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An evaluation of the emergency online teaching provision in Wales' Initial Teacher Education courses

Recommendations for an excellence framework for future online provision

Research

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An evaluation of the emergency online teaching provision in Wales' Initial Teacher Education courses

Audience

Educators and education professionals, Higher Education Institutes providing Initial Teacher Education (ITE)

Overview

This report was produced in collaboration between Bangor University, Glyndwr University and The Open University as part of the Collaborative Evidence Network (CEN) research. It provides an overview of the emergency online pedagogies delivered in ITE in Wales during the pandemic.

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Action required

Report has been shared with Welsh Government policymakers

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Mae'r ddogfen yma hefyd ar gael yn Gymraeg.
This document is also available in Welsh.

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Glossary

Abbreviations	Definition
ALN	Additional Learning Needs
BA QTS	Batchelor of Arts with Qualified Teacher Status
BU	Bangor University
EWC	Education Workforce Council
COI	Community of Inquiry
CPD	Continuous Professional Development
HEI	Higher Education Institution
ICT	Information and Communication Technology
ITE	Initial Teacher Education
MOOCS	Massive Open Online Courses
NSERE	National Strategy for Educational Research and Enquiry
NQT	Newly Qualified Teacher
OU	The Open University
PGCE	Post Graduate Certificate in Education
UT	University Teacher
VLE	Virtual Learning Environment
WGU	Wrexham Glyndwr University

Executive Summary

- The purpose of this report was to evaluate the emergency online teaching provision offered by Initial Teacher Education providers in Wales during the COVID-19 pandemic. Accordingly, the research makes recommendations which can be used to guide the design and development of future online provision and to develop a research-informed and evidence-based model for the digital enhancement of ITE pedagogy.
- The study was a two-phase study, that made use of mixed methods. The first phase drew on qualitative descriptive data from published literature, along with quantitative and qualitative data collected through an online survey to gather opinions of Newly Qualified Teachers (NQTs) and student-teachers about their digital learning experiences. The second phase drew on qualitative data from semi-structured interviews with university lecturers who were teaching at a Higher Education Institution (HEI) in Wales during the COVID-19 pandemic. The study was undertaken with participants from all ITE partnerships in Wales.
- In ITE, distance online learning and technology provide multiple ways to access professional learning. Whilst some gains were made across the ITE sector in Wales in terms of building the knowledge base and capacity of individual providers to deliver teacher education through online learning, there exists a lack of awareness of the evidence-base which identifies superior teaching practices in online education.
- Online teaching during the COVID-19 pandemic was focused on synchronous activities which were variably experienced by NQTs and student teachers in terms of their sense of belonging. This suggests that participants' experiences of online learning are influenced by their own characteristics, the subject they are training within, their language medium or other factors.
- For the majority of NQTs and student teachers, their engagement with online learning was not negatively impacted by access and connectivity issues. Both NQTs and student teachers had mixed responses about the preparation they received for online learning. NQTs had positive assessments of the design and organisation of their online courses, while student teachers' responses were more mixed. The majority of participants reported positively on their experiences of the teaching and learning process including the resources provided to support learning. However, the synchronous online learning environment may not always have been conducive to student engagement with content and meaningful learning. NQTs and student teachers had positive attitudes towards online learning, although some found working alone in the online environment challenging, which was reflected in some participants' lack of belonging to an online learning community. NQTs were in agreement that online learning had prepared them for entering the teaching profession, whilst many student teachers reflected this view, an equal amount were unsure on did not agree.
- Our analysis of university lecturers' experiences of online teaching identified seven key themes which included the challenge of ensuring digital equity, assuring professional learning, design principles for online learning, the need for a new teaching philosophy, online etiquette and expectations, meeting the teaching standards, and belonging. Whilst aware of challenges associated with online teaching and learning university lecturers did not always have the resources to negotiate these effectively.

- The research highlights the importance of conceptualising online learning pedagogy as part of a Community of Inquiry, which draws on the principles of Constructivism and Connectivism. Further, the findings affirm that the architecture of digitally enhanced learning design for online learning needs to provide learners with opportunities for quality and dynamic interaction with information to support the construction of knowledge and flexibility in access to resources and interconnected networks of professional and academic experience. This moves online professional learning away from a narrow-focused teacher-centred activity to one which is focused on learner autonomy, knowledge networks and connectivist learning and a student-centred active learning environment, which engages students' motivation through critical analysis of education and knowledge building, which requires the interrogation of a variety of peer and expert sources.
- The theories of Constructivism and Connectivism can be used to generate a multi-theoretical framework as a basis for envisioning pedagogies of online teacher training. Such a framework can provide a theoretical and conceptual basis for learning designers and academics to engender learning through developing complex professional networks involving knowledge generation and dynamic learning experiences from which trainee teachers can construct culturally-relevant meaning and understanding of educational phenomena.
- Twelve principles and critical design elements for online learning are presented, which are connected by an understanding of online learning as underpinned by the theories of connectivism and constructivism as a theoretical framework. These provide a framework for digital design to develop learning spaces to enact the concepts of collaboration, critical reflection, inquiry and application.

Recommendation 1
Design principles for distance online learning
Teacher education delivery needs to be purposively designed for blended and online learning. Models for technology-based learning should be based on substantive contemporary learning theory and research evidence. If a best practice approach to online learning design is adopted the evidence base should incorporate findings derived from the collection and analysis of empirical data which lead to the identification of superior teaching practices.

Recommendation 2
Online learning should be used to engage student teachers in the critical evaluation of educational phenomena
Critical evaluation of educational practice needs to be part of an 'Active' learning process which supports 'Constructive' and 'Connectivist' learning and allows for the synthesis of evidence and creation of 'Personal meaning'. The emphasis on online learning should centre on the synthesis of evidence and critical analysis of educational phenomena which is derived from a variety of sources including experience, research, and theory. This is important for supporting a meaningful learning experience for student teachers during their university and placement experiences.

Recommendation 3
Digitally enhanced pedagogy of online learning should privilege asynchronous teaching and learning activities to promote student engagement
Asynchronous online distance learning affords the architecture for shared and connected collaborative spaces for student teachers to interact and create digital artefacts as an outcome of critical thinking and writing supported by critical reading and meaningful reflection. If a greater emphasis on the asynchronous mode is incorporated into the design vision for online learning, it will require a reconceptualisation of teaching and learning in online spaces. One that represents a new way of teaching and thinking about academic and professional learning, and one which focuses on critical pedagogy.

Recommendation 4
A professional learning pathway should be considered to support ITE lecturers and key partners in designing, developing and delivering effective online learning environments

ITE Lecturers and key partners need to be given a pathway to engage with international and sector-leading research in the field of online learning and digital pedagogies. A new model of online learning for ITE provision should seek to prepare student teachers more fully for a career in professional practice by providing a wider range of flexible learning opportunities which engage them in professional learning and motivate them to continue their professional learning journal from the early career stage and beyond.

1. Introduction and Background

1.1 The effects of the COVID-19 pandemic on schools and education

The research reported here is a Welsh Government-commissioned project focused on the implications of the COVID-19 pandemic on the pedagogy of Initial Teacher Education (ITE) provision in Wales. It was designed as a response to a Welsh Government funding call which was first available in September 2021. Following a rapid process based on Expressions of Interest as part of the National Strategy for Educational Research and Enquiry (NSERE) and the Collaborative Evidence Network, the commission was awarded in October 2021.

This study was designed to respond directly to the Welsh Government's stated call, namely 'the impact of the pandemic on the education system in Wales and the recovery process'. The core purpose was to understand how the March 2020 and subsequent COVID-19 imposed lockdowns had affected the pedagogy of ITE across Higher Education Institutions (HEIs) in Wales. Further, there is a focus on the implications for the development of fit-for-purpose online learning programmes and digital pedagogy in ITE as a way of preparing teachers for the real-life experience of teaching in schools in Wales.

The forced transition of teaching in higher education from the face-to-face delivery mode to the online distance learning mode and digitally supported teaching and learning, and more latterly blended learning has been significant. The closure of university campuses in March 2020 forced the migration of ITE onto online platforms with virtual learning environments becoming the dominant teaching and learning spaces. Unlike strictly campus-based courses, most ITE programmes involve a period of study on campus followed by a school-based placement experience. Both places of learning were affected by the lockdown and HEIs responded with their own versions of emergency ITE pedagogy.

Whilst previous research describes how teacher education in other countries migrated successfully to an online teaching format during the COVID-19 pandemic (Darling-Hamond and Hyler, 2020), there is no detailed understanding of how those students currently enrolled in ITE in Wales and those teachers who were newly qualified during the pandemic have been impacted.

Initial recommendations from the NSERE report by Thomas et al. (2021) which investigated the impact of the COVID-19 pandemic on the Welsh education system, identified a need to emphasize and enhance current provision in ITE in the areas of blended and distance learning. The forced shift to online distance learning meant that the development of digital pedagogy for ITE had entered a new phase. Building upon the findings of Thomas et al. (2021), this research was envisioned to develop and extend the knowledge base relating to stakeholders' experiences of emergency online teaching within ITE partnerships operating in Wales.

Post-COVID recovery, therefore, represented a valuable opportunity for Wales' ITE providers to collaboratively evaluate a range of approaches to ITE's pandemic pedagogy. It offered the possibility of reimagining initial teaching education through the development of digitally enhanced pedagogic models and frameworks for future provision which are effective at enhancing teachers' professional learning and, by extension, teacher efficacy and retention (La Velle et al., 2020; Podolsky et al., 2016). The theories of Constructivism and Connectivism provided a multi-theoretical framework for understanding the affordances of distance education for student learning. Constructivism offered a theoretical framework for the identification and analysis of core pedagogic principles of online learning. Those which engage the learner in meaningful and socially mediated interaction with others and lead to the generation of culturally imbued and personalized forms of understanding (Zittoun and Gillespie, 2015). The theory of Connectivism (Siemens, 2005) provided a complimentary framework and mechanism for understanding the complex array of professional and academic networks that connect learners, leading to generative professional networks (Downes, 2022).

1.2 Research Aims

The aims of this study are threefold: (1) to contribute to the development of a research-informed and evidence-based model and approach to developing digitally enhanced pedagogies for ITE in Wales, and (2) to develop a set of learning design principles which when combined offers a flexible framework for designing online learning experiences for initial teaching education and which meets the varied delivery needs of providers and programmes. Furthermore, this research allowed developing these initial findings and inspire a network of centres of pedagogical excellence across Wales.

1.3 Initial research questions

The research methodology and study were guided by the following research questions.

1. How has the pandemic impacted newly qualified teachers' preparedness for teaching?
2. How has the pandemic impacted the initial education and preparation of student teachers in Wales?
3. How can blended and online learning design better support student teachers' and newly qualified teachers' professional learning?
4. What are the design features which are critical to supporting and informing effective digitally enhanced provision in ITE?

2. Research Design and Methodology

The planned schedule for the research consisted of two phases. The first phase drew on data from student teachers and newly qualified teachers, and published literature. The second phase gathered data from teacher educators.

Phase 1

In the first phase of data collection (February to March 2022), a survey-style approach and systematic literature review research methodology were used combining the two data collection strategies: (1) online questionnaire and (2) literature review. Data were gathered and grouped in three ways: (1) qualitative and quantitative data collected from student teachers enrolled in teacher education in one of the eight ITE partnerships operating in Wales, (2) qualitative and quantitative data collected from newly qualified teachers who were employed and teaching in Wales during the COVID-19 pandemic, and (3) qualitative descriptive data gathered from published literature.

This phase afforded the opportunity to develop a rich evidence base combining learners' experiences of emergency online learning in Wales with case studies of successful practice in online learning from an international perspective. Data collected that related to ITE partnerships provided a window into partnerships between universities and schools that worked together to provide the professional education and development of student teachers and prepare them for work in school. Data collected from published literature focused on established models of online learning, examples of emergency ITE pedagogy from across several countries and learners' and educators' experiences of teacher education during the first and subsequent lockdowns of the COVID-19 pandemic.

The findings from the survey data collection were used to inform the second phase of data collection.

Phase 2

An overlapping second phase (conducted in March 2022) used the outcomes of phase one to frame data gathering with a cross-section of teacher educators from across eight HEI's which offer teacher education in Wales including The Open University, Aberystwyth University, Bangor University, Cardiff Metropolitan University, Wrexham Glyndwr University, Swansea University, University of South Wales and University of Wales, Trinity St. David. Each HEI provides teacher education in Wales and has similar ITE arrangements e.g., they offer courses at undergraduate and postgraduate levels, which typically have an on-campus element and a school placement element. This took the form of a survey approach and drew on data collected from semi-structured interviews. The main purpose of the second phase was to provide an alternative frame of reference for understanding the enactment of emergency pedagogy by gathering the experiences of teacher educators.

By combining the gathered perspectives of both past and present learners and teacher educators, and case studies from the literature, we sought to gain a more

complete understanding of the existing online learning provision in Wales. The primary objective was to establish a framework for teaching excellence in digitally enhanced practice for ongoing ITE provision and provide robust models and design scaffolds for ITE providers. This would be complemented by the rich detail garnered from the literature about successful pedagogies of teacher education from across a range of institutions and countries beyond Wales.

As the study progressed the data revealed that the shift to online learning had been a protracted experience for many HEIs. Consequently, the goal of a digitally enhanced pedagogic model for ITE would require a greater focus on HEIs and teacher educators, and evidence from existing research-informed online distance learning models to support the development. Hence, the literature review methodology and thematic content analysis became the central source of findings which informed the design principles and model.

2.1 Research Design

The originally conceived methodology adopted a sequential mixed methods design (Johnson and Onwuegbuzie, 2004) and combined three methods of data to provide a more complete analysis of the phenomenon under investigation. The combined findings would be used to inform the design of a model for practice based on a meta-synthesis of data and findings from the following: (1) an integrative literature review and identification of case studies; (2) a survey instrument; and (3) semi-structured interviews. Due to difficulties in recruiting sufficient participants which led to a low response rate during the first phase, a concurrent approach was later adopted, and the survey phase was extended to run parallel with the second phase and interviews.

The revised research design was a concurrent methodological approach. We originally envisaged that the quantitative and qualitative data collected from the online questionnaires would be used to determine the breadth of NQTs' and student teachers' experiences from across Wales. However, the total number of responses to the survey represented only 2.8% of the population of NQTs and student teachers. Nonetheless, an initial analysis of the qualitative responses proved useful. Thus, the findings from phase one were used to inform the design of the second phase and the design of a semi-structured interview schedule and questions. These were focused on teacher educators' experiences of emergency online teaching; a sample drawn from across eight HEIs. In Phase 2, the focus of the interviews with university teachers was on pandemic experiences and pedagogy from March 2020 onwards.

Due to the challenge of obtaining a valid and representative sample in phase one, a decision was made to foreground the findings from the literature review and the second-stage interviews as the main contributors to the study and design of the model of technology-enhanced pedagogy due to the low response rate to the online questionnaire.

Data and findings were triangulated using different data and methodological approaches which encompassed data from primary and secondary sources. The purpose of between-methods triangulation was to improve accuracy and increase coverage of the phenomenon under investigation (Arias Valencia, 2022) and provide

a fuller picture with which to inform an integrated synthesis of knowledge. Triangulation using different forms of data, collected from different groups enabled both comparison and verification of data which identified commonalities and differences in reported experiences.

2.2 Phase 1: Quantitative and qualitative data

In the first phase of the survey approach, an integrative literature review approach was chosen to sample a broad area of the available literature on theoretical approaches relevant to online learning, digital design, and case studies of teacher education operating during the COVID-19 pandemic and to extract qualitative data in the form of descriptions, and critical evaluation in relation to the research problem being investigated. The sampled literature was not limited to studies from Wales as very few existed, rather the aim was to identify studies from different countries across the globe to inform the enumeration of a digital design framework for online learning, and situated the proposed model within the larger field of study.

2.2.1 Literature review approach

The aim of the integrative literature review approach was to critique and synthesise literature from a range of sources about educational and digital learning theory which could be applied to digital learning design, and to identify case studies of successful online learning in initial teacher education including practice during the COVID-19 pandemic. Literature included research articles identified from scholarly journals, books, and other published texts. The literature review is located in Appendix F.

2.2.3 Literature Review: Search strategy and search terms

The literature search used the following databases: ResearchGate, Sage Journals and Taylor and Francis Online. The following search terms were used for the literature review which focused on learning theories in the context of the digital age, as opposed to the Grand Theories which emerged in the 20th century before digital technology was embedded in education:

- MOOCS education
- Connectivism digital age
- Traditional teaching digital learning
- Cognitivism online learning
- Cognitivism digital learning
- National curriculum UK
- National curriculum Wales
- Digital competence framework
- Behaviourism digital pedagogy
- Behaviourism technology learning

For the identified case studies of successful online learning practice within ITE, the following search terms were used in combination:

- Online learning ITE Case Study
- Online learning ITE
- Case studies online methods initial teacher education
- Digital teaching ITE Wales
- ITE Wales teacher training digital online
- Covid impact Wales ITE teaching
- PGCE Online teaching Wales

The literature review and searches explored local and international contexts including Wales, the UK, Europe, Asia, ITE, Secondary and Primary education.

2.2.4 Survey approach

For the online questionnaires, the survey style was chosen to sample a wide cross-section of the participant target population to determine the nature of the emergency ITE pedagogy through a survey of past students' experiences (NQTs) and current student teachers' experiences in ITE. A questionnaire (see Appendix A) containing open and closed questions that captured key demographic details and attitudes, and allowed participants to elaborate on their views, opinions, and experiences of ITE's pandemic pedagogy was administered to collect both quantitative and qualitative data.

The questionnaire was designed using the Community of Inquiry (COI) Framework principles (Garrison and Arbaugh, 2007), which offered a theoretical framework for the analysis of online educational environments. The original COI framework encompasses critical dimensions that influence the online learning experience, focusing on three independent elements: (1) social presence, (2) cognitive presence and (3) teaching presence, in an online provision.

Social Presence
This element reflects the personal characteristics of teachers and participants in community discussions, which leads to trust building the establishment of personal and professional relationships and provides the grounding for open and substantive content discussion. The three main aspects of social presence are effective communication, open communication and group cohesion.

Cognitive Presence
This element focuses on the community's ability to construct and confirm meaning through rich discussion in a cycle of practical inquiry triggered by an event. Through active exploration, construction, resolution and confirmation of understanding cognitive presence is operationalized in relation to making sense of the event.

Teaching Presence
This element focuses on the teacher activity before and during online teaching, which includes the design of course materials, direct instruction and facilitation of the learning and interaction involved in growing the knowledge within the community. The design of course materials and the community environment provide the architecture for the manifestation of teaching presence. Teaching presence is a significant determinate of successful online learning.

To fully answer the research questions, the COI principles were applied to the questionnaire design and further developed into seven sub-categories extending on the three dimensions, as presented in Table 1.

Table 12 The Community of Enquiry Dimensions and Questionnaire Sub-categories

Sub-categories	COI dimensions
1. Access and Connectivity	Teaching Presence
2. Studying Environment	Social Presence
3. Design and Organization	Teaching Presence
4. Teaching and Learning	Teaching Presence
5. Attitudes Towards Learning	Cognitive Presence
6. Online Communities	Social Presence
7. Preparedness for Teaching	Cognitive Presence

All questions for the above were designed to collect quantitative data with range scale answers, (5-point Likert scale) where participants were offered a five-option response to the statements offered (see Appendix A). This was used to provide sensitive and differential data, which also provided respondents with a discrete range to narrow possible opinions.

The questionnaire included several open-ended questions that collected qualitative data by giving participants the opportunity to provide extended responses. These were included to give participants a space to freely elaborate on their thinking which could offer an opportunity to evince detail in a more organic way. It offered participants an opportunity to further reflect their opinions on online learning. Qualitative questionnaire data were used to provide rich descriptions which supported the exploration and interpretation of quantitative data which was analysed and presented in tabulated form.

2.3 Phase 2: Qualitative data

Phase 2 of the project involved the collection of qualitative data.

2.3.1 Semi-structured Interviews

In the second phase, the unit of analysis shifted to individual HEIs and a small-scale survey approach with the aim to detect institutional factors or variables which influenced the approach to online distance learning and emergency ITE pedagogy and the post-lockdown emergent blended and online pedagogies. The participant group were university teachers who were lecturing in ITE in the current academic year (2021/22) and who had been lecturing in ITE during the academic year 2020/21.

2.3.2 Interview design

The interview was designed using the qualitative conventional content analysis approach (Kleinheksel et al., 2020), to gain a thorough insight into the institutional approaches to ITE emergency pedagogy and university teachers' experiences of teaching and learning during the first and subsequent lockdowns, and how online learning evolved across the HEIs during the first year of the COVID-19 pandemic.[1] The interview included seven semi-structured questions with further descriptive prompts to gain a full insight of what happened (see Appendix B).

Interviews focused on (1) elements of emergency pedagogy which were deemed to have been effective and high-quality, and which were likely to inform future approaches to digitally-enhanced pedagogy in ITE and (2) the underlying principles which informed each HEI's response to the initial transition to online learning and later blended learning, including the ways in which universities engaged learners.

2.3.3 Literature Review: Inclusion and exclusion criteria

This research involved the gathering of previously published theory and theory-based research and empirical qualitative and quantitative studies including case studies that had researched distance and online learning designs for teacher education. The study adopted the following inclusion criteria:

- Case studies published between 2015 and 2021.
- Peer-reviewed theory-based and research-based scholarly articles published between 1993 and 2021.

Thirty-seven articles were identified and included in the final analysis (see Appendix D and E).

The second stage concluded by drawing together the complete interview data set to undertake a thematic analysis which focused on emergency ITE practice, collected from the HEIs.

2.4 Population and Sample

2.4.1 Sampling Methods

In the first instance, eight HEIs were identified through criterion sampling; the criteria being HEIs offering ITE provision in Wales and those which could award Qualified Teacher Status (QTS) in Wales. Phase one excluded data gathering from the Open University as their PGCE programme was in its first year at the time the research was undertaken, and these student teachers were the first cohort of the two-year PGCE and were due to qualify in summer 2022. In phase two, data collected from HEIs included the Open University which has demonstrable experience in online education, and it was felt this was a potentially valuable data source.

[1] This is a conventional content analysis approach and hybrid coding approach involving deductive and inductive coding and reasoning.

2.4.2 Phase 1: Online survey sample

Online survey participants were recruited through census sampling with the support of local consortia to reach the sample.

Newly Qualified Teachers
This sample came from seven HEIs. The total population of NQTs (total passes) awarded QTS for the academic year 2020-2021 and registered in November 2021 as a schoolteacher by employment in Wales was 1031 (EWC, 2022), and is consistent over the last five years. A return rate of 20% would have provided a sample of 206.2 data points, although this was optimistic as Fan and Yan (2010) report that the response rate in web surveys tends to average 11% lower than other survey methods e.g., paper based. The actual response rate in this study was 1.7% (*n* = 18).

Student teachers
In this study student teachers were defined as learners enrolled on a PGCE or a BA degree course which award QTS and in their third/final year of study. The total population of student teachers across the academic year 2021/22 was 1467. This figure represented current student enrollments across the eight HEIs offering initial teacher education with Qualified Teacher Status (QTS) in Wales. The representativeness of the sample could not be determined until the data were collected. The response rate was 3.5% (*n* = 52), as illustrated in Table 2.

Table 13 Representative Sample Population and Sample Response in Stage 1

Phase 1 Online survey	Population Education Workforce Council (2022)	Sample	Response Rate %
Student teachers	1467	52	3.5
Newly qualified teachers	1031	18	1.7
Total	**2498**	**70**	**2.8**

2.4.3 Phase 2: Semi-structured interview sample

University teachers (potential interview participants) were identified through non-probability sampling. In the first instance, the eight HEIs were identified through criterion sampling; the criteria being HEIs which provisioned ITE in Wales and could award Qualified Teacher Status. From these eight HEIs, a sample of 18 participants were invited to take part in an individual semi-structured interview. Potential participants were purposively identified and selected according to the following two subgroups: (1) university teachers with specialist or expert knowledge of online learning design and (2) university teachers with limited experience in online learning design (Table 3). The sample was aimed to include ITE course directors and lecturers representing different responsibilities and who were at various stages in their careers. Potential participants were purposively identified and hand-picked

based on the researchers' personal knowledge, review of institutions' webpages and recommendations from colleagues.

Thirteen consented to take part in an individual interview lasting a minimum of 30 minutes and a maximum of 60 minutes which explored their experience of teaching in ITE through the online and or blended learning modes, depending on their institution's response, during the COVID-19 pandemic.

Table 14 Representative Sample Population and Sample Response in Stage 2

Phase 2 Semi-structured interviews	**Sample**
The Open University	2
Aberystwyth University	1
Bangor University	3
Cardiff Metropolitan University	2
Wrexham Glyndwr University	2
Swansea University	1
University of South Wales	1
University of Wales, Trinity St. David	1
Total	13

2.4.4 Inclusion and Exclusion Criteria

The full set of inclusion and exclusion criteria for the newly qualified teachers' sample, student teachers' sample and university teachers' sample are available in the ethics application form in Appendix C.

2.4.5 Coverage error and sampling error

The sampling frame for the study had its limitations through coverage error and sampling error; there was always the possibility that not all NQTs and student teachers would be reachable using the email address lists, as some may have been outdated, or some prospective participants have not had access to the Internet (Nayak and Narayan, 2019). This may limit the generalizability of the findings and introduce bias. However, the multi-method approach with an emphasis on the collection of qualitative data at the second stage meant that data triangulation could be conducted. For data collected during phase one, this approach attempted to minimize any areas where data were absent, and a representative sample of the population was uneven or unequal due to the low return rate on responses. In practical terms this involved the researchers monitoring the student teacher survey responses and noting at an HEI level where response rates were low and recirculating the recruitment email.

2.4.6 Ethical approval and data-sharing

The research project was submitted to the Bangor University, School of Educational Sciences Research Ethics Committee on 7th December 2021 and a favourable response was received on 6th January 2022 (ethical approval number: 06012022-1255). The participant information sheet and consent forms are shown in Appendix C. Key ethical considerations such as issues of recruitment of participants, recording of informed consent, participants' rights to anonymity and to withdraw, storage of research data were scrutinized in accordance with British Educational Research Association (BERA) 2018 guidelines and Bangor University's policies with regard Ethics. A Collaboration Agreement which included clauses relating to data-sharing was drawn up between Bangor University and the Open University in March 2022 and signed by both universities.

2.4.7 Limitations

The original aim of the study was heavily focussed on learning from the experiences of past and present students in teacher education. As a result of the low return rate to the online survey and questionnaire amongst these participant groups, research questions 1 and 2 could not be fully addressed. The data collected and findings are therefore representative of only a very small cross-section of the population (NQTS and student teachers) and are not generalizable to the population. For example, the majority of the NQT sample had obtained a PGCE Primary; the majority of student teacher participants were from either Bangor University or Cardiff Metropolitan University, meaning responses were highly representative of online learning experienced at these two institutions.

As a result of this limitation, the findings from the literature review and the second-stage interviews were the main contributors to the study and design of the model of technology-enhanced pedagogy. This limits the input to the design process from students and NQTs experiences of teacher education in Wales, with the potential to influence a nuanced and situated model of online learning and digital provision for HEIs in Wales.

2.4.8 Research team

The research team was drawn from Bangor University and Wrexham Glyndwr University with the Open University acting as critical reviewers for the project. It included high-level expertise and experience in the following: pedagogies in higher education; teacher education, distance and online teacher education; teacher education research; Welsh medium expertise; professional development and learning. Team members were Dr Lowri Jones (BU); Dr Tanya Hathaway (BU); Gwawr Maelor (BU); Julian Ayres (WGU); Dr Alison Glover (OU); Mathew Jones (OU).

2.5 Newly Qualified Teachers' demographic data

Participants who were NQTs were recruited from across Wales. Table 4 shows the number of participants at each HEI by their medium of study.

Table 15 Percentage Scores for number of students studying for Qualified Teaching Status and Welsh HEIs

HEI QTS gained at	Percentage	Frequency	Welsh Medium	English Medium
Aberystwyth University	5.5	1		1
Bangor University	5.5	1	1	
Cardiff Metropolitan University	16.6	3	1	2
Glyndwr University, Wrexham	44.4	8		8
Swansea University	5.5	1	1	
University South Wales	5.5	1		1
University Trinity Saint David	16.6	3		3
Total	**100**	**15**	**3**	**15**

The majority of NQTs who responded to the survey had a PGCE Primary and combined with those who had gained a BA QTS award, they comprised 84% of the total sample (Table 5).

Table 16 Percentage Scores showing Teaching Qualification NQT Students gained

Course	n	Percentage
PGCE Secondary	2	16.7
PGCE Primary	13	72.2
BA QTS	2	11.1
Total	**18**	**100**

The focus on the primary phase was confirmed in the type of school participants were employed in, with the majority employed in mainstream primary (Table 6) and teaching in the Foundation Phase and Key Stage 2 (Table 7).

Table 17 Percentage Scores for the type of school the NQT survey respondents work in

Type of school	n	Percentage
Mainstream Primary	13	72.2
Mainstream Secondary	3	16.6
Pupil Referral Unit	1	5.6
Special School	1	5.6
Total	**18**	**100**

Only a quarter of participants were employed in Key Stage 3 and 4 combined.

Table 18 Percentage scores for the teaching phase and stage groups taught by NQT survey respondents by county

Number of NQTs by county	Percentage	Total	Foundation Phase	Key Stage 2	Key Stage 3	Key Stage 4
Denbighshire	11.1	2	0	1	1	0
Flint	16.7	3	1	1	1	0
Neath Port Talbot	11.1	2	2	0	0	0
Newport	5.6	1	0	0	0	1
Pembrokeshire	16.7	3	1	0	2	0
Powys	11.1	2	2	0	0	0
Torfaen	5.6	1	0	1	0	0
Wrexham	22.2	4	0	4	0	0
Total	**100**	**18**	**6**	**7**	**4**	**1**

During their teacher education just under half of the respondents reported receiving over 75% of their course through online learning (Table 8).

Table 19 Percentage scores of teacher education delivered to NQT survey respondents online during the pandemic by HEI

HEI	0-50%	51-75%	76-100%	Total
Aberystwyth University	0	1	0	1
Cardiff Metropolitan University	1	1	0	2
Glyndwr University, Wrexham	3	2	3	8
Swansea University	0	0	1	1
The Open University Partnership, Wales	0	1	0	1
University South Wales	0	0	1	1
University Trinity Saint David, Carmarthen	0	0	3	3
Total	**4 (23%)**	**5 (29%)**	**8 (47%)**	**17***

Note: The numbers do not exactly relate to the total numbers in Tables 5, 6, 7, 8 and 9 because there is an instance of missing data for one respondent. Therefore, the total number of NQT respondents is 18.

2.6 Student Teacher's Demographic Data

Participants who were student teachers were recruited from across Wales and were currently training to be teachers at one of eight higher education institutions in Wales including the Open University Partnership during the academic year 2020 to 2021.

Table 9 below shows the number of student teacher participants at each HEI by their language medium of study. The majority of student teacher participants were from either Bangor University of Cardiff Metropolitan University.

Table 20 Number of student teachers survey respondents by HEI and language medium

HEI	Welsh	English	Both languages	Total
Bangor University	13	10	0	23
Aberystwyth University	0	4	0	4
Cardiff Metropolitan University	2	17	1	20
The Open University Partnership	1	2	0	3
Total	**16**	**33**	**1**	**50**

Note: The numbers do not exactly relate to the total numbers in Tables 9 and 10 because there is an instance of missing data for two respondents. Therefore, the total number of student teacher respondents is 52.

Table 10 and Figure 1 below show the number of participants registered in the four different degree programmes which lead to QTS. The combined number of enrolments on primary focussed initial teacher education programmes (PGCE Primary and BA QTS Year 3) accounts for just under two-thirds of the respondents, with the remaining third enrolled in PGCE secondary and PGCE Bridging course.

Table 21 Number of student teachers by degree programme and HEI

HEI	PGCE Secondary	PGCE Primary	PGCE Bridging Course Primary-Secondary	BA QTS Year 3	Total
Bangor University	10	11	1	1	23
Aberystwyth University	1	3	0	0	4
Cardiff Metropolitan University	7	6	1	6	20
The Open University Partnership	0	3	0	0	3
Total	**18**	**23**	**2**	**7**	**50**

Note: The numbers do not exactly relate to the total numbers in Tables 9 and 10 because there is an instance of missing data for two respondents. Therefore, the total number of student teacher respondents is 52.

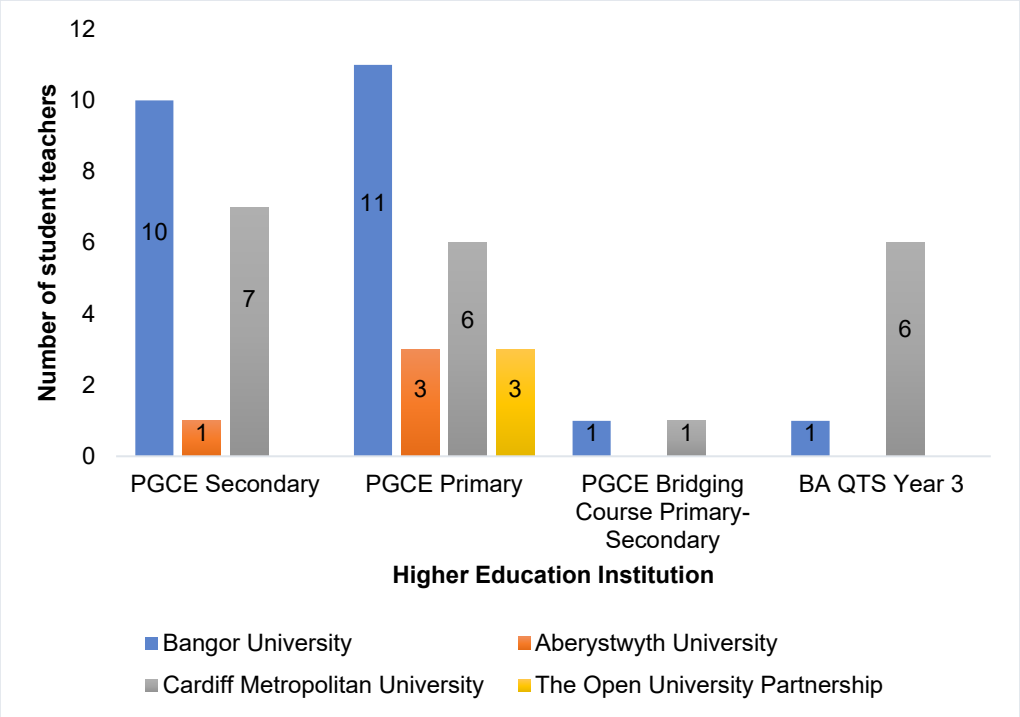

Figure 1 *Number of student teachers by degree programme and HEI*

3. Findings

The findings from each main source of data are presented in three parts as related to the three main sources of data and research questions: (1) the experiences of past and present student teachers, (2) the experiences of university teachers, and (3) the literature review.

3.1 Findings Part One

Experiences of newly qualified teachers and student teachers

This section presents the findings from the analysis of the quantitative and qualitative data collected using the online questionnaire. The questionnaire and individual questions therein were structured and organised using subcategories based on the following dimensions of the community of inquiry framework (Garrison and Arbaugh, 2007), access and connectivity, studying environment, design and organization, teaching and learning, attitudes towards learning, online communities, and preparedness for teaching.

Within each subcategory, variables were measured by statements which required participants to rate their responses on a 5-point Likert scale. The responses were ordered according to the occurrence of the different responses and presented in graphs showing relative frequencies. Where percentages are presented, they represent either combined strongly agree and agree responses or combined strongly disagree and agree responses, unless stated otherwise. Qualitative data, in the form of participant responses to open-ended questions, were used to aid the interpretation of the quantitative data and responses and support the elaboration of the findings in relation to research questions 1 and 2.

3. How has the pandemic impacted newly qualified teachers' preparedness for teaching?
4. How has the pandemic impacted the initial education and preparation of student teachers in Wales?

3.1.1 Access and Connectivity

The majority of newly qualified teachers (55%) reported that their Internet connectivity did not impair their ability to participate in online learning, and 78% of respondents reported that their Internet connectivity during the pandemic lockdown was stable and reliable, with good access to both a computer and the Internet (Figure 2). However, a small number of participants (22%) do experience issues with their Internet reliability which they report negatively impacting their ability to participate in online activities (44%).

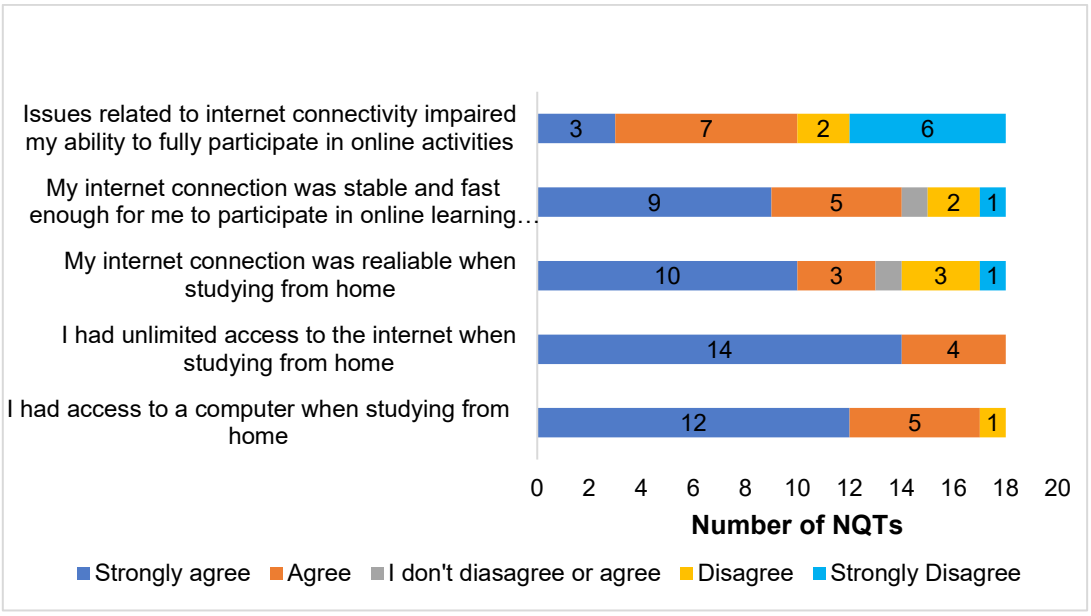

Figure 2 *NQTs' access and connectivity during training*

For all student teachers, they have a slightly lower degree of unlimited access to the Internet at home (90%) enabling them to continue with their studies during any further lockdowns (Figure 3). Compared to NQTs, 44% of student teachers reported that their Internet connection impaired their ability to participate in online activities. However, 83% reported that their internet connection is reliable when studying from home.

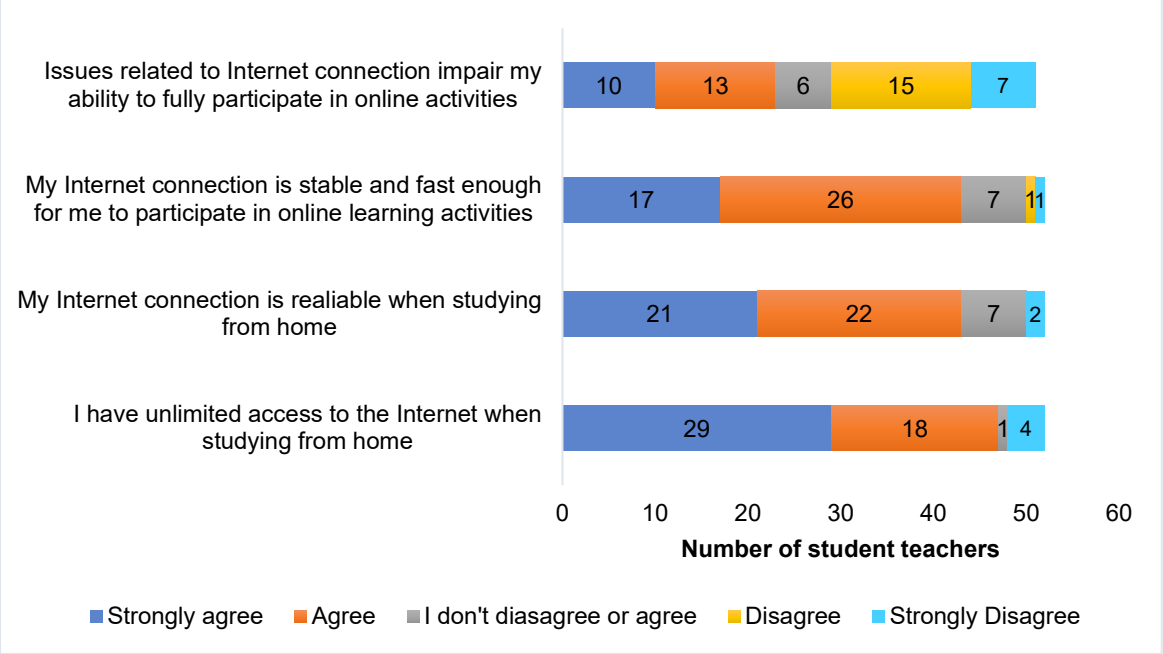

Figure 3 *Student teachers' access and connectivity during training*

3.1.2 Studying Environment: Engagement with online learning

The impact of the *study environment* on newly qualified teacher participants' engagement with online learning was measured through five statements (Figure 4). Many participants (89%) reported that they had difficulties staying motivated when participating in online learning. Further, a majority (67%) reported being distracted when studying at home. This was despite many participants (61%) reporting that their home working environment was suitable for studying from home. In terms of engaging in the online learning environment, the majority of participants (72%) reported turning on their cameras during synchronous activities which may be a reflection of their awareness of online etiquette.

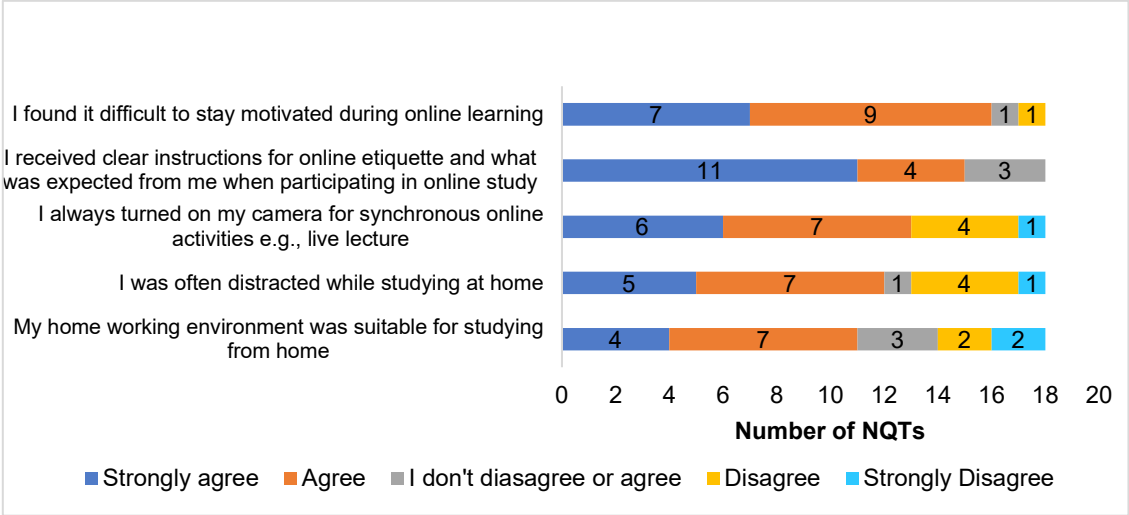

Figure 4 *NQTs' engagement with the online learning environment*

Similar to newly qualified teachers, student teachers reported facing challenges with engaging with online learning, in terms of being exposed to distractions whilst studying at home (60%) and the majority (62%) reported difficulty with staying motivated during online learning (Figure 5). In contrast to newly qualified teachers (72%), those currently in initial teacher training were less inclined (17%) to switch on their cameras during synchronous online activities.

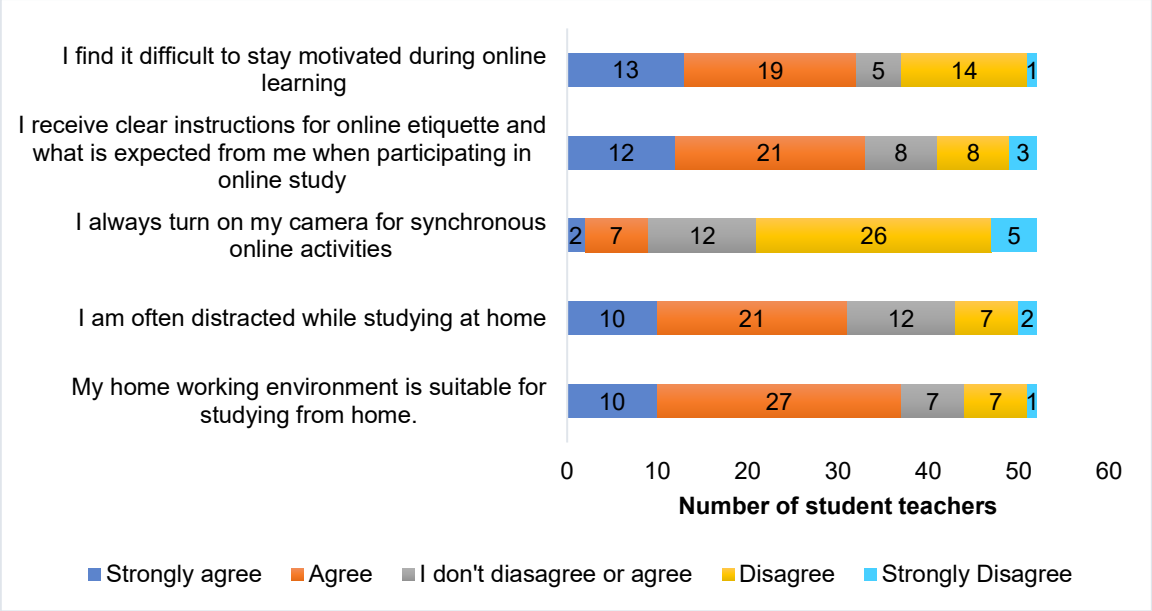

Figure 5 *Student teachers' engagement with the online learning environment*

3.1.3 Design and Organisation

In terms of the infrastructure to support students to ensure they were able to engage fully in online learning, there were mixed responses from NQTs about this element (Figure 6). Overall, more newly qualified teachers agreed that they were satisfied with their preparation for and participation in online learning than were not. This was reflected in the following accounts, 'We had a couple of initial online meets and were walked through it step by step. If stuck a member of staff would assist asap', and 'Emails were replied to promptly. I was able to access a wide range of resources to help me study thanks to my tutors'. However, there were a smaller proportion of NQTs who disagreed with these statements.

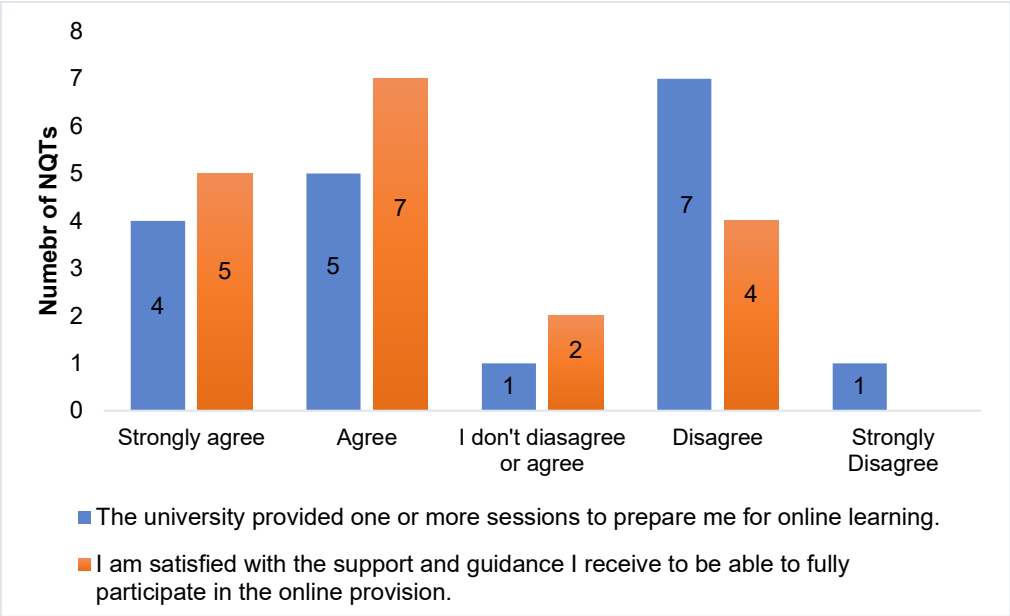

Figure 6 *NQTs' opinions on the support given to engage with online learning*

Student teachers had mixed responses to their preparation for online learning with no clear majority. This is hinted at in the following comment which portrays dissatisfaction with the level of support provided, 'No prior support session was provided to my knowledge – however, I was still able to access and work the online services'. The student appears to have been able to interpret the online learning system through their independent actions which suggests that some students experienced a degree of resilience. Similarly, some students turned towards their peers for support, as illustrated in the following, 'Those not used to the high use of online communication and all its platforms and apps suffered and relied on others to help with links and connections'. In contrast, others experienced support very differently, for example 'We were given lectures of how to manage online recordings surrounding previous learning and how to engage with active learning resources'. This suggests that an individual's experience may be impacted by factors such as their own characteristics, the subject they are training within, their language medium or other factors.

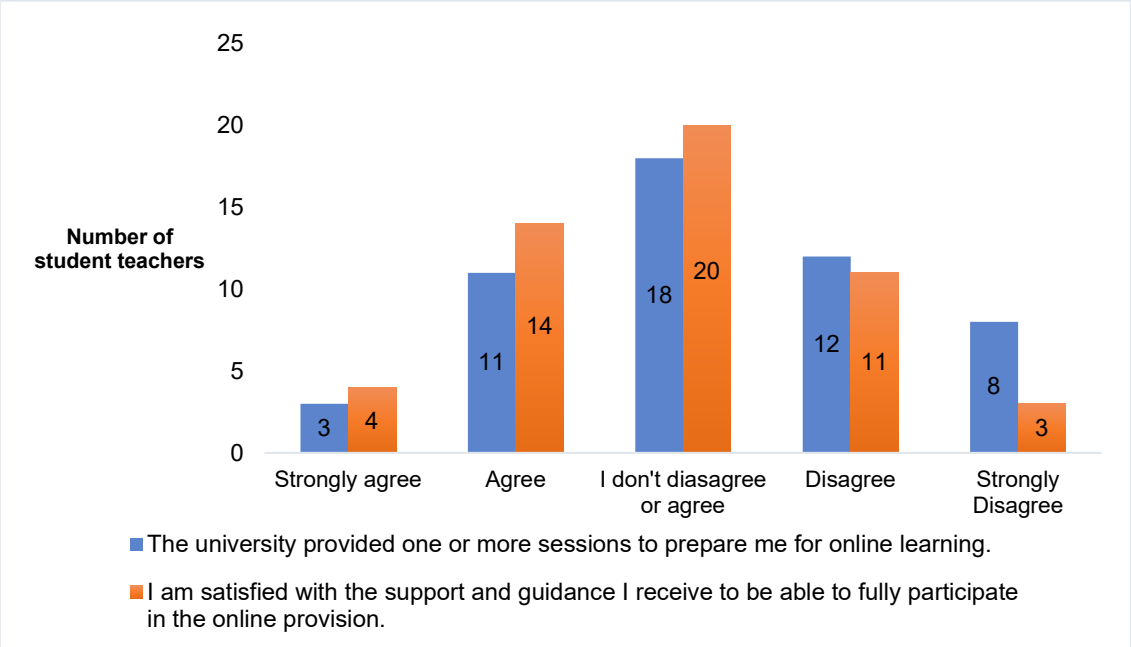

Figure 7 *Student teachers' opinions on support given to engage with online learning*

Overall, newly qualified teacher participants reported positively on all aspects related to online learning design and organization of their courses (Figure 8). The respondents agreed (98%) that important dates including submission dates were communicated. As part of teaching, instructions for participation in online activities were provided (83%) and this was framed by clear communication of course objectives (78%). The important subject-related matter was clearly communicated (83%).

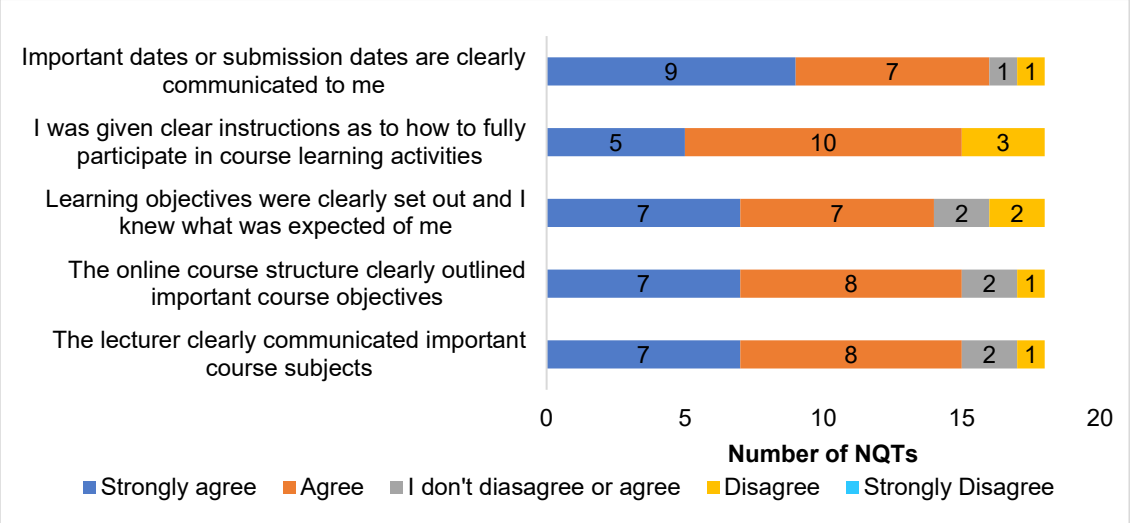

Figure 8 *NQTs' opinions on course organisation*

In terms of course design and organisation, student teachers varied in their experiences. Whilst approximately half of the participants agreed that aspects such as communication of important course subjects, course objectives, learning objectives, instructions for online learning and important course dates and submission dates were clearly communicated, combined there was a significant proportion of respondents who did not agree or disagree and who disagreed and strongly disagreed. This suggests that their experience of course organisation was very different to those who strongly agreed and agreed with positive aspects.

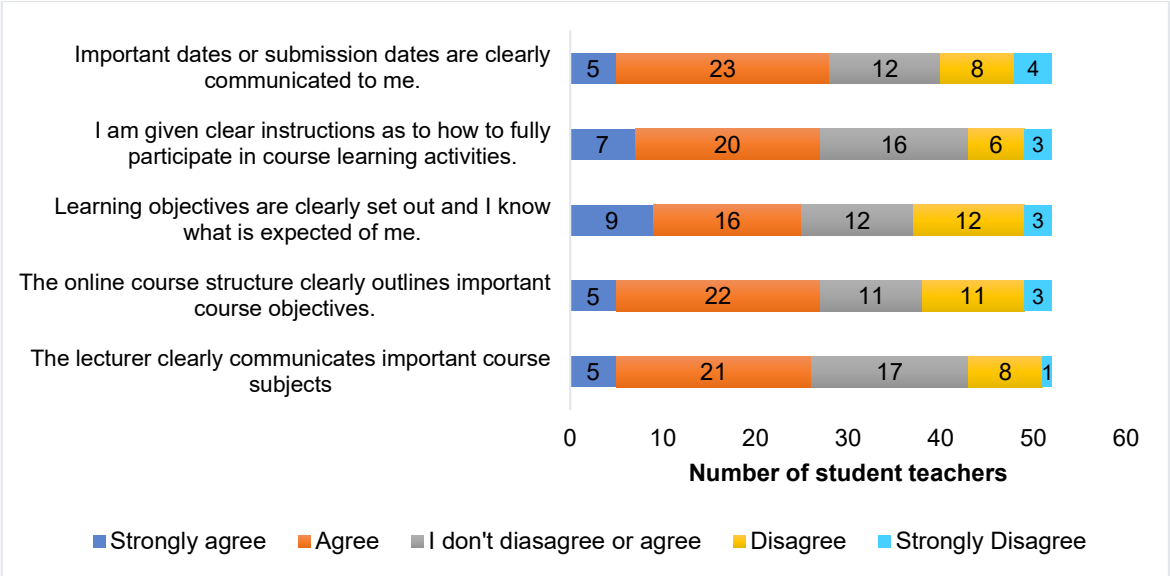

Figure 9 *Student teachers' experiences of course organisation*

3.1.4 Teaching and Learning

The majority of respondents who were newly qualified teachers agreed that online resources to support learning were suitable for online learning mode (83%). The study material was reported as being available online, by a majority of respondents (78%) (Figure 10). In terms of activities in the online environment, respondents

reported positively which suggests that the online learning environment was supportive of learning. This extended to assignments which were linked to the material discussed in the online environment (78%) which suggests resources were carefully selected to support students' learning, as illustrated in the following participant responses, 'There were always documents to access via Teams that supported the session and in 'breakout rooms' everyone had access to the materials needed to complete tasks' and 'Vast amounts of resources were provided...'.

There were a number of respondents who reported less positively (33%) on their experience of asking questions during online lectures, which is corroborated in the following response, 'When I was in smaller lecture spaces (sometimes network-specific) I felt that I could ask questions and interact more. At times when there were over 200 students in an online space, interacting with the material, asking questions and posing new ideas became more difficult.'

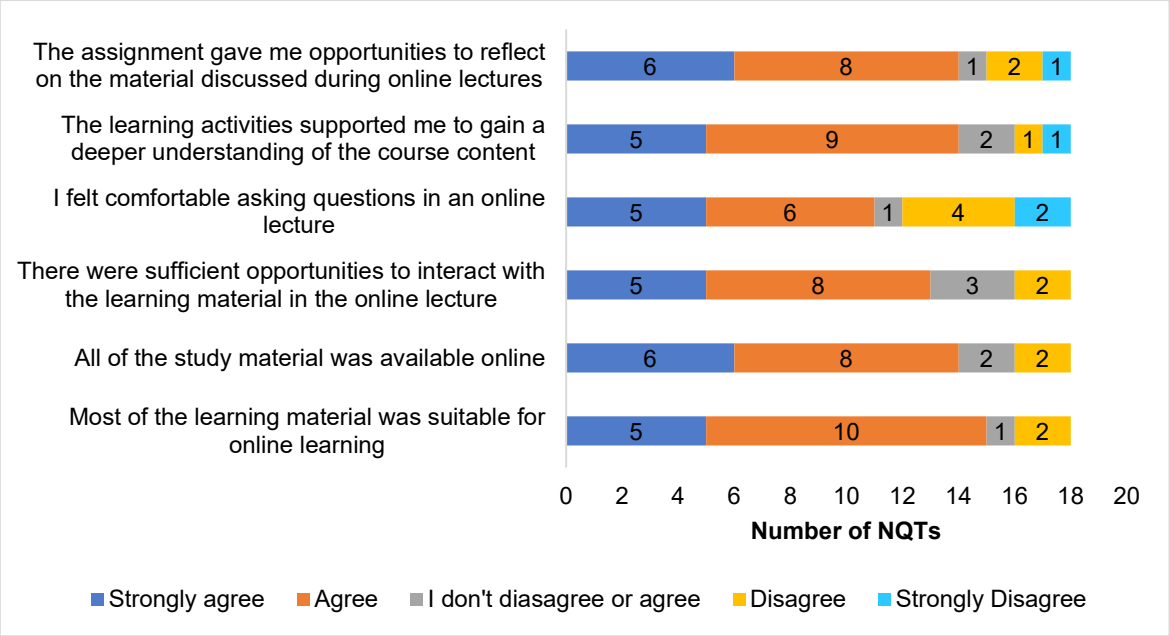

Figure 10 *NQTs' opinions on the quality of and access to online resources to support learning*

In terms of resources to support online learning, the majority of student teachers (67%) agreed that learning and study materials were suitable, available (71%) and explored in online lectures (62%). There were mixed responses regarding whether students felt comfortable asking questions in online lectures, which was congruent with NQTs' responses. Student teachers were less positive (52%), and in many cases undecided (29%) about the value of assignments in relation to online learning and the efficacy of learning activities in supporting them in gaining a deeper understanding of the learning material (38%). It suggests that whilst the material is available, the online environment may have a negative impact on students' synchronous engagement with content during lectures which does not engage them which content and impacts their ability to independently gain an understanding of the material.

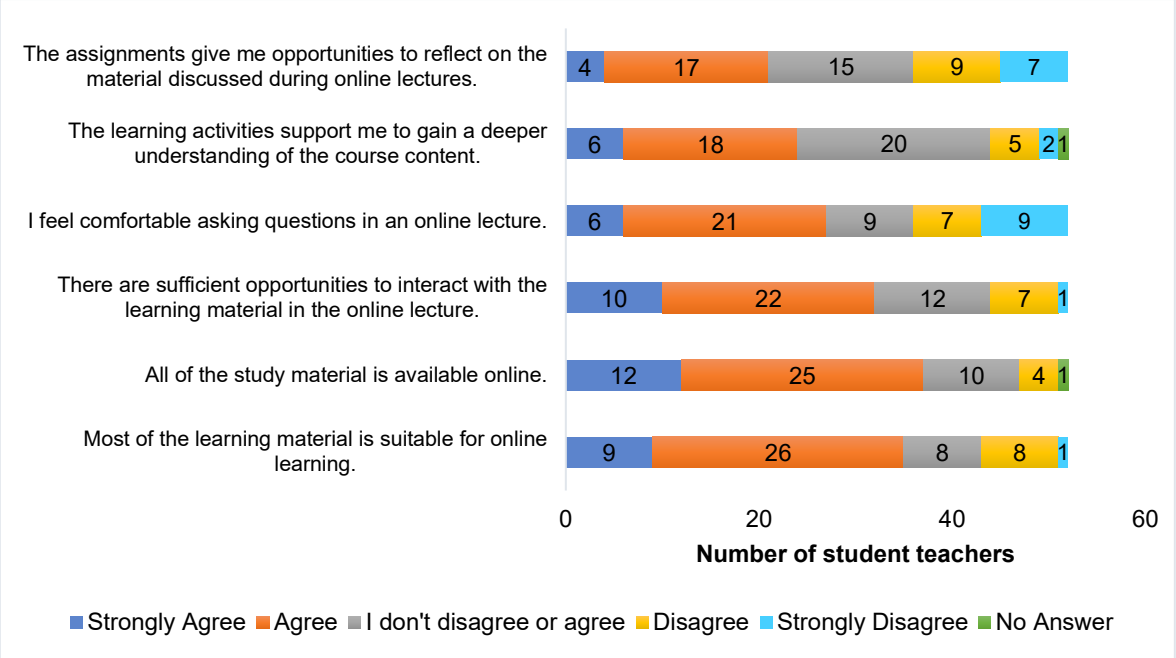

Figure 11 *Student teachers' opinions on the quality of and access to online resources to support learning*

The majority of newly qualified teachers were in agreement about the effectiveness of the teaching and learning process, including the quantity of feedback received to support learning (72%), student engagement (67%), quality of dialogue (66%) and time on task (61%) (Figure 12). Notably, students focused on their experiences of group work in their supporting examples, as follows, 'We used breakout rooms for smaller group work.', and 'It was always better when with our phase or smaller discussion groups.'. Smaller group sizes were related to positive experiences. It should be noted that there were negative views expressed and that clearly not all respondents had a universally positive experience of the educational process. These experiences seemed to be related to the lack of engagement from both students and academics during group work, illustrated as follows, 'Purely due to student choice to contribute, no fault of the lecturer. I feel the students who did not contribute would not in face-to-face learning either.' and 'Some lecturers were better than others by keeping the students engaged.' The latter quotation illustrates the impact of teaching quality on the student experience.

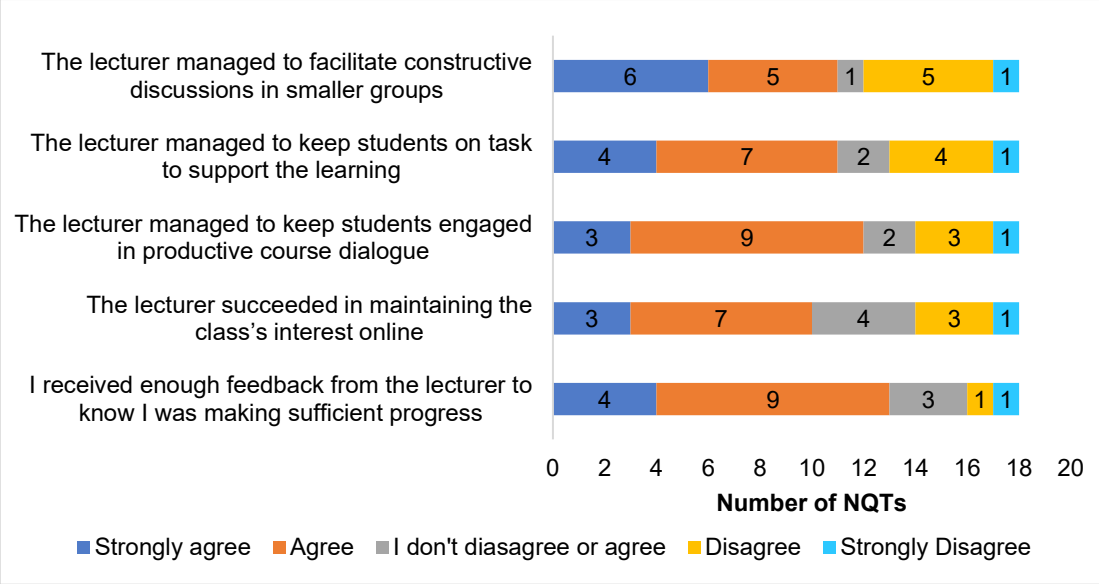

Figure 12 *NQT's experiences of online teaching*

In terms of the teaching and learning process, student teachers had mixed views on the efficacy and sufficiency of aspects such as the quantity of feedback, the lecture's ability to engender student engagement as indicated by productive course dialogue and time on task. Combined, the majority of students (54%) reported that the lecturer was successful in enacting group work which may reflect a growing competency amongst lecturers having spent time using group work during the first lockdown period.

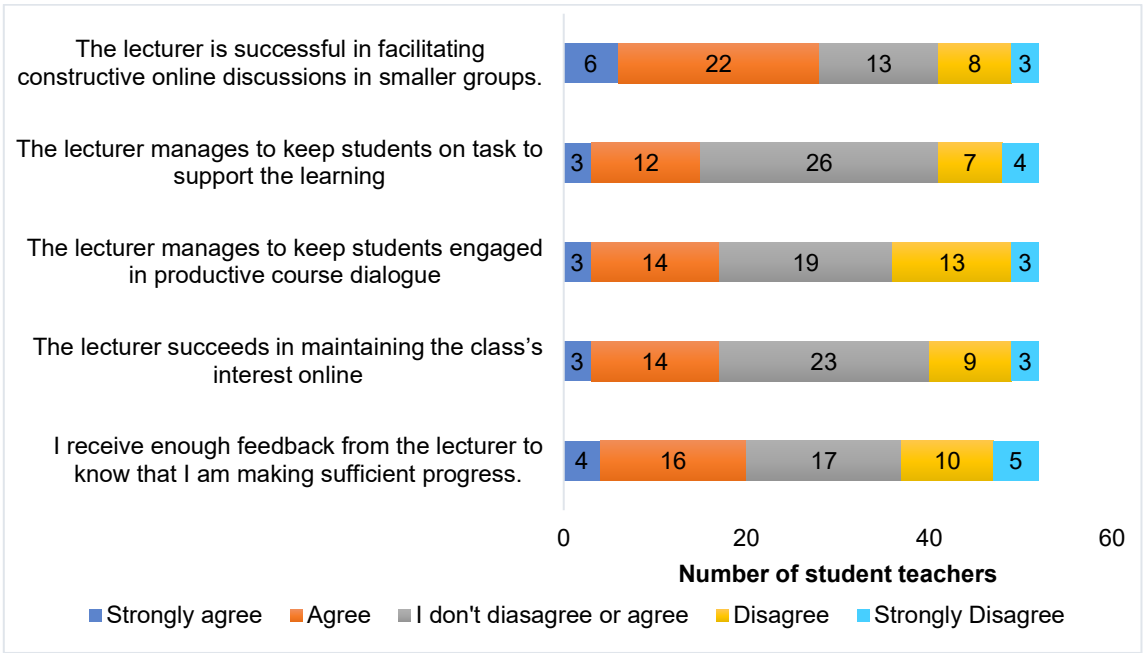

Figure 13 *Students teachers' experiences of online teaching*

3.1.5 Attitudes Towards Learning

For the majority of newly qualified teachers, their experiences of learning in the online environment engendered positive attitudes towards learning. These included peer-peer interactions such as asking for support (61%), feeling part of a learning group (61%), having confidence in the application of knowledge (56%), and having confidence in their ability to work online (56%). This may be reflective of students having initially studied on-campus in a face-to-face environment where they had the opportunity to build relationships which later supported them during with online learning during the first lockdown. Half of the respondents reported liking working in the online environment (50%), which during lockdown was accessed from home. The exception relates to online communication where views were mixed.

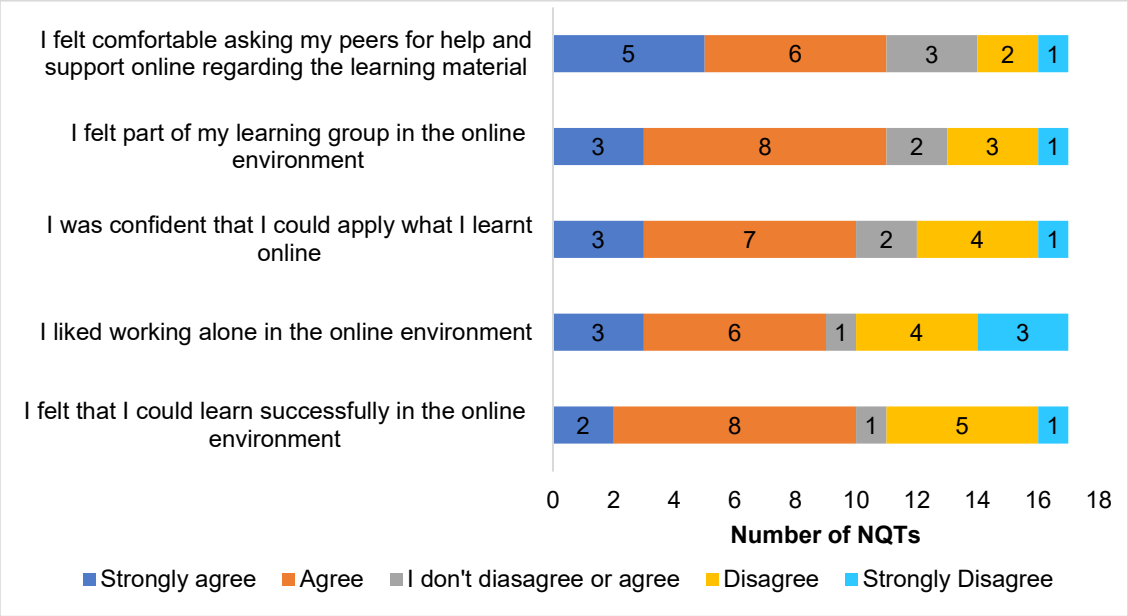

Figure 14 *NQTs experiences of the online community*

The pattern of responses was different for student teachers and their attitudes towards learning online. The majority of respondents (73%) were comfortable drawing on support from peers. In contrast, combined more students (71%) were non-committal about feeling part of a learning group or disagreed that they felt part of a learning group. There was a slight majority of students (52%) who were confident that they could apply what they had learnt online. This may be reflective of their education experience, having had less time engaged in face-to-face learning before moving online. A similar distribution of responses was seen in terms of students' attitudes towards being able to learn successfully in the online environment.

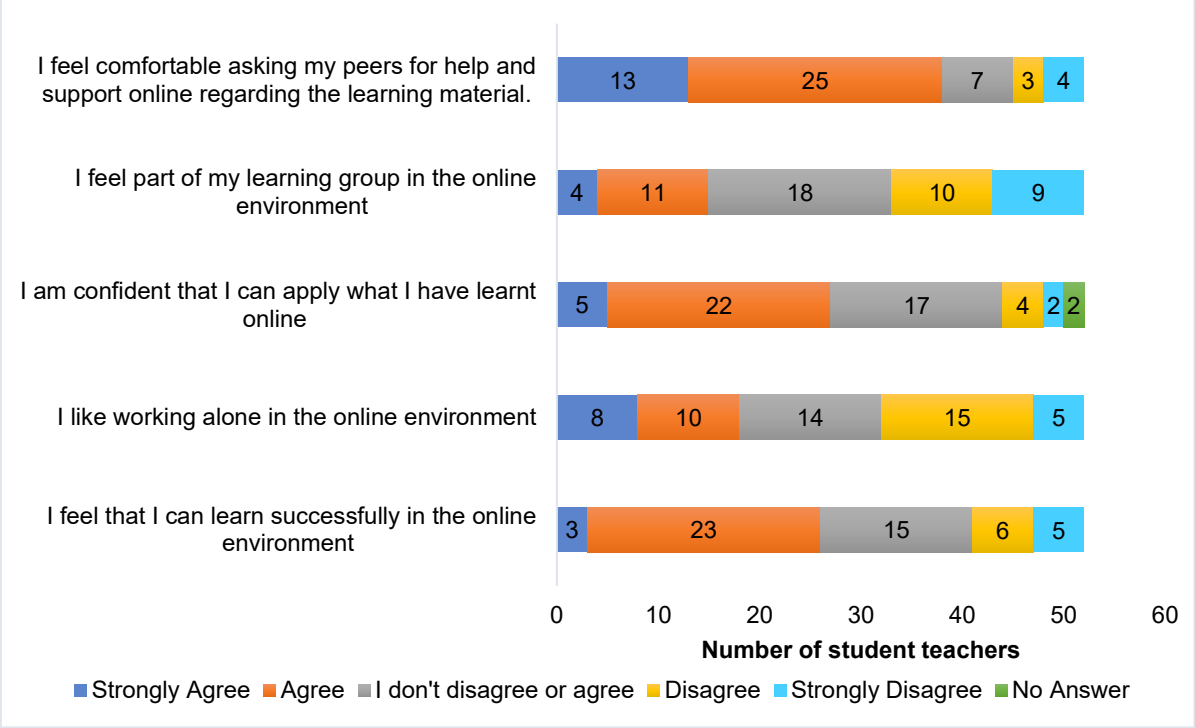

Figure 15 *Student teachers' experiences of the online community*

3.1.6 Online Communities

The sense of belongingness to a learning community in the online environment was measured by five statements (Figure 16 and 17). Across the five statements, NQTs agreed that they felt comfortable during discussion-based activities (56%). There were some exceptions and interactions in breakout rooms received mixed responses.

Overall, online communication was seen as a positive experience but only by the majority compared to those who were either not in agreement or were undecided. It suggests that a positive sense of belonging, and a sense of online community was not universally experienced and is an aspect which needs to be developed in the future distance and online teacher education pedagogy. The following participant response illustrates how the online environment negatively impacted some participants, 'It limited interactions and was not good for such a course where you rely on discussions with peers.' The ability to develop relationships with others, manifested as social presence was variably experienced and seemingly dependent on the individual. The following illustrates the experiences of two participants 'Online learning was difficult at times when face to face would have been better.' And 'I didn't feel I could communicate with peers during the first few months.'.

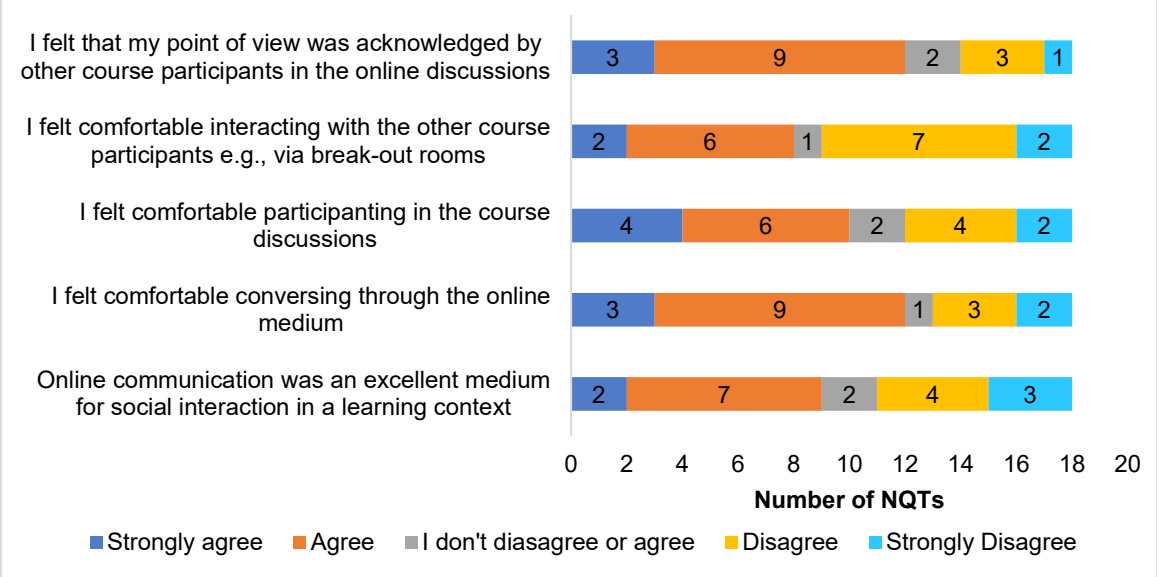

Figure 16 *Student teachers' sense of belonging and online community*

In terms of student teachers' sense of belonging and feeling part of an online community, the combined strongly agree and agree responses are in the majority. The exception relates to whether online communication is an effective medium for social interaction in the learning context, where combined the strongly disagree and disagree responses form the majority (42%) compared to those who disagree (33%). It suggests that at the time the survey was conducted student teachers had had a very mixed educational experience and had insufficient time face-to-face in the university and school environment to support them with online learning.

The following participant responses reflect this phenomenon, 'I learn more being present in lectures than being online. It is the conversations over a coffee/between lectures which create a learning community.' and 'Far more social learning takes place when face to face. Often when put into breakout rooms nobody speaks.' It illustrates how learning can be both formal and informal and that, for some, physical presence can be important for learning.

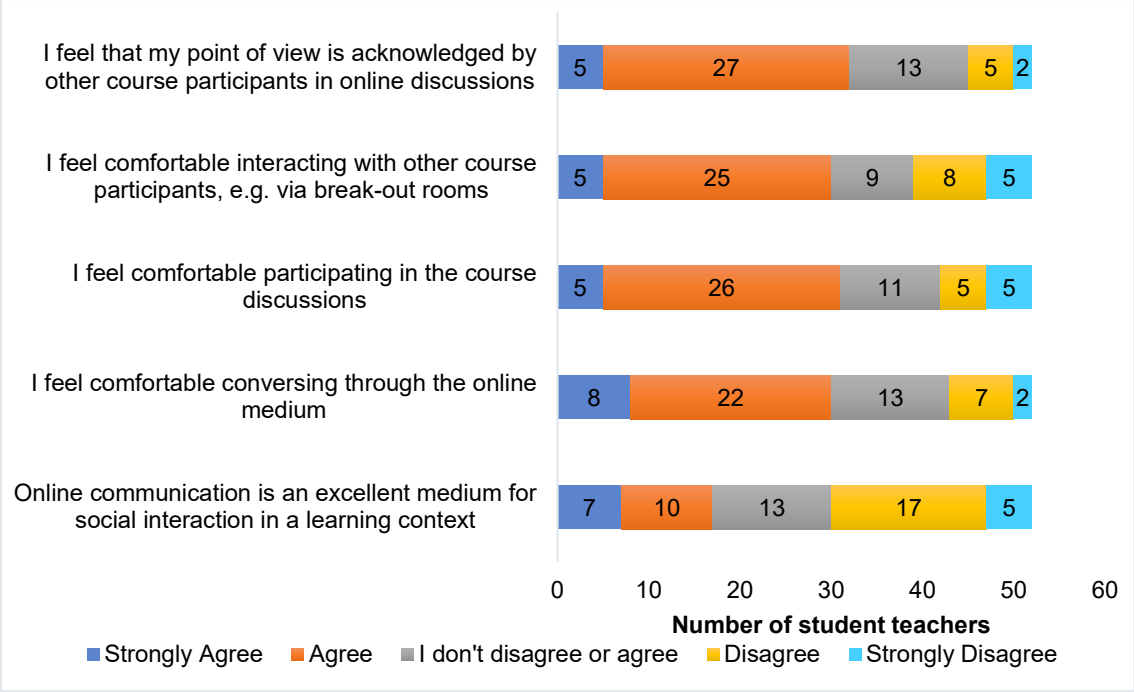

Figure 17 *Student teachers' sense of belonging and online community*

3.1.7 Preparedness for Teaching

In terms of university teachers' cognitive presence impacting teaching and its effectiveness in preparing students for teaching in the school-based environment, combined the majority of respondents were in agreement that the skills, knowledge and experience they had gained during online learning could usefully be applied to their teaching practice. This is illustrated in the following participant responses, 'On my first placement it was all online learning, because of all the online learning we'd had I was far more comfortable with the set up than I would've been. Since then, online learning is still present so I'm still using those skills' and 'It shown me that learning is possible online. I am more confident should I have to use online learning tools in my practice. It has also shown me just how confident my learners can feel when provided with the right/sufficient resources to help them learn.' Others experienced preparedness from an alternative perspective, as illustrated, 'I feel that the placement aspect of the course prepared me for teaching, while the online side prepared me to gain the knowledge to pass the assignments', and for some it seemed detrimental to starting their career, as follows, 'I feel that the placement aspect of the course prepared me for teaching, while the online side prepared me to gain the knowledge to pass the assignments.'

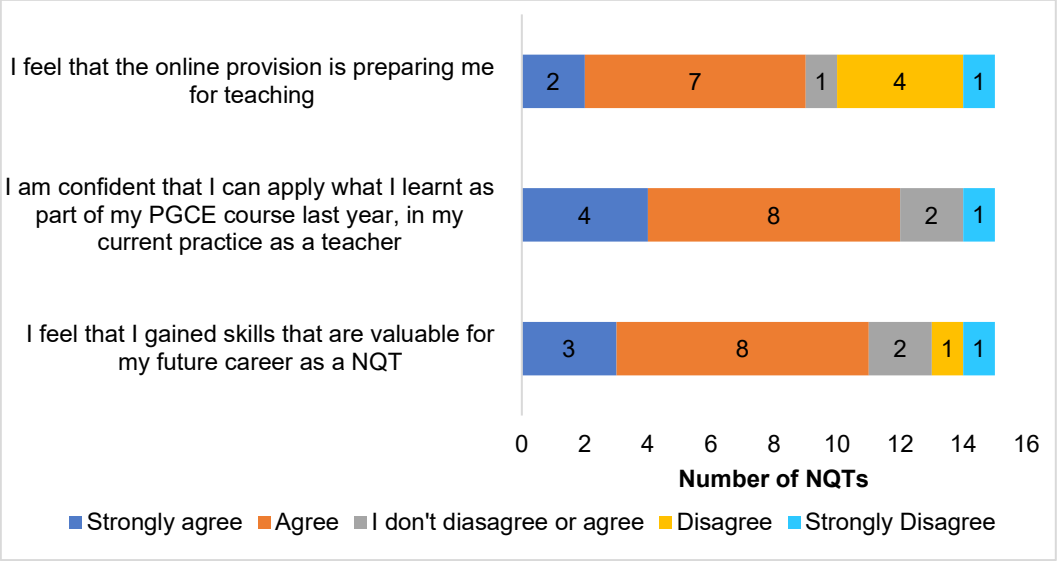

Figure 18 *NQT's preparedness for teaching*

Similarly, many student teachers felt that their online experience was preparing them for their future in teaching (29%), however, notably, combined, there were a similar number of respondents who disagreed or who were non-committal. This may reflect their newness to the profession and lack of applied knowledge and confidence in their experience, and limited exposure to a variety of teaching situations. This was evidenced in some of the participant responses, as follows, 'From a PE point of view, the majority of the online content has been heavily classroom based and has not linked with my subject area and its requirements. Subject days and AoLE days face to face have been far more beneficial. I often learn more in one AoLE day than I do in an entire week of general online lectures' and 'Difficult linking to practical subjects and lack of social interaction.' The preference for an on-campus training experience was reiterated, as follows, 'Online learning is a necessity of our time. Being present in lectures is how a degree such as teacher training is most effectively delivered.'

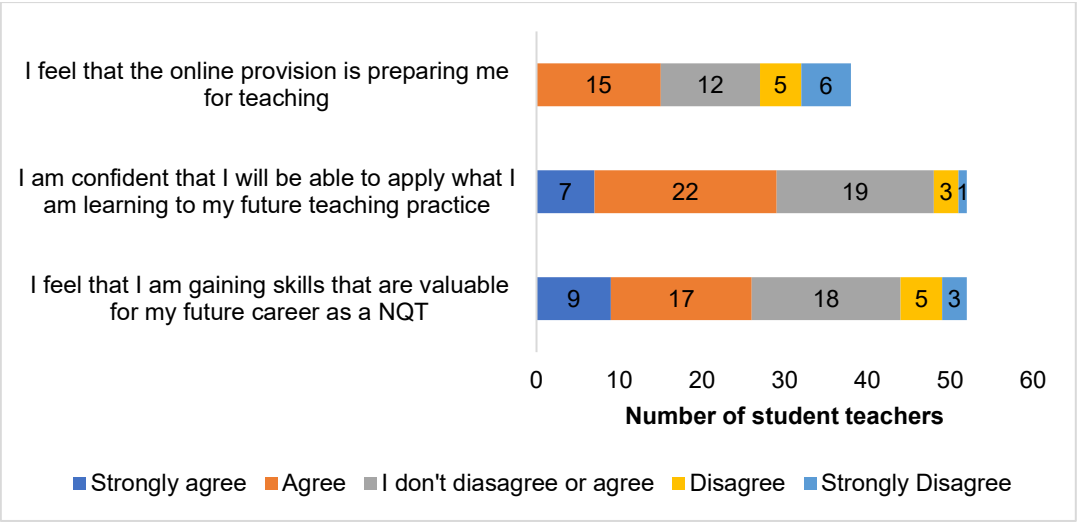

Figure 19 *Student teachers' preparedness for teaching*

3.2 Key Findings Part Two

Emergent themes of online learning

This section presents the findings from the analysis of the qualitative data collected from semi-structured interviews with university lecturers. Thirteen university lecturers were interviewed as part of the data collection process. The qualitative data collected are presented as themes and quotes and analysed using a hybrid approach to thematic analysis which started with a deductive conceptual coding process. The open codes were taken from the COI conceptual framework (Garrison and Arbaugh, 2007); data analysis starting with a top-down deductive process which naturally evolved to incorporate a bottom-up, inductive data-driven approach to developing final codes (Swain, 2018) giving rise to a set of unique themes.

The following themes were identified as the main themes arising from the data, digital equity, professional learning, online etiquette, design principles, teaching philosophy, teaching standards and belonging. These informed the findings in relation to research questions 3 and 4 and the digital design framework for online learning.

> 5. How can blended and online learning design better support student teachers' and newly qualified teachers' professional learning?
> 6. What are the design features which are critical to supporting and informing effective digitally enhanced provision in ITE?

3.2.1 The Challenge of Ensuring Digital Equity

During the initial pandemic lockdown period of emergency ITE provision, university teachers were aware of challenges relating to students' access and connectivity issues, including insufficient digital infrastructure in some geographical areas which arose and lead to students not being able to access online learning. University tutors reported that other students experienced hardware issues and variations in institutional support. This led to equitability issues in the provision. General unpreparedness among institutions for remote teaching led to some students not receiving sufficient support for their studies.

> *"My priority was more about students and engagement. It was making sure that not only did they have access to the stuff. But they had access to us as individuals to make sure that they could understand that content." University tutor*

Whilst university lecturers were aware of the emergence of digital inequity, they were powerless to resolve this issue.

3.2.2 Assuring Professional Learning

During the interviews, participants demonstrated varied understanding of digital pedagogies which led to a discussion about professional learning opportunities for

students. Digital expertise varied substantially within universities and between individuals, which mirrored differences in strategy and guidance given by different HEIs. University lecturers were aware that they needed to develop their skills in order to fully support the teaching and learning along with being able to fully support their students who were equally grappling with the unfamiliar technology. Not only did students have limited experience in the online learning environment, but the university lecturers had limited experiences too. Delivering within an online environment presented challenges, especially when it came to supporting students with their learning and familiarising students with the unfamiliar studying environment.

> *"There is a gap in our understanding of learning design through virtual learning environments and that's very ad hoc, relying on people's personal experience or how much they're keen or interested to do it." University tutor*

It suggests that university lecturers wanted to be provided with a clear professional learning route to develop their digital skills and ensure teaching and learning standards and expectations were maintained.

3.2.3 Design Principles for Online Learning

The development of online learning materials and the design principles behind that process was portrayed differently by different individuals; this reflected the previous theme, assuring professional learning.

> *"Learning is a social process and teaching is a social process. Dialogue is so important. And I think one of the biggest things for me is looking at how we can complement each with the new digital pedagogies that we've got and looking at how actually we can integrate the two together." University tutor*

Engendering student engagement was an important factor for the lecturers in order to be able to ensure the development of the reflective conversations and the professional dialogues that were necessary for student teachers' academic and professional learning. The course material needed to be knowledge rich and, at the same time, allow for critical discourse. Some lecturers went further and discussed the importance of developing online learning materials based on the social constructivist principals that could potentially lead to a connectivism approach. In order to achieve suitable academic content that could support learning synchronously and asynchronously, there needed to be rigour within the content development process.

3.2.4 The Need for a New Teaching Philosophy

Leading cultural change for online delivery was a predominant factor that framed discussions about teaching philosophy. Leading cultural change through online pedagogy included ensuring appropriate levels of student engagement and

interaction, setting clear student expectations through sharing principles of online etiquette, supporting online interaction architecture, and creating online communities and relationships that led to formative learning experiences that fully supported students in their school placements. University teachers asserted that this should be done through simple and flexible means, allowing appropriate interactive digital tools to support synchronous delivery and active teaching. It should be driven by beliefs and values about teaching.

> *“A teaching philosophy of making sure that you actually engage with all students, that all students have to contribute, that you direct questions to individuals in order to ensure that they respond verbally to the seminar and in some cases, turn their cameras on. I think that's really important. I think you've got to be more active as a teacher to do that.” University tutor.*

Synchronous teaching presence was asserted as pivotal in ensuring real-time engagement, and that online communities and relationships are created through synchronous interaction although this with significant time implications as a result of the volume of resources required and time-intensive nature of synchronous learning. There was no acknowledgement that ensuring engagement in online learning was misdirected.

> *“We weren't static in our approach. I think you've got to be a lot more energetic and outgoing when you're presenting on screen.” University tutor.*

Although university lectures could be creative with their teaching approaches, the digital delivery mode did seem to present a barrier in building professional relationships. The learner-teacher ratio was mentioned as a factor to be considered when attempting to develop these online communities.

3.2.5 Online etiquette and expectations

The lack of opportunities for student autonomy, which impacted self-determination and intrinsic motivation, was a concern. This surfaced through low levels of student engagement, attendance issues, personal conduct issues and lack of preparedness and professionalism.

In response to the synchronous delivery, students were passive recipients of learning and did not show sufficient intrinsic motivation for learning or engagement. Students did not seem to be aware of any expectations for synchronous online learning and this provided challenges to university lecturers to manage expectations. Students did not turn on their cameras for in-person discussions and most students did not contribute to discussions through the chat function. This led to issues with professional and personal conduct.

> *“I think we've definitely concluded now that attendance and engagement come up a lot as part of conversations, and maybe they become the same term too often. We talk about a lack of*

engagement from students because they've got the cameras off or lack of engagement because they haven't watched the video. Actually to me, that's probably more of an attendance issue that you're looking at - they haven't turned up. And the students that have turned up, it doesn't mean they're necessarily engaged." University tutor

University lecturers felt that it was difficult to ensure full engagement and interaction from students when there was no way of tracking or observing their online presence.

3.2.6 Meeting the teaching standards

The role of the academic within ITE is complex due to the constant need for collaboration with stakeholders and external partners, none more so than during the pandemic. There are requirements on HEIs to ensure that all student teachers complete the statutory number of days needed for successful completion of school placement. University teachers perceived that not being able to deliver lectures, especially on important aspects such as professional conduct and teaching standards did affect students' preparedness for teaching. The suitability of the digital delivery was questioned at times with a course that has such a practical nature, especially when considering factors such as variations in subject pedagogies, developing personalised learning experiences, and developing teaching and learning practice. The online delivery mode, although it allowed for forms of flexibility in delivery at a challenging time, was limited in its ability to afford the creation of effective professional relationships. Developing that trust to fully reflect on professional standards was difficult when computer screens were seen as barriers to engagement.

"*We felt they (student teachers) weren't really equipped in the same way because those professional codes hadn't been established. We recognise the flexibility, but with the principle that we'd rather go back to face-to-face teaching because of when it comes to it face-to-face teaching is what we're trying to teach them to do." University tutor*

ITE has aspects that can be delivered effectively online, but individual aspects such as subject pedagogies, preparedness for teaching and professional practice need to be thoroughly considered when planning online delivery. The prospect of desisting from the live discussion in the synchronous mode and considering using the asynchronous mode and online forums to provide a space for students to collaboratively reflect on the professional values and attributes needed to be a teacher was not considered.

3.2.7 Belonging

Building online communities posed a challenge to university lecturers. Lecturers could take a creative approach in order to deliver online teaching and learning, but building real-life relationships and making those genuine connections were

challenging. Not only did geographical challenges such as connectivity issues provide barriers to learning, but there was also a lack of appropriate digital linguistic support for Welsh language students, along with a variation in staff confidence and ability to access professional learning in the field of digital learning, these factors led to a variation in the digital provision. There was an absence of guidance from an institutional level at times, and lack of transparency regarding online expectations that lead to these online communities not being fully developed.

> *"Even though we can be very creative about the pedagogical approaches there's something about being in person and building those relationships, that seems very important." University tutor*

Participants perceived that most students did not fully engage with online learning, due to this relationship taking longer to develop, or they did not develop at all. The online environment made social presence difficult to enact and was critical to developing group cohesion and effective communication.

3.3 Findings Part Three

Digital design for online learning

The literature review looked at digital theory and e-learning practice within ITE. It looked at existing case study reviews internationally and nationally, identifying established practices, key points for best practices and digital design and e-learning advantage (Appendix F).

These informed the findings in relation to research questions 3 and 4 and the digital design framework for online learning.

3. How can blended and online learning design better support student teachers' and newly qualified teachers' professional learning?
4. What are the design features which are critical to supporting and informing effective digitally enhanced provision in ITE?

3.3.1 Key findings and implications

1. Based on contemporary theory-based and research-based literature, distance and online learning pedagogy is most appropriately conceptualised as a community of inquiry where learners and educators are engaged in a collaborative endeavour.

2. Constructivist and connectivist theories provide the most powerful theoretical framework within which distance education and online learning can be explained and understood.

3. Universal design for learning provides a powerful framework within which online learning can be conceptualized.

4. In online learning pedagogies, there remains a focus on the community of inquiry as a principal means of encouraging the integration of theory and practice.

5. For practice to reflect research and theory in online pedagogy in higher education, institutions should seek to put in place professional development and training to ensure academics are able to exploit the pedagogical and technological affordances of the online environment to be able to integrate online learning with the curriculum.

6. Synchronous, skills-based approaches that introduce students to teacher education practices will only truly support students' development of theoretical models/frameworks for teaching insofar as they form part of a transmission approach to teaching – the practice of which must shift over time to support constructivist and connectivist principles and the development of a connected theoretical and conceptual framework which underlies sophisticated beliefs about professionalism, pedagogy and learning.

7. Synchronous online activities can no longer be the focus for online learning, and whilst it may seem to be a key time during which students are supported to engage with teacher education practices, online learning cannot replicate the face-to-face classroom in terms of learning and asynchronous activities should be used to support students making meaning of their school-based experiences in the context of research and theory.

8. Institutions and their students must come together and recognize their respective roles in online learning, as well as academic and student identities, and should shift the conceptual focus of learning from teacher-students to peer-peer collaboration to support active learning and engagement with research and theory in the teaching.

9. Institutions should seek to shift their own practices, structures and pedagogic processes in order to develop online learning and blended provision which offer flexibility and quality, which supports learner retention.

3.3.2 Design Framework for Online Learning

Twelve principals and critical digital design elements emerge from the literature review of digital theory and universal design for learning.

1. Online pedagogy which is learner-centred and places constructivist principles and connectivism theory at the centre, one which empowers learners to extend their networks and make connections, identifying relevant data through engaging with a variety of sources.

2. Digitally enhanced pedagogies based around curricula that are contemporary and relevant to learners and inspiring self-directed learning and critical

thinking, that provides the opportunity for critical reflection on professional practice and peer-peer collaboration.

3. Online learning environments should support constructivist teaching strategies that lead to a relevant/meaningful learning experience, one which requires learners to interrogate new sources of data and promotes the construction of personal meaning and situated and contextual meaning.

4. Online learning spaces should afford learners the opportunity to collaboratively construct knowledge and further develop their personal meanings and understandings of educational phenomena through application and contextualization.

5. The pedagogy of online learning must provide the opportunity for critical discourse on education and teaching and a community of inquiry framework which encourages learners to make strategic connections with peers and move beyond prescribed content in a connectivism inspired approach to professional learning.

6. Online collaborative spaces should support critical discourse on education amongst learners and the construction of knowledge and meaning based on prior experience and knowledge whether that may be experienced through interaction with a variety of peer and expert sources, through both synchronous and asynchronous interactions.

7. The academic in online learning is positioned as facilitator (in exchanges but also developing meaning) but the role of expertise/expert ways of thinking should not be underplayed, encouraging learners to become critical professionals. The expertise of the academic should be complemented by the connectivism approach.

8. Online learning should provide formative activities and assessments which engender learners' intrinsic engagement in the meaningful application of knowledge; this means offering choice and flexibility in forms of assessment to support learners in determining the direction of their own learning.

9. Learning designs (structure of online learning environments including resources and format of media) which provide for quality interaction with information (including experts and peers), opportunities for collaboration (synchronous and asynchronous), opportunities to reflect on the learning process, to engage in evaluation and critique of expert sources identified through connectivism.

10. Online learning pedagogy for self-determination, engagement and motivation that encourages self-regulated and independent learning.

11. Digitally enhanced learning designs which provide flexibility in access to resources and the mode/medium of resources, and which remove barriers to

instruction (rethinking of instruction and pedagogy required), yet still provide support and challenge (level of curriculum), at all times supporting learner progression.

12. Digitally enhanced learning designs which are equitable, flexible, simple and intuitive, offer multiple means of presentation, are success-orientated, foster students' intrinsic engagement in learning, and are inclusive and encouraging learning environments.

4. Discussion

The forced proliferation of online education in response to the pandemic has brought to light various challenges faced by students, educators, and higher education institutions alike (Watermeyer, Crick and Knight, 2022). Initial teacher education is no exception to this, given the pandemic-induced disruption to its traditional mode of delivery which includes both campus-based instruction and practicum experience. Whilst the findings from this study reveal that this was a period of challenge for stakeholders within ITE, through this adversity, there is evidence of an evolving understanding of distance online learning and its potential to both complement university and schools-based practice and transform pedagogy within initial teacher education. The quantitative and qualitative data, which emerged from the literature review, questionnaires and interviews, pointed to a number of critical features which warrant a further discussion about student learning and the preparation of teachers, digital education design and distance online learning.

This present research highlights some of the underlying factors that should be considered further in shaping the ITE online learning experience.

1. How has the pandemic impacted newly qualified teachers' preparedness for teaching?

2. How has the pandemic impacted the initial education and preparation of student teachers in Wales?

Preparation of teachers
The study revealed that both student-teachers, newly qualified teachers and university lecturers have expressed difficulties in effectively engaging with online learning, as discussed in section 4.

The results of the quantitative data reveal that for learners these challenges predominantly stem from issues related to motivation and distractions within the home learning environment. Consequently, it becomes evident that the efficacy of online education cannot be solely attributed to digital connectivity issues, despite some university lecturers suggesting that some students residing in rural areas face distinct challenges with internet connectivity.

The findings from the thematic analysis combined with the quantitative data suggest that while Internet connection is a concern for some, it is not the primary cause of students' lack of autonomy and engagement during online learning. This aligns with the observations of university teachers who have highlighted concerns regarding students' online etiquette and passive approach towards online learning.

Notably, this research did confirm a lack of engagement and a tendency for passive learning amongst NQTs and student-teachers. The misconception of online learning as a passive event rather than an intellectually challenging experience reflects the need for pedagogical strategies that are learner-centred and use active learning as a basis for fostering learner engagement, as confirmed in the literature review (Singh,

Steele and Singh, 2021; Eady, Green and Capocchiano, 2021). A confluence of studies documents the benefits of active learning including increases in student engagement, participation and learning (Allsop et al., 2020; Aksit, Niemi and Nevgi, 2016) and by extension self-efficacy and ownership of learning tasks (Calabrese, 2023). Further, the literature review reveals that learning designs and pedagogical strategies for online learning programmes need to be underlain by multi-theoretical frameworks, which include constructivist and connectivist learning theories, intertwined with the concept of active learning. Multi-theoretical frameworks widen the possibilities for understanding and advancing online education and can guide the development of communities of inquiry that encourage students to extend their networks and make connections in an online environment and increase their sense of self-efficacy and learning achievement (Wang and Zhang, 2023).

Lack of student engagement and passivity was a main concern amongst university teachers, mainly in the synchronous online learning environment as this led to a lack of connection between students and lecturers and amongst students within the learning environment and a lack of sense and feelings any belonging to the online community. As Hopwood et al. (2023) state, the connection between the students and their online teacher is of utter importance and a vital ingredient for successful online learning. The data does not suggest that all university teachers were equipped to develop online collaborative spaces where critical discourse around education and the construction of knowledge based on experiences was happening. Socio-cultural activity theory supports the findings that for online learning communities to support students' attainment of learning objectives requires a discourse which includes participants questioning, discussing and establishing the core concepts of teacher education and objects of learning (Guldberg, 2010). Further, Shambaugh (2010) asserts that activity theory can be used in online programme design to make explicit course learning objectives and at the programme design stage to surface issues and concerns which are important to sustainable programme development. Complimenting this is Ali and Nath's (2023) conclusion that effective course design and instructional dialogue are critical for a reimagined and sustainable teacher education when remote online learning is required.

This study highlighted the issues that teacher education is, like other professions, focused on a synthesis of academic and professional learning. Online learning offered an ideal space for student teachers to engage with theory and research in education, but delivery varied between universities in their ability to develop effective professional learning opportunities for students. As Kidd and Murray (2020, p.1) explain, there was a ‘practicum vaccum’ that required teacher educators to reframe and relocate practice in the online learning space presented a significant challenge for a field of professional learning which was experiencing a hyper-emphasis on clinical practice. From an academic development point of view, La Velle et al. (2020) along with Thomas et al. (2023) and Carrillo and Folres (2020) asset that professional learning for teacher educators is essential for effective online delivery.

Digital Education Design

It is recommended that there should be a professional learning pathway to support ITE lecturers and key partners in designing, developing and delivering effective

online learning environments, that support University teachers with their understanding of online pedagogy.

3. How can blended and online learning design better support student teachers' and newly qualified teachers' professional learning?

4. What are the design features which are critical to supporting and informing effective digitally enhanced provision in ITE?

One of the recurrent themes across these discussions is the lack of clarity in expectations within the synchronous online learning environment. This ambiguity has contributed to various challenges, particularly in cultivating online learning communities. The absence of well-defined expectations underscores the importance of clear communication between educators and students to facilitate a more effective and interactive online learning experience. The delivery of teacher education should be intentionally structured to accommodate blended and online learning, with technology-based learning models grounded in substantial contemporary learning theory and supported by research evidence.

In the digitally enriched pedagogy of online learning, priority should be given to asynchronous teaching and learning activities to foster student engagement, again this could be addressed through a professional learning pathway to support the design of online ITE course design.

5. Recommendations

Recommendation 1
Design principles for distance online learning
Teacher education delivery needs to be purposively designed for blended and online learning. Technology provides multiple ways to access professional learning and engage in collaborative tasks, creating an intellectually challenging and motivating learning experience. Models for technology-based learning should be based on substantive contemporary learning theory and research evidence. If a best practice approach to online learning design is adopted the evidence-base should incorporate findings derived from the collection and analysis of empirical data which lead to the identification of superior teaching practices.

Recommendation 2
Online learning should be used to engage student teachers in critical evaluation of educational phenomena
Critical evaluation of educational practice needs to be part of an 'Active' learning process which supports 'Constructive' and 'Connectivist' learning and allows for the synthesis of evidence and creation of 'personal meaning'. In online learning, a tendency to privilege knowledge gained from experience at the expense of critical analysis of evidence and incidents does not support the development of sophisticated professional knowledge and values. The emphasis on online learning should centre on the synthesis of evidence and critical analysis of educational phenomena which is derived from a variety of sources including experience, research, and theory. This is important for supporting a meaningful learning experience for student teachers during their university and placement experiences.

Recommendation 3
Digitally enhanced pedagogy of online learning should privilege asynchronous teaching and learning activities to promote student engagement
Online learning which focuses on engaging students through extended synchronous interaction is often constrained to the didactic method, is time-intensive, resource intensive, focused on extrinsic motivation, and fraught with challenges to engaging students in meaningful learning leading to participation issues. Asynchronous online distance learning affords the architecture for shared and connected collaborative spaces for student teachers to interact and create digital artefacts as an outcome of critical thinking and writing supported by critical reading and meaningful reflection. If a greater emphasis on the asynchronous mode is incorporated into the design vision for online learning, it will require a reconceptualisation of teaching and learning in online spaces. One that represents a new way of teaching and thinking about academic and professional learning, and one which focuses on a critical pedagogy.

Recommendation 4
A professional learning pathway should be considered to support ITE lecturers and key partners in designing, developing and delivering effective online learning environments

ITE Lecturers and key partners need to be given a pathway to engage with international and sector-leading research in the field of online learning and digital pedagogies. Through a professional learning route, lecturers, school partners and

key stakeholders should be provided with the opportunity to develop their own knowledge, understanding and skills to envision, design, develop and enact effective digital ITE provision. A new model of online learning for ITE provision should seek to prepare student teachers more fully for a career in professional practice by providing a wider range of flexible learning opportunities which engage them in professional learning and motivate them to continue their professional learning journal from the early career stage and beyond.

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Appendix A - Online questionnaire – Newly qualified teachers and student teachers

Welsh version

Cefndir

Q1. Rhyw

Q2. Rydw i'n...

 Athro Newydd Gymhwyso (ANG)

 Athro Cysylltiol (AC) yn astudio ar hyn o bryd

Cefndir ANG

Q3. Roeddwn i'n astudio ar gyfer fy nghymhwyster athro yn:

 Prifysgol Bangor

 Prifysgol Glyndwr, Wrecsam

 Prifysgol Aberystwyth

 Prifysgol Y Drindod Dewi Sant, Caerfyrddin

 Prifysgol Abertawe

 Prifysgol De Cymru

 Prifysgol Met Caerdydd

Q4. Rydw i'n gweithio fel ANG yn:

 Ynys Môn

 Gwynedd

 Conwy

 Dinbych

 Fflint

 Wrecsam

 Powys

 Ceredigion

 Sir Benfro

□ Abertawe

□ Blaenau Gwent

□ Bro Morgannwg

□ Caerdydd

□ Caerffili

□ Casnewydd

□ Castell Nedd Port Talbot

□ Merthyr Tydfil

□ Penybont Ar Ogwr

□ Rhondda Cynon Taf

□ Sir Fynwy

□ Sir Gaerfyrddin

□ Torfaen

Q5. Mi wnes i ennil cymhwyster:

□ Tystysgrif i Raddedigion Uwchradd (TAR)

□ Tystysgrif i Raddedigion Cynradd (TAR)

□ BA Statws Athro Cymwys

Q6. Roeddwn i'n astudio drwy gyfrwng:

□ Y Gymraeg

□ Y Saesneg

□ Cyfuniad o'r ddwy iaith

Q7. Rydw i bellach yn gweithio mewn ysgol:

□ Meithrin

□ Cynradd

□ Annibynnol

□ Uwchradd

□ Arbennig

□ Cyflewni

Cefndir Athrawon Cysylltiol

Q8. Rydw i'n astudio ar gyfer fy nghymhwyster athro yn:

□ Prifysgol Bangor

□ Prifysgol Glyndwr, Wrecsam

□ Prifysgol Aberystwyth

□ Prifysgol Y Drindod Dewi Sant, Caerfyrddin

□ Prifysgol Abertawe

□ Prifysgol De Cymru

□ Prifysgol Met Caerdydd

Q9. Rydw i'n astudio ar gyfer cymhwyster:

□ Tystysgrif i Raddedigion Uwchradd (TAR)

□ Tystysgrif i Raddedigion Cynradd (TAR)

□ Y Cwrs Pontio CYnradd/Uwchradd TAR

□ BA Statws Athro Cymhwys Blwyddyn 3

Q10. Rydw i'n astudio drwy gyfrwng:

□ Y Gymraeg

□ Y Saesneg

□ Cyfuniad o'r ddwy iaith

Cysylltedd, Mynediad a Dyluniad y Ddarpariaeth ar-lein

Atebwch y cwestiynau'n y rhan nesaf yng nghyd-destun y ddarpariaeth ddigidol yr ydych yn ei derbyn fel rhan o'ch cwrs AGA ar hyn o bryd.

Q11. Mae'r cwestiwn hwn yn gofyn am ddwysder y ddarpariaeth ar-lein.

	0	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**
Faint o'ch darpariaeth sy'n cael ei haddysgu ar-lein (%)?												

Q12. Rydw i'n defnyddio'r canlynol ar gyfer astudio ar-lein gyda'r Brifysgol:

□ Microsoft TEAMS

□ Blackboard Collaborate

 Moodle

 Google Classroom

 Zoom

 Skype

 Arall

Os dewisoch Arall, nodwch:

Q13. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Mae gen i fynediad i gyfrifiadur pan dw i'n astudio.					
Mae gen i fynediad diderfyn i'r we a digon o ddata pan fyddaf yn astudio o gartref.					
Mae fy nghysylltiad gwe'n ddibynadwy pan fyddaf yn astudio o gartref.					
Mae fy nghysylltiad gwe'n ddigon cryf a chyflym i fedru cymryd rhan mewn gweithgareddau dysgu ac addysgu ar-lein.					
Mae materion yn ymwneud â chysylltedd gwe yn amharu ar fy ngallu i fedru ymroi'n llawn i weithgareddau dysgu ar-lein.					
Rydwyf yn medru ymuno â gweithgareddau dysgu ac addysgu ar-lein pan rydwyf yn yr ysgol.					

Cysylltedd, Mynediad a Dyluniad y Ddarpariaeth ar-lein ANG

Atebwch y cwestiynau'r rhan nesaf yng nghyd-destun y ddarpariaeth ddigidol a dderbynioch chi llynedd fekl rhan o'ch cwrs Addysg Gychwynol Athrawon (blwyddyn academaidd 2020-21)

Q14. Mae'r cwestiwn hwn yn gofyn am ddwysder y ddarpariaeth ar-lein.

	0	5	10	15	20	25	30	35	40	45	50	55
Faint o'ch darpariaeth gafodd ei haddysgu ar-lein (%)?												

Q15. Roeddwn i'n defnyddio'r canlynol ar gyfer astudio ar-lein gyda'r Brifysgol:

□ Microsoft TEAMS

□ Blackboard Collaborate

□ Moodle

□ Google Classroom

□ Zoom

□ Skype

□ Arall

Os dewisoch Arall, nodwch:

Q16. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Roedd gen i fynediad i gyfrifiadur pan oeddwn i'n astudio.					
Roedd gen i fynediad diderfyn i'r we a digon o ddata pan oeddwn yn astudio o gartref.					
Roedd fy nghysylltiad gwe'n ddibynadwy pan oeddwn yn astudio o gartref.					
Roedd fy nghysylltiad gwe'n ddigon cryf a chyflym i fedru cymryd rhan mewn gweithgareddau dysgu ac addysgu ar-lein.					
Roedd materion yn ymwneud â chysylltedd gwe yn amharu ar fy ngallu i fedru ymroi'n llawn i weithgareddau dysgu ar-lein.					

Roeddwn yn medru ymuno â gweithgareddau dysgu ac addysgu ar-lein pan oeddwn yn yr ysgol.					

Amgylchedd Gweithio oddi ar y campws/ gartref

Q17. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Mae fy amgylchedd gweithio o adref yn addas ar gyfer fy astudiaethau a gofynion y cwrs.					
Mae'n anodd canolbwyntio wrth weithio o adref.					
Rydw i bob amser yn ymuno mewn sesiwn fyw ar-lein gyda fy nghamera ymlaen.					
Rydw i'n derbyn cyfarwyddiadau clir gan y Brifysgol am ddisgwyliadau ac etiquette astudio ar-lein.					
Rydw i'n ei gweld hi'n anodd cynnal lefel o gymhelliant yn ystod sesiynau dysgu ar-lein.					

Amgylchedd Gweithio oddi ar y campws/ gartref ANG

Q18. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Roedd fy amgylchedd gweithio o adref yn addas ar gyfer fy astudiaethau a gofynion y cwrs.					
Roedd hi'n anodd canolbwyntio wrth weithio o adref.					
Roeddwn i bob amser yn ymuno mewn sesiwn fyw ar-lein gyda fy nghamera ymlaen.					
Roeddwn i'n derbyn cyfarwyddiadau clir gan y Brifysgol am ddisgwyliadau ac etiquette astudio ar-lein.					

Roeddwn i'n ei gweld hi'n anodd cynnal lefel o gymhelliant yn ystod sesiynau dysgu ar-lein.					

Dyluniad a Threfn

Q19. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	**Anghytuno**	**Ddim yn cytuno nac anghytuno**	**Cytuno**	**Cytuno'n Gryf**
Mae'r darlithydd yn llwyddo i gyfathrebu pynciau pwysig y cwrs.					
Mae strwythur y cwrs ar-lein yn galluogi i mi wybod beth ydy prif nodau'r cwrs.					
Gosodir deilliannau dysgu clir ac rydw i'n gwybod beth sy'n ddisgwyladwy ohonai.					
Rhoddir cyfarwyddiadau eglur i mi ar sut i gyfranogi yn ystod gweithgareddau dysgu'r cwrs.					
Trosglwyddir gwybodaeth am ddyddiadau pwysig neu ddyddiadau cyflwyno yn eglur i mi					

Dyluniad a Threfn ANG

Q20. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	**Anghytuno**	**Ddim yn cytuno nac anghytuno**	**Cytuno**	**Cytuno'n Gryf**
Llwyddodd y darlithydd i gyfathrebu pynciau pwysig y cwrs.					
Roedd strwythur y cwrs ar-lein yn galluogi i mi wybod beth oedd prif nodau'r cwrs.					
Gosodwyd deilliannau dysgu clir ac roeddwn i'n gwybod beth oedd yn ddisgwyladwy ohonai.					
Rhoddwyd cyfarwyddiadau eglur i mi ar sut i gyfranogi yn ystod gweithgareddau dysgu'r cwrs.					

Trosglwyddwyd gwybodaeth am ddyddiadau pwysig neu ddyddiadau cyflwyno yn eglur i mi					

Addysgu a Dysgu

Q21. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno' n Gryf	**Anghytuno**	**Ddim yn cytuno nac anghytuno**	**Cytuno**	**Cytuno'n Gryf**
Rydw i'n fodlon gyda'r gefnogaeth a'r arweiniad rwyf yn ei derbyn gan ddarlithwyr wrth ddysgu ar-lein.					
Rydw i'n derbyn digon o adborth gan y darlithydd i wybod fy mod yn gwneud cynnydd priodol.					
Mae'r darlithydd yn llwyddo i gynnal diddordeb y dosbarth ar-lein.					
Mae'r darlithydd yn llwyddo i gadw pawb yn rhan weithredol o'r trafodaethau yn ystod darlith ar-lein.					
Mae'r darlithydd yn medru cadw pawb ar dasg er mwyn cefnogi'r dysgu ar-lein.					
Mae mwyafrif o'r deunydd dysgu yn addas ar gyfer dysgu ar-lein.					
Mae'r holl ddeunydd astudio ar gael ar-lein.					
Mae digon o gyfleon i ryngweithio gyda'r deunydd dysgu mewn darlith ar-lein.					
Rydw i'n teimlo'n gyfforddus i ofyn cwestiwn mewn darlith ar-lein.					
Mae'r gweithgareddau dysgu ar-lein yn fy nghefnogi fi i ddeall cynnwys cwrs yn well.					
Mae'r aseiniadau yn cynnig her i mi adlewyrchu ar y deunydd sy'n cael ei drafod yn y darlithoedd ar-lein.					

Mae'r darlithydd yn llwyddo i hwyluso trafodaethau adeiladol mewn grwpiau llai ar-lein.					

A ferdwch roi enghrefftiau i gefnogi eich barn am y gosodiadau uchod?

Addysgu a Dysgu ANG

Q22. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno' n Gryf	**Anghytuno**	**Ddim yn cytuno nac anghytuno**	**Cytuno**	**Cytuno'n Gryf**
Roeddwn i'n fodlon gyda'r gefnogaeth a'r arweiniad roeddwn yn ei derbyn gan ddarlithwyr wrth ddysgu ar-lein.					
Roeddwn i'n derbyn digon o adborth gan y darlithydd i wybod fy mod yn gwneud cynnydd priodol.					
Roedd y darlithydd yn llwyddo i gynnal diddordeb y dosbarth ar-lein.					
Roedd y darlithydd yn llwyddo i gadw pawb yn rhan weithredol o'r trafodaethau yn ystod darlith ar-lein.					
Roedd y darlithydd yn medru cadw pawb ar dasg er mwyn cefnogi'r dysgu ar-lein.					
Roedd mwyafrif o'r deunydd dysgu yn addas ar gyfer dysgu ar-lein.					
Roedd yr holl ddeunydd astudio ar gael ar-lein.					
Roedd digon o gyfleon i ryngweithio gyda'r deunydd dysgu mewn darlith ar-lein.					
Roeddwn i'n teimlo'n gyfforddus i ofyn cwestiwn mewn darlith ar-lein.					
Roedd y gweithgareddau dysgu ar-lein yn fy nghefnogi fi i ddeall cynnwys cwrs yn well.					

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Roedd yr aseiniadau yn cynnig her i mi adlewyrchu ar y deunydd sy'n cael ei drafod yn y darlithoedd ar-lein.					
Roedd y darlithydd yn llwyddo i hwyluso trafodaethau adeiladol mewn grwpiau llai ar-lein.					

A ferdwch roi enghrefftiau i gefnogi eich barn am y gosodiadau uchod?

Agweddau at Ddysgu

Q23. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Rydw i'n teimlo fy mod yn medru dysgu'n llwyddiannus mewn gofod ar-lein.					
Rydw i'n hoffi dysgu ar ben fy hun ar-lein.					
Rydw i'n hyderus fy mod yn medru cymhwyso'r hyd rydw i'n ddysgu ar-lein.					
Rydw i'n teimlo'n rhan o'r grŵp sy'n dysgu ar-lein.					
Rydw i'n teimlo'n gyfforddus yn gofyn i fy nhydfyfyrwyr am gymorth wrth ddysgu ar-lein.					

Agweddau at Ddysgu ANG

Q24. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Roeddwn i'n teimlo fy mod yn medru dysgu'n llwyddiannus mewn gofod ar-lein.					
Roeddwn i'n hoffi dysgu ar ben fy hun ar-lein.					

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Roeddwn i'n hyderus fy mod yn medru cymhwyso'r hyd roeddwn i'n ddysgu ar-lein.					
Roeddwn i'n teimlo'n rhan o'r grŵp oedd yn dysgu ar-lein.					
Roeddwn i'n teimlo'n gyfforddus yn gofyn i fy nhydfyfyrwyr am gymorth wrth ddysgu ar-lein.					

Perthyn a Chymuned ar-lein

Q25. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Mae cyfathrebu ar-lein yn gyfrwng gwych i ryngweithio'n gymdeithasol mew cyd-destun dysgu.					

Pam eich bod yn dweud hyn?

Q26. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Rydw i'n teimlo'n gyfforddus yn cyfathrebu drwy'r cyfrwng ar-lein.					
Rydw i'n teimlo'n gyfforddus yn cyfranogi yn nhrafodaethau'r cwrs ar-lein.					
Rydw i'n teimlo'n gyfforddus yn rhynwgeithio gyda myfyrwyr eraill ar y cwrs e.e. mewn ystafell 'breakout'.					
Rydw i'n teimlo bod fy safbwyntiau yn cael eu cydnabod gan fy nghydfyfyrwyr mewn trafodaethau ar-lein.					

Perthyn a Chymuned ar-lein ANG

Q27. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Roedd cyfathrebu ar-lein yn gyfrwng gwych i ryngweithio'n gymdeithasol mew cyd-destun dysgu.					

Pam eich bod yn dweud hyn?

Q28. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Roeddwn i'n teimlo'n gyfforddus yn cyfathrebu drwy'r cyfrwng ar-lein.					
Roeddwn i'n teimlo'n gyfforddus yn cyfranogi yn nhrafodaethau'r cwrs ar-lein.					
Roeddwn i'n teimlo'n gyfforddus yn rhynwgeithio gyda myfyrwyr eraill ar y cwrs e.e. mewn ystafell 'breakout'.					
Roeddwn i'n teimlo bod fy safbwyntiau yn cael eu cydnabod gan fy nghydfyfyrwyr mewn trafodaethau ar-lein.					

Paratoi ar Gyfer Ymarfer

Q29. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	Anghytuno	Ddim yn cytuno nac anghytuno	Cytuno	Cytuno'n Gryf
Rydw i'n teimlo fy mod yn datblygu sgiliau gwerthfawr ar gyfer fy ngyrfa fel ANG.					

Rydw i'n hyderus fy mod yn medru cymhwyso'r hyn rydw i'n ei ddysgu ar leoliad yn yr ysgol.					

Q30. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	**Anghytuno**	**Ddim yn cytuno nac anghytuno**	**Cytuno**	**Cytuno'n Gryf**
Rydw i'n teimlo bod y ddarpariaeth ar-lein yn fy mharatoi ar gyfer y byd addysg.					

A fedrwch chi egluro pam neu sut?

Gorffennwch y brawddegau isod yng ngeiriau eich hun.

Q31. Y peth gorau am ddysgu ar-lein ydy...

Q32. Y peth gwaethaf am ddysgu ar-lein ydy..

Paratoi ar Gyfer Ymarfer ANG

Q33. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	**Anghytuno**	**Ddim yn cytuno nac anghytuno**	**Cytuno**	**Cytuno'n Gryf**
Rydw i'n teimlo fy mod wedi datblygu sgiliau gwerthfawr ar gyfer fy ngyrfa fel ANG.					
Rydw i'n hyderus fy mod yn medru cymhwyso'r hyn rydw i wedi ei ddysgu ar y cwrs yn fy ngyrfa fel ANG.					

Q34. Nodwch eich barn am bob un o'r gosodiadau isod:

	Angythuno'n Gryf	**Anghytuno**	**Ddim yn cytuno nac anghytuno**	**Cytuno**	**Cytuno'n Gryf**

Rydw i'n teimlo bod y ddarpariaeth ar-lein yn fy mharatoi ar gyfer y byd addysg.					

A fedrwch chi egluro pam neu sut?

Gorffennwch y brawddegau isod yng ngeiriau eich hun.

Q35. Y peth gorau am ddysgu ar-lein ydy...

Q36. Y peth gwaethaf am ddysgu ar-lein ydy…

English version

Background

Q1. Gender:

Q2. I am a:

□ Newly Qualified Teacher (NQT)

□ Associate Teacher (AT) currently studying

NQT Background

Q3. I was studying for my QTS at:

□ Bangor University

□ Glyndwr University, Wrexham

□ Aberystwyth University

□ University Trinity Saint David, Carmarthen

□ Swansea University

□ University South Wales

 Cardiff Metropolitan University

Q4. I'm working as an NQT in:

 Anglesey

 Gwynedd

 Conwy

 Denbighshire

 Flint

 Wrexham

 Powys

 Ceredigion

 Pembrokeshire

 Swansea

 Blaenau Gwent

 The Vale of Glamorgan

 Cardiff

 Caerphilly

 Newport

 Neath Port Talbot

 Merthyr Tydfil

 Bridgend

 Rhondda Cynon Taf

 Monmouthshire

 Carmarthenshire

 Torfaen

Q5. The teacher qualification I gained was:

 PGCE Secondary

 PGCE Primary

 BA QTS

Q6. I was studying through the medium of:

 Welsh

 English

 Combination of both languages

Q7. I'm now working as an NQT in the following phase:

 Nursery

 Primary

 Independent

 Secondary

 Special

 I work as a supply teacher at various schools

Associate Teacher Background

Q8. I was studying for my QTS at:

 Bangor University

 Glyndwr University, Wrexham

 Aberystwyth University

 University Trinity Saint David, Carmarthen

 Swansea University

 University South Wales

 Cardiff Metropolitan University

Q9. I am studying for the following qualification:

 PGCE Secondary

 PGCE Primary

 PGCE Bridging Course Primary- Secondary

 BA QTS Year 3

Q10. I'm studying through the medium of:

 Welsh

 English

 Both languages

Online Learning Access and Connectivity

Answer the following questions about the digital provision you are receiving as part of your ITE course at the moment.

Q11. This question is about the amount of digital/online ITE provision you are receiving.

	0	**5**	**10**	**15**	**20**	**25**	**30**	**35**	**40**	**45**	**50**	**55**
How much of your provision is taught/ delivered online?												

Q12. I'm using the following to participate in online teaching and learning activities:

□ Microsoft TEAMS

□ Blackboard Collaborate

□ Moodle

□ Google Classroom

□ Zoom

□ Skype

□ Other

If you selected Other, please specify:

Q13. State if you agree or disagree with the following:

	Strongly Disagree	**Disagree**	**I don't disagree or agree**	**Agree**	**Strongly Agree**
I have unlimited access to the internet when studying from home.					
My internet connection is reliable when studying from home.					
My internet connection is stable and fast enough for me to participate in online learning activities.					
Issues related to internet connection impairs my ability to fully participate in online activities.					

Online Learning Access and Connectivity NQT

Answer the following questions about the digital/online provision that you experienced as part of your ITE Course last academic year (2020-21).

Q14. This question asks about the online provision density.

	0	5	10	15	20	25	30	35	40	45	50	55
How much of your ITE provision was delivered online (%)?												

Q15. I used the following for my online studies:

□ Microsoft TEAMS

□ Blackboard Collaborate

□ Moodle

□ Google Classroom

□ Zoom

□ Skype

□ Other

If you selected Other, please specify:

Q16. Please note your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I had access to a computer when studying from home.					
I had unlimited access to the internet when studying from home.					
My internet connection was reliable when studying from home.					
My internet connection was stable and fast enough for me to participate in online learning activities.					
Issues related to internet connectivity impaired my ability to fully participate in online activities.					

Home studying/ off campus studying environment

Q17. Please note your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
My home working environment is suitable for studying from home.					
I am often distracted while studying at home.					
I always turn on my camera for synchronous online activities e.g., live lecture.					
I receive clear instructions for online etiquette and what is expected from me when participating in online study.					
I find it difficult to stay motivated during online learning.					

Home studying /off campus studying environment NQT

Q18. Please note your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
My home working environment is suitable for studying from home.					
I was often distracted while studying at home.					
I always turned on my camera for synchronous online activities e.g., live lecture.					
I received clear instructions for online etiquette and what was expected from me when participating in online study.					
I found it difficult to stay motivated during online learning.					

Design and Organisation

Q19. Please note your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
The lecturer clearly communicates important course subjects.					
The online course structure clearly outlines important course objectives.					
Learning objectives are clearly set out and I know what is expected of me.					
I am given clear instructions as to how to fully participate in course learning activities.					
Important dates or submission dates are clearly communicated to me.					

Design and Organisation NQT

Q20. Please note your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
The lecturer clearly communicated important course subjects.					
The online course structure clearly outlined important course objectives.					
Learning objectives were clearly set out and I knew what was expected of me.					
I was given clear instructions as to how to fully participate in course learning activities.					
Important dates or submission dates were clearly communicated to me.					

Teaching & Learning

Q21. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I am satisfied with the support and guidance I receive from the lecturer in the online provision.					
I receive enough feedback from the lecturer to know that I am making sufficient progress.					

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
The lecturer succeeds in maintaining the class's interest online.					
The lecturer manages to keep students engaged in productive course dialogue.					
The instructor manages to keep students on task to support the learning.					
Most of the learning material is suitable for online learning.					
All the study material is available online.					
There are sufficient opportunities to interact with the learning material in the online lecture.					
I feel comfortable asking questions in an online lecture.					
The learning activities supports me to gain a deeper understanding of the course content.					
The assignments give me opportunities to reflect on the material discussed during online lectures.					
The lecturer is successful in facilitating constructive online discussions in smaller groups.					

Can you please provide examples to support some of your statements above?

Teaching & Learning NQT

Q22. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I am satisfied with the support and guidance I received from the lecturer in the online provision.					

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I received enough feedback from the lecturer to know I was making sufficient progress.					
The lecturer succeeded in maintaining the class's interest online.					
The lecturer managed to keep students engaged in productive course dialogue.					
The instructor managed to keep students on task to support the learning.					
Most of the learning material was suitable for online learning.					
All the study material was available online.					
There were sufficient opportunities to interact with the learning material in the online lecture.					
I feel comfortable asking questions in an online lecture.					
The learning activities supported me to gain a deeper understanding of the course content.					
The assignments gave me opportunities to reflect on the material discussed during online lectures.					
The lecturer managed to facilitate constructive online discussions in smaller groups.					

Can you please provide examples to support some of your statements above?

Attitudes Towards Learning

Q23. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I feel that I can learn successfully in the online environment.					

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I like working alone in the online environment.					
I am confident that I can apply what I have learnt online.					
I feel part of my learning group in the online environment.					
I feel comfortable asking my peers for help and support online.					

Attitudes Towards Learning NQT

Q24. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I feel that I learned successfully in the online environment.					
I liked working alone in the online environment.					
I was confident that I can apply what I have learnt online.					
I felt part of my learning group in the online environment.					
I felt comfortable asking my peers for help and support online.					

Online Community

Q25. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
Online communication is an excellent medium for social interaction in a learning context.					

Please explain your answer.

Q26. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I feel comfortable conversing through the online medium.					
I feel comfortable participating in the course discussions.					
I feel comfortable interacting with other course participants e.g., via break-out rooms.					
I feel that my point of view is acknowledged by other course participants in online discussions.					

Online Community NQT

Q27. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
Online communication was an excellent medium for social interaction in a learning context.					

Please explain your answer.

Q28. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I felt comfortable conversing through the online medium.					
I felt comfortable participating in the course discussions.					
I felt comfortable interacting with other course participants e.g., via break-out rooms.					
I felt that my point of view was acknowledged by other course participants in online discussions.					

Preparing for teaching

Q29. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I feel that I am gaining skills that are valuable for my future career as an NQT.					
I am confident that I will be able to apply what I am learning to my future teaching practice.					

Q30. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I feel that the online provision is preparing me for teaching.					

Can you please explain why or how?

Please complete the following sentences in your own words

Q31. The best thing about online learning is...

Q32. The worst thing about online learning is...

Preparing for teaching NQT

Q33. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I feel that I gained skills that are valuable for my future career as an NQT.					

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I am confident that I can apply what I learnt in my current practice as a teacher.					

Q34. Please state your opinions about the following statements:

	Strongly Disagree	Disagree	I don't disagree or agree	Agree	Strongly Agree
I feel that the online provision is preparing me for teaching.					

Can you please explain why or how?

Please complete the following sentences in your own words

Q35. The best thing about online learning is...

Q36. The worst thing about online learning is...

Appendix B - Semi-structured interview questions: University teachers

Welsh version

1. Beth oedd eich profiad, os o gwbl, o ddysgu o bell ac addysgu ar-lein cyn pandemig Covid-19?

    • A oedd gennych unrhyw brofiad blaenorol o ddysgu o bell mewn rôl a/neu sefydliad yn y gorffennol?

2. Allwch chi ddisgrifio'r hyn a ddigwyddodd yn eich adran AGA wrth I chi drosglwyddo I addysgu ar =lein lein, gan fanylu ar yr elfennau canlynol o'r rhaglen h.y. trosglwyddo darlithoedd/ seminarau i'r gofod dysgu Rhithiol ayyb?

    • Allech chi ei ddisgrifio/esbonio ychydig ymhellach?
    • Sut byddech chi'n disgrifio rôl yr academydd yn y cyfnod addysgu ar-lein hwnnw? A newidiodd hyn dros amser?

3. Allwch chi ddisgrifio'r rhesymeg dros y ffordd y gwnaethoch chi strwythuro'ch ymateb wrth newid i addysgu ar-lein? Beth oedd eich blaenoriaethau o ran addysgu a dysgu yn ystod y cyfnod hwn?

4. Sut oedd yr eich addysgeg yn whanol wrth ddarparu darlithoedd ar-lein mewn ymateb i'r cyfyngiadau Covid, o'l gymharu a'r addysgeg wyneb yn wyneb neu ddull cyfunol yn eich sefydliad?

    • Allech chi ei ddisgrifio/esbonio ymhellach?
    • Beth oedd y nodweddion a oedd yn wahanol?

5. Beth oedd/yw nodweddion mwyaf effeithiol addysgeg ar-lein AGA yn eich sefydliad ar gyfer paratoi ACau ar gyfer eu blwyddyn ffurfiannol/blwyddyn ANG yn yr ysgol a pham?

    • Allwch chi feddwl am unrhyw weithgareddau a weithiodd yn dda ac sydd wedi parhau ôl dychwelyd i addysgu wyneb yn wyneb?

6. A oedd unrhyw egwyddorion oedd wrth yn sail l'ch darpariaeth dysgu ac addysgu ar-lein a ddefnyddiwyd gennych yn ystod y pandemig sydd bellach yn cael eu defnyddio yn rheolaidd gennych?

7. Disgrifiwch ffordd benodol yr ydych yn ymgysylltu â dysgwyr ac yn eu hysgogi yn ystod addysgu ar-lein.

English version

1. What was your experience, if any, of distance learning and online teaching prior to the Covid-19 pandemic and lockdown?

- Did you have any other experience of distance learning in a previous role and or institution?

2. Can you describe what happened in your ITE department when you made the shift to online teaching, in terms of transferring components of the programme i.e., lectures/ seminars to the VLE, etc.?
    - Could you describe it/explain it a little further?
    - How would you describe the role of the academic in that online teaching phase? Did it change over time?

3. Can you describe the rationale for way you structured your response to the shift to online teaching? What were your priorities with regard teaching and learning during this time?

4. How did the online pedagogy in response to lockdown differ from the blended or face-to-face pedagogy of ITE in your institution?

    - Could you describe it/explain it a little further?
    - What were features which differed?

5. What were/are the most effective features of the online pedagogy of ITE at your institution for preparing ATs for their formative year/ NQT year in school and why?

    - Can you think of any activities that worked well and were kept in place following the return to face-to-face teaching?

6. Were there/are there any principles which underly the teaching and learning design you adopted?

7. Please describe a specific way that you engage and motivate learners during online teaching.

Appendix C - Ethics Application Form, Participant Information Sheets and Consent Forms

These are available from the author on request.

Appendix D - Annotated Bibliography

Ten (10) international case studies and three local case studies were identified which explore effective practice within ITE e-Learning including during the Covid-19 pandemic.

COVID-19 and teacher education: a literature review of online teaching and learning practices (2020)

This is a comprehensive literature review of the most recurrent topics explored in online teaching and learning in Higher Education. Online practices, related to social, cognitive, and teaching issues were explored to assist in teacher education and further support ITE and online learning. The study encompasses the benefits of online learning, and the opportunities it presents to develop flexible assessment and pedagogical methods.

Come to a screeching halt': Can change in teacher education during the COVID-19 pandemic be seen as innovation? (2020)

This research conducted semi-structured research interviews with staff in leading roles within ITE universities in Asia, Europe, North America and Oceania. The research explored two key questions: looking at how have leaders of ITE addressed the challenges of the COVID-19 pandemic internationally, and did their responses suggest that the changes they enacted might be classed as innovations?

Shifting the Delivery but Keeping the Focus: A Reflection on Ensuring Quality Teacher Preparation during a Pandemic (2021)

This research paper explores how the School of Education, University of Wollongong, Australia shifted teaching modes and assessment tasks in light of COVID-19 to be supported by digital technologies unexpectedly as the main delivery mode for the preparation of future teachers.

Keeping the Party in Full Swing: Findings on Online Student Engagement With Teacher Education Students (2021)

This research explores what it means for ITE students to be engaged in online learning and how teacher educators can enhance pedagogical practices in the online learning space. They do this by using 'a party' analogy.

Initial teacher education in England and the Covid-19 Pandemic: challenges and opportunities (2021)

This research explores the impact and implications on initial teacher education (ITE) of the crisis brought about by the Covid-19 lockdown of schools and universities from the perspectives of four university providers in England.

Blended Learning at the University of the Highlands and Islands: A case study in self-awareness and policy making (2015)

This study conducted in The University of Highlands and the Islands (UHI) - a non-traditional structurally institution with a network of thirteen academic partners (colleges and research centres) across the Highlands, Northern and Western Isles, Argyll, Moray and Central Scotland where 75% reside in rural highlands and islands presents challenges to teaching and learning. This case study aims to review how blended learning within UHI supported student satisfaction, interaction and support between stakeholders along with how it assisted staff in providing education within the rural setting and how it supported their needs.

The Covid-19 pandemic and its effects on teacher education in England: how teacher educators moved practicum learning online (2020)

This study focuses on the challenges Covid-19 posed for teacher educators in their final practicum year. Using qualitative research methods and concepts from spatial geography, the research explores how pedagogies adapted as the removal of the practicum relocated learning communities to new online spaces.

Preparing educators for the time of COVID…and beyond (2020)

This study explores what policymakers and educators can do to support educators in meeting the social emotional and academic needs of students following the COVID-19 pandemic. The pandemic emphasised that even greater efforts are needed to address students' academic and social emotional needs, while making up for learning loss and preparing for the unpredictable combinations of distance learning, blended learning, and in-classroom learning. These expectations, along with the need for greater emphasis on equity-focused teaching and learning have raised the bar for educators and for educator preparation.

Combining the best of online and face-to-face learning: Hybrid and blended learning approach for COVID-19. post-vaccine and post-pandemic world (2021)

The was a descriptive study aiming to examine history, evolution and development of blended learning. It explores and presents models of hybrid learning and different e-Learning models.

It uses the (cause and effect diagram) of the fishbone analysis to identify problems faced by instructors as they transitioned to a completely online medium of instruction, conducts a SWOT analysis of blended and hybrid medium of instruction before providing evidence-based practical solutions and recommendations for implementation and success of blended and hybrid models of instruction at academic institutions.

Student Teachers' go online: the need for a focus on human agency and pedagogy in learning about 'e-learning' in Initial Teacher Education (ITE) (2008)

This study focuses on the 2008 UK Government strategy to introduce e-learning into the competences needed in order to achieve Qualified Teacher Status. The Aim of the study was to design and resource a module which facilitated opportunities for

student teachers to engage in online learning dialogues with children, having initially met face to face.

Delivering education reform in Wales: a flexible route into teaching (2022)

The study looks at the introduction of a flexible Open University in Wales Partnership PGCE programme - with training over two years allowing for the option to work alongside existing studies and/or have time for other commitments. Teacher recruitment in Wales is reported as a 'substantial challenge' for the secondary sector. The number entering ITE has fallen below expected targets with Welsh and bilingual schools experiencing challenges (language and the rurality of some schools). The introduction of a new flexible ITE teaching route is explored as a way of supporting this current system.

Teacher's professional learning: country background report of Wales for the OECD TPL study (2020)

Current reforms within the education system in Wales represent a fundamental shift in the expectations of the teaching workforce. A number of policy initiatives have been introduced
to support schools to develop a culture centred around professional learning, including:
National Approach to Professional Learning, Schools as Learning Organisations, the new professional standards and performance management arrangements.

National Approach to Professional Learning: research report The Professional Learning Blend 2.0 (2018)

This research report builds on the commissioned report by the Welsh Government (2018) to support the National Approach to Professional Learning (NAPL). It's aim is to develop a deeper understanding of the NAPL's commitment to achieve a professional learning blend. The report identifies the need for a cultural move amongst education professionals from 'compliance' to 'agency', making professional learning more effective with increased autonomy in relation to one's own development.

Appendix E - Key findings, challenges and barriers

Table 22 Summary of characteristics of included studies in the literature review

Study	Author and year	Country of Origin	Established Practice	Key Findings	Challenges and Barriers
S1	Carrillo and Flores (2020)	Catalonia and Portugal	Community Of Inquiry framework (Garrison and Arbaugh, 2007)	Success is driven by students' attitude and commitment to engage.	• Challenges arose from issues connected with contextual limitations to internet connection and suitable technology linked with digital inequalities. • The capacity to provide design support for staff with online learning.
S2	Ellis, Steadman and Mao (2020)	Australia and London	Majority of the interviews discuss the panic that ensued due to the restrictions and impact of the pandemic with little in place prior to support the students and the programmes.	• The move to online learning during Covid-19 highlighted the potential benefits of a blended approach in the future. • Staff identify better with technology and innovative digital practices seen as sustainable pedagogical methods, as opposed to a plaster to cover current gaps due to the pandemic. • The increase in communications between ITE partners through digital means, allowed better understanding and practice between partners in order to build programmes for students based on needs.	• The impact of Covid-19 highlighted the fragility of the current ITE model. The blended approach helped to show how ITE programmes, and the staff can be supported and potentially reduce the stress and emotional impact of practice.

S3	Eady, Green and Capocchiano (2021)	Australia	Active Learning Integration of theory and practice	• The use of technologies has improved collaboration between schools and the ITE provider, as well as highlighting the importance for increased communication between the two providers for ongoing evaluation and improvement. • Creativity is key, there is a continuous need to find new and creative approaches that engage and inspire students. The importance of the student's Voice, providing students with the tools to get where they are going enables us to foster self-directed, independent school leaders of tomorrow.	
S4	Hopwood et al. (2023)	Australia	Prior to this research, online courses were made available to those unable to attend or had external life commitments	• The research emphasized the importance that students felt connected with their online teacher. • Human Connection is a vital ingredient for successful online learning. This can be done through teachers introducing themselves, welcoming students, replying to posts, providing prompt feedback on assessment tasks, and generally building a sense of human connection between teacher and student. • Authentic content ensuring variety in activities, and assessments. (See Checklist for Successfully "Hosting the Party" to support online learning see page 13-14)	• Learning Space Design: if this was poorly designed, the students were less likely to engage. • Availability of teachers needs to be designated as part of the design where students could contact teachers at specific times through the VLE.

S5	La Velle et al. (2020)	England	Prior to pandemic, technical systems were in place, with some experience of using these systems from teacher educators noted. Systems in place included: Blackboard Collaborate, Microsoft Teams, Google Hangout Meet, Panopto, One, Bluesky, Whatsapp, Skype	• Professional learning and staff training in the means of online delivery is essential. Knowledge enhancement framework for blended teaching in the post-Covid age could help educators in improving their online teaching.	• Staff nervous about online teaching. • Challenges in supporting personal elements of the student teacher's development. • ITE providers felt a lack of support/guidance. • Lack of initial collaboration between ITE providers and lack of consistency e.g., digital tools being used. • Rapid development of technologies. • Students feeling that their practical experience teaching was limited because of online delivery means.
S6	Panciroli et al. (2015)	Scotland	Blended learning is used as an option within this organisation due to the need for flexible approaches for the learners along with providing support retention and quality. Blended learning is capitalised as a means of encouraging students to study within the organization and therefore the area, to support social and economic benefits.	• Flexibility to support all learners in rural and isolated locations. Socio-economic benefits of keeping students in the local area.	• Poor design of blended teaching created limitations. • Lack of appropriate technology and low digital literacy skills from both students and teachers. • A shortfall in opportunity for staff to identify problems with students' wellbeing. • Limitations due to isolation and lack of inclusive learning strategies.

S7	Kidd and Murray (2020)	England	Professional Learning	• Increased contact time with students due to removal of logistics (travel time). • Increased opportunities for 1-2-1 tutorials and support of individual learners. • Allowance for more regular contact assisted with removing any misconceptions or problems that students may have had. • Pupil/teacher dynamic shift due to knowledge/level of skills with technology- thus, teachers needed to think deeper with regards to their use of technology (develop new skills which complement the classes). • Technology has given students a direct connection to teaching staff allowing for a holistic and inclusive basis along with developed autonomy.	• Educators may sometimes be 'unsettled' and 'challenged' and have some 'epistemological and pedagogical questions, doubts, or uneasiness'. • Teaching methods needs to be considered; how do we deliver knowledge as opposed to didactic approaches. • Online group size: the use of small groups to help deliver topics as opposed to one large group lecture- allows for discussion, collaboration and communication.
S8	Darling-Hammond and Hyler (2020)	USA	Practice currently in place prior to the pandemic was indicated as 53% of teachers from the Organisation for Economic Co-operation and Development (OECD), 2019 reported that they allow students to use computers.	• The importance to recruit, develop, and retain a strong educator workforce. • Incentives needed to accomplish this reside at all levels of government. • Support mentoring and new teacher roles. • Create collaboration time for teachers to prepare programs, strengthen collaboration within university departments, along with providing greater support for teacher and leaders' social and emotional needs.	• Teacher shortages, including teachers retiring if schools physically return. • Greater levels of teacher training needed, educators need to be increasingly knowledgeable with regards to how they can implement meaningful activities that engages students to inquiry and learning in the classroom.

S9	Singh, Steele and Singh (2021)		Evolution and Development of Blended/Hybrid Learning Four models of hybrid (and blended) education, (a) rotation, (b) flex, (c) A La Carte, and (d) enriched virtual (Christensen, Horn and Staker 2013).	• There is a need for training to develop pedagogical content knowledge using technology. • Appropriate teaching resources needs to be provided to staff to support a wider range of online classes. • Online teachers need to learn how to humanise the online course to engage students- and develop the feeling of belongingness in the classroom that is missing in online learning spaces. • There needs to be an increase in the availability of tools and training that support inclusive/ALN and accessibility	• The fish-bone analysis (cause and effect diagram) found the following key issues: • Teacher limitations: Fear of technology, Limited knowledge of software and tools, Time management issues, feeling of isolation, Declining enrolment and budget cuts impacted wellbeing of staff. • Lack of training for staff on the technology heavily impacted their wellbeing. • Practical elements of assessment provide great challenges.
S 10	Turvey (2008)	England	The use of Virtual Learning Environment (VLE) in the classroom to support assessment.	• Online communication and asynchronous learning tools increase opportunities for reflection- the decontextualized online communication environment lends itself to cognitive dialogues. • Evaluation of methods allows the student-teacher to gain a better understanding of the tools being used by their students, the learning process and how to better support them. The use of student teachers using the VLE allowed them to re-evaluate and consider the value and quality of work being uploaded.	• The awareness of teaching methods not robust. • This requires effective reflection on e-learning practice within meaningful and purposeful contexts if to be adopted within ITE programmes in the future.

S11	Glover and Hutchinson (2023)	Wales	Co-participation and co-construction approaches (The student teachers' community) The Knowledge Base for Teaching Hybrid blended open learning approach	• Flexible approach seen as a method that can also help to qualify professionals from a range of diverse backgrounds to help Wales meet its professional workforce goals. • Online materials, seminars, practice in schools and progressive assessments provide the structure for the PGCE experience. • Research-informed practice ensures the student teachers are engaged in evidence gathering to critically inform their practice.	• Capacity and capability of the teacher workforce to develop and implement a new curriculum for Wales. • Welsh language capacity of the teacher workforce, subject shortages and the lack of diversity in the teaching profession.
S 12	Thomas et al. (2023)	Wales	Continued Professional Development	• Introduction of online tools (Professional Learning Passport and Hwb Platform) are seen as a flexible model that can help overcome current identified barriers to Continued Professional Development. • The introduction of an online portal will provide access to academic journals and research relating to education and pedagogy for staff.	• The Survey identified that ICT and Digital Skills training is needed. • A shortage of time means that educators cannot participate in CPD in a way that could benefit their skills.
S 13	Jones et al. (2020)	Wales	Professional Learning Professional Learning Blend Blended Learning	• e-Learning and online social interactions support teachers to develop increased awareness of issues such as: ethics, copyright, netiquette and digital literacy. • Engaging in professional learning through the medium of online learning helps to improve digital skills and increase capacity to embed them into practice. • Flexible methods and control over the work pace benefitted pre-service teachers and allow time for student-teachers to make links between the course content and practice, this is linked to the benefit of MOOCS as a supportive method.	• Quality of e-learning provision • The variety of VLE's being used within HEIs provide challenges in content consistency across providers. • Digital infrastructure is insufficient. • Accessibility of material. • Access to provision, including bilingual provision. • Sustainability of programmes, needs to be flexible and adaptable throughout.

Appendix F - Literature review

Digital Theory

Digital technologies are now an integral feature of education, with the integration of technologies in schools by no means a new phenomenon (Department for Education, 2019; Grand-Clement, 2017; House of Lords Select Committee on Digital Skills, 2015). Digital technology in education is identified as the alternative to the physical and spatial confines of an educational setting, as well as providing an alternative to the assessment methodologies used in traditional education environments (Blundell, Lee and Nykvist, 2016). As Selwyn (2017, pp.143-144) identified though, this is not to say that we need to denounce the current forms of education instead educational institutions need to make the most of digital technology, through some 'relatively modest readjustments' to educational practice. Ally (cited in Anderson, 2008) details that the use of online and digital learning methods does not advantage or disadvantage knowledge-centered learning, identifying that negative preconceptions of this medium are gathered from formal and informal experiences within virtual classrooms. Research though has identified that it is the responsibility and skills of the teacher to ensure that all students have the opportunity whilst using digital tools to reflect, experience critical discourse and construct relevant knowledge structures that assist with their learning journey (Baroud and Dharamshi, 2020; Ally as cited in Anderson, 2008).

Anderson and Dron (2011) describe digital teaching as a form of a dance, as having both technology and pedagogy intertwined; with technology being the beat and music and pedagogy as the moves. As Anderson and Dron (2011) discuss in their research into distance education pedagogy, the availability of technologies will potentially influence the pedagogical approach utilised. Though it must be identified that it is also essential for the educator to understand how to effectively implement pedagogical approaches within these technologies as well as identify how we can utilise technology to support methods we may use already in our learning settings. A concern raised by Anderson (2020) being that due to challenges faced when integrating technology into the curriculum, academics need to be provided with relevant knowledge and skills-update with regards to pedagogical and technological developments that are directly applicable, meaningful and relevant to each discipline and for which each academic can then make their own.

Siemens (2005) states that the key learning theories utilised in the creation of instructional environments are behaviorism, cognitivism and constructivism, however as learning methodologies change, so must the learning theory that help to shape the design of our instructions. Ertmer and Newby (1993) and Johnson (2014) express these three learning theories as a taxonomy for learning, with behaviourism strategies used to teach the what (facts) cognitive strategies can be used to teach the how (processes and principles) and constructivist strategies used to teach the why (higher level thinking that promotes personal meaning and situated and contextual meaning). In the digital age teaching and learning therefore, the central premise of connectivism as an underpinning pedagogical theory is recognised as assisting with addressing the challenges that students may face, where behaviorism, cognitivism and constructivism do not (Siemens, 2005). Lunevich (2021, p.2020) identifies that the dynamics of teaching and learning have to develop from 'critical

pedagogy' to 'critical digital pedagogy', with teachers needing to learn new technologies and creative approaches to teaching to adequately prepare students for their future.

Anderson (2008) acknowledges that behaviorism, cognitivism and constructivist theories have and will continue to contribute to the design of digital learning tools and in this next section we will discuss how these underpin digital pedagogy, identifying the fundamental features that support the what, how and why of learning with digital tools in our classroom, before moving onto the role and fundamentals of connectivism as a theory that can support our students for the increasing complexity of learning and working in a networked world (Selwyn, 2017).

Behaviorism places emphasis on the learning being accomplished through the correct response of an individual, with the association between stimulus (question) and the response (student answer) strengthened and maintained over time, repetition and quality of instruction (Ertmer and Newby, 1993). The underpinning benefits of behaviorism, as identified by Johnson (2014) being that behaviour is a function of experience and as such a curriculum broken into manageable tasks that can be practiced to support the development of mastery. Boghossian (2006) notes though that in traditional behaviourist models, a core concern is that it views the students as an unreflective responder, there is no subjective element to the learning and therefore limited focus on determining as to whether the work completed by the individual has been understood or could be interpreted for use in other areas of their study or life. Critical thinking skills, allowing the student to evaluate and make judgements as well as scrutinize new information is discussed as being a fundamental feature for 21st century education (Lombardi et al., 2021; Noddings, 2006; Pithers and Soden, 2000). With the Digital Competence Framework (WG, 2018) and National Curriculum for the UK (Department for Education, 2014) identifying the need for students to be provided with the opportunity to develop into creative and critical thinkers, utilising a purely behavioral strategy in digital learning would restrict the opportunities for student motivation, engagement and achievement; skills identified as required for the new and emerging digital future (EPRS, 2020; Helsper and Eynon, 2013).

Cognitive-behaviourist strategies arose from the aforementioned barriers, with a focus for there to be a greater focus on how the student can recall and utilise information stored (Anderson and Dron, 2011) and shift away from the perceived behaviourism failure to support students with understanding the how and why when processing information (Yilmaz, 2011). Cognitivism, as an underpinning theory of learning, views the learning process as active, in that both the acquisition and reorganizing of information and the learner as a participant within this process are engaged and greater emphasis is placed on what the individual knows and how they can use this information in a variety of other meaningful experiences (Sezgin, 2021; Kassymova et al., 2019; Yilmaz, 2011). Anderson (2008) acknowledges that students require opportunities to reflect upon their own thinking and the need to transfer their own knowledge to unfamiliar contexts, in turn supporting the creation of new knowledge structures.

Within an online learning environment, utilising cognitivist theory to underpin practice requires that relevant strategies to support independent learning and thinking are

provided and examined to assist with enabling students to process the materials efficiently (Anderson, 2008). Central to effective facilitation is the encouragement of students to use metacognitive skills to help within the learning process; the learner being aware of their skills and how to use them effectively, the opportunity to reflect on what they are learning, collaborate with other learners and use these elements to adjust their learning approach if necessary, thus supporting the move to becoming self-regulated within the digital learning landscape (Yen et al., 2018; Cubukcu, 2009; Anderson, 2008). Fisher (1998) identified this, with regards to the importance of metacognitive awareness in children, recognizing that if we can bring the process of thinking and learning to a conscious level (being reflective and aware of the learning process), then we can assist with them gaining control or mastery over the organisation of their learning and assisting with the evaluation of their own beliefs (Moore and Parker, 2009).

Constructivism originated as a conceptual framework for understanding cognitive development, in that students are encouraged to construct their own knowledge from experience (Johnson, 2014; Koohang, Riley and Smith, 2009). The notion being that learners are seen as active in the experience, they are in the centre of the learning experience with the teacher adopting the role of a facilitator or advisor (Anderson, 2008). Selwyn (2017) refers to constructivist approaches in the digital learning environment as one in which digital technology is seen as an effective means of providing individuals with enhanced access to sources of knowledge and expertise that exist outside of their immediate environment. This model of online learning relies on the design of learning activities that actively encourage collaboration, self-reflection, multiple representations of ideas and the opportunity to explore new ideas driven by the learner's goals, objectives and own previous experiences (Koohang, Riley and Smith, 2009; Anderson, 2008). Though the role of the teacher, as discussed, moves from the traditional teacher-centred passive learning model, in which knowledge is imparted to students, the learner-centred classroom pays a greater level of attention to why one is learning a topic, with an increased focus on students being responsible for the development of their knowledge; the teacher's role being one that provides the opportunities for development as well as answer questions and facilitate deeper levels of criticality in their work (Lunevich, 2021; Li et al., 2018: Anderson, 2008).

Mayer (2002) asserts that two of the most important educational goals are to promote the retention and transfer of knowledge; positing that students need to not just be able to retain new sources of information but to also apply them in meaningful contexts. This view is agreed by Sailin and Mahmor (2018) and Anderson (2008) in that when learners are able to be active, constructive and cooperative within the learning environment they are then capable of both being motivated to engage with the activities as well as find ways to contextualize the learning to other problems they may encounter in both education and the 'outside world'. Constructivist learning models of digital design encourage a problem-based approach to learning and thus improve their opportunities to apply these skills to 'real-world' scenarios (Selwyn, 2017, p.87). As Mayer (2002) identifies, within a constructivist approach to learning, the teacher must ensure that we move beyond recognise and recall and allow for understanding, application, analyzing, evaluation and finally creation. Siemens (2005) contends however that behaviourism, cognitivism and constructivism alone do not address the challenges of organisational knowledge and transference of

knowledge and instead proposes the learning theory of connectivism as being the alternate method educators should utilise when considering the implementation of digital learning strategies. Siemens (2005) attests to connectivism in that learning is a process that occurs within shifting environments not under the control of the individual, with connectivism being driven by the understanding that decisions made are based on altering foundations within which new information is acquired; the responsibility of the individual therefore being the ability to identify relevant information and make decisions based upon new opinions, the correct choice of learning to support shifting realities as well as the ability to see connections between ideas and concepts.

Connectivism is discussed as the learning theory that best supports practitioners for the digital age, in that as information is changing over time, the ability to learn about the subject in question will also change with connectivism emphasizing two essential skills; notably the ability to search for current information and the ability to filter secondary and external information. As discussed by Sirghea (2020), connectivism relies upon the ability to make decisions based on the information obtained. Anderson (2008) supports this, stating that connectivism helps us to understand that learning is about making connections with ideas, facts, people and communities, with connectivism addressing how we use the knowledge that we can gather (Siemens, 2005).

As in the previous theory of a constructivist learning environment, the teacher's role is more in-line with that of a facilitator or mentor of the learning setting (Sirghea, 2020) with the learner's responsibility being to construct networks of knowledge based on previous experience and new realms of understanding (Goldie, 2016). An example of this in practice are Massive Open Online Courses (MOOCs), which differ from traditional learning in that they are open-access, free content with the participation in these programmes being voluntary. The central feature of this model being that the teacher's role is not to transmit knowledge to the students but rather to facilitate exchanges between participants about the subjects in question. As defined by Pomerol, Epelboin and Thoury (2016) teachers are the project commissioners, defining the learning objectives and intervening where necessary to bring discussions back on track. The responsibility of a learner in this platform is reliant upon individual research, group collaboration and the ability to interact with additional content and social networks to assist with the construction of meaning (Anderson, 2008).

Anderson (2008) identifies that all of these learning theories have contributed in their own way to the design of online materials and as evident within the model seen in Figure 8. The theories that underpin each approach from the *what, how* and *why* of the digital learning planning can be identified in the components of effective online learning.

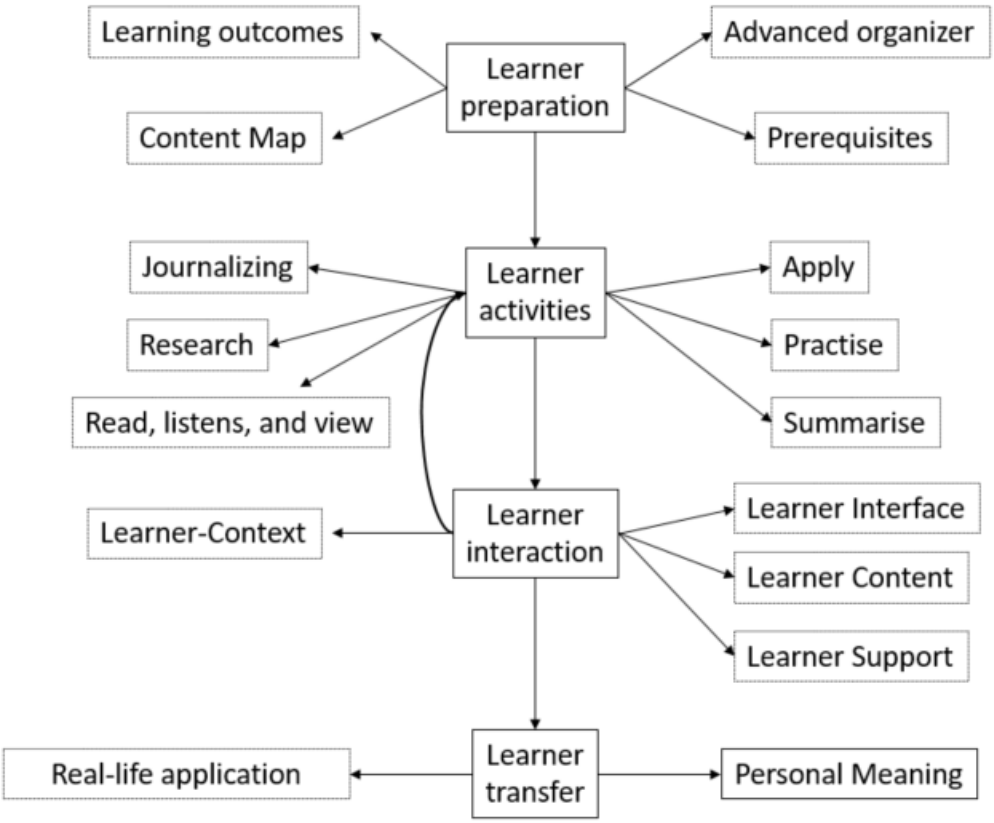

Figure 20 *Components of effective online learning (after Anderson, 2008)*

The central themes therefore that must be considered when looking to implement an effective online learning/digital pedagogy would be:

- the consideration as to how the students can interact with the information.
- the role of collaboration to support additional understanding.
- ability to reflect effectively during the learning process with the provision of reflection.
- evaluation and critique of the subject area.
- the relevance of the learning to ensure a meaningful experience.

The next element to consider therefore is how can we successfully implement these learning theories within a digital learning environment; especially one that, as Siemens (2005) identifies, is constantly adapting and changing. Rose and Meyer (2002 cited in Edyburn, 2005) coined the phrase Universal Design for Learning (UDL) based on the term ‘universal design’ with the concept and underlying philosophy being that the design and delivery of products or services should be both functional and usable for all people with the widest possible range of capabilities. Rose and Meyer (2002 cited in Edyburn, 2005) noted the disconnect between the diverse needs of the student population and the current models and theories in the curriculum which relied upon a ‘one size fits all’ approach. The fundamental principles of UDL guide educational practices in that teachers and educators would provide flexibility in the ways information is presented, the ways students can respond or demonstrate knowledge and skills, whilst also removing potential barriers in instruction; with these in place there should be opportunity still to support and

challenge learners without exception (Tobin and Behling, 2018; Rose, 2001). Table 12 summarises some of the key features of UDL.

***Table 23** Features of UDL*

Features	Description
Equitability	The needs of all students are met
Flexibility	The diversity students bring to learning is embraced
Simple and intuitive	Teaching and learning are accessible and adjustable
Multiple means of presentation	Educators use different ways to teach
Success-orientated	Barriers are removed, and student learning is supported
Appropriate level of student effort	Educators adjust their teaching and assessing
Appropriate environment for learning	The environment is accessible and encourages learning for all

Source: CEC (2005) as cited in Bouck (2017)

Assistive Technology (AT) and UDL are closely related, however it is important to note that where there are similarities in that they both utilise digital technologies to support student progression, within AT, modern technology is utilised to support the individual student to overcome barriers in the curriculum and living environments, whereas UDL targets the curriculum itself; UDL is implemented by the teacher to provide accessibility for a wide range of students through the provision of multiple options (Bouck, 2017; Rose et al., 2005).

The core elements of UDL though are of importance when considering the digital learning theories adopted for effective teaching and learning. The underlying features that require implementation when planning the design for learning are based upon the way in which our brain networks are stimulated when wishing to learn and retain what we learn:

- Affective networks: Engagement must be purposeful; stimulating and motivating interest from learners.
- Recognition networks: Suitable representation for resourceful and knowledgeable learners; allowing for both presentation and assimilation of content in different ways.
- Strategic networks: Action and expression for strategic goal-direct learners-ensuring that students are provided with the opportunity to differentiate how they express understanding and meaning (Tobin and Behling, 2018, p.129).

Referring to the idea of effective digital learning theories, we can draw parallels with regards to the core elements of effective curriculum design and the requirements identified from a UDL classroom, principally assessment that accommodates for

changing circumstances and needs of the individual and assimilation of content that is recognizable to the individual or relevant to assist with motivation.

Selwyn (2017) highlights the criticisms of digital technology by some practitioners, with the reluctance to adopt new methods or approaches due to time constraints or lack of willingness to adapt current traditional methods unless they can perceive a complementary or workable use of the digital methodology. As Selwyn (2017) identifies though, many of the concerns centre on the role of digital technology potentially marginalizing or standardizing the job of being a teacher. However, as identified in constructive, cognitive and connectivism based approaches, underpinned with UDL, the role of the teacher is moving more in line with what Selwyn (2017) discusses as the active facilitator; providing the opportunity for learners to determine the direction of their own learning.

In practice, The Active Learning Framework (ALF) is one method underpinned by UDL which aims to encourage practitioners to utilise new and emerging digital pedagogies to support student attainment, motivation and achievement. The principles for this approach embrace flexible and accessible learning, innovative methods of assessment to allow all learners to demonstrate learning and understanding and the use of digitally enabled learning methods to assist with both assessment and inclusive practice (Taylor et al., 2020). Also, accelerated learning allowing for the contextualizing of learning to meet the needs of individuals, the inclusion of self-reflection to support progress and generation of collaborative discussions (Moon et al., 2005).

The need for practitioners within education therefore to develop skills in digital pedagogy to support individuals is of the upmost importance, enabling practitioners to not just develop their understanding of the learning design tools but also to build collaborative learning groups with other educators to share pedagogical resources and knowledge; co-designing rather than using ready-made resources to assist with increased recognition of technology-enabled learning activities (Lewin, Cranmer and McNicol, 2018).

Appendix G - Themes from Semi-Structured Interview Analysis

Examples of meaning units	Condensed meaning unit	Code (Open coding process)	Sub-themes (latent analysis – deep structure)	(Concept) Category (identify homogenous groups – broad surface structure)	Sub-themes
I mean the broadband was a massive issue to begin with, delays. People couldn't log-on, people didn't have the right technology there.	Unpreparedness for remote teaching and learning at home Digital infrastructure not sufficient in some areas	Access and Connectivity	Equity	Insufficient hardware and connectivity	Geographical challenges with connectivity
My priority was more about students and engagement. It was making sure that not only did they have access to the stuff. But they had access to us as individuals to make sure that they could understand that content.	Access to academic staff	Access and Connectivity	Wellbeing	Staff availability	Student support Access to academic support

Academically and intellectually, people understood they needed to make a change and what they could do about it. But they didn't have the practical tools to be able to deliver that. RQ1	Hardware Digital Tools Institutional Support Equitability	Access and Connectivity	Professional Learning	Access to suitable equipment	Tools to support digital pedagogies Being equipped to support change
Examples of meaning units	**Condensed meaning unit**	**Code (Open coding process)**	**Sub-themes (latent analysis – deep structure)**	**(Concept) Category (identify homogenous groups – broad surface structure)**	**Sub-themes**
I tried to think about the wellbeing of students, what I could do to get them to respond but also to feel comfortable online, because a lot of them were in their bedrooms and didn't want the camera on. It wasn't a comfortable situation for them, being in that situation.	Challenges with online engagement Supporting student's remotely Students' confidence in a remote learning environment	Studying Environment for students	Student Attitudes	Online etiquette	Motivation and maintaining engagement Suitability of students studying environment Learner Centred

The challenge initially of the shock of being on screen and then also all students, turn the cameras off, not wanting to, not feeling comfortable, to participate all the time, perhaps or uncertain in in how to participate.	Unfamiliar studying environment for teaching and learning Student disengagement	Studying Environment (lecturer perspective)		Online etiquette	Limited experience in the online environment Motivation and Engagement issues

Examples of meaning units	**Condensed meaning unit**	**Code (Open coding process)**	**Sub-themes (latent analysis – deep structure)**	**(Concept) Category (identify homogenous groups – broad surface structure)**	**Sub-themes**
There is a gap in our understanding of learning design through virtual learning environments and that's very ad hoc, relying on people's personal experience or how much they're keen or interested to do it. RQ 4	Understanding online Pedagogy Being research informed Interactive not reactive design and organisation Professional Learning for lecturers Institutional Challenges	Design and Organisation	Design Principles	Understanding of Digital Pedagogies	Digital Expertise Learning Design Research Informed Design Guidance and Strategy

Learning is a social process and teaching is a social process. Dialogue is so important. And I think one of the biggest things for me is looking at how we can complement each with the new digital pedagogies that we've got and looking at how actually we can integrate the two together.	Social Constructivist Approach	Design and Organisation		Connectivism Approach	Interaction Engagement Pedagogy led Collaboration
They're read through (materials) by a number of academics who discuss the materials and the tasks that students are given. It's then sent to editors and critical readers.	Developing asynchronous online materials The rigour of the authoring online learning materials Process and timescale of development	Design and Organisation		Developing learning materials	Academic content Suitability of online learning materials

It's about getting students to engage with the materials reflectively that they're accessing and therefore providing opportunities for them to engage with those materials and engage with each other around their thoughts.	Student Engagement Reflective conversations Professional Relationships Suitability of Academic resources Critical Discourse	Design and Organisation		Knowledge Centred	Engagement Academic Content Reflective practice Academic Engagement

Examples of meaning units	**Condensed meaning unit**	**Code (Open coding process)**	**Sub-themes (latent analysis – deep structure)**	**(Concept) Category (identify homogenous groups – broad surface structure)**	**Sub-themes**
A (teaching) philosophy of making sure that you actually engage with all students, that all students have to contribute, that you direct questions to individuals in order to ensure that they respond verbally to the seminar and in some cases, turn their cameras on. I think that's really important. I think you've got to be more active as a teacher to do that.	Ensuring appropriate levels of student engagement Supporting online interaction architecture Student expectations Leading cultural change for online delivery	Teaching and Learning		Teaching Philosophy	Engagement Interaction Active Teaching Online Etiquette Intuitive

I think it's the making sure that we break down delivery into sections and thinking about that kind of 12 minute maximum for any one activity to maintain engagement.	Learning design principles Engaging students Interactive tools to support delivery of T&L	Teaching and Learning		Appropriate delivery method	Learning activity design Interaction and Engagement Flexible Simple
There wasn't a one size fits all. All schools took different approaches. Some did worksheets only. Some did online live lessons. Some did pre-recorded lessons.	Supporting student's school practice Variation in means of remote delivery	Teaching and Learning			
We weren't static in our approach. I think you've got to be a lot more energetic and outgoing when you're presenting on screen.	Creating online communities and relationships Ensuring real time engagement Creativity in delivery Synchronous interaction	Teaching and Learning		Teaching Presence	Interaction Teaching style Online Personality Creativity

And so I think there's a lot of things that that we can use and take into the classroom how to do summative assessments and quick quizzes as a snapshot that can then be used for assessment.	Formative Learning Assessment	Teaching and Learning		Meaningful Application of Knowledge	Transferable Skills Hybrid approach for the future

Examples of meaning units	**Condensed meaning unit**	**Code (Open coding process)**	**Sub-themes (latent analysis – deep structure)**	**(Concept) Category (identify homogenous groups – broad surface structure)**	**Sub-themes**
Despite being asked numerous times to turn cameras on and engage with the chat facility and to contribute to the live lectures, many students didn't do that.	Low level of student engagement Online expectations for synchronous learning	Attitudes Towards Learning	Teaching Standards	Engagement expectations	Synchronous Activities etiquette Online Communities Students Attitudes

I think we've definitely concluded now that attendance and engagement come up a lot as part of conversations, and maybe they become the same term too often. We talk about a lack of engagement from students because they've got the cameras off or lack of engagement because they haven't watched the video. Actually to me, that's probably more of an attendance issue that you're looking, they haven't turned up. And the students that have turned up, it doesn't mean they're necessarily engaged.	Low level of student engagement Attendance issues Learner autonomy Managing Expectations Barriers to learning	Attitudes Towards Learning		Learner Autonomy	Ownership of learning Motivation Engagement Self-motivation
What we've noticed with our first years particularly is because they didn't attend any face to face lectures those professional behaviours; attention and the way that they present themselves and the language that they use, they weren't as finely developed.	Professional Standards Personal conduct Professional language development Preparedness for professionalism	Attitudes Towards Learning		Standards and behaviour	Passive recipients of learning Unfamiliar learning environment Cognitive presence

Examples of meaning units	Condensed meaning unit	Code (Open coding process)	Sub-themes (latent analysis – deep structure)	(Concept) Category (identify homogenous groups – broad surface structure)	Sub-themes
Even though we can be very creative about the pedagogical approaches there's something about being in person and building those relationships, that seems very important.	Creative approaches to teaching Real life relationships Building connections	Online Communities	Belonging	Building Relationships	Barriers to building professional relationships Creative delivery
Asynchronous materials, the engagement and motivation is very much about encouraging the students for example, to make forum posts and that's about then me engaging with their forum post showing that I've read them and reacting to other people's discussions and encouraging that discussion.	Organising Forums to promote the online community Setting clear expectations for online engagement	Online Communities		Role of the learner online	Engagement Student Participation Academic support Feedback Modality
We do realize the value of those small seminar groups you've got, you know, eight or ten students. It really does make a difference.	Course structure Student teacher ratio Safeguarding	Online Communities		Learner- teacher ratio	Interaction Building relationships Group size Delivery mode

How can we build these communities of practice where students are engaging with each other and that the screen and the computer aren't barriers to engagement.	Online expectations Online Etiquette Learner Autonomy Collaboration	Online Communities		Barriers to learning	Geographical challenges Developing an online community Creating Digital Relationships
Zoom is the only platform that allows simultaneous translation to happen, and that's very important for us working we do a lot of things, almost everything bilingually	Digital tools to support bilingual communities Working bilingually Welsh Language Communities	Online Communities		Working bilingually	Language development Welsh language communities Linguistic support

Examples of meaning units	**Condensed meaning unit**	**Code (Open coding process)**	**Sub-themes (latent analysis – deep structure)**	**(Concept) Category (identify homogenous groups – broad surface structure)**	**Sub-themes**

It's obviously equipped them to handle digital learning themselves better.	Personal Learning Experience Digital Competencies Creative means of delivery	Preparedness for teaching	Teaching Standards	Digital Competence	Digital Skills Digital Pedagogies Reflective Practice Preparedness for hybrid digital use Digital Tools
We felt they weren't really equipped in the same way because those professional codes hadn't been established.	Teaching Standards Professional Conduct Professional Development Constructing personal meaning	Preparedness for teaching		Developing Professional Standards	Personal Conduct Professional Behaviour

We recognize the flexibility, but with the principle that we'd rather go back to face-to-face teaching because of when it comes to it face to face, teaching is what we're trying to teach them to do.	Suitability of Delivery Professional Course Teaching Practice	Preparedness for teaching		Suitability of Digital Delivery	Variations in subject pedagogies Developing teaching practices Teaching Standards Professional Standards Interpersonal Skills
We had to look at how we could, ensure the students were able to achieve the Teacher Standards when they weren't going to be in school. We developed a portfolio of activities each week for them to engage with. That meant that they were still showing that they were working towards the teacher standards.	Teaching standards Teaching Practice Student Support	Preparedness for teaching		Achieving Teacher Standards	Reflecting of the standards Opportunities to meet standards Professional Development