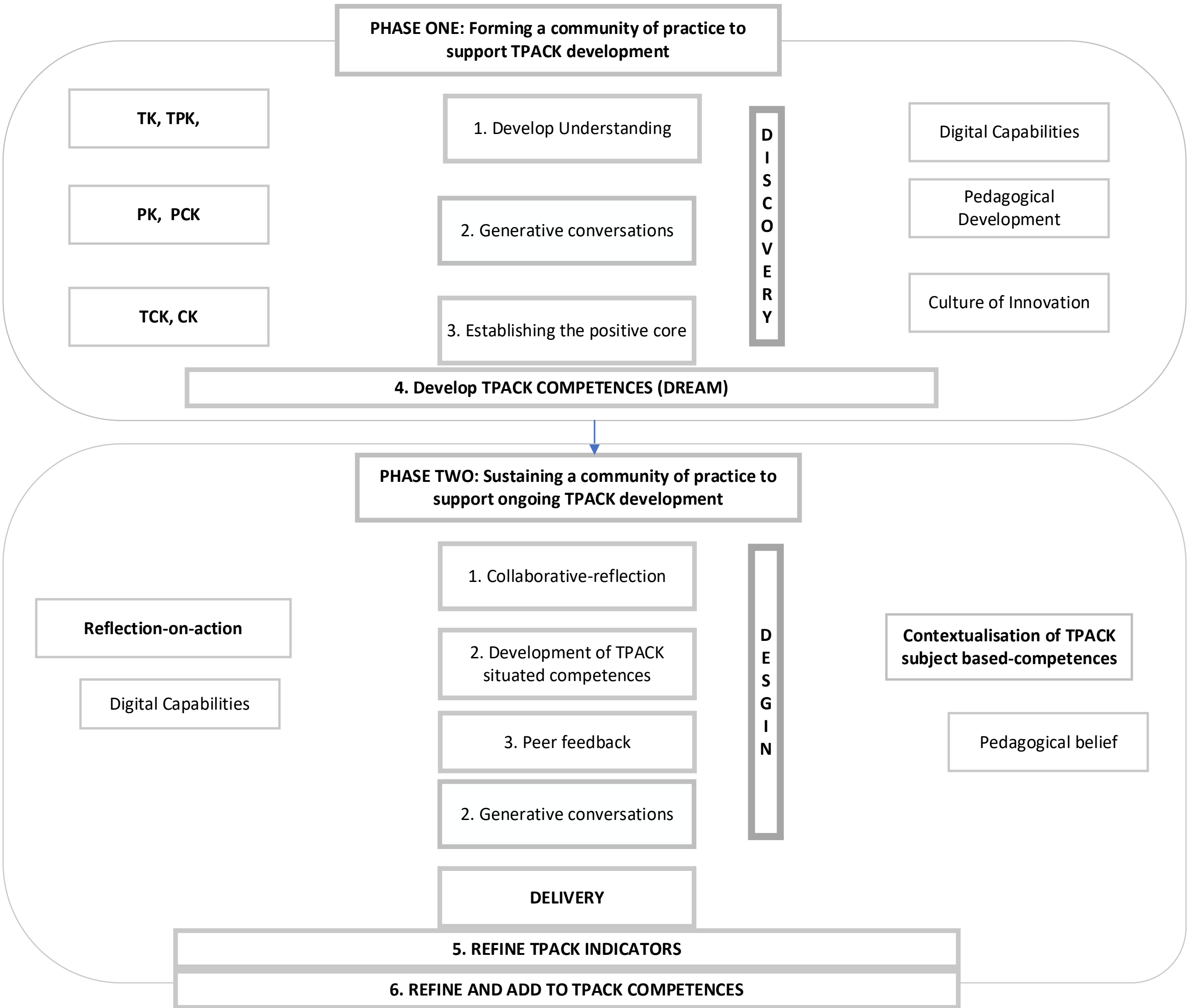


Figure 5.2: AI Framework to support an online CoP develop and implement SCL pedagogies using the TPACK framework

Within the second phase of the CoP there is the opportunity for the development of context-based rubrics, using ongoing dialogue by communities of practice to give a practical focused approach to development that encourages reflective TPACK approaches (Mouza, 2011). This reflection-on-action approach could see the sharing of examples, and of designs of TPACK lesson plans and resources, acknowledging that the design of the session, and planning and preparation of lesson resources, are critical to the implementation of SCL pedagogies as indicated in the adapted TPACK framework. It is suggested that further research is undertaken to review approaches to developing TPACK, for example the value of TK first approaches or PK with in-service teachers, as there is an assumption that in-service teachers have detailed pedagogic knowledge (PK).

Recommendations for further research exploring the implementation of SCL pedagogies includes the use of a wider range of TPACK strategies to support professional development, for example the development of shareable resources to provide visibility of shared practices including TPACK lesson plans, and supporting lecturer pedagogical development through scaffolded lesson design approaches (Chai and Koh, 2016). TPACK using CoPs, as a TPACK building strategy, could be explored further, acknowledging the strategic importance of developing lecturers' and the need for support at an institutional level. It is recommended that further research is undertake to explore how CoPs can be supported in combination with TPACK leadership approaches for example using the theory-of-action and management of change framework approaches to enable a systematic approach to embedding practices, as a strategically-led initiative.

REFERENCES

Angeli, C. and Valanides, N. (2009). 'Epistemological and methodological issues for the conceptualization, development, and assessment of ICT–TPCK: Advances in technological pedagogical content knowledge (TPCK)', *Computers & education*, *52*(1), pp.154-168.

Archambault, L. and Crippen, K. (2009). 'Examining TPACK among K-12 online distance educators in the United States', *Contemporary issues in technology and teacher education*, *9*(1), pp.71-88.

Archambault, L., Wetzel, K., Foulger, T.S. and Kim Williams, M. (2010). 'Professional development 2.0: Transforming teacher education pedagogy with 21st century tools', *Journal of Digital Learning in Teacher Education*, *27*(1), pp.4-11.

Argyris, C. and Schon, D.A. (1974). *Theory in practice: Increasing professional effectiveness*. San Francisco: Jossey-Bass.

Armstrong, D.K. and Asselin, M.E. (2017). 'Supporting faculty during pedagogical change through reflective teaching practice: An innovative approach', *Nursing education perspectives*, *38*(6), pp.354-357.

Baggaley, J. (2013). 'MOOC rampant', *Distance education*, *34*(3), pp.368-378.

Baran, E. and Uygun, E. (2016). 'Putting technological, pedagogical, and content knowledge (TPACK) in action: An integrated TPACK-design-based learning (DBL) approach', *Australasian journal of educational technology*, *32*(2), pp.47-63. doi: 10.14742/ajet.2551.

Barr, R.B. and Tagg, J. (1995). 'From teaching to learning—A new paradigm for undergraduate education', *Change: The magazine of higher learning*, *27*(6), pp.12-26.

Bayne, S. and Ross, J. (2014). 'MOOC pedagogy', *Massive open online courses: The MOOC revolution.* In P. Kim (ed). New York: Routledge, pp.23-45.

Beatty, B. (2007). Transitioning to an Online World: Using HyFlex Courses to Bridge the Gap. In C. Montgomerie & J. Seale (Eds.), Proceedings of ED-MEDIA 2007--World Conference on Educational Multimedia, Hypermedia & Telecommunications (pp. 2701-2706). Vancouver, Canada: Association for the Advancement of Computing in Education (AACE). Available at: https://www.learntechlib.org/primary/p/25752/ [Accessed 09.11.2020].

Beatty, B. J. (2019). *Hybrid-Flexible Course Design: Implementing student-directed hybrid classes* (1st ed.). EdTech Books. Retrieved from https://edtechbooks.org/hyflex

Beetham, H. and Sharpe, R. eds., 2013. *Rethinking pedagogy for a digital age: Designing for 21st century learning.* New York: Routledge.

Beetham, H. (2013). 'Designing for active learning in technology-rich contexts'. In *Rethinking pedagogy for a digital age* (pp.55-72). New York:Routledge.

Bonwell, C. C., and Eison, J. A. (1991). Active Learning: Creating Excitement in the Classroom. ASHE-ERIC Higher Education Report, Washington DC: School of Education and Human Development, George Washington University.

Boschman, F., McKenney, S. and Voogt, J. (2015). ‘Exploring teachers' use of TPACK in design talk: The collaborative design of technology-rich early literacy activities’, *Computers & Education*, *82*, pp.250-262.

Boyd, D. (2016). ‘What would Paulo Freire think of Blackboard: Critical pedagogy in an age of online learning’, *The International Journal of Critical Pedagogy*, *7*(1).

Brantley-Dias, L. and Ertmer, P.A. (2013). ‘Goldilocks and TPACK: Is the construct ‘just right?’’, *Journal of Research on Technology in Education*, *46*(2), pp.103-128.

Braun, V. and Clarke, V. (2006). ‘Using thematic analysis in psychology’, *Qualitative research in psychology*, *3*(2), pp.77-101.

Brown, M., Dehoney, J. and Millichap, N. (2015). The next generation digital learning environment. *A Report on Research. ELI Paper. Louisville, CO: Educause April*, *5*(1), pp.1-13.

Bryman, A. (2012) *Social Research Methods*. Buckingham: Oxford University Press.

Burnard, P. (1999). ‘Carl Rogers and postmodernism: Challenges in nursing and health sciences’, *Nursing & Health Sciences*, *1*(4), pp.241-247.

Bushe, G.R. (2011). ‘Appreciative inquiry: Theory and critique’, *The Routledge companion to organizational change*, *87*, p.103.

Bushe, G.R. and Kassam, A.F. (2005). ‘When is appreciative inquiry transformational? A meta-case analysis’, *The journal of applied behavioral science*, *41*(2), pp.161-181.

Campbell, A. & Groundwater-Smith, S. (Eds.). (2010). *Connecting inquiry and professional learning in education: International perspectives and practical solutions.* New York: Routledge.

Chai, C.S. and Koh, J.H.L. (2017). ‘Changing teachers’ TPACK and design beliefs through the Scaffolded TPACK Lesson Design Model (STLDM)’, *Learning: research and Practice*, *3*(2), pp.114-129.

Chai, C.S., Hwee Ling Koh, J. and Teo, Y.H. (2019). ‘Enhancing and modelling teachers’ design beliefs and efficacy of technological pedagogical content knowledge for 21st century quality learning’, *Journal of Educational Computing Research*, *57*(2), pp.360-384.

Chai, C.S., Koh, J.H.L. and Tsai, C.C. (2010). ‘Facilitating preservice teachers' development of technological, pedagogical, and content knowledge (TPACK)’, *Journal of Educational Technology & Society*, *13*(4), pp.63-73.

Chisholm, I.M. and Padgett, H. (2004). ‘Observations of faculty integration of technology into teacher preparation’, in *Society for Information Technology & Teacher Education International Conference* (pp. 3498-3504). Association for the Advancement of Computing in Education (AACE).

Churches, A. (2008). ‘Bloom's taxonomy blooms digitally’, *Tech & Learning*, *1*, pp.1-6.

Clancey, W.J. (1995). A tutorial on situated learning. In J. Self (Ed.), Proceedings of the International Conference on Computer and Education (pp. 49-70).

Coghlan, A.T., Preskill, H. and Tzavaras Catsambas, T. (2003). ‘An overview of appreciative inquiry in evaluation’, *New directions for evaluation*, *2003*(100), pp.5-22.

Conole, G. (2008). ‘Listening to the learner voice: The ever-changing landscape of technology use for language students’, *ReCALL*, *20*(2), pp.124-140.

Conole, G. (2012). *Designing for learning in an open world* (Vol. 4). New York: Springer Science & Business Media.

Coonan, E. and Pratt-Adams, S. (2018). Building higher education curricula fit for the future. How higher education institutions are responding to the industrial strategy. Available at: https://www.advance-he.ac.uk/sites/default/files/2019-05/Building-HE-Curricula-Fit-For-The-Future.pdf. [Accessed 20.05.2020].

Cooperrider, D. and Fry, R. (2020). ‘Appreciative inquiry in a pandemic: an improbable pairing’, *The Journal of Applied Behavioral Science*, *56*(3), pp.266-271. https://journals.sagepub.com/doi/full/10.1177/0021886320936265.

Cooperrider, D. and Srivastva, S. (1987). ‘Appreciative inquiry in organizational life’, in R. Woodman and W. Pasmore (Eds.), Research in organizational change and development, 1, pp. 129–169. In *Organizational generativity: The appreciative* *inquiry summit and a scholarship of transformation*. Bingley: Emerald Group Publishing Limited.

Cooperrider, D. and Whitney, D. (2005). *Appreciative inquiry: A positive revolution in change*. San Francisco: Berrett-Koehler.

Cooperrider, D., Whitney, D.D. and Stavros, J. (2008). *The appreciative inquiry handbook: For leaders of change*. San Francisco: Berrett-Koehler Publishers.

Cornelius, S. and Gordon, C. (2008). 'Providing a flexible, learner-centred programme: Challenges for educators', *The Internet and Higher Education*, *11*(1), pp.33-41.

Cornelius, S., Gordon, C. and Ackland, A. (2011). 'Towards flexible learning for adult learners in professional contexts: An activity-focused course design', *Interactive Learning Environments*, *19*(4), pp.381-393.

Cousin, G. (2009). *Researching learning in higher education: An introduction to contemporary methods and approaches*. New York: Routledge.

Cox, S. and Graham, C.R. (2009). 'Using an elaborated model of the TPACK framework to analyze and depict teacher knowledge', *TechTrends*, *53*(5), pp.60-69.

Creswell, J. W. (2007) *Qualitative inquiry and research design: Choosing among five traditions*. 2nd Edition. Thousand Oaks, CA: Sage.

Creswell, J.W. (1994) *Research design: Qualitative and quantitative approaches*. Thousand Oaks, CA: Sage.

Crowther, D. and Lancaster, G. (2008). *Research methods in education*. Oxford: Elsevier Limited.

Dahlgren, P. (2005). 'The Internet, public spheres, and political communication: Dispersion and deliberation', *Political communication*, *22*(2), pp.147-162.

Daniels, H. ed. (1996). *An introduction to Vygotsky*. US: Taylor & Francis.

Davies, J. and Graff, M. (2005). 'Performance in e-learning: online participation and student grades', *British Journal of Educational Technology*, *36*(4), pp.657-663.

DCMS (2019). *No longer optional: employer demand for digital skills.* Available at:https://assets.publishing.service.gov.uk/government/uploads/system/uploads/attachment_data/file/807830/No_Longer_Optional_Employer_Demand_for_Digital_Skills.pdf. [Accessed 13.09.2020].

Dede, C. (2014). The Role of Digital Technologies in Deeper Learning. Students at the Center: Deeper Learning Research Series. *Jobs for the Future*. Available at: https://eric.ed.gov/?id=ED561254. [Accessed 11.11.2020].

Dennis, A.R., Fuller, R.M. and Valacich, J.S. (2008). 'Media, tasks, and communication processes: A theory of media synchronicity', *MIS quarterly*, pp.575-600.

Denzin, N.K. and Lincoln, Y.S. (2005). Introduction: The discipline and practice of qualitative research. In N. K. Denzin & Y. S. Lincoln (Eds.), *Strategies of qualitative inquiry* (pp. 1–43). Thousand Oaks, CA: Sage Publications, Inc.

Dwyer, K. (1982) *Moroccan Dialogues: Anthropology in question.* Baltimore: Johns Hopkins University Press.

Ellis, N. and Loughland, T. (2016). 'The challenges of practitioner research: A comparative study of Singapore and NSW', *Australian Journal of Teacher Education*, *41*(2), p.8.

Ertmer, P.A. (2005). 'Teacher pedagogical beliefs: The final frontier in our quest for technology integration?', *Educational technology research and development*, *53*(4), pp.25-39.

Ertmer, P.A., Ottenbreit-Leftwich, A.T., Sadik, O., Sendurur, E. and Sendurur, P. (2012). 'Teacher beliefs and technology integration practices: A critical relationship', *Computers & education*, *59*(2), pp.423-435.

Ertmer, P.A., Ottenbreit-Leftwich, A.T. and Tondeur, J. (2015). 'Teachers' beliefs and uses of technology to support 21st-century teaching and learning'. *International handbook of research on teacher beliefs*, *403*.

Ferri, F., Grifoni, P. and Guzzo, T. (2020). 'Online learning and emergency remote teaching: Opportunities and challenges in emergency situations', *Societies*, *10*(4), p.86.

Flipped Learning Network (2014). Flipped learning network unveils formal definition of flipped learning. Available at: http://www.flippedlearning.org/domain/46. [Accessed 10.01.2020].

Foulger, T.S., Graziano, K.J., Schmidt-Crawford, D. and Slykhuis, D.A. (2020). ‘Throw me a lifeline: A professional development pro-gram for teacher educators managing the demands from the rapid transition to online teaching’, *Teaching, Technology, and Teacher Education During the COVID-19 Pandemic: Stories from the Field*, pp.517-520.

Foulger, T.S., Graziano, K.J., Schmidt-Crawford, D. and Slykhuis, D.A. (2017). ‘Teacher educator technology competencies’, *Journal of Technology and Teacher Education*, *25*(4), pp.413-448.

Garrison, D.R. and Kanuka, H. (2004). ‘Blended learning: Uncovering its transformative potential in higher education’, *The internet and higher education*, *7*(2), pp.95-105.

Garrison, D.R. and Vaughan, N.D. (2008). *Blended learning in higher education: Framework, principles, and guidelines*. San Francisco: John Wiley & Sons.

Gibbs, G. (1995). ‘The relationship between quality in research and quality in teaching’, *Quality in Higher Education*, *1*(2), pp.147-157.

Graham, S. (2011). *Cities under siege: The new military urbanism*. London: Verso Books.

Grandgenett, N., Harris, J., & Hofer, M. (2010-2011). An activity-based approach to technology integration in the mathematics classroom. NCSM Journal of Mathematics Education Leadership, 13(2), pp.19-28.

Graziano, K.J., Herring, M.C., Carpenter, J.P., Smaldino, S. and Finsness, E.S. (2017). 'A TPACK diagnostic tool for teacher education leaders', *TechTrends*, *61*(4), pp.372-379.

Grix, J. (2004). *The foundations of research.* London: Palgrave Macmillan.

Grosseck, G. (2009). 'To use or not to use web 2.0 in higher education?', *Procedia-Social and Behavioral Sciences*, *1*(1), pp.478-482.

Guba, E.G. (1990). *The Paradigm Dialog*. Newbury Park, Thousand Oaks, CA:Sage Publications.

Guba, E.G. and Lincoln, Y.S. (1994). 'Competing paradigms in qualitative research', *Handbook of qualitative research*, *2*(163-194), p.105.

Gov.uk. (2017). *Industrial Strategy.* Available at: https://www.gov.uk/government/topical-events/the-uks-industrial-strategy [Accessed 23.03.2021]

Harasim, L. (2000). 'Shift happens: Online education as a new paradigm in learning', *The Internet and higher education*, *3*(1-2), pp.41-61.

Harris, J.B. (2016). 'Trends, Models, and Trajectories', *Handbook of technological pedagogical content knowledge (TPACK) for educators*, p.75.

Harris, J., Grandgenett, N. and Hofer, M. (2012, March). ‘Using structured interviews to assess experienced teachers’ TPACK’, in *Society for information technology & teacher education international Conference* (pp. 4696-4703). Association for the Advancement of Computing in Education (AACE).

Harris, J., Grandgenett, N. and Hofer, M. (2010, March. Testing a TPACK-based technology integration assessment rubric’, in *Society for Information Technology & Teacher Education International Conference* (pp. 3833-3840). Association for the Advancement of Computing in Education (AACE).

Harris, J. and Hofer, M. (2009, March). ‘Instructional planning activity types as vehicles for curriculum-based TPACK development’, in *Society for information technology & teacher education international conference* (pp. 4087-4095). Association for the Advancement of Computing in Education (AACE).

Harris, J.B. and Hofer, M.J. (2011). ‘Technological pedagogical content knowledge (TPACK) in action: A descriptive study of secondary teachers’ curriculum-based, technology-related instructional planning’, *Journal of Research on Technology in Education*, *43*(3), pp.211-229.

Harris, J.B., Phillips, M., Koehler, M.J. and Rosenberg, J.M. (2017). Editorial 33 (3): ‘TPCK/TPACK research and development: Past, present, and future directions’, *Australasian Journal of Educational Technology*, *33*(3).

Hattie, J., 2008. *Visible learning: A synthesis of over 800 meta-analyses relating to achievement*. New York: Routledge.

Haugsbakken, H. and Langseth, I. (2019). ‘The blockchain challenge for higher education institutions’, *European Journal of Education*, *2*(3), pp.41-46.

Herring, M., Thomas, T. and Redmond, P. (2014). Special editorial: ‘Technology leadership for preparing tomorrow's teachers to use technology’, *Journal of Digital Learning in Teacher Education*, *30*(3), pp.76-80.

Higher Education Academy (2015) Framework for flexible learning in Higher Education. York: Higher Education Academy.

Hirumi, A. (2014). ‘Does the use of technology improve learning? The answer lies in design’, *STEM (Science Technology Engineering Math)*, p.8.

Hodges, C., Moore, S., Lockee, B., Trust, T. and Bond, A. (2020). ‘The difference between emergency remote teaching and online learning’, *Educause review*, *27*, pp.1-12.

Hofer, M. and Harris, J. (2012, March). ‘TPACK research with inservice teachers: Where’s the TCK?’, in *Society for Information Technology & Teacher Education International Conference* (pp. 4704-4709). Association for the Advancement of Computing in Education (AACE).

Hollands, F.M. and Tirthali, D. (2014). ‘MOOCs: Expectations and reality’, *Center for Benefit-Cost Studies of Education, Teachers College, Columbia University,*

Houle, C. E. (1980) *Continuing Learning in the Professions*. San Francisco: Josey Baines.

Hussin, A.A. (2018). ‘Education 4.0 made simple: Ideas for teaching’, *International Journal of Education and Literacy Studies*, *6*(3), pp.92-98.

Jameson, J., Ferrell, G., Kelly, J., Walker, S. and Ryan, M. (2006). ‘Building trust and shared knowledge in communities of e-learning practice: collaborative leadership in the JISC eLISA and CAMEL lifelong learning projects’, *British Journal of Educational Technology*, *37*(6), pp.949-967.

JISC (2020a). *Digital Learning Rebooted*. Available at: https://www.JISC.ac.uk/reports/digital-learning-rebooted. [Accessed 23.03.2021].

JISC (2020b). *Learning and Teaching Reimagined*. Available at: https://www.JISC.ac.uk/reports/learningand-teaching-reimagined-change-and-challenge [Accessed 13.09.2020].

JISC (2020c). *Further Education and Skills Strategy 2020-2023*. Available at: https://www.JISC.ac.uk/reports/JISC-further-education-and-skills-strategy-2020-2023. [Accessed 13.09.2020].

Johnson, L., Adams Becker, S., Estrada, V. & Freeman, A. (2015). *NMC Horizon Report: 2015 Museum Edition*. Austin, Texas: The New Media Consortium. Available at: https://www.learntechlib.org/p/182009/. [Accessed 20.05.2020].

Jones, E. (2019). *The life and work of Sigmund Freud.* Lexington: Plunkett Lake Press.

Joynes, C., Rossignoli, S. and Amonoo-Kuofi, E.F., (2019). 21st Century Skills: evidence of issues in definition, demand and delivery for development contexts. Available at http://assets.publishing.service.gov.uk/media/5d71187ce5274a097c07b985/21st_century.pdf [Accessed 10.03.2020].

Kebritchi, M. (2014). 'Preferred teaching methods in online courses: Learners' views', *Journal of Online Learning and Teaching*, *10*(3), p.468.

Kember, D. (1997). 'A reconceptualisation of the research into university academics' conceptions of teaching', *Learning and instruction*, *7*(3), pp.255-275.

Kereluik, K., Casperson, G. and Akcaoglu, M. (2010, March). 'Coding pre-service teacher lesson plans for TPACK', in *Society for Information Technology & Teacher Education International Conference* (pp. 3889-3891). Association for the Advancement of Computing in Education (AACE).

Kılıçkaya, F. (2009). 'The effect of a computer-assisted language learning course on pre-service English teachers' practice teaching', *Educational Studies*, *35*(4), pp.437-448.

Kirkpatrick, L.A. and Hazan, C. (1994). 'Attachment styles and close relationships: A four-year prospective study', *Personal relationships*, *1*(2), pp.123-142.

Kirkwood, A. and Price, L. (2012). 'The influence upon design of differing conceptions of teaching and learning with technology', *Informed design of* *educational technologies in higher education: Enhanced learning and teaching*, pp.1-20.

Kirkwood, A. and Price, L. (2014). ‘Technology-enhanced learning and teaching in higher education: what is ‘enhanced’ and how do we know? A critical literature review’, *Learning, media and technology*, *39*(1), pp.6-36.

Knowles, M. (1990). *The Adult Learner: A neglected species*. 4th edn. Houston. TX: Gulf Publishing.

Koehler, M.J. and Mishra, P. (2005). ‘What happens when teachers design educational technology? The development of technological pedagogical content knowledge’, *Journal of educational computing research*, *32*(2), pp.131-152.

Koehler M.J., Mishra P., Kereluik K., Shin T.S., Graham C.R. (2014) The Technological Pedagogical Content Knowledge Framework. In: Spector J., Merrill M., Elen J., Bishop M. (eds) Handbook of Research on Educational Communications and Technology. New York: Springer. https://doi.org/10.1007/978-1-4614-3185-5_9.

Koehler, M. and Mishra, P. (2009). ‘What is technological pedagogical content knowledge (TPACK)?’, *Contemporary issues in technology and teacher education*, *9*(1), pp.60-70.

Kogan, L., Papanikolaou, D., Seru, A. and Stoffman, N. (2017). ‘Technological innovation, resource allocation, and growth’, *The Quarterly Journal of Economics*, *132*(2), pp.665-712.

Koh, J.H.L., Chai, C.S. and Lim, W.Y. (2017). ‘Teacher professional development for TPACK-21CL: Effects on teacher ICT integration and student outcomes’, *Journal of Educational Computing Research*, *55*(2), pp.172-196.

Kolb, D.A. (1984). ‘*The process of experiential learning. Experiential learning: experience as the source of learning and development’*. Upper Sadle River: Prentice-Hall, Inc.

Kukulska-Hulme, A., (2010). Mobile learning as a catalyst for change, Open Learning: The Journal of Open, Distance and e-Learning, 25(3), 181-185, DOI:10.1080/02680513.2010.511945.

Laurillard, D., (1993). Balancing the media. *Journal of educational Television*, *19*(2), pp.81-93.

Laurillard, D. (1993). Rethinking University Teaching: A Framework for the Effective Use of Educational Technology. London: Routledge.

Laurillard, D. (2002). Rethinking University Teaching. A conversational framework for the effective use of learning technologies. London: Routledge.

Lave, J. and Wenger, E. (1991). *Situated learning: Legitimate peripheral participation*. Cambridge: Cambridge University Press.

Lea, S.J., Stephenson, D. and Troy, J. (2003). ‘Higher education students' attitudes to student-centred learning: beyond 'educational bulimia'?’, *Studies in higher education*, *28*(3), pp.321-334.

Lincoln, Y.S. and Guba, E.G. (1985). *Naturalistic inquiry*. Beverly Hills: Sage.

Luckin, R., Bligh, B., Manches, A., Ainsworth, S., Crook, C. and Noss, R., (2012). Decoding learning: The proof, promise and potential of digital education. Nesta. Available at: https://apo.org.au/node/32254.

Maor, D. (2013). 'Does the use of the TPACK model enhance digital pedagogies: We don't understand the present so how can we imagine the future?', in *ASCILITE-Australian Society for Computers in Learning in Tertiary Education Annual Conference* (pp. 531-540). Australasian Society for Computers in Learning in Tertiary Education.

Melkun, C.H. (2012). 'Nontraditional students online: Composition, collaboration, and community', *The Journal of Continuing Higher Education*, *60*(1), pp.33-39.

Mezirow, J. (1978). 'Perspective transformation', *Adult education*, *28*(2), pp.100-110.

Mishra, P. and Koehler, M.J. (2006). 'Technological pedagogical content knowledge: A framework for teacher knowledge', *Teachers college record*, *108*(6), pp.1017-1054.

Mishra, P., Peruski, L. and Koehler, M. (2007). 'Developing technological pedagogical content knowledge (TPCK) through teaching online', in *Society for Information Technology & Teacher Education International Conference* (pp. 2208-2213). Association for the Advancement of Computing in Education (AACE).

Mishra, P., Koehler, M.J. and Henriksen, D. (2011). 'The seven trans-disciplinary habits of mind: Extending the TPACK framework towards 21st century learning', *Educational Technology*, pp.22-28.

Mkhize, D. (2016). 'Mediating epistemic access through everyday language resources in an English language classroom', *Southern African Linguistics and Applied Language Studies*, *34*(3), pp.227-240.

Mouza, C. (2016). 'Developing and assessing TPACK among pre-service teachers', *Handbook of technological pedagogical content knowledge (TPACK) for educators*, *169*.

Ng, W. (2012). 'Can we teach digital natives digital literacy?', *Computers & education*, *59*(3), pp.1065-1078.

Niess, M.L., Ronau, R.N., Shafer, K.G., Driskell, S.O., Harper, S.R., Johnston, C., Browning, C., Özgün-Koca, S.A. and Kersaint, G. (2009). 'Mathematics teacher TPACK standards and development model', *Contemporary issues in technology and teacher education*, *9*(1), pp.4-24.

Niess, M.L., van Zee, E.H. and Gillow-Wiles, H. (2010). 'Knowledge growth in teaching mathematics/science with spreadsheets: Moving PCK to TPACK through online professional development', *Journal of Digital Learning in Teacher Education*, *27*(2), pp.42-52.

Niess, M.L. (2011). 'Investigating TPACK: Knowledge growth in teaching with technology', *Journal of educational computing research*, *44*(3), pp.299-317.

Ofs (2021). *Gravity assist: propelling higher education, reviewing the shift towards digital learning.* Available at: https://www.officeforstudents.org.uk/publications/gravity-assist-propelling-higher-education-towards-a-brighter-future/. [Accessed 10.05.2021].

Oren, D.A., Jacobsen, F.M., Wehr, T.A., Cameron, C.L. and Rosenthal, N.E. (1992). ‘Predictors of response to phototherapy in seasonal affective disorder’, *Comprehensive psychiatry*, *33*(2), pp.111-114.

Orr, K. and Bennett, M. (2009). ‘Reflexivity in the co-production of academic-practitioner research’, *Qualitative Research in Organizations and Management: An International Journal*, 4(1), pp.85-102.

Padilla Rodriguez, B.C. and Armellini, A. (2014). ‘Applying the interaction equivalency theorem to online courses in a large organization’, *Journal of Interactive Online Learning*, *13*(2), pp.51-66.

Palloff, R.M. and Pratt, K. (2007). *Building online learning communities: Effective strategies for the virtual classroom*. San Francisco, CA: John Wiley & Sons.

Parr, T. (2013). *The definitive ANTLR 4 reference*. Raleigh: NC. Pragmatic Bookshelf.

Patton, M.Q. (1999). ‘Enhancing the quality and credibility of qualitative analysis’, *Health services research*, *34*(5 Pt 2), p.1189.

Patton, M. (2014) *Qualitative research & Evaluation Methods*. 4th edn. London: Sage Publications Ltd.

Phillips, M.D. (2014). *Teachers' TPACK enactment in a Community of Practice.* (Doctoral dissertation, Monash University).

Poore, M. (2011). 'Digital literacy: Human flourishing and collective intelligence in a knowledge society', *Literacy learning: The middle years*, *19*(2), pp.20-26.

Porras-Hernández, L.H. and Salinas-Amescua, B. (2013). 'Strengthening TPACK: A broader notion of context and the use of teacher's narratives to reveal knowledge construction', *Journal of Educational Computing Research*, *48*(2), pp.223-244.

Priest, Ann-Marie; Sturgess, Phillipa (2005): But is it scholarship? : group reflection as a scholarly activity. CQ University. Available at: https://hdl.handle.net/10018/2489. Accessed 30.30.2020].

Pring, R. (2015). *Philosophy of Educational Research.* 3rd edn. London, UK: Bloomsbury.

QAA, (2020). *Building A Taxonomy for Digital Learning*. Available at: https://www.qaa.ac.uk/newsevents/news/qaa-publishes-building-a-taxonomy-for-digital-learning [Accessed 30.08.2020].

Qasim AlHamad, A., Salameh, M. and Al Makhareez, L. (2014). 'Identifying students' trends toward personalizing Learning Management System (LMS) at Zarqa

University (Extended)', *Journal of Information Technology & Economic Development*, *5*(1).

Rivers, M.L., Dunlosky, J. and Joynes, R. (2019). 'The contribution of classroom exams to formative evaluation of concept-level knowledge', *Contemporary Educational Psychology*, *59*, p.101806.

Grobler, M.D. and Doering, A.H. (2000). *Integrating educational technology into teaching.* USA: Pearson.

Rogers, C.R. and Allender, J.A. (1983). *Freedom to learn for the 80's.* Ohio:US: Merrill Publishing.

Rose, D.H. and Meyer, A. (2002). *Teaching every student in the digital age: Universal design for learning*. Association for Supervision and Curriculum Development, Alexandria,

Rosenberg, J.M. and Koehler, M.J. (2015). 'Context and technological pedagogical content knowledge (TPACK): A systematic review', *Journal of Research on Technology in Education*, *47*(3), pp.186-210.

Rosenthal, R. (2010). 'Pygmalion effect', *The Corsini encyclopedia of psychology*, pp.1-2.

Salmon, G. (2014). 'Learning innovation: A framework for transformation', *European Journal of Open, Distance and e-Learning*, *17*(2), pp.220-236.

Salmon, G. (2019). ‘May the Fourth Be with You: Creating Education 4.0’, *Journal of Learning for Development*, *6*(2), pp.95-115. Available at: https://jl4d.org/index.php/ejl4d/article/view/35 [Accessed 23.03.2021].

Salmon, P. (2001). ‘Effects of physical exercise on anxiety, depression, and sensitivity to stress: a unifying theory’, *Clinical psychology review*, *21*(1), pp.33-61.

Salmons, J. 2012. Designing and Conducting Research with Online Interviews. In: Janet Salmons ed. 2012. *Cases in Online Interview Research*, Thousand Oaks, CA: SAGE Publications, Inc. pp. 1-30. Available at: http://www.doi.org/10.4135/9781506335155. [Accessed 10.07.2019]

Sandelowski, M. (1986). ‘The problem of rigor in qualitative research’, *Advances in nursing science*, 23(4), pp.223-340.

Schmidt, D.A., Baran, E., Thompson, A.D., Mishra, P., Koehler, M.J. and Shin, T.S. (2009). ‘Technological pedagogical content knowledge (TPACK) the development and validation of an assessment instrument for preservice teachers’, *Journal of research on Technology in Education*, *42*(2), pp.123-149.

Schmidt-Crawford, D.A., Tai, S.J.D., Wang, W. and Jin, Y. (2016). ‘Understanding teachers’ TPACK through observation’, *Handbook of technological pedagogical content knowledge (TPACK) for educators*, *107*. Pp. 117-128.

Schultz, T.W. (1962). ‘Reflections on investment in man’, *Journal of political economy*, *70*(5, Part 2), pp.1-8.

Senge, P.M. (1990). *The art and practice of the learning organization*. Available at: https://doi.org/10.1002/9780470479216.corpsy076.

Sharma, R., Jones, K., Anderson, W. and Inthiran, A. (2019). *Higher Education 4.0: Uni for nothin’, MOOCs for free?* Technology, Research, Education, Opinion. Available at https://github.com/mschermann/treoaticis2019. [Accessed 13.04.2019].

Sharpe, R. and Beetham, H. (2010). Understanding students’ uses of technology for learning: towards creative appropriation. *Rethinking learning for the digital age.* New York: Routledge. Available at https://doi.org/10.4324/9780203852064.

Sharples, M., Adams, A., Ferguson, R., Mark, G., McAndrew, P., Rienties, B., Weller, M. and Whitelock, D. (2014). *Innovating pedagogy 2014: exploring new forms of teaching, learning and assessment, to guide educators and policy makers*. Milton Keynes: The Open University.

Shulman, L. (1987). ‘Knowledge and teaching: Foundations of the new reform’, *Harvard educational review*, *57*(1), pp.1-23.

Siemens, G. (2005). ‘Learning development cycle: Bridging learning design and modern knowledge needs’. Available at: www.*Elearnspace everything elearning*.org/Articles/ldc.htm. [Accessed 10.05.2020].

Siemens, G. (2013). ‘Learning analytics: The emergence of a discipline’, *American Behavioral Scientist*, *57*(10), pp.1380-1400.

So, H.J. and Kim, B., (2009). Learning about problem-based learning: Student teachers integrating technology, pedagogy and content knowledge. *Australasian Journal of educational technology*, *25*(1). pp. 101-116. Available at: https://doi.org/10.14742/ajet.1183.

Strauss, W. and Howe, N. (1991). Generations.*: The history of America's future, 1584 to 2069*. New York: Quill.

Stavros, J.M., Torres, C. and Cooperrider, D.L. (2018). *Conversations worth having: Using appreciative inquiry to fuel productive and meaningful engagement*. Oakland, CA: Berrett-Koehler Publishers.

Stein, D. (1998). *Situated learning in adult education* (pp. 640-646). ERIC Clearinghouse on Adult, Career, and Vocational Education, Center on Education and Training for Employment, College of Education, the Ohio State University.

Stojanovic, L., Staab, S. and Studer, R. (2001, October). ‘eLearning based on the Semantic Web’, in *WebNet2001-World Conference on the WWW and Internet* (pp. 23-27).

Svenja, V., David, K., Eckhard, K. and Sonja, B. (2012). *TALIS teaching practices and pedagogical Innovations evidence from TALIS: Evidence from TALIS*, OOECD Publishing. Available at: http://dx.doi.org/10.1787/9789264123540-en.

Swallow, M.J. and Olofson, M.W. (2017). 'Contextual understandings in the TPACK framework', *Journal of Research on Technology in Education*, *49*(3-4), pp.228-244.

Tai, S.J.D. (2015). 'From TPACK-in-action workshops to classrooms: CALL competency developed and integrated', *Language Learning & Technology*, *19*(1), pp.139-164.

Tondeur, J., Forkosh-Baruch, A., Prestridge, S., Albion, P. and Edirisinghe, S. (2016). 'Responding to challenges in teacher professional development for ICT integration in education', *Educational Technology and Society*, *19*(3), pp.110-120.

Toohey, K. (2000). 'Multilingual Matters', *Learning English at school: Identity, social relations, and classroom practice* (Vol. 20).

Trosten-Bloom, A., Cooperrider, D., Zhexembayeva, N. and Whitney, D. (2003). 'Business as Agent of World Benefit', *OD PRACTITIONER*, *35*(3), p.5.

Tsai, C.C. and Chai, C.S. (2012). 'The" third"-order barrier for technology-integration instruction: Implications for teacher education', *Australasian Journal of Educational Technology*, *28*(6).

UNESCO (2018). *ICT Competency Framework of teachers*. Available at: https://en.unesco.org/themes/ict-education/competency-framework-teachers. [Accessed 23.03.2021].

Van Manen, M. (1995). ‘On the epistemology of reflective practice’, *Teachers and teaching*, *1*(1), pp.33-50.

Veale, A. (2005). ‘Creative methodologies in participatory research with children’, *Researching children’s experience: Approaches and methods*. London: Sage Publications Ltd.

Voogt, J. and McKenney, S. (2017). ‘TPACK in teacher education: Are we preparing teachers to use technology for early literacy?’, *Technology, pedagogy and education*, *26*(1), pp.69-83.

Voogt, J. and Roblin, N.P. (2010). 21st century skills discussion paper. *University of Twente*.

Voogt, J. and Roblin, N.P. (2012). ‘A comparative analysis of international frameworks for 21st century competences: Implications for national curriculum policies’, *Journal of curriculum studies*, *44*(3), pp.299-321.

Voogt, J., Fisser, P., Pareja Roblin, N., Tondeur, J. and van Breaks, J. (2013). ‘Technological pedagogical content knowledge–a review of the literature’, *Journal of computer assisted learning*, *29*(2), pp.109-121.

Vygotsky, L.S. (1978). *Mind in society: The development of higher mental processes* (E. Rice, Ed. & Trans.). Cambridge, MA; Harvard University Press.

Wales, J. (2011). *Learning without Frontiers Keynote*. Available at: http://www.learningwithoutfrontiers.com/lwf-london-2011. [Accessed on 15.02.2021].

Weinberger, Y., 2018. Strategies for effecting system-wide pedagogical change: identifying and addressing the gap between organizational and pedagogical implementation. *Professional Development in Education*, *44*(1), pp.47-61.

Whitney, D., Trosten-Bloom, A. and Vianello, M.G. (2019), Appreciative Inquiry: Positive Action Research', Zuber-Skerritt, O. and Wood, L. (Ed.) *Action Learning and Action Research: Genres and Approaches*, Bingley: Emerald Publishing Limited, pp. 163-177.Available at: https://doi.org/10.1108/978-1-78769-537-520191015.

Williams, J. and Ritter, J.K. (2010). 'Constructing new professional identities through self-study: from teacher to teacher educator', *Professional development in education*, *36*(1-2), pp.77-92.

World Economic Forum (2020). *Schools of the Future Defining New Models of Education for the Fourth Industrial Revolution.* Available at http://www3.weforum.org/docs/WEF_Schools_of_the_Future_Report_2019.pdf [Accessed on 23.03.2021].

APPENDICES

List of Contents

Appendix 1 – Participant Information Sheet

Topic of Study
This study is part of a professional doctorate in Education (EdD), with a working title of Facilitating Pedagogical change in online learning in higher education through professional development. It is focused on using technology effectively to support student-centred learning pedagogies with online learning. As a professional doctorate the research intends to inform future online learning teaching practices and inform approaches to professional development to support the development of digital capabilities.

Participation
Participants will be invited to take part in the research project, participation is voluntary, and candidates are able to withdraw from the process at any time. The project will take place over an 8-week period during team meetings (PTL (Programme Team Leader) day May, June, and July). During that time participants will be asked to observe teaching practice online and take part in a small-group appreciative interview, take part in an online focus group, and then contribute to an online discussion forum. Participants will be permanent members of staff, who are able to influence online teaching practices as part of their current job role.

The research
The overall aim is to explore best practices in online learning and develop a future collective vision by identifying strengths and building of current practice. A key focus of the research is the development of digital capabilities for teaching staff to support the development of student's digital capabilities in response to changing needs of the workforce the fourth industrial revolution (4IR). The methodology of AI is a group process and involves the systematic discovery of what gives life to activity. It involves asking questions which strengthen a system to apprehend, anticipate and heighten positive potential (Cooperrider and Whitney, 2005).
The research intends to build on the aspirations and ideas of the participants, who will be supported in using the principles of socio-constructivism, to provide a catalyst for change. The participants will have significant involvement in supporting teachers in using technology in the context of online learning. AI involves the use of methods which allow for questions encouraging positive thinking and group interaction. The research process will align with the stages of appreciative enquiry process of discover, dream, design, and destiny.

Research aims
1. Investigate how technology is being integrated to support student-centred learning pedagogies in online learning
The first research question examines current teaching practice and facilitates discussion around how technology supports student centred learning pedagogies within recently observed lessons. This first stage of the appreciative inquiry process known as the discovery phase. Participants will undertake observations of online lessons and take part in a small group interview which uses generative questions to explore the best of what has been observed using the Technology, Pedagogical, and Technological Framework (TPACK).
2. Explore how technology could be utilised to support student-centred learning pedagogies in online learning
Phase two of the appreciative enquiry is referred to as the 'Dream' stage and will consist of building on the themes arising from the first phase (Discovery) to collectively envision what the future involves. This would involve an online focus group to bring ideas together to gain a collective view of what student-centred learning in online learning would look like using a virtual Whiteboard. Phase 3, the 'Design'

stage will require participants to design future practice by developing propositional statements within a synchronous online forum. Whilst participants will be required to be creative, they will be encouraged to identify realistic visions which could operate within the challenges they are faced with.

3. How can professional development approaches support lecturers develop their digital literacies to deliver student-centred pedagogies in online learning

Within the 'Destiny' stage participants will explore the professional development needed to enable the pedagogical change. The group will be split into 'project groups' and asked to prepare some statements which can bridge the gap between current and future practices and provide some suggested staff development activities. The use of a Kanban board (e.g., Planner or Trello) will be used to enable the sharing and co-collaboration of these proposition statements and professional development activities.

Dissemination

Dissemination of findings will occur through a Microsoft Office Teams Site, which will be used to develop a community of practice through the AI process, and in the final published thesis. Further dissemination may take place through the journal articles, and conference proceeding, or sharing within learning technology networks (Association of Learning Technologies, and JISC). Outcomes from the study will also be shared at the Arden University Learning and Teaching Committee. The final thesis and other outputs will be shared with participants.

Confidentiality

The study will collect data from observation of teaching practice which will be anonymized by participants, with summaries of conversations kept secure with access by the participants involved in the observation and the researcher. Any dialogue recorded as part of the appreciative enquiry process will be anonymised in the recording and transcribing.

Participants can withdraw themselves from the study at any time. All contact about the study should be via the Research Project Teams site or through the Arden email address of the research Carmen Miles – email address [redacted]

Appendix 2 – Ethical Approval Form

Ethics Submission Form 2018

Faculty of Education, Health and Well-being

- *You must complete all sections of this form in as much detail as possible. (word counts are given if necessary) If your form is incomplete, it will be returned to you to resubmit.*
- *You must be given approval for your research project from the University before you can begin.*
- *Applications should be submitted by 1st Monday of each month to* FEHWEthics@wlv.ac.uk.

SECTION ONE

1. Enter Your First Name and Surname Below:	
First Name	Carmen
Surname	Miles

2. Enter your University Student/ Number
1531019

3. Enter your University e mail address (e.g., M.Name@wlv.ac.uk)
[e-mail address redacted]

4. Enter your daytime contact telephone number in case we need to contact you.
[number redacted]

5. Enter the name of your Project Supervisor, Director of Studies, or Principal Investigator.
Megan Lawton/John Traxler

6. Which subject area is your research / project located? Please ü all that apply

		ü
1	FEHW	x
2	Education	ü
3	Health	
4	Sport	
5	Psychology	
6	FSE	
7	FOSS	
8	FOA	
9	COLT	
10	Cross University Project	

	Other – Please give details below:	

7 Please indicate if this study is	
	ü
Staff Research (Externally funded)	ü
Staff Research (University funded)	

8. Which Category of Project Are You Applying For? Categories are outlined in the handbook from the RPU (www.wlv.ac.uk/rpu) Please tick ü					
Category A	x	Category B		Category 0	

9. Give details of service user involvement

SECTION TWO

10. What is the title of your project?
Facilitating Pedagogical change in blended learning in higher education through professional development.

11. Give details of any proposed research questions/hypothesis

The research uses Appreciative Inquiry (AI) to explore a hypothesis that technology is not utilised effectively to support pedagogical approaches in active blended learning. The key focus is the digital skills of tutors and how they might be developed.

Proposed research questions:

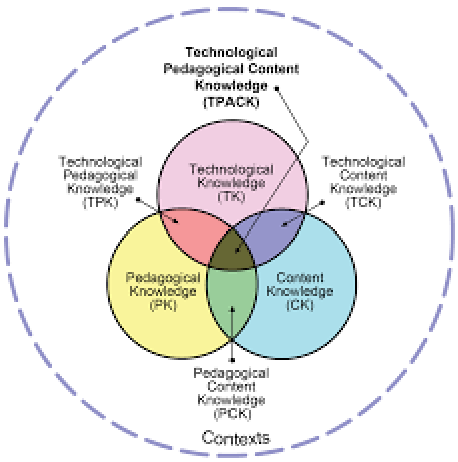
1. How is technology being integrated to support pedagogical approaches associated with active blended learning
2. How could technology be utilised to support active blended learning
3. What professional development approaches could support the integration of technology in active blended learning

12. Briefly outline your project, stating the rationale, aims and expected outcomes. (300 words)

The project will take place in a private university specialising in blended and online education and will explore how tutors could be supported in their integration of technology. The growth in opportunities for using technology within education calls for effective integration of technology into teaching and learning within the higher education. It is recognised that the use of technology within teaching needs to be underpinned by sound pedagogical decisions (Conole et al., 2004). Using a pedagogically driven approach to integrating technology has become a challenge for teachers (Beetham and Sharpe, 2013). Pedagogical change is needed to enable higher education tutors to use active learning pedagogies in blended learning contexts to address the gap between published research and actual teaching practice.

The outputs from this research will be transferrable to other settings trying to integrate technology. The use of professional development, to support the integration of technology of teaching approaches which develop the learner's transferable skills including digital literacy, communication and leadership has been influenced by Laurillard (2013).

TPACK (technological, pedagogical, and content knowledge) is a pedagogical change framework, aimed at the integration of technology into teaching through the intersections of the domains, using professional development. This research focuses on the intersection between pedagogical knowledge and technological knowledge.



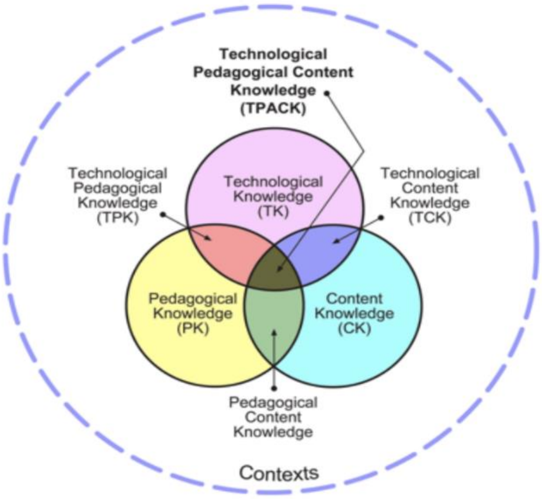
The outcomes from the research are expected to be solutions generated through the four stages of Appreciative Inquiry and align to the proposed research questions.

1. How is technology is being integrated to support pedagogical approaches associated with active blended learning
2. How could technology be utilised to support active blended learning
3. What professional development approaches could support the integration of technology in active blended learning

13. How will your research be conducted? (750 words max.)
Describe the methods so that it can be easily understood by the ethics committee.
Please ensure you clearly explain any acronyms and subject specific terminology.

This is a qualitative piece of research and will be conducted using
an Appreciative Inquiry (AI) methodology. This research approach aligns to the overall research aim of changing practice focusing on identifying strengths and building on these

instead of identifying problems and weaknesses. AI is a group process and involves the systematic discovery of what gives life to activity. It involves asking questions which strengthen a system to apprehend, anticipate and heighten positive potential (Cooperrider and Whitney, 2005).
The research intends to build on the aspirations and ideas of the participants, who will be supported in using the principles of socio-constructivism, to provide a catalyst for change. The participants will have significant involvement in supporting teaching or the use of technology in the context of blended learning. AI involves the use of methods which allow for questions encouraging positive thinking and group interaction. For my study, the research questions (above) and methods align with the stages of appreciative enquiry process of discover, dream, design, and destiny.
1. How technology is being integrated to support pedagogical approaches associated with active blended learning
The first research question examines current teaching practice and facilitates discussion around how technology is integrated into teaching within the lessons observed. Observation of teaching practice will be carried out in phase one of the appreciative inquiry process which is known as the discovery phase. Information will be gathered on what is working well through undertaking observation of lessons and recording the intersection between technology knowledge (TK) and technological pedagogy knowledge (PK) illustrated as technological pedagogical and knowledge (TPACK) model included here:



(Mishra and Koehler, 2009)
A group of a minimum of 10 participants will conduct peer observations, using a TPACK style lesson observation instrument. The TPACK model of pedagogical change has been selected for its focus on the development of teachers, and their integration of pedagogy and technology, which was highlighted as a gap in knowledge within the pilot study carried out April 2017.
Analysis of these observations will focus on the integration of technology, with the encouragement of sharing stories between the tutor and the peer observer of what is working well. This will be followed by a semi-structured group interview in a larger group where participants share 'stories' of what they found gave 'life' to the successful integration of technology as outlined in the appreciative inquiry process outlined by Cooperrider et al., (2003)

These shared experiences will be used within the group to provide themes arising from the reflection of factors which have contributed to the successful integration of technology. Discussion here will focus on key strengths of the teaching including what gave life to the session, what participants felt added the most value to their work, and initial reflections on how the participants envisaged how technology could be better integrated in the future.
2. How could technology be utilised to support active blended learning

Phase two of the appreciative enquiry is referred to as 'Dream' and will consist of building on the themes arising from the first phase (discovery) to collectively envision what the future involves. This would involve all participants, using a second group interview. The purpose of this stage is to gain a collective view of what the active blended learning implementation would look like. Part of this visioning stage will require participants to design the future practice. Whist participants will be required to be creative they will be encouraged to identify realistic visions which could operate within the challenges they are faced with.
3. What professional development approaches could support the integration of technology in active blended learning

Within the design stage participants are asked to develop propositional statements about the types of professional development needed to enable the pedagogical change. The group will be asked to prepare some statements which can bridge the gap between current and future practices. The use of an asynchronous online discussion forum will be used to enable the sharing and co-collaboration of the proposition statements.
Supporting the dream phase, identification of how we can empower educators to put into practice the ideas generated around integrating technology into their teaching and facilitate the development and sharing of good practice. We will consider implementation and evaluation strategies that can be used to facilitate the implementation of active learning, through the development of the wider academic community.

14. How will your data be analysed?

This is a piece of participatory action research, using appreciative inquiry. Analysis will take place at each stage of the AI process in line with the AI methodology.

15. Is ethical approval required by an external agency? (e.g., NHS, company, other university, outside organisation, etc.)

YES - ethical approval has been obtained

External Approval has been gained by the Senior Management Team at Arden University, as the research is a work-based project.

3. YES - see contact details below of person who can verify that ethical approval has been obtained)

Email: [e-mail address redacted] Secretary of the Senior Management Team, Arden University
[e-mail address redacted] Chair of the Senior Management Team
Telephone: [number redacted]

16. What in your view are the ethical considerations involved in this project? (e.g., confidentiality, consent, risk, physical or psychological harm, etc.) Please explain in full sentences. Do not simply list the issues. You should also make it clear how you are going to deal with issues about your own welfare and safety.

Areas	ü	As a practitioner-researcher I will need to acknowledge my professional role within the research and ensure that this does not impact on any of the research process from collection of data through to data analysis. Participants are either studying for a doctorate or have them. In the pilot I was viewed as a practitioner-research rather than as a 'manager' trying to implement a change. My role as an insider researcher will need to be considered in the design of the research, and dealing with colleagues, in order that its situatedness does not impact on the scholarship of the project. A key aspect of the research is the positive impact of engaging with a community of practice, but the research will need to be sensitive to the challenges of insider research. Challenges identified include the anonymity and confidentiality of colleagues, challenging the value system of the workplace and teaching practices, and adopting of roles within the research process which may be intimidating to those new to research. I will need to adopt a reflexive distance from the 'professional' role I adopt within Arden University in order that the integrity of the research is not compromised.
Confidentiality	**ü**	Confidentiality of reporting from the observation of lessons to alleviate any potential harm caused by collecting data and using this in further discussions. Confidentiality and anonymity of data within the research process - achieved by coding participants.
Consent	**ü**	Informed consent will be sought, as a researcher I will need to be sensitive to the additional time and workload the project will incur and allow for withdrawal. Be clear that the project is beneficial to those who are taking part, and the contribution to their own development and that of their teams (i.e., closely relates to their own job role of improving practice).
Participants Under 18	None	

17. Have participants been/will participants be, fully informed of the risks and benefits of participating and of their right to refuse participation or withdraw from the research at any time?

1. YES (Outline your procedures for informing participants in the space below.)

YES

Participants will be given accessed to a secure area within office 365 teams, where research discussion and dissemination of results will be shared.

The shared area will be given information which outlines the nature, purpose, and scope of the research alongside the right to withdraw. Participants will be made aware of their contribution to enhancing the teaching and learning approaches, and their own professional development that will arise as a result – including evidence against the Professional Standards Framework.

Participants will be briefed in the conducting of peer observations and the anonymity of participants will be observed, in this and the recording of data from group interviews.

Informed consent will be sought by all participants. All participants will be required to sign a declaration to confirm that they have read the participation information sheet, and that they consent to take part in the research.

Withdrawal will be made clear, and the stage of withdrawal, before the start of the next phase.

18. How will you ensure that the identity of your participants is protected (See RPU website (www.wlv.ac.uk/rpu) and follow link to Ethical Guidance pages for guidance on anonymity)

The recording of data in group interviews will protect the identity of the contributors. The group conversations will not share the names of participants that have been observed.

Group communication using online forums, will take place in a secure site, using office 365 teams which will not be accessible to non-members.

19. How will you ensure that data remains confidential ((See RPU website (www.wlv.ac.uk/rpu) and follow link to Ethical Guidance pages for definition of confidentiality)

Data created as part of the research process, including interview transcripts, observation records and questionnaires will be stored in a password protected computer. During the appreciative inquiry process data will not be shared with any participants, without checking that confidential details are not shared.

20. How will you store your data during and after the project? (See RPU website (www.wlv.ac.uk/rpu) and follow link to Ethical Guidance pages for definition of and guidance on data protection and storage).

During the project data will be stored on an encrypted laptop. After the project data will be deleted from the laptop and stored on an encrypted UBS stick.

Permission will be gained for future use of the data in future research articles.

SECTION THREE

The following questions must be answered otherwise your form will not be reviewed and it will need to be resubmitted to the panel later.

21. Does Your Research Involve Children Under 18 years of Age?
Please delete and leave your response below

1. No

If Yes, do you have an Enhanced Disclosure Certificate from the Criminal Records Bureau/Disclosure and Barring Service (DBS)?

No

22. Are participants in your study going to be recruited from a potentially vulnerable group? (See RPU website (www.wlv.ac.uk/rpu) and follow link to Ethical Guidance pages for definition of vulnerable groups)

1. YES (Describe below which groups and what measures you will take to respect their rights and safeguard them)
2. NO

NO

23. Does your research fit into any of the following security-sensitive categories? (For definition of security sensitive categories see RPU webpages (www.wlv.ac.uk/rpu) follow links to Ethical Guidance). If so, please complete questions 22-26

	Security Sensitive Categories	If YES, please tick below. ü	If NO, please tick below.
1	Commissioned by the military		x
2	Commissioned under an EU security call		x
3	Involve the acquisition of security clearances		x
4	Concern's terrorist or extreme groups		x

24. Does your research involve the storage on a computer of any records, statements or other documents that can be interpreted as promoting or endorsing terrorist acts?

Please delete and leave your response below.
1. NO

25. Will your research involve the electronic transmission (e.g., as an email attachment) of any records or statements that can be interpreted as promoting or endorsing terrorist acts? Please delete and leave your response below.
1. NO

26. Do you agree to store electronically on a secure University file store any records or statements that can be interpreted as promoting or endorsing terrorist acts. Do you also agree to scan and upload any paper documents with the same sort of content? Access to this file store will be protected by a password unique to you. Please confirm you understand and agree to these conditions.
1. YES, I understand and agree to the conditions
Yes

27. Do you agree NOT to transmit electronically to any third-party documents in the University secure document store?
1. YES, I agree

28. Will your research involve visits to websites that might be associated with extreme, or terrorist, organisations? (for definition of extreme or terrorist organisations see RPU webpages (www.wlv.ac.uk/rpu) and follow links to Ethical Guidance.
1. YES (Please outline which websites and why you consider this necessary) 2. NO
No

29. You are advised that visits to websites that might be associated with extreme, or terrorist organisations may be subject to surveillance by the police. Accessing those sites from University IP (Internet Protocol) addresses might lead to police enquiries. Do you understand this risk?
1. YES, I understand

30. Appendices (All submissions) Please list the items that you are submitting with this document. (These will need to be submitted to FEHWResearch@wlv.ac.uk) You may want to include additional information that will help the panel with their decision such as your proposal. You need to provide examples of research instruments, recruitment posters and leaflets, information sheets (age appropriate) assent forms (for children), consent forms, risk assessment if research is carried out abroad.

Appendix 3 - Appreciative Inquiry Interview Guide (Discovery Phase)

RESEARCH PROJECT FACILITATING PEDAGOGICAL CHANGE IN ONLINE LEARNING WITHIN HIGHER EDUCATION

How to use this guide:
You have been invited to join an 'appreciative inquiry' interview with another member of the project team, to share stories about online teaching at Arden University. To prepare for this interview, please complete the table (on page 2) to help identify some of the best practices you have uncovered as part of your recent lesson observations.

What is appreciative inquiry?
Appreciative inquiry (AI) is a positive strengths-based approach to help facilitate organisational change. It has many definitions, but it is based on the premise if we discover what is working well and build on this, we can uncover the best in ourselves and others and envision and design the future. AI is used around the world by organisations with differing aims and scale and is becoming more widespread as a power tool to enable change.

What is an appreciative interview?
To have an appreciative conversation you will need to be a generous listener, the purpose is to focus on what we are doing well through sharing stories. By asking generative questions about past successes will help us uncover the best in ourselves and our organisation which we can then build on for future success. The goal of asking questions is to invite insight into innovations and that sharing stories can be scaled up to lead to positive change. Find out more.

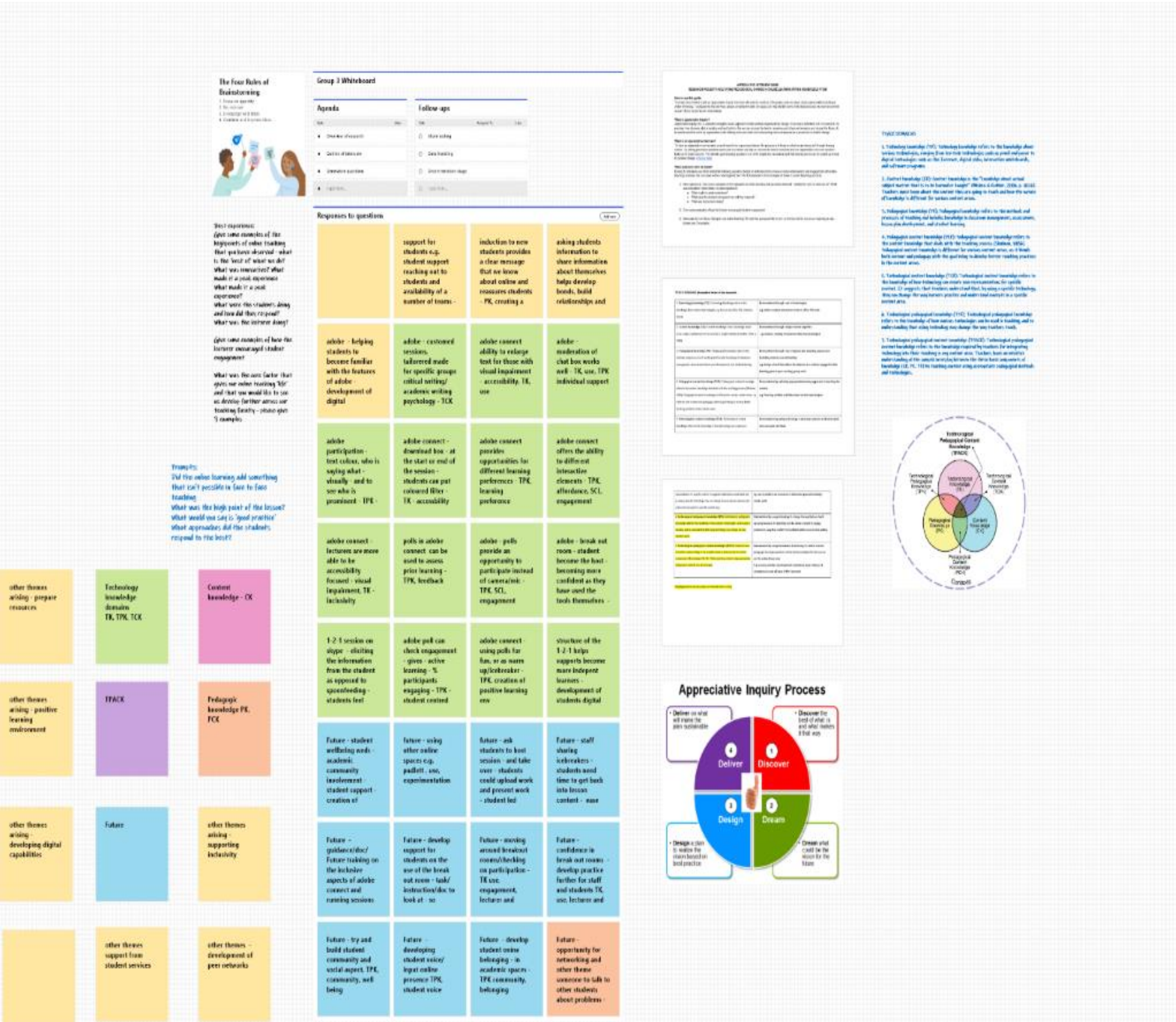
What questions will I be asked?
During the interview you will be asked the following questions based on reflections from previous lesson observations and engagement with online teaching practices, the outcomes will be coded against the TPACK framework to find examples of these in current teaching practices.

1. Best experience: Give some examples of the highpoints of online teaching that you have observed - what is the 'best of' what we do? What was innovative? What made it a peak experience
    - What made it a peak experience?
    - What were the students doing and how did they respond?
    - What was the lecturer doing?

2. Give some examples of how the lecturer encouraged student engagement

3. What was the core factor that gives our online teaching ‘life’ and that you would like to see us develop further across our teaching faculty - please give 3 examples?

Appendix 4 - Sample Whiteboard from Discovery Interviews



Appendix 5 - Appreciative Enquiry Dream Online Focus Group

Within this stage we are discussing the insights we gained from the 'discovery stage' where we used appreciative interviews to uncover the positive core and highlights of our online teaching practices.
Listed below are some generative questions which will help facilitate discussion around each of the TPACK domains, to help gain a collective vision of online teaching at Arden University in the future. The questions below are to help stimulate thought and conversation – you may think of others.
Schedule for the focus group:

1. Facilitator to provide a summary of findings from the discovery stages (whole group summary) 10 mins

Adaptability by lecturers to student needs	**Ideas for targeted staff development and student development,**	**Opportunity for student engagement by all**
Creativity across learning spaces,	**Lots of ways to enhance online presence e.g., music**	**Opportunity for student-centred learning**
Better focus on accessibility and inclusivity	**Examples of experimentation with how you use online tools in this case adobe connect**	**Opportunity for individual support**

2. Small break out groups to answer the generative questions and recording answers on this word document using a shared screen or a separate word document
3. Collection of all focus group responses into a 'whole group' Whiteboard (asynchronous) member to view the team white board as part of the design stage)

Technological knowledge
How could we use technology to enable students to?

- Learn innovative ideas
- Build knowledge
- Share knowledge with others
- Applying their knowledge to new scenarios
- Engage with formative and summative Feedback
- Prepare for assessment
- Enable students and lecturers to move between online spaces
- Provide feedback to learners

Pedagogical knowledge
How can we use technology to?

- Encourage self-regulation
- Encourage students to be take ownership for their learning
- Encourage students to have greater influence on the learning process
- To develop their understanding of key concepts, and threshold knowledge
- To encourage engagement with lecturer, peer feedback and self-reflection

Content knowledge

How can technology support:

- Understanding of subject content and knowledge
- Learning that is specific to your subject discipline

Pedagogical Content knowledge

- How can we learn about new ways teach our subject?
- How can technology help us teach new concepts?
- What types of feedback could work well in your subject area, thinking the development of learners for future study/employment?
- How could we develop student's language skills, so they are able to have the right words to talk about their subject
- What sources of information would you like students to have to look up information/key concepts in the classroom in your subject area?
- What elements of delivery should we standardise when we have different student profiles/tutor approaches to teaching and learning?
- Students in law are expected to research class materials before the lesson to have debates in class – what would be needed to make that happen in your class?

Technological content knowledge

- How could we use technology to support the learning of new ideas?
- How can technology help learners build their knowledge?
- How can technology provide learners practice in applying their knowledge?

Technological Pedagogical knowledge

- In online learning what is most valuable use of face-to-face sessions
- In blended learning what strategies could be used to encourage good student attendance
- How can we enable students who miss a session catch up within a blended class?
- How can we encourage students to participate in discussion forums?
- How can we encourage students to participate in blogs?
- How can we encourage students to participate in groupwork online?
- What should a blended learning classroom look like?
- Are there any other features of ilearn (Moodle) you think we should use to enhance blended learning?
- What other resources are needed within the classroom to support active learning?
- What can supplement the Whiteboard/flip chart as we are writing a lot of info on these
- Can technology support us in teaching referencing?
- How does technology help us provide informal feedback to students?
- How does technology help us provide formal feedback to students?
- How does technology help us facilitate groupwork – for learning, formative, and summative assessment

Technological, pedagogical, and content knowledge

- How can technology support giving feedback in your subject?

- What other resources are needed to support active/student-centred learning in your subject
- How are we using technology/content/pedagogical knowledge to help prepare students effectively towards their summative assessment?
- How can we use technology to support student-centred learning?
- What tools can we use to support collaboration with peers, lecturers
- What uses of technology can we use to encourage critical thinking

Appendix 6 – Propositional Statements

Designing SCL Pedagogies using the TPACK Framework

Current approaches to LTA	Where we want to be	How do we get there?
Flexible Learning		
Focus on student outcomes instead of the wider benefits of the learner process Need to integrate sector and 21st C digital capabilities into programme design	The learning experience is transformative, relevant and current. Development of digital capabilities is embedded into the learning experience Learning content is intentional and lecturers choose the best content to deliver either within the classroom, or online. Learning opportunities provided are relevant, current and of a high value to each learner	Initiatives that focus on the transformative impacts of online learning. Use of evaluation tools to assess the impact of initiatives on their transformative impact to inform future initiatives/development Use a mixture of quantitative and qualitative analysis to assess the impact on the student experience Revise the approach to authoring, structure, and purpose of online materials.
Dominance of teacher led activities Little freedom of choice for learners	There is a shift of power from teacher to students enabled in all aspects of the learner journey e.g., from programme design, delivery, assessment, and feedback Lecturers are facilitators of the online learning experience supporting learners through oversight of their development	Rethink programme and module design processes Use of student-centred learning teaching strategies Use innovative assessment and feedback practices to provide more student choice in assessment and feedback
The institute keeps student information and tracks progression The structure of learning is quite ‘fixed’ and does not adapt to learners needs	There is an emphasis on developing students' self-regulation and autonomy There is transparency of learning processes and student’s progress is highly individual and visible. Learning is adapted to suit the context and the learners needs	Redesign the module page to show progress tracking Development of a student dashboard Learner analytics support both at risk and inform teaching Creation of individual learning paths

Developing Digital Capabilities		
Digital capability is unknown. There is not a systematic approach to developing staff and student digital capabilities	Digital capabilities are a key focus of professional development for all staff and students so we can develop the 21st skills needed by our learners We engage with sector experts to ensure we are preparing our learners for their future goals	Development of an Arden Digital Skills Framework + Digital Learning Taxonomy Professional development that focuses on Digital Learning e.g.PG Cert in Digital Pedagogies Digital capabilities audit e.g., JISC discovery tool Staff and student digital workshops Develop expertise by engaging with external networks/sector leading best practice
There is a difference between enacted and actual integration of digital skills and pedagogies Lack of clarity of how to embed digital capabilities into the design of a programme, module, lesson, and assessment	There are clear processes to embed digital into the curriculum effectively. Students and lecturers are pro-actively supported in their development. Faculty are highly reflective practitioners and have a high level of self-efficacy.	CPD for staff and students through bitesize learning that is accredited/badged Development of digital taxonomies PG Cert Digital Learning Arden AdvanceHE Fellowship programme Ongoing consultation with sector experts e.g., JISC, PSRBs
Technology is used to replicate classroom teaching practice. Little scope for staff and students to experiment with technology to discover transformative elements of online teaching	Students are given opportunities to construct knowledge (independently and collaboratively) through innovative ways of using technology	Experimentation with VLE design and trial of teaching tools e.g., shared virtual spaces, co-creation/curation of artefacts
Culture of Innovation		
Staff are unclear how they move ideas forward and where to share their ideas Staff feel unable to try innovative ideas	There is a culture of innovation and permission to 'fail' and experiment. Innovation is generated from all avenues and is not specific to role	Culture of 'trust' and 'autonomy' Teachers have autonomy over their teaching environments
Fixation of problems that need to be fixed developments are not user-centric Thinking is linear, and convergent	Innovation is supported by the institution using systematic approaches to enhance the learning experience Staff are given opportunities to develop creative thinking and innovative solutions	Instil belief that individuals can shape future changes Application of design thinking is used shape a learning experience that meets learners needs

Community of Practice		
Little knowledge of lecturer current skills and lack of robust support for skill development Teaching is not viewed as a highly skilled activity Development of staff is not viewed as a strategic priority by all	There is institutional buy-in for the professionalism of teaching staff and support for professional development Pedagogic knowledge - priority - support for etc Professional development as an enabler of change	Academics are consulted on decisions which impact on their learning environment and providing support to their learners. Professional development supports changes in lecturer roles because of changes to teaching and learning approaches
Informal networks exist but do not contribute to decision making or share best practice across the university	Communities of practice and peer networks are central in developing teaching and learning practices through exploratory approaches and sharing good practice	Launch of the CILT (Centre for Innovation, Learning and Teaching) Research/practice groups Innovation fund School based and cross dept CoP networks

Appendix 7 - TPACK Indicators – Developed and Advanced

Student Centred Learning benefits/opportunities	Indicators (Examples of Developing TPK)	Indicators (Examples of Advanced TPK)
Online participation and engagement: ability to check on learning, personalised and timely feedback	Students use the chat box in real time to ask /answer group or individual questions. Effective use of questioning, pause, and chat box features to encourage engagement. Using polls, quizzes and directed questioning to check understanding and encourage online participation. Lecturers provide a safe space to participate and scaffold learning.	Lecturers proficient in a range of techniques to encourage participation and engagement and can adapt easily. Feedback is personalised and provided at the point of need. Webinars and forums provide greater opportunity to participate and engage with others than f2f learning.
Flexible learning: learning, which is adaptive, inclusive, uses a mix learning spaces through both synchronous and asynchronous activity	Design of the session offers some flexibility and aims to adapt to all learners' needs. Online classroom management techniques are inclusive, provide a safe space and fair to all Online learning offers equal access to all learners. Opportunities to review, download and access activities and resources in different formats in advance the session.	Students continue to populate discussion forums after the session. Session design allows high level of engagement in synchronous/asynchronous attendance. Students set up their own online group spaces moving freely to suit learning activity. Online learning offers greater opportunity for all to access.
Collaboration: opportunities for socio-constructivist learning, curation, and social learning	Students use group spaces to collaborate on a shared task. Students can discuss, present, and share ideas in online webinars, and forums. Peer support provided using university facilitated online and student-led spaces.	Student facilitation of group tasks within online spaces, using different media. Students generate discussion and seek opportunities for learning independently.
Independent learning: by promoting self-regulation and digital capabilities	Development of student confidence of digital capabilities through accessing and engagement with the online learning environment. Develop new ways of communicating and collaborating online	Students actively engage with subject resources and share and discuss with others online.

High 'value' learning experiences; relevant for the learner for personal aspirations, and meeting goals	The learning experience facilitates sharing of student's experiences and interests. Learning outcomes, timings and objectives are shared and discussed with learners. Lecturer time is maximised through the effective planning, ability to share resources, enabling discussions, feedback outside of the classroom.	Clear linkage between session and students' goals and aspirations (career, academic) Learners have oversight of the learning process. Learning has been well designed to integrate synchronous and asynchronous learning.
Positive learning Environment: developing relationships by building cohort cohesion, lectures presence, student identity	The use of online icebreakers helps build group cohesion. Lecturers have an authentic lecturer and build rapport with learners. Lecturers scaffold learning activities to encourage student engagement and confidence to participate in activities.	Use of a range of strategies to build group cohesion. Strong lecturer presence through confidence of digital capabilities and facilitation of online learning activities.