

Strategies for digital inclusion: towards a framework
for embracing student diversity and sustaining
engagement with blended learning.

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A thesis submitted in partial fulfilment of the
requirements of Bournemouth University for the degree of Doctor
of Philosophy.

January 2017

Bournemouth University

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Contents

Abstract.....	10
Acknowledgement	12

Author’s Declaration.....	13
Chapter 1 Introduction to the Research.....	14
1.1 Purpose of the Research and Contribution to Knowledge	14
1.2 Statement of the Problem and Significance of the Research	16
1.3 Personal Context	17
1.4 Research Aim.....	17
1.5 Structure of the Thesis	18
Chapter 2 Literature Review	20
2.1 Chapter Introduction	20
2.2 Diverse Learners	24
2.2.1 Age.....	24
2.2.2 Gender.....	25
2.2.3 Ethnicity.....	26
2.2.4 Geography.....	27
2.2.5 Socio-economic Status.....	27
2.2.6 Educational Background	28
2.3 Learning Styles	28
2.4 E-learning Theory, Models and Frameworks.....	30
2.5 Current and Emerging Technologies	34
2.5.1 Personal Learning Environments	39
2.5.2 Blogs for Formal and Informal Learning.....	43
2.6 Blended Learning.....	43
2.7 Digital Literacies.....	46
2.8 Emancipation and Power Relationships.....	47
2.9 Chapter Summary	48
Chapter 3 Research Design.....	50
3.1 Chapter Introduction	50
3.2 Research Paradigm.....	50
3.2.1 The Role of the Researcher.....	52
3.3 Research Approach and Strategy	52
3.3.1 Sampling	57
3.3.2 Semi-structured Interviews – Phases 1, 2 and 3 (Step 4).....	57
3.3.3 Questionnaire Survey– Phase 3 (Step 1).....	58
3.3.4 Instant Reaction Mobile Interviews – Phase 3 (Step 2)	59
3.3.5 Focus Group – Phase 3 (Step 3).....	60
3.4 Justification for Rejecting a Pre-validated Questionnaire.....	61
3.5 Research Methods for Data Analysis.....	61
3.5.1 Thematic Analysis – Phases 1 and 2.....	61

3.5.2 Directed Content Analysis – Phase 3	62
3.6 Data Management and Quality Criteria	63
3.7 Chapter Summary	65
Chapter 4 Research Implementation	66
4.1 Chapter Introduction	66
4.2 Pilot Study.....	68
4.3 Research Samples and Settings.....	68
4.3.1 Phase 1 Sample – Learner Group 1 – HEI 1(Semi-structured Interviews) n=16.....	69
4.3.2 Phase 2 Sample – Learner Group 2 – HEI 1(Semi-structured Interviews) n=10.....	70
4.3.3 Phase 3 Samples – Learner Groups 2,3,4 – HEIs 1,2 (Interviews and Focus Group) n=18 and Teacher Group – HEIs 1,2 (Semi-structured Interviews) n=4	70
4.4 Ethical Considerations	71
4.4.1 Phase 1 Considerations	72
4.4.2 Phase 2 Considerations	72
4.4.3 Phase 3 Considerations	72
4.5 Phase 1 Data Collection and Analysis	73
4.5.1 Semi-structured Interviews	73
4.5.2 Thematic Analysis.....	74
4.6 Phase 1 Findings and Implications for Phase 2.....	79
4.6.1 Appropriate Content.....	82
4.6.2 Compatibility	82
4.6.3 Clarity	82
4.6.4 Peers.....	83
4.6.5 IT Support.....	83
4.6.6 M-Learning	83
4.6.7 Equipment.....	84
4.6.8 Navigation and Logging In	84
4.6.9 Online Submission	84
4.6.10 Theme Summary	85
4.6.11 Characteristics.....	86
4.6.12 Participant Characteristics Compared to Traditional Demographics	87
4.7 Justification and Explanation of Researcher’s Interpretation of Data.....	89
4.8 Phase 2 Data Collection and Analysis	90
4.8.1 Semi-structured Interviews	90
4.8.2 Thematic Analysis.....	90
4.9 Phase 2 Findings and Implications for Phase 3.....	92
4.9.1 Other Key Findings.....	97
4.9.2 Themes	98

4.9.3 Usefulness of Current Technologies for Pedagogy with a Diversity of Learners.....	103
4.9.4 Characteristics.....	103
4.10 Justification and Explanation of Researcher’s Interpretation of Data.....	106
4.11 Phase 3 Data Collection and Analysis	106
4.11.1 Pilot Study.....	107
4.11.2 Step 1 – Questionnaire Survey (Learner Group 2).....	107
4.11.3 Step 2 – Instant Reaction Mobile Interviews (Learner Group 3).....	107
4.11.4 Step 3 – Focus Group (Learner Group 4).....	108
4.11.5 Step 4 – Semi-structured Interviews (Teacher Group).....	109
4.12 Directed Content Analysis	110
4.12.1 Step 1 – Learner Group 2.....	111
4.12.2 Step 2 –Learner Group 3.....	115
4.12.3 Step 3 –Learner Group 4.....	117
4.12.4 Step 4 –Teacher Group	121
4.13 Phase 3 Findings and Implications for Phase 4.....	127
4.14 Justification and Explanation of Researcher’s Interpretation of Data.....	140
4.15 Chapter Summary	140
Chapter 5 The Blended Learning Framework - Discussion.....	141
5.1 Phase 4.....	141
5.3 Phase 1 - Summary of Results	144
5.4 Phase 2 - Summary of Results	144
5.5 Phase 3 - Summary of Results	145
5.6 Phase 4 - Summary of Results	145
5.7 Discussion.....	145
5.7.1 Objective 1.....	145
5.7.2 Objective 2.....	147
5.7.3 Objectives 3 and 4.....	151
5.8 Chapter Summary	155
Chapter 6 Conclusions	157
6.1 Statement of the Problem – Addressed.....	157
6.2 Contribution to Knowledge.....	158
6.2 Strengths and Limitations	159
6.3 Further Research	159
6.4 Implications for Practice	160
6.5 Researcher Reflections.....	161
References.....	162
Bibliography	181
Glossary	187

Appendices.....	189
Published Material (Peer reviewed).....	212

List of Tables

Table 1. Examples of search terms and results	20
Table 2. Framework for critiquing qualitative research articles adapted from Holland and Rees, (2010)	23
Table 3. Learning styles models analysed by Coffield et al., (2004)	29
Table 4. Summary of e-learning models and frameworks	33
Table 5. Inclusion criteria and rationale that was used to search for relevant literature	35
Table 6. Exclusion criteria and rationale that was used to search for relevant literature	35
Table 7. Synthesis of current and emerging technology literature	38
Table 8. Differences between a VLE and a PLE (Schaffert and Hilzensauere, 2008)	41
Table 9. Research plan and the relationship between the objectives and phases	55
Table 10. Adapted from Nvivo (2014) (in Braun and Clarke, 2006) - eight steps of analysis	62
Table 11. Learner Group 1	69
Table 12. Learner Group 2	70
Table 13. Characteristics present in each theme	86
Table 14. Analytical propositions to be investigated further	89
Table 15. Summary of data for Phases 1,2 and 3.	129

List of Figures	
Figure 1. Research design	56
Figure 2. Data collection	67
Figure 3. Screenshot that illustrates the nodes (from A – M)	76
Figure 4. Screenshot illustrates how a node was populated	76
Figure 5. Screenshot illustrates ‘coding-on’ separating each node into 1. Digital exclusion, 2. Digital Inclusion and 3. Recommendations, (from A – B)	77
Figure 6. Screenshot of the generated themes, amount of sources and references	78
Figure 7. How characteristics were sorted into each theme	78
Figure 8. Screenshot illustrates total number of sources that disclosed attitudes towards digital exclusion	79
Figure 9. Screenshot illustrates the nodes (from A – I)	91
Figure 10. Screenshot illustrates emerging themes	92
Figure 11. Screenshot of characteristics	104
Figure 12 Three major themes	105
Figure 13. Photograph of prompt cards summary for Participant 38	121
Figure 14. Photograph of prompt cards summary for Participant 39	122
Figure 15. Photograph of prompt cards summary for Participant 40	122
Figure 16. Photograph of prompt cards summary for Participant 41	123
Figure 17. Map of generated themes and related elements	128
Figure 18. The Blended Learning Framework	143

Abbreviations

CMC: Computer Mediated Communication

F2f: Face to face

HE: Higher Education

HEI(s): Higher Education Institution(s)

ICT: Information and Communications Technology

MKO: More Knowledgeable Other

PLE(s): Personal Learning Environment(s)

TEL: Technology Enabled Learning

VLE(s): Virtual Learning Environment(s)

ZPD: Zone of Proximal Development

Abstract

Educators have long sought to use appropriate teaching methods in the classroom to improve learner outcomes and to address the diversity of learners by designing teaching and learning activities to complement different learner characteristics. Learners have been categorised by learning styles and demographics such as gender, age, ethnicity, geography, socio-economic status and educational background. Yet there is growing evidence that grouping learners according to their demographic and learner characteristics may not provide sufficient evidence to identify if or how learners will be engaged with elements of their programme of study. While the introduction of Virtual Learning Environments has supported the development of blended learning programmes, adopting a mix of face to face and technology based teaching methods, the technology has added a further dimension to the challenges of developing effective teaching strategies to engage learners. Technology can support student engagement which can conflict with conventional ideas about ownership and power in formal and informal educational contexts. Therefore, there is a need to explore the nature of student engagement in relation to digital inclusion and blended learning and produce a framework to guide educators.

This research aims to develop a conceptual framework which can be used to develop effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes. This research focuses on student experiences of blended learning programmes to explore whether learners associate particular personal characteristics with a sense of digital inclusion or exclusion. Technologies were reviewed for their usefulness by collecting data from primary and secondary sources and an investigation was conducted of how a diverse group of learners identifies what on a blended learning programme they need to be effectively engaged with. A conceptual framework was created from the findings, which guides the development of strategies for digital inclusion. This research adopted a critical realist philosophical approach and used a qualitative methodology sequentially through four phases. Phase 1 drew on learner narratives using semi-structured interviews, to explore the many characteristics of the participants (n=16) in their own words and how these influenced their engagement with technology. Phase 2 involved interviewing a second sample (n=10) of participants from a different cohort to investigate themes which emerged from Phase 1 in more depth and to review the usefulness of current and emerging technologies by learners. At the conclusion of Phase 2, a preliminary conceptual framework was introduced, synthesising the outcomes of this stage. It was validated in Phase 3 by collecting data from participants (n=13) from a different HEI and from educators (n=4) from within the same HEIs as the samples from all three phases, using a mixture of survey, structured, semi structured and instant reaction mobile interviews and focus group methods. Phase 4 collated all the validations from Phase 3 to create a final conceptual framework, the Blended Learning Framework.

This research suggests that while digital exclusion has been associated with gender, age, ethnicity, geography, socio-economic status, educational background, and learning styles, these characteristics could not explain why some learners feel included or excluded. For the participants in this research, digital exclusion was found to be influenced by organisational factors, such as elements of the programme content rather than learner digital literacy skills. This research suggests that current technologies, such as social media, and emerging technologies, such as Personal Learning Environments, may offer useful opportunities to effectively engage a diversity of learners on blended learning programmes. The resulting Blended Learning Framework addresses the findings from this research and reflects the three major themes identified: Technology; Pedagogy and Human. The Blended Learning Framework consists of ten elements divided into

four specific sections: Preparation; Design; Engagement and Ongoing, and offers a variety of strategies that educators can implement before and during a blended learning programme to encourage inclusion. Staff appraisals of the conceptual framework suggest that it could positively influence digital inclusion in a blended learning environment.

At the time of writing, no other study has examined learner characteristics identified by learners themselves which influence digital inclusion and exclusion in blended learning. Therefore, a conceptual framework created using the narratives of the learners provides a unique insight on which to develop strategies for embracing diversity and sustaining engagement with blended learning. The Blended Learning Framework is an original contribution to knowledge and provides guidelines for educators when designing and implementing blended learning programmes.

Acknowledgement

I would like to thank the following people for their support and guidance: my Supervisors, Dr. Milena Bobeva, Dr. Maggie Hutchings and Dr. Jacqui Taylor.

I would like to extend my gratitude to the university, who granted me a fully funded studentship to undertake this research.

Finally, I wish to thank all of the participants who gave up their valuable time to take part.

This thesis is dedicated to Shani, my beautiful daughter.

Author's Declaration

I Baylie Hart Clarida, declare that this thesis entitled 'Strategies for digital inclusion: towards a framework for embracing student diversity and sustaining engagement with blended learning' and the work presented in the thesis are both my own and have been generated by me as the result of my own original research.

I confirm that:

1. This work was done wholly or mainly while in candidature for a research degree at this University;
2. Where any part of this thesis has previously been submitted for a degree or any other qualification at this University or any other institution, this has been clearly stated;
3. Where I have consulted the published work of others, this is always clearly attributed;
4. Where I have quoted from the work of others, the source is always given. With the exception of such quotations, this thesis is entirely my own work;
5. I have acknowledged all main sources of help;
6. Where the thesis is based on work done by myself jointly with others, I have made clear exactly what was done by others and what I have contributed myself;
7. Either none of this work has been published before submission, or parts of this work have been published.

Chapter 1 Introduction to the Research

1.1 Purpose of the Research and Contribution to Knowledge

This PhD research study aims to develop a conceptual framework for effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes. Studies in the past have identified inclusion and exclusion factors in terms of: access to equipment (Longley et al., 2006); capabilities and digital literacy skills (Lane, 2009); engagement with technology (Warren, 2007); technology use (Koivusilta et al., 2007); confidence in using technology (Contreras, 2004); the use of mobile devices to learn (Park et al., 2012); social media in education (Friesen and Lowe, 2012) and bandwidth (Longley et al., 2006). As all of these factors could potentially contribute to exclusion or inclusion on a blended learning programme, digital exclusion/inclusion will be defined in this research as being un/able to access or use technology, or use it in the way it was intended to facilitate the learning process for any reason.

To achieve the aim of this PhD, the research initially explored characteristics of diverse learners in higher education institutions (HEIs) and how these characteristics influence experiences of digital inclusion or exclusion in the context of blended learning programmes. Blended learning is defined in this research as the facilitation of teaching and learning using a combination of face to face (f2f) and online methods and will be discussed in more depth in section 2.6. The individual characteristics of learners were not pre-determined by the researcher, but determined by the participants themselves. This was done because at the time of writing, no other research study had investigated learner characteristics in this way. Participants shared their experiences of digital inclusion and exclusion on a blended learning programme in interviews. Their experiences and characteristics were analysed and used to create a conceptual framework for effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes. The conceptual framework is designed to engage a diversity of learners with a blended learning programme. Learner engagement has been described as participation in academic practices (Kuh et al., 2007), learners engaging in pursuits based on research (Krause and Coates, 2008) and quality of learner effort (Hu and Kuh, 2001) and has been measured as successful completion of programme learning outcomes, amount of time spent on a range of educationally orientated activities measured by time logged in to universities VLEs (Trowler, 2010) and through learner feedback most commonly through questionnaires (Little et al. 2009). In contrast, HEFCE (2008) would suggest that engagement concerns HEIs involving learners in creating a suitable learning experience. However, taking into account all of these descriptions, this research takes the definition of engagement from Trowler (2010) who defines engagement as,

Student engagement is concerned with the interaction between the time, effort and other relevant resources invested by both students and their institutions intended to optimise the student experience and enhance the learning outcomes and development of students and the performance, and reputation of the institution. (p. 3)

Trowler's definition places the responsibility of engagement on both the learner and the HEI, which means that the relationship between the learner and teacher will be significant if the learner is to be engaged with the learning process. It also takes into account the development of the learner and not solely focusing on academic success or learning outcomes. This is important for this research as a blended learning programme is likely to include elements that require the learner to take control of their own learning spaces (Holley and

Oliver 2009), for example completing elements of the programme outside of the classroom. Literature on student engagement has established correlations between engagement and student success, student development, student satisfaction, academic achievement and social engagement (Astin, 1993, Berger and Milem, 1999, Chickering and Gamson, 1987, Goodsell, Maher and Tinto, 1992; Kuh and Vesper, 1997; Pace, 1995; Pascarella and Terenzini, 2005).

According to Harper and Quaye, (2009) engagement is greater than participation as it requires feelings and sense-making. They go on to suggest that acting without feeling engaged can just be compliance; feeling engaged without acting is dissociation. Coates (2007) classified student engagement into four types:

Intense - an intense form of engagement is where learners are highly involved with their university study.

Independent - an independent form of engagement is where learners see themselves as part of a supportive learning community.

Collaborative - a collaborative form of engagement is where learners prefer the more social aspects of university life, as opposed to the more individualistic forms of interaction.

Passive – a passive form of engagement is where learners rarely participate in activities and conditions linked to productive learning.

Although Coates' 'passive engagement' would not appear to define an engaged learner, he goes on to advise that these,

“styles of engagement refer to transient states rather than student traits or types. It is not supposed, for instance, that these are enduring qualities that are sustained within individuals over time or across contexts” (Coates, 2007, 132).

Implications of this statement are that interventions can be put in place to encourage learner engagement.

Coates' typology places the responsibility of engagement with the learner and does not consider the institutions role in student engagement whereas Pike and Kuh_(2005) argue that universities differ in how they engage students and centre around seven types:

Diverse, but interpersonally fragmented - Learners at these institutions have a high frequency of experiences with diversity and tend to use technology.

Homogeneous and interpersonally cohesive - Learners at these institutions have relatively few experiences with diversity, but view the institution and their peers as supportive.

Intellectually stimulating - Learners at these institutions are engaged in a variety of academic activities and have a great deal of interaction with lecturers inside and outside the classroom.

Interpersonally supportive - Learners attending these institutions report a high frequency of diversity experiences and view their peers and the campus as supportive.

High-tech, low-touch - Information technology takes precedence at these institutions to the point of overlooking other types of interactions.

Academically challenging and supportive – the institution sets high expectations and emphasises higher-order thinking in conventional ways.

Collaborative - Learners use technology to collaborate and give support to one another.

Pike and Kuh's different types of universities is important for this research as it suggests that HEIs can manage learner engagement by providing appropriate support to address a range of diverse needs, such as providing more flexible ways for learners to communicate with their teachers. Pike and Kuh's typology also adds a technological focus on engagement which supports a report for the National Survey of Student Engagement (NSSE) (2009). The NSSE report suggests that educators have combined the use of active learning strategies with technologies to create a learner-centred classroom, for example online support resources and 24 hour computer suites. Of course, by combining conventional learning strategies with technology the learning expands beyond the classroom, for example using a flipped classroom model (Bishop and Verleger, 2013). To engage learners in an online environment, such as elements of a blended learning programme, activities should be academically rigorous, with opportunities to collaborate with peers and interact with lecturers (Robinson and Hullinger, 2008). Laird and Ku (2005) propose that when learners are engaged with technology for formal learning purposes it may increase their opportunities for other types of engagement, such as engagement with personal development opportunities.

Trowler (2010) cautions that,

While most of the literature discussed – or assumed – the benefits of student engagement, a striking absence was the student voice in the literature on student engagement. Instead, literature was written about students for managers, policy makers, researchers, funders or teachers, with occasional briefing guides for student leaders, by other managers, policy makers, researchers or teachers (p. 50).

This research will address this criticism by collecting stories of engagement directly from learner's voices.

1.2 Statement of the Problem and Significance of the Research

Educators have long sought to use appropriate teaching methods in the classroom to improve learner outcomes, (Hunt, 1971) and to address the diversity of learners by designing teaching and learning activities to complement different learner characteristics. Yet there is growing evidence that grouping learners cannot be used to accurately determine which face-to-face (f2f) or technology enabled learning (TEL) methods will and will not engage these categories of learners, (Garner, 2000: Cubeta et al., 2001: Coffield et al., 2004: Klein et al., 2007). Adding to this challenge, the number of HEIs using Virtual Learning Environments (VLEs) is growing every year (JISC, 2015a), giving rise to the implementation of blended learning programmes adopting a mix of f2f and technology based teaching methods. By its very nature technology is constantly evolving. Therefore, an investigation is needed to determine whether certain learner characteristics influence experiences of digital inclusion and exclusion and to identify what learners need to be engaged with technology on a blended learning programme.

According to Newby (2010) one of the fundamental objectives of educational research is to contribute something new to the body of educational knowledge and Denzin and Lincoln (2000) propose that your research should produce findings that will contribute to educational practice. This research has attempted to do both by creating a conceptual framework that provides a foundation for which teachers can design and

deliver a blended learning programme which could effectively sustain engagement with a diversity of learners.

1.3 Personal Context

This area of research was of particular interest as a former blended learning student, a teacher on blended learning programmes and a teacher training educator who has used blended learning models. Having been a former student and now teacher has provided insight into the potential affordances of such models, for example its flexibility to complete TEL elements at home (So and Bonk, 2010). During a Masters' degree, how technology was being used within the cohort was of interest, and as learners, all had different experiences while using it. Then as a teacher, being surprised at how different learners reacted to technology triggered a curiosity about whether teachers can accurately determine which learners could potentially experience exclusion when using technology.

Furthermore, having a teaching background presented some challenges as a new researcher. Evidence of effective practice was usually obtained as a teacher from assessment of learners and reflection on own and others' practice (Hargreaves, 1997). Whereas evidence as a researcher is usually obtained from collecting, analysing and presenting data using a systematic process (Scott and Usher, 1996). Of course, to some extent, a teacher collects and analyses data in most lessons and presents the findings in future lessons as a new or improved approach to teaching or learning. The distinction between the two appears in the necessity as a researcher to using a systematic process, often not regarded by teachers as an important characteristic of the research procedure. In addition to the challenge of using a systematic approach to collecting evidence, recognising the position as researcher within the research also required some reflection. The evidence in this research is built on participant voices however, it is impossible as a researcher and a teacher to distance oneself completely from the research. At points in the data analysis process, researcher interpretations make inferences regarding learner stories. To ensure a level of trustworthiness, a number of triangulation methods were performed, such as member checking after each set of learner interviews in Phases 1 and 2, a literature review was conducted throughout data collection and analysis and analytical memos were recorded during data collection. Additionally, a range of data collection methods were implemented with new samples later in the research to validate the findings. A full discussion on the researcher's position within the research will be discussed in section 3.2.1.

1.4 Research Aim

Given the exploratory nature of the PhD outlined above, the research focused around a central aim as opposed to generating specific research questions. The aim of this research is to develop a conceptual framework for effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes. In order to achieve this aim, the research has been divided into four specific objectives:

1. To explore the characteristics of learners and analyse their influence on digital exclusion and inclusion.
2. To investigate the usefulness of current and emerging technologies for pedagogy with a diversity of learners.
3. To examine what learners need to be effectively engaged with a blended learning programme.

4. To incorporate the findings into a conceptual framework for sustaining engagement with blended learning programmes.

1.5 Structure of the Thesis

Each objective was met largely in turn and the design of the research can be seen in section 3.3. The following précis sets out how the thesis is structured.

Chapter 2.

This chapter begins to address the objectives of this research. In order to appreciate the challenges teachers currently face when determining how learners will interact with TEL it was considered useful to have a general understanding of how learners are and have been categorized in the past. Literature documenting diverse learners shows that usually demographics such as gender, age, ethnicity, geography, socio-economic status and educational background are used to group learners and each will be critically discussed in turn. Research into these different categories will be critically reviewed, such as Knowles et al. (2011) work on adult learners, which suggests that older learners learn in a different way to their younger counterparts. The literature on learning styles will be reviewed, drawing on a report of 13 learning styles by Coffield et al., (2004). The chapter continues with a general overview of current e-learning theory, drawing on work from Conole (2010) in order to identify which models or frameworks potentially inform current practice in HE. Current and emerging technologies are reviewed next in order to establish which are or have the potential to be used in HE, highlighting the affordances of Personal Learning Environments (Schaffert and Hilzensauere, 2008) and blogs (Venkatesh et al., 2014). The chapter will continue by exploring what is meant by blended learning and critically review literature that has studied a blended learning approach to engage learners as well as discussing what is meant by the term ‘digital literacy’. The chapter concludes by evaluating the concepts of emancipation and power relations and how these concepts impact on knowledge construction, (Radford, 2012).

Chapter 3.

This chapter will discuss the design of the research and will highlight the philosophical beliefs informing the choice of research methods (Denzin and Lincoln, 2000) and their appropriateness to this study. Having established that the research will adopt a critical realist philosophical approach, an acknowledgement of the role of the researcher (Day, 2012) will follow. A discussion on the data collection methods used, including the use of semi-structured interviews as the primary data collection method for Phases 1 and 2 will be critically justified. The chapter continues with an exploration of the data analysis methods and will critically justify the adopted method of thematic analysis which was used to analyse the primary data in Phases 1 and 2. A justification for rejecting a pre-validated questionnaire is included based on findings from the literature review and the objectives of this research. The chapter concludes by discussing how the data was managed using an Nvivo database.

Chapter 4.

This chapter explains the implementation of the research design. The chapter begins by setting out the samples and settings (Denzin and Lincoln, 2005) used in each phase and the ethical considerations involved with collecting data from each sample. The chapter then discusses the data collection, analysis and findings,

addressing each phase in turn. Semi-structured interviews were used to obtain stories of experiences of digital inclusion and exclusion from participants in their own voice. These experiences were analysed and then validated by new samples by using a range of qualitative data collection methods, including structured and instant reaction mobile interviews, a focus group and semi-structured interviews. The chapter concludes by illustrating the findings by mapping themes that had emerged from the first three phases against the conclusions made.

Chapter 5.

This chapter presents the conceptual framework created from the findings of the first three phases. The chapter begins with a summary of each phase to consolidate the findings. An illustration is provided and an explanation of how it is divided into four sections, designed to be initiated at different points of the blended learning process. The chapter concludes by discussing the findings of this research and how they relate to current literature, addressing each objective in turn. As this was a small scale research project findings, cannot be generalised to other blended learning programmes in HE however, it is suggested that the resulting conceptual framework is a flexible framework that offers a variety of strategies that could be adapted by teachers in their own context.

Chapter 6.

The final chapter starts discussing how the statement of the problem was addressed in this research. The chapter continues by highlighting the contribution to knowledge that this research makes followed by setting out the strengths and limitations of the research and by suggesting opportunities for further research to address unanswered questions that were outside the scope of this research and recommendations to validate the conceptual framework using the Learning Evaluation Model (Kirkpatrick, 1994). This is followed by the potential impact of this research on educational practice. The chapter will conclude with reflections of the researcher and what personal and practical lessons have been learnt during this PhD research.

Chapter 2 Literature Review

2.1 Chapter Introduction

The purpose of this chapter is to begin to address the research objectives (section 1.4). Search engines and databases, for example Google Scholar, Academia.edu, Academic Research Complete and ERIC were used to locate relevant journal articles and books. A search on Google Scholar returned over 2 million results for ‘online learning’, so with this in mind, specific key words were used as a general search of the problem area, such as (but not limited to): ‘e-learning pedagogy’, ‘digital inclusion/exclusion’, ‘diverse learners’, ‘student characteristics’, ‘technology enabled/enhanced learning’ and ‘computer mediated communication’. Further, searches to specifically address the Objectives were executed. Examples of search terms and results are shown in Table 1.

Objective	Search term	Results	Timeline of literature searches
1	*grouping learners *diverse groups in higher education	88,000 2,840,000	} October 2012 – February 2016
2	*e-learning theory * emerging technology in education	126,000 2,700,000	
3	*blended learning *blended learning theory	405,000 210,000	
1,2,3	*e-learning pedagogy *digital exclusion *digital inclusion *divers learners *student characteristics *technology enabled learning *technology enhanced learning * computer mediated communication	83,000 461,000 1,150,000 721,000 4,070,000 952,000 2,200,000 1,390,000	

Table 1. Examples of search terms and results.

The literature review was conducted throughout the PhD, from October 2012 until February 2016.

Given the speed in which technological developments advance, the search for comparable research, with regards to knowledge contribution, was limited to literature written since 2010, to allow for developments such as Web 2.0 (The second stage of development of the Internet, characterized especially by the change from static web pages to dynamic or user-generated content and the growth of social media (Oxford Dictionaries, 2015)), while being aware of technological hype that can sometimes be associated with new technologies (Gartner, 2013). Although the term Web 2.0 was first coined by the architect, DiNucci in 1999 it was popularised by O’Reilly at a Media conference in 2004 (whatis.techtarget, 2015). However, in the literature the term was not used in a higher education context until 2006. A search of ‘Web 2.0 higher education’ on Google Scholar returned the earliest paper as: Alexander, (2006). This paper talks about Web 2.0 as an emerging technology in higher education and was one of the first published papers investigating Web 2.0 affordances in this context. The use of Web 2.0 for communication between learners and teachers

has not always been popular with learners, (Dabbagh and Kitsantas, 2011). However, the Web 2.0 offers learners the opportunity to be co-creators of content, such as contributing to blogs and being able to distribute their creations to a wider network than before social media was common place. But these networks need to be carefully constructed; collaborative engagement should be built under flexible, hierarchical structures; learner and teacher participants need to develop relevant digital literacy skills to be able to become effective co-creators; both learner and teacher need to be able to take on the role of the other as well as taking on a collective sense of responsibility (Ellison and Wu, 2008) all of which can conflict with conventional ideas about ownership and power and in a formal educational context raises issues about appropriate types of assessment (Chen and Bryer, 2012). Madge et al. (2009) suggests that social networking sites are more useful in an informal rather than a formal learning context as most participants in their study never used the Web 2.0 to communicate with their lecturers. Veletsianos and Cesar (2012) found that in their study of distance learners, participants valued the interaction that social networking sites offered them but managing the amount of information presented to them was a challenge. Additionally, learners had to devise, what Veletsianos and Cesar call ‘workarounds’ to manage participation in online environments.

In their literature review on the use of Web 2.0 tools in HE, Conole and Alevizou (2010) identified the following as commonly cited reasons by lecturers for a lack of adoption,

‘I haven’t got time’, ‘My research is more important’, ‘What’s in it for me?’, ‘Where is my reward?’, ‘I don’t have the skills to do this’, and ‘I don’t believe in this, it won’t work’ (p. 22).

In addition to this list, barriers remain around the evolving nature of privacy and ownership when using Web 2.0 (Piotrowski, 2015). There appears to be a lack of understanding among teachers of the implications of adopting more open approaches and negative attitudes of openness (Greenhow et al., 2009). Implications of this for this research is that for Web 2.0 tools to be used effectively by participants, that is both learners and teachers, a radical rethink of the learning and teaching design process should be considered; a shift from an internalised and individually designed programme to one that is explicit and co-created by both educator and learner. Taking into account there can be a four year time-to-adoption period for new technologies (Johnson et al., 2014), it was considered that 2010 was a reasonable year to explore similar and comparable research.

However, to gain a fuller insight into the field of study, earlier literature was examined. A thorough search of the data bases mentioned produced no literature examining characteristics identified by learners themselves, therefore no current conceptual framework for effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes in this context exists.

The ‘framework for critiquing qualitative research articles’ (Holland and Rees, 2010) (Table 2) was used to ensure the quality of the search and the literature being investigated. The methods adopted for identifying potentially relevant studies include:

- Searching multiple bibliographic databases
- Scanning reference lists of existing reviews and eligible studies
- Scanning conference proceedings
- Hand-searching key journals

- Forward citation searching of seminal articles

- Searching the Internet

-

Aspect	Questions
Focus	What topic is the concern of this article? Is this an important topic? The focus here will be broader than that of quantitative research and may emphasise experience of a condition or situation.
Background	How does the researcher argue that the topic is worthwhile? How widespread or big a problem is it? Is the seriousness of the topic reinforced by the previous studies? Is there a thorough review of the literature outlining current knowledge on this topic? The background may make the qualitative approach a logical choice.
Aim	What is the statement of the aim of the data collection? This usually begins with the word 'to' and may concentrate on an exploration of a situation, e.g. 'The aim of this study is to explore the lived experience of chronic illness.
Methodology or Broad approach	Within a broad qualitative approach is it phenomenological, ethnographic, grounded theory, or broad qualitative design? Does this match the statement of the aim?
Tool of data collection	What was the method used to collect the data? Had this tool been used in previous studies of this type? A qualitative tool will not be piloted to check accuracy but may be used firstly on a small scale to give the researcher experience of its use in this situation. There may be mention of credibility where the researcher attempts to give clear details on the circumstances and environment in which data gathering took place. The descriptions of such things as individual interviews may be extensive to allow you to feel almost as though you were there. Do you feel this tool worked well or might an alternative have been more effective?
Method of data analysis and presentation	This is one of the most important steps in qualitative approach where the researcher's understanding emerges inductively from the data and their interpretation of what is going on with those involved. To make sense of large amounts of text the researcher may mention specific systems for analysing the data either in the form of computer programs such as NUDIST and NVivo, or systems designed by other qualitative analysts such as Colaizzi or Van Manen. There may be reference to immersion in the data where the researcher reads over and over the details of what people have said or done. Codes to categorised themes may be mentioned and illustrations of the way this was done may be presented to form an 'audit trail' to allow you to follow the way the researcher managed the data from transcript to coded themes. The data will be in the form of observed descriptions or verbal comments and statements from those involved. These may be quite powerful in their description of feelings and emotions where the researcher is attempting to provide evidence of 'credibility' so we can believe in the accuracy of the findings and the interpretation of them.
Sample	Here the numbers of participants will be low, perhaps under 10 and often not more than 20. Data collection may have stopped once 'saturation' was reached, that is, where no new categories emerged from the findings. Were there inclusion and exclusion criteria stated? Were these reasonable given the research question and the nature of the sample? Do the selection criteria limit to whom the results may apply? What method was used to select who got into the study (the sampling strategy)? Is this appropriate for this research question and approach? Does the sample suffer from any kind of bias?
Ethical considerations	Did an ethics committee approve the study? Was informed consent gained and mention made of confidentiality? Could the study be said to be ethically rigorous?

Table 2. Framework for critiquing qualitative research articles adapted from Holland and Rees, (2010)

2.2 Diverse Learners

The first objective of this research is:

To explore the characteristics of learners and analyse their influence on digital exclusion and inclusion.

In order to appreciate the challenges teachers currently face when determining how their learners will interact with TEL it will be useful for readers to have a general understanding of how learners are and have been categorized in the past.

As far back as the 1800s, authors and researchers refer to diversity in education. Sir Edward Taylor (1870) for example, writes about “race”, “origin” and “culture” (p.2) when he discusses language learning in his book. Conventionally, diverse learners are categorized by a widely used set of demographics. This review of the literature found that historical and recent literature documenting diverse learners demonstrates that usually demographics such as gender, age, ethnicity, geography, socio-economic status and educational background are used. Yet much of the literature that focuses on learner diversity was before technology was common place in education and certainly does not reflect the rapidly gaining momentum of advances in technology and its impact on the learner and their needs. Furthermore, it is possible that some learners will fall into one or more of the groupings (Taylor and House, 2010). Little has been done to explore if the needs of a new population of higher education (HE) learner, studying a blended learning programme, can be determined using the same set of demographics or if in fact they have different characteristics, or combination of characteristics all together.

Several universities in the UK encourage learners to enroll on programmes regardless of previous academic success but with evidence of career experience in the subject area (Jarvis, 2013, Quaye and Harper, 2014). This could result in a cohort of learners with different educational backgrounds. An exploration into potential causes of non-learning in higher education by Haggis (2006) argues that instead of focusing on an individual, deficit approach to student difficulties, institutions should consider the potential influences of cultural values, assumptions and practices in higher education, for example she cites ‘a lack of familiarity with educational processes’ as a potential factor of non-learning. With many learners choosing HE from a variety of educational and professional/vocational backgrounds, university processes could be unfamiliar and therefore, conventional support is unrealistic. It is up to the educational establishments that provide for these learners to move away from traditional support networks and concentrate on new teaching and learning approaches (Haggis, 2006) that could address these difficulties, rather than focusing on potential factors of individuals that may influence non-learning, although Haggis’ paper does not specifically address the new skills that teachers and support staff are likely to need. Importantly, adapting programmes so as to utilise new technology, will enable the diverse learner population to access and learn the subject. The following summaries of some of the common demographics identified by this literature search are supported by Appendix 1 which illustrates the breadth and weight of the literature used to build this chapter, which concerns digital inclusion or exclusion.

2.2.1 Age

A report of university learners conducted by Yorke and Longdon (2008) found that learners failing to adjust to different and unfamiliar teaching and learning environments were ‘at risk’ of withdrawing from their programme of study. Of those, mature learners are more likely to ‘drop out’ in the first year of study compared to younger learners (Coffield et al., 2004). According to Knowles et al. (2011), adult learners, argued to be ‘digital immigrants’ by Prensky (2001), learn in a different way to their younger counterparts.

Andragogy, the science behind the teaching of adults, proposes that adult learners may need different support networks to younger learners such as, academic, technical or pastoral support for self-managed learning. Aside from this support, older learners will also need to know what they will gain from their learning experience but at the same time they can bring their life and work experiences to the learning process. Recently, a great deal of literature has argued against Prensky's digital native/digital immigrant concepts (McKenzie, 2007; Kennedy et al., 2010). His assertions concerning digital immigrants can be misunderstood. When he talks about digital immigrants, he refers to the time in which they were born and not the level of technological competence they possess. He likens the comparison of 'digital natives' and 'digital immigrants' to a native speaker of a language compared to a non-native speaker. Many learners obtain qualifications later in life (Swain and Hammond, 2011) which suggests that a greater number of older learners are using HE to improve life and career chances, therefore HEIs that use blended learning programmes have a duty to consider this group. When the addition of technology is incorporated into the learning process, such as in a blended learning programme, there can potentially be differences between older and younger learners in comfort levels while using technological learning tools, such as social media (Garcia and Qin, 2007). Their study of 280 blended learning students attempted to identify the generation gap and any associated differences in HE. Although they do not allude to comfort levels as indicators of digital exclusion or inclusion, if a learner experiences feelings of being uncomfortable when using technology or its applications, it could be argued that they are experiencing digital exclusion to some extent. Digital exclusion in the context of this research is defined as when a learner cannot use the technology in the way it was intended by the teacher. If a learner is uncomfortable, they could be experiencing negative feelings and potentially disengagement which could be said to be digitally excluded. This supports a study by Dziuban et. al. (2005) of HE undergraduates on a blended learning programme who found that there are no differences between different aged learners in what was attributed to effective teaching in HE. This suggests that although there are potential differences in the attitudes of learners towards how they use technology and its associated applications there may not be differences in learner attitudes in how the technology or its associated applications are used by the teacher. Furthermore, a study of 988 digital immigrant/native distance learning post graduate students found that the digital immigrants adapted to learning with new technologies such as blogs, better than the digital natives. Additionally, the digital immigrants were found to log on the VLE more frequently to use network research resources and communicate with peers (Berman and Hassell, 2014). The literature seems to be inconclusive regarding age as a factor to determine how learners may interact with the teaching and learning process and activities, which could suggest that there is no one age group that will experience digital exclusion more than another and that all ages have the potential to be digitally excluded in one form or another. Whether it is in the level of comfort they experience while using technology or in the different types of support they might need.

2.2.2 Gender

According to Wehrwein et al. (2007) gender can impact on how learners learn. Anderson and Haddad (2005) found that female learners are less likely to speak out in a traditional face to face (f2f) classroom environment yet in online programme discussions are more likely to voice contributions, in turn impacting on perceived deeper learning. However, Lorenzo and Dziuban (2006) argue that even digital natives, regardless of their gender, ethnicity or socio-economic status, do not necessarily have exposure to or the skills needed to confidently use technology. Kay (2008) reports that male learners have higher self-efficacy than females when learning online but females are slightly more positive about the e-learning experience and perform

better on computer-related tasks. In contrast, González-Gómez et al., (2012) survey of 1185 university students which explored gender perceptions of e-learning found that female learners place more importance on the planning of e-learning activities and value f2f contact with the teacher. The evidence from the literature demonstrates that no one gender experiences digital exclusion more than the other. Both genders could be potentially engaged using technology in different ways. However, there is a possibility that female learners could potentially gain more from a blended learning environment if f2f teacher contact is important.

2.2.3 Ethnicity

According to McNaught and Vogel (2004), whose paper focused on how technology can support communications between learners when there are significant language and cultural differences, multi-cultural learners require teacher contact and more specifically monitoring of student progress and support with online learning. Their paper offers no comparison with white learners, unlike Ashong and Commander (2012) who compare African Americans perceptions of online learning with White Americans. They found that White Americans were overall more positive about asynchronous communication with peers and teachers. These findings share similarities with Okwumabua et al's. (2011) whose exploration of 124 African American seven to sixteen year old learners' described their attitudes toward online learning as anxious and unconfident even though they showed positive attitudes towards computers. In addition, Merrills (2010) who interviewed ten African American HE learners found that this group prefers regular f2f contact with peers and oral contact with teachers. Merrills also found that African Americans enjoy the convenience of learning online although become frustrated at slow responses from teachers. Effective and timely support appears to be key elements of a successful learning environment where technology places a significant role for these learners. A number of researchers have studied the preferences of different ethnic groups towards online learning: Chin et al., (1999) study of HE learners studying in Australia found that Asian learners were less confident with computer activities than Anglo-Saxon learners; In Munro-Smith's (2002) comparison of HE learners in Melbourne, found that Singaporean learners prefer f2f contact but Australian learners prefer online communication. However, Boyette (2008) points out that there is little research on some ethnic groups with reference to online learning. Online content itself is a cause for concern. Heemskerk et al. (2005) literature review of 50 papers found that on a practical level, certain ethnic groups are under-represented in e-learning materials. Furthermore, respecting different cultures is vital to encourage participation and ensuring that material is culturally acceptable to all culturally diverse learners. Cubeta et al. (2001) argues that ethnicity should not be used to estimate learner's academic outcomes. Their study of 542 US HE learners found that a combination of personal and social factors are more appropriate identifiers. Although some of the above studies are conducted outside of the UK, it provides an insight into ethnicity in HE environments across the world and considering that technology is closing the geographical gap to study, more international learners are becoming part of UK cohorts (Universities UK, 2012). The evidence from the literature demonstrates that there is no one ethnic group that will experience digital exclusion more than another and that all ethnicities could potentially be digitally excluded in one form or another in an online learning context. Additionally, section 2.2.2 discussed research that had identified that female learners value f2f teacher contact more than males and research in this section identified that multi-cultural learners value f2f teacher contact. So does this indicate that only males that are multi-cultural value f2f teacher contact? This starts to demonstrate the difficulty of grouping learners to determine their interaction with technology.

2.2.4 Geography

According to some of the literature, where learners live impacts on their use of technology. There are areas in the UK that are ‘digitally unengaged’ (Longley and Singleton 2008). Longley and Singleton’s study showed that approximately 1.15 million people in England live in an area of digital unengagement, in turn impacting on educational success with technology. Unengaged areas are more often than not linked to areas of material deprivation but not always. In some coastal and rural areas the geographies are different. There is little material deprivation but other factors influence digital unengagement, such as lack of or slow bandwidth is a major factor along with the ages of the population. Others suggest that geographical unengagement reveals itself in terms of a lack of access to some services, speed, convenience and availability to new technologies in public and private areas (Longley et al., 2006). Geography also plays a part in what technology is used for. Learners from wealthier areas are more likely to use computers for study activities whereas learners from poorer areas are more likely to use computers for gaming. (Koivusilta et al., 2007). This could potentially pose challenges to HEIs and their learners who live in these areas on blended learning programmes. Blended learning programmes rely on a certain amount of online learning and if a learner is unable to access their university’s VLE or other online content required for their programme, they could experience digital exclusion.

2.2.5 Socio-economic Status

As mentioned above, geographical unengagement is often linked to material deprivation. Generally, the digital divide represents the gap between people who can use and have access to technology and those that do not. Chen and Wellman (2004) describe the digital divide as ‘*differences between those who have all the necessary resources to participate in current society and those who do not*’ (Eynon, 2009 p.27). Lichy (2011) though talks about a ‘*second-level*’ digital divide within the UK. Their study investigated learners and their use of the internet. Largely down to the Labour Government’s 2008 ‘*Home Access*’ scheme, which provided lower income families with IT equipment and internet packages, they concluded that there was no longer a significant ‘*divide*’ between learners being able to access the internet or not; the ‘*second-level divide*’ appeared in the way in which the internet was being used. Although this scheme has now ceased, families will still benefit from the equipment provided and as stated earlier, 95% of families now have internet access and is close to entirety across all economic classes (Ofcom, 2012). So with most learners now having access to computer equipment and the internet HEIs need to focus on what and how the technology is used. According to Ofcom (2012) learners from higher socio-economic backgrounds use the internet more for school and home work than lower socio-economic groups. Furthermore, no one socio-economic group is more likely not to use the internet at all. Yet school pupils who are eligible for Free School Meals (FSM) are less than half as likely to go to university as other pupils (BIS 2011). This could suggest that computer and internet use has no impact on whether pupils progress to HE. Although a study by O’Driscoll et al. (2010) had low participating rates in their focus groups, their findings showed that learners from lower socio-economic groups felt that access to computers and the internet at home was a concern. Surprisingly, this group of learners did not find the lack of computers at their university as much of a problem as their peers from higher socio-economic backgrounds. The same study goes on to report that learners from lower socio-economic backgrounds felt that lack of support and training was the main barrier to their participation in online learning. An emerging group of lower income learners who have little exposure to technology before entering education or university are categorised as ‘*digital strangers*’ by Czerniewicz and Brown (2013). They argue that although technology, by way of computers, is unfamiliar to this group, mobile phones are

common so universities should do more to exploit this resource. The evidence from the literature demonstrates that there no longer seems to be a significant divide between ownership of computer equipment or access to the internet across socio economic groups, rather what and how the technology is used is different. This could signify a requirement for HEIs to change the type of support they offer. Computer suites provided for learners to use may not be the priority now, rather technical support or training to develop literacy skills may be more useful.

2.2.6 Educational Background

Several universities in the UK encourage learners to enrol on programmes regardless of previous academic success but with evidence of career experience in the subject (Jarvis, 2013). This has resulted in mixed academic (proven) ability within cohorts, (Wooden et al., 2001). Learners who enter HE with ‘non-traditional’ qualifications could be disadvantaged due to the lack of preparation for essay writing and study skills (O’Driscoll et al., 2010). Additionally, learners who are most likely to say they are not interested in connecting to the internet are those with lower levels of education (Helsper, 2011). In contrast, Koivusilta et al. (2007) proposes that links between educational background and technology use is in the activity itself and not the time spent on it. In particular, digital gaming was linked to poor school achievement in some cases. Moreover, with a plethora of new and different types of schools emerging (DfES, 2014), the type of school you attend is reported to shape your technology use. Attending a vocational school, where less academic subjects are studied, could reduce the amount of technology you are exposed to (Koivusilta et al., 2007). The evidence from the literature demonstrates again that technology is used in different ways by different groups of learners. With the promotion of widening participation in HEIs cohorts are subsequently more diverse, which poses a challenge for educators in anticipating learner engagement with TEL. The literature is indeterminate on how to determine which groups of learners will be more likely to experience digital exclusion. It is suggested that online technologies self-efficacy (DeTure, 2004) or previous experiences with technology (Waschull, 2005) are not useful predictors of learner success. With universities widening participation to encourage a more diverse range of learners, educational backgrounds will become far ranging, from learners attending university from sixth form to learners that have been out of an educational institution for some time. This suggests that using a learner’s educational background to determine their experiences with technology is not useful.

Having explored how learners have been categorised in the literature by diverse demographic characteristics, this thesis next examines how learners can be categorised by learning styles.

2.3 Learning Styles

Learning styles are not a new concept. As far back as the early 1900s Montessori used teaching methods that allowed learners to ‘do’ rather than ‘listen’ for example, using material to enhance the senses during the learning process (Montessori Media Centre, 2016). Since then, learning styles have been developed and have been continuously used in educational establishments to determine how best a student might learn. There is a plethora of learning styles models available in the literature, one report identified 71, (Coffield et al., 2004). 13 of the learning styles models analysed by Coffield et al., (2004) are illustrated in Table 3 and shows the author or creator, the name of the measure used to anticipate learning preferences, key terms or descriptors and when the model was first introduced.

Author(s)/creator(s)	Measure	Key terms/descriptors	Date introduced
Myers-Briggs	Myers-Briggs Type Indicator (MBTI)	perceiving/judging – sensing/intuition – thinking/feeling – extraversion/introversion	1962
Kolb	1. Learning Style Inventory (LSI) 2. Revised Learning Style Inventory (R-LSI) 3. LSI Version 3	accommodating – diverging – converging – assimilating styles	1976 1985 1999
Gregorc	Gregorc Mind Styles Delineator (MSD)	concrete sequential/abstract random – abstract sequential/concrete random	1977
Dunn and Dunn	1. Learning Style Questionnaire (LSQ) 2. Learning Styles Inventory 3. Productivity Environmental Preference Survey (PEPS) 4. Building Excellence Survey (BES)	environmental – emotional – sociological – physiological processing	1979 1975 1979 2003
Entwistle	1. Approaches to Study Inventory (ASI) 2. Revised Approaches to Study Inventory (RASI) 3. Approaches and Study Skills Inventory for Students (ASSIST)	meaning orientation – reproducing orientation – achieving orientation – non-academic orientation – self-confidence deep approach – surface approach – strategic approach – lack of direction – academic self-confidence – metacognitive awareness	1979 1995 2000
Honey and Mumford	Learning Styles Questionnaire (LSQ)	activist/reflector – theorist/pragmatist	1982
Riding and Chima	Cognitive Styles Analysis (CSA)	holist/analytic – verbaliser/imager	1991
Herrmann	Brain Dominance Instrument (HBDI)	theorist/humanitarian – organiser/innovator	1995
Allinson and Hayes	Cognitive Style Index (CSI)	intuitive/analytic	1996
Vermunt	Inventory of Learning Styles (ILS)	meaning-directed – application directed – reproduction-directed – undirected	1996
Apter	Motivational Style Profile (MSP)	telic/paratelic – negativism/conformity – autic mastery/autic sympathy – alloic mastery/alloic sympathy – arousal avoidance/arousal seeking – optimism/pessimism – arousability – effortfulness	1998
Sternberg	Thinking Styles	functions – forms – levels – scopes – meanings	1998
Jackson	Learning Styles Profiler (LSP)	initiator – analyst – reasoner – implementer	2002

Table 3. learning styles models analysed by Coffield et al., (2004)

Table 3 illustrates just 13 of the 71 identified models analysed by Coffield et al., (2004) demonstrating that there is no one recognised model, in turn creating a challenge for teachers to understand which model to use in the classroom. Regardless of the mass of literature and supporters of learning styles, their report concluded that there was no evidence that learning style models can accurately determine how best learners achieve academic success in the classroom. According to TES, arguably the most popular weekly publication aimed at teachers with over 3.6 million registered online users in 279 countries (TES, 2015), the most commonly used learning styles model and most widely promoted by the Department for Education and Skills, is Fleming's VARK (Fleming and Baume, 2006) model, yet this is not included in Coffield's analysis. This is an example of the potential challenges discussed in section 1.3 between research evidence and practice evidence that teachers and researchers experience. Opponents of incorporating learning styles considerations into a lesson, such as Claxton (2013), argues that teaching to cater to preferred ways of learning can restrict learning and does not influence learning outcomes (Stahl, 2002) and Spoon and Schell (1998) believe that a human's preferred learning style changes with age. The evidence from the literature is clear that learning styles cannot be relied upon to determine learning outcomes or engagement. If determining how learners learn best is unreliable this could also suggest that learning styles models will be unreliable at determining learning outcomes with technology.

This research will refer to learning styles throughout this thesis and can be defined as a learners preferred 'way' of learning with no pre-defined label unless otherwise stated.

Having explored the different categories that learners can be grouped by, the evidence would suggest that while digital exclusion has been associated with gender, age, ethnicity, geography, socio-economic status, educational background, and learning styles, these characteristics do not present a sufficiently nuanced perspective to explain why some students feel included or excluded. Additionally, there has been no research where the characteristics of learners have been identified by the learners themselves.

2.4 E-learning Theory, Models and Frameworks

Reflecting on the findings from studies of how diverse learners have been categorised to determine their interaction with TEL and considering the second objective of this research:

To investigate the usefulness of current and emerging technologies for pedagogy with a diversity of learners

it is pertinent to provide a general overview of current e-learning theory, models and frameworks. Whilst it is not the intention to review each e-learning theory, model and framework in detail, it is useful to offer an overview of current theoretical perspectives in order to identify which theories, models or frameworks potentially inform current practice in HE.

The rapid momentum that ICT gains in its development signifies an urgent re-evaluation of whether learners' experiences of digital exclusion and inclusion are the same now as they were before technology was a ubiquitous part of life. According to Andrews (2011) there are considerable differences between conventional learning and e-learning: digitization of text allows teachers and learners to share documents with more ease; opportunities to extend collaborative learning beyond the immediate classroom; access to more resources and the opportunity for more dynamic exchanges between learners with the use of asynchronicity. He goes on to say that,

“e-learning is continuously emergent, the co-evolution of learning and technology. The emergence of new technology changes the way learners interact, access and use it therefore, the possibility that how learners learn with it may change (p. 115).”

Considering the above statement, where e-learning is used, it would appear that the physical classroom is expanding into a virtual one where the opportunity to communicate and collaborate with a wider circle of peers and making use of a wider range of resources is the key to learning. And if this is the case, does the element of f2f teacher/learner contact and interaction, such as a blended learning programme, enhance the learning process? Additionally, if technology and learning evolve together, educational research and teacher professional development needs to take place continuously. This has implications for teachers who will need to facilitate engaging learning opportunities using current and emerging technologies.

Technology provides opportunities for how, when and where we learn. Yet researchers and educationalists are still attempting to find e-learning models and frameworks to make learning with technology more effective. Mayes and DeFreitas' (2004) e-learning review concluded that there were no e-learning models, only e-enhancements of existing teaching and learning models and frameworks. An example of this is expressed by Mason (1998) when discussing 'pedagogical evolution' (p. 3)

“All of the elements I am about to discuss are very familiar educational approaches - they are simply being adapted and re-discovered in their online form,” (p. 3).

Salmon's 5 Stage E-Moderating Model (Salmon, 2003) goes some way to developing e-learning pedagogy and describes the stages of participation in an online community which educators can consider when designing this type of teaching method, but it does not account for any differences in learner characteristics that may be present. Haythornthwaite and Andrews (2011) started to build a theory of e-learning but decided that the field was not mature enough for such an ambitious attempt. A review of pedagogical models and their use in e-learning conducted by Conole (2010) concluded that many of the popular models available can be theoretically misunderstood by practitioners who usually adopt a 'surface application' of the model in practice, for example using a theory to guide the design process such as Wenger's Community of Practice (COP) (2011). Teachers may group learners to collaborate on an online task based on a COP theory when those learners may not in fact share any similarities needed in order for it to be defined as a COP, such as a shared engagement. Conole goes on to critique that this could be due to relevant theories many components, for example Wenger's COP requires the 'community' to be:

Mutually Engaged; members establish norms and build collaborative relationships which form the community which is mutually engaged in a shared goal.

Joint Enterprise; through their interactions, they create a shared understanding of what joins them together as a community to complete a shared goal or joint enterprise such as a task.

Shared Repertoire; the community produces a set of communal resources which are used in the pursuit of their joint enterprise and can be physical resources or support networks.

This would suggest a need for a simple model with fewer components that educators can use effectively. Moreover, experienced teachers often use a tried and tested approach to designing activities that subconsciously incorporate theories and approaches to teaching and learning. With new technologies introduced into the learning environment there can be a difficulty in understanding how and why to use them (Falconer and Conole, 2006). As this research will propose strategies for digital inclusion, it is beneficial to

take in to account some of the current theories of learning and frameworks that can influence effective use of e-learning. Table 3 has been extracted and adapted from Conole's (2010) review, which was built on earlier reviews (Ravenscroft, 2003, Thorpe, 2002, Dyke et al, 2007, Beetham, 2004, Mayes and de Freitas, 2004). Conole's (2010) table has been used because it is one of the most current summaries on e-learning pedagogy available. The table is split into five columns. The first column shows which perspective the model or framework falls under, that is the significant assumptions about the processes and outcomes that constitute learning. This section is split into three categories:

Associative – Learning as activity through structured tasks

Cognitive – Learning through understanding

Situative – Learning as social practice

The second column shows the associated models or frameworks and sources. The third column details which learning theory or approach each model or framework is based upon, the fourth column details the features of the learning theory or approach, that is how it could potentially be used by teachers and the fifth column details how the model or framework is applied with the addition of technology. However, it is important to point out the limitations of Conole's (2010) review and how the table has been adapted for the purpose of this document. Each model or framework within Conole's (2010) review has been strictly aligned with a learning theory or approach and subsequent application, yet in practice the alignment is rarely this clear-cut.

Additionally, in practice some models or frameworks and applications may incorporate one or more learning theory or approach when used with learners, for example the Community of Inquiry framework in Table 4 is positioned under a Constructivist theory of learning yet it is described by Garrison (2011) as collaborative-constructivist. Furthermore, the Community of Inquiry framework relies on a process of creating meaningful learning experiences through the development of three interdependent elements: social; cognitive and teaching presence. The teaching presence element depends on design, facilitation and cognitive and social processes for the purpose of meeting personal and educational outcomes. If that is the case then there must also be an element of assessment, to assess whether the educational outcomes have been met. Therefore, it could be argued that the Community of Inquiry framework also incorporates a behaviourist theory of learning. With this in mind, double arrows have been added to illustrate the non-alignment of the theories of learning or approach in practice and right braces have been added to illustrate the range of applications that can be applied to one or more theory of learning or approach. Furthermore, the headings have been changed to better reflect the content within the table in relation to this research.

Perspective	Model or Framework and Source	Learning Theory/Approach	Features	Examples of E-learning Application
1. Associative	1. Instructional design principles Merrill's (2002) Reigeluth (2013)	Behaviourism Instructional design Intelligent tutoring systems	Focuses on behaviour modification, via stimulus-response pairs; Controlled and adaptive response and observable outcomes; Learning through association and reinforcement	Content delivery plus interactivity linked directly to assessment and feedback
2. Cognitive	2. Kolb's (1984) learning cycle Boud et al., (2013) 3. Laurillard's (2002, 2013) conversational framework 4. Community of Inquiry framework (Garrison et al., 2010) (Fisher, 2013) 5. Jonassen's et al.(2003) constructivist model 6. Blended learning curriculum design model (Huang et al., 2008) 7. n-Quire model (Paddock, 2011) 8. E-learning Framework (Dyke et al. 2007)	Constructivism Constructionism Reflective Problem-based learning Inquiry-learning Dialogic-learning Experiential learning	Learning as transformations in internal cognitive structures; Learners build own mental structures; Task-orientated, self-directed activities; Language as a tool for joint construction of knowledge; Learning as the transformation of experience into knowledge, skill, attitudes, and values emotions.	Development of intelligent learning systems and personalised agents; Structured learning environments (simulated worlds); Support systems that guide users; Access to resources and expertise to develop more engaging active, authentic learning environments; Asynchronous and synchronous tools offer potential for richer forms of dialogue/interaction; Use of archive resources for vicarious learning;
3. Situative	9. Activity Theory (Mwanza 2002) (Buchem et al. 2011) Wenger's Community of Practice (1998, 2011) 10. Salmon's (2003, 2004) 5-stage e-moderating model 11. Connectivism (Siemens, 2014) (Bell, 2010) 12. Blending with purpose: multimodal model (Piciano, 2009) 13. Framework for online community Preece (2000) (Wang et al. 2012)	Cognitive apprenticeship Case-based learning Scenario-based learning Collaborative learning Social constructionism Social constructivism	Take social interactions into account; Learning as social participation; Within a wider socio-cultural context of rules and community;	New forms of distribution archiving and retrieval offer potential for shared knowledge banks; Adaptation in response to both discursive and active feedback; Emphasis on social learning & communication/collaboration; Access to expertise; Potential for new forms of communities of practice or enhancing existing communities

Table 4. Summary of e-learning models and frameworks.

Table 4 illustrates the complexity of learning theories and the evidence suggests that depending on the teacher's theoretical position, theories can fall under different perspectives, indicating that there is an element of interpretation when considering which theory to subscribe to. The final column of the table gives examples of how models or frameworks can be applied with the addition of technology. The technology applications have been aligned with the most relevant theory but they are not theories specifically conceptualised by the use of technology. A framework conceptualised by the use of specific technologies is required to fill this gap in the literature.

Conole's (2010) review, like those e-learning reviews it followed, are essential in the process of understanding how e-learning can influence successful outcomes. But as technology is a moving target with regards to development, earlier reviews, although important need to be built upon to ensure relevancy in what is currently being used by learners and teachers. Laurillard (2006) sums this sentiment up by stating of her own research,

“The range and scale of possible applications of new technologies in HE is almost beyond imagining because, while we try to cope with what is possible now, another technological application is becoming available that will extend those possibilities even further. Everything in this chapter will need updating again when 3G mobile phones begin to have an impact on our behaviour,” (p.1).

2.5 Current and Emerging Technologies

The next part of the literature review specifically addresses the second objective. Current and emerging technologies were investigated. It was considered by the researcher that *current* technology is technology currently being experienced by HE learners, such as blogs and to some extent will be investigated during participant interviews in the first two phases of this research. *Emerging* technology was considered by the researcher to be technology that is not commonplace in education, such as personal learning environments, although may be used to some extent in some institutions. An overview of current and emerging technologies is provided in Table 7 and further discussed subsequently. For the search it was considered that the context within which the *emerging* technology was set was not significant, rather the technology itself. This was because emerging technologies can have a time-to-adoption timeframe, usually four to five years, where the technology is utilised across other contexts. This is reported in the Horizon Report (2014) which

‘identifies and describes emerging technologies likely to have a large impact over the coming five years in every sector of education in some 65 countries around the globe’ (p.1).

The inclusion and exclusion criteria for relevant literature are set out in Tables 5 and 6 below and Table 7 synthesises the findings. The sixth column of the third table offers the researcher's interpretation on the usefulness of the current and emerging technology for pedagogy with a diversity of learner.

Inclusion Criteria	Rationale
Where will data be collected: Library, search engines, scholarly websites, and educational websites.	The researcher will make use of the university's extensive library and databases. Additionally, data bases on the internet provide opportunities to focus the search on a specific time frame. Educational websites provide reports and articles detailing what current and emerging technologies are being used in education.
How will data be collected: Literature review based on search terms, personal experience and sample's experiences, forward citations.	Literature found by the search engines, data bases, educational websites and library search will be found using focused search terms and personal experiences of the researcher and experiences of the samples in Phase 2. The rationale for this is because the sample was exposed to TEL on a blended learning programme.
Data bases used include: Google scholar, Academia.edu, Academic Research Complete and ERIC, TES, JISC.	The researcher chose to use popular academic data bases to search for relevant literature. It was accepted that this range of data bases would cover the search area sufficiently. Additionally, educational websites were used as these would provide practical uses of technology currently being used or emerging in education.
Search terms: Emerging technology in higher education, emerging pedagogies, innovative teaching methods/resources.	Focused search terms were used because of the extensive amount of literature on current and emerging technology. A search of 'Emerging technology' on Google returned 42, 000 000 + results. A search of 'Emerging technology' on Google Scholar returned 3, 000 000 + results. A search of 'Emerging technology in higher education' on Google Scholar returned 2, 530, 000 results. With this in mind, three search terms were used to investigate 'emerging technologies'.
Types of data: Journals, books, qualitative and quantitative data reports, educational websites.	The researcher wanted access to up to date literature on current and emerging technology so it was considered that relevant journal articles would provide this. Recent books were also consulted. Reports found on educational websites would provide information on what is emerging in education at practice level.
Language: English	This is the researcher's first language.
Context: Literature based in HEIs anywhere in the world.	Technologies emerging in HEIs were investigated because this research was set in HE. Current and emerging technologies that were being used anywhere in the world were considered because there are no geographical boundaries for technology. Cultural factors were not considered because it was the actual technology being investigated and not the outcome of using it.
Time frame: 2014-15	The researcher only wanted to consider the most recent literature due to the focus being 'current and emerging technologies' therefore, any literature before this time would not be current or emerging. A search for 'emerging technology' on Google Scholar (since 2014) returned 118, 000 results. The search was refined further by focusing on 'emerging technology in higher education' which returned 72, 000 results.

Table 5. Inclusion criteria and rationale that was used to search for relevant literature.

Exclusion Criteria	Rationale
Types of data: Literature that is not current.	The literature review was to investigate 'current and emerging technology' therefore, any literature that is not current would not give relevant data.

Table 6. Exclusion criteria and rationale that was used to search for relevant literature.

Findings	Title	Author	Purpose	Methodology	Researcher Comments and interpretation of its usefulness for a diversity of learners.
PLEs can connect formal and informal learning. PLEs can support learners in becoming self-regulated learners.	Personal Learning Environments, social media, and self-regulated learning: A natural formula for connecting formal and informal learning.	Dabbagh, N. and Kitsantas, A. 2011.	To provide a three-level pedagogical framework for using social media to create PLEs that support student self-regulated learning.	Method:Literature review. Context:HE	PLEs could be useful for learners in preparing them for using certain software for formal learning (such as blogs) and can help to promote independent and self-directed learning.
Emergence of iPad usage. Learners use instant messaging, mobile phones, e-readers, social networking, RSS feeds, podcasts, and tablets.	Higher Education and Emerging Technologies: Shifting Trends in Student Usage	Cassidy, E. Colmenares, A., Jones, G., Manolovitz, T., Shen, L. and Vieira, S. 2014.	A study about the use and preferences of Internet, communication, and educational technologies among learners in HEIs libraries.	Method:Survey Context:FE	Is this all learners or just younger generation? Is this initiated by teachers? Comparable to this research data and other literature. Useful methods of communication and what seems to be expected by a current learner.
Video can be used to enhance and deepen the teaching and learning process.	Video research in the learning sciences.	Goldman, R., Pea, R., Barron, B. and Derry, S. 2014.	A study of how video can be used by learners to record annotate and reflect on their work.	Book	Can this be used for formative or summative assessment? Its usefulness would depend on learning styles and capabilities of learners. Visual methods could be an innovative way of recording learner reflections and is worth testing/trialling.
HEIs are responding positively and academics are collaborating with emerging technologies, such as the internet and social media, which is enhancing student-centred learning.	Intersection of Pedagogy and Emerging Technologies to Enhance Student-Centred Learning in Higher Education.	Chaudhry, M. and Malik, A. 2014.	The study investigates the importance of intersection of pedagogy and emerging technologies to enhance student-centred learning.	Method:Reflective Context:HE	Student-centred? Not defined.
Intelligent tutoring systems (ITS) were used effectively to enhance mathematics teaching and learning.	Emerging Technologies and Landmark Systems for Learning Mathematics and Science	Sosnovsky, S., McLaren, B. and Aleven, V. 2014.	A study of how artificial intelligence (AI) can be used in teaching and learning mathematics.	Method:Empirical Context:Primary	Can this be transferred to other subjects? Limited studies on AI and those available are outdated. No comparable data in this research. No researcher experience with AI. Useful for larger cohorts or for learners who need support outside of university.
Patients and service users record health data on wearable technology (Apple watches). Student nurses etc. are being taught about wearable technology as a tool that is used in healthcare practice.	Emerging Technologies Center: The Connected Age and Wearable Technology	Skiba, D. 2014.	Patient generated health data using wearable technology.	Method:Case study. Context:Study of service users.	Can this be transferred to learners using wearable technology? No comparable data and limited literature in an educational context. Any device that can be used easily, anytime, anywhere by a learner would be useful. Convenience is appreciated by learners (according to data in this research).
The following will be used more within the next 5 years: Flipped classroom	Horizon Report: 2014	Johnson, L., Becker, S., Estrada, V.	A study identifying and describing emerging technologies likely to	Method:Report	Some of these methods are already being used but sometimes as enhancements to learning (ie. Where the learning taking place is enhanced by the technology,

Learning analytics 3D printing Games and gamification Quantified self Virtual assistants.		and Freeman, A. 2014.	have an impact on learning, teaching, and creative inquiry in education.	Context:Education	but would still take place without the technology) rather than enablers to learning (ie. Where the learning only takes place when the technology is present). Some teachers do not have the technological skills or motivation to use emerging technologies. Flipped classrooms are currently being used in HEIs and other institutions. Useful to develop learner autonomy. No comparable data or researcher experience with 3D printing but would be useful in certain subjects eg. Medicine.
Text to speech software improves outcomes for some learners (eg. Dyslexic) and reduces the need for readers during exams.	Take advantage of digital exam formats for print-impaired learners	McNaught, A. 2015.	An article about text to speech software for use in online exams for learners with print impairment.	Article	Could improve reader/interpreter bias. Could positively support print impaired learners and reduce any anxiety towards exam taking.
Projects in progress: Lingoflow A language vocabulary learning app. Startwrite A web app to help learners stay organised and get assignments done on time. UniBoard Online noticeboard to connect university learners. Unisocs Subject-specific discussion and progress tracking for learners. Unitu A feedback tool to listen and engage with the student voice through student representatives.	Summer of Student Innovation	JISC. 2015b.	Individual projects in progress	Variety	Apps are convenient for learners to use and are as long as a smart phone or tablet is readily accessible, can be instantly available and attainable.
Electronic submission and feedback.	Electronic management of assessment	JISC. 2015b.	Exploring how technology can support the assessment lifecycle, from the electronic submission of assignments to marking and feedback.	Ongoing	Reduces paper waste. Universities strive to be 'green' without success with the necessity for paper assignments. Electronic methods are not always utilised.
Nursing education is recognising how social media could be one strategy that could be used effectively to enhance new millennia learners' active learning and subsequent deep learning. Study goes on to say that	Fostering new pedagogies for the new age: The use of social media in nursing education	Lopez, V. 2014.	This study looks at how social media is used in nurse education to foster deep learning.	Method:Editorial Context:HE	This could apply to any subject or discipline and not only for new millennia learners.

nurse educators must move with the times and use technology in their lessons.					
Mobile affordances can augment, extend and construct learning in HE.	Towards a mobile learning pedagogy.	Hamm, S. Drysdale, J. and Moore, D. 2014.	Investigates how mobile technology can be used for informal learning.	Method:E vidence-based Context:H E	They are suggesting that universities need to recognise the difference between mobile learning and using mobile devices to learn. They go on to say that universities have an opportunity to exploit mobile affordances for the potential of informal learning.
Kaltura was piloted in December 2014 and is used with the university's VLE. Users can record, upload, publish, search, and share video and audio files directly from the VLE. Users can upload and record media (including screen casts and web cam recordings), organize and share their content, and view and interact with their media via captions and comments.	Indiana University Bloomington.	NA	Kaltura is a cloud-based video management application that allows learners and teachers to store and share videos.	NA	Relies on a sufficient VLE system and teacher skills.

Table 7. Synthesis of current and emerging technology literature.

The literature on emerging technologies shows a definite incline towards technology that is mobile and can be used for communication. Since the emergence of smartphones in the late 1990s (Pocketnow, 2016) m-learning has gradually been developed as a teaching and learning approach. M-learning offers more freedom for learners, changing the spaces around them (Bradley and Holley, 2011) for example, accessing teaching and learning activities anywhere instead of being restricted to a building with an internet connected computer.

More recently there seems to have been a shift towards using social media and other forms of synchronous and asynchronous communication for formal and informal learning, rather than using the Web 2.0 for purely collaborative tasks. Learners are able to construct knowledge individually and socially by informal means and this is once again being recognised by educators. Computer mediated communication and the opportunities to collaborate among cohorts have been a popular pedagogical model for some time (Coiro, 2014) but it has again been recognised that learners can construct knowledge by themselves, using the same tools. According to Vygotsky's (1978) Social Constructivism theory of learning there needs to be present a More Knowledgeable Other (MKO) for a learner to construct knowledge in order to travel through the Zone of Proximal Development (ZPD). Traditionally this has been a teacher, adult or peer but now it could be argued that the technology a learner engages with could also act as their MKO as it provides materials and opportunities which support them in scaffolding their knowledge and understanding. What is important here is the opportunity to have access to that MKO at all times, when informal learning opportunities present. Most learners have easy access to mobile devices which enable them to learn informally anytime, anywhere.

Another emerging technology highlighted in the review was the adoption by educators of artificial intelligence (AI). Still in its early stages, AI is being used to mentor and support learners. This would be particularly useful in HEIs where there are large cohorts of learners and not enough teaching or university staff to offer the levels of support required. Additionally, using AI is another means of accessing university support anytime, anywhere, unlike making an appointment to see your university teacher.

What seems to be a common theme throughout the literature review is the need for educators to be trained and open to using new technologies for teaching and learning. Most educators were taught without the enhancement or enablement of technology therefore it is vital that educators do not try and teach today's learners, however old they are, using similar methods that were used when they were in education. Today's learners are used to technology, it is an accepted part of most people's lives and is part of our social world.

Personal Learning Environments (PLEs) are the emerging technology that is anticipated to have the greatest impact on teaching and learning (Johnson et al., 2011). Because of this, literature on PLEs will be further reviewed in the next section.

2.5.1 Personal Learning Environments

Computer supported collaborative learning affordances are forcing a pedagogical change where the social aspect of learning is a key aspect (Siemens, 2014) and that HEIs should be including social media platforms to encourage the creation of personal and social learning spaces to enable learner centred 'personalised' experiences (Anderson, 2008; Siemens and Tittenberger, 2009; Dabbagh and Reo, 2011). Educators can facilitate the learning process by providing opportunities for learners to participate in student-student and student-technology interactions. The literature shows that learners are often more able to comprehend programme content when it is reinforced by their peers (Ambrose et. al, 2010). Interpretations given in

addition to those of the teachers' can increase learning (Roscoe and Chi, 2008, Griffin et al. 2008). Additionally, learning support can be provided by both peers and technology and is often delivered in a different way to that of the teacher, which can enhance the process (Concannon et al., 2005, Yang et al., 2007). PLEs can be described as 'the sum of all used tools (email, websites, Browser, apps)' (Schaffert and Hilzensauere, 2008 p. 2) and where social software and web services are grouped in one place. PLEs not only enable learners to produce learning content, but reflections and data about their own learning, such as blog posts or RSS feeds (Rich Site Summary- a format for delivering regularly changing web content.). Some applications currently used as PLEs are: WordPressMU, I-Google, Flock and Netvibes (Schaffert and Hilzensauere, 2008). PLEs differ from VLEs in that the learner is in control of what information they share within a PLE. To offer the reader some explanation into the differences between a VLE and a PLE from a learner's perspective Table 8 (Schaffert and Hilzensauere, 2008) is included below.

Concept	VLE	PLE	Challenges and/or shifts
role of learner	learner as consumer of pre-defined learning materials, dependent on the “creativity” of the teachers	active, self-directed, creator of content	shift from consumer to “prosumer”, self-organisation is possible and necessary
personalisation	is an arrangement of learning assignments and materials according to a (proposed or pre-defined) learner's model, based on an underlying expert system	... means to get information about learning opportunities and content from community members and learning services fitting to the learner's interests (via tags/RSS)	competence for usage of several tools and a self-organisation is needed
content	developed by domain experts, special authors, teachers and/or teachers	the infinite “bazaar” of learning content in the Web, exploring learning opportunities and services	necessary competences to search, find and use appropriate sources (e.g. blogs)
social involvement	limited use of group work, focus on the closed learner group (e.g. in the VLE), collaboration and exchange not primarily in the focus	the community and the social involvement (even in multiple communities) is the key for the learning process and the recommendations for learning opportunities	community and collaboration as the central learning opportunities
ownership	content is generally owned by the educational institutions or the learners, due to technological reasons, this ownership cannot always be realised	content is organised in multiple, Web-based tools, ownership is controlled by the learners themselves and/or (commercial) service providers	awareness of personal data is needed
educational & organisational culture	imitation of classroom learning, programme-orientated, teacher-orientated features	self-organised learner is the focus	change of learning culture and perspective – move towards self-organisation and self determination
technological aspects	classical learning content needs interoperability between VLE and data repositories	Social software tools and aggregation of multiple sources	required interoperability between VLE and the social software

Table 8. Differences between a VLE and a PLE (Schaffert and Hilzensauere, 2008).

Table 8 highlights some significant differences between a VLE and a PLE however, it is important to point out its limitations. There requires a level of competence to use and populate both a VLE and PLE that has not been considered. Schaffert and Hilzensauere has not allowed for the differences in how technology is used within a VLE, for example they point out that there is limited use of group work within a VLE but this would depend on how the technology is used.

The implications of the differences set out in Table 8 for this research are that the learner has essentially shifted from being the consumer of content to creator (Schaffert and Hilzensauere, 2008). Often that creativity will consist of a social aspect of collaboration. With all of the possibilities that new technologies, websites and software offer learners, careful planning could be required by educators and programme designers to ensure that learners know how to search, utilise and organise these technological resources.

PLEs offer the learner the opportunity to personalise their learning environment, adding different types of technological resources or communication tools, such as blogs. Research has shown that VLEs are often used for convenience by educators (Weller, 2007) and additionally, VLEs do not encourage social networking (Valjataga et al., 2011) unless it is institutionally managed. Social networking tools can encourage informal learning opportunities which are a vital element to the learning process (Selwyn, 2007). However, research has recently shown that PLEs can integrate both informal and formal learning (McGloughlin and Lee, 2010). Hall (2009) proposes that the learning experience is most successful when learners engage in both formal and informal learning because the two combined allows a learner ‘to create informal associations’ (p.38) with their ‘formal, institutional work’ (p.38). Dabbagh and Kitsantis (2011) suggests that,

“PLEs can be considered as a promising pedagogical approach for the deliberate or intentional integration of formal and informal learning spaces.” (p.2).

However, there are some criticisms of PLEs. The term ‘personal learning environment’ itself is an evolving term and has no clear definition or form: it is made up of undefined software. A learner is required to continually organise, populate and maintain a PLE, which requires a level of self-direction (Educause, 2015). This could potentially be a challenge at first for some learners. Furthermore, some learners may lack the necessary skills to identify reliable sources of information. While a PLE could support a learner to develop such skills, they may need pedagogical support from teachers initially.

The social media element of a PLE will encourage learners to create an online identity, aided by cues that prompt them about how to successfully merge formal and informal learning. Hutchings (2002) states that,

“CMC has the potential to develop academic writing and argumentation skills outside the classroom but only if individuals are prepared to engage collaboratively with the process of knowledge construction” (p. 107).

However, even though learners are willing to engage with CMC or CSCL on an informal basis, some learners may not be willing to engage with CSCL on a formal basis hence, learning in this way for some present challenges of which PLEs could be the answer. A PLE could allow learners the time to become familiar with different aspects of a blended learning programme (Dabbagh and Kitsantas, 2011). Blogging for example can first be attempted by learners informally and as the programme progresses, and with pedagogical support and cues from their teachers, share posts on a formal basis. The difference between a VLE and a PLE in this

context is that a learner has ownership of a PLE by deciding on the applications that are used as well as being able to communicate with many, rather than a closed group as part of a university's VLE.

2.5.2 Blogs for Formal and Informal Learning

According to work carried out by UNESCO (2012) and OECD (2010) learning contexts can be split into three types: formal, informal and non-formal. They define formal learning as learning that is highly organised and structured with learning outcomes and the use of assessment to judge whether these outcomes have been met. They define informal learning as learning that is not highly organised or structured but instead happens as a result of everyday activity. They also go on to define a learning context that sits between formal and informal learning: non-formal learning. This type of learning is more organised than informal learning but still consists of planned activities, such as activities planned within an extra-curricular club or sports team.

With the affordances of Web 2.0, blogging has become a popular teaching method in universities (Venkatesh et al., 2014). However, research is limited on the use of blogging for formal learning and in particular as a tool to assess learners. Google Scholar returned under 2000 results when a search was executed for 'using blogs for formative and summative assessment' compared to over 16000 for 'using blogs for formal and informal learning'. It is not surprising then that educators are less enthusiastic about using blogs for assessment purposes when little evidence exists of its effectiveness.

An article by Oravec (2002) over ten years ago reported on the possibilities that blogging offered for deeper learning. Blogging's potential to offer a platform to reflect and collaborate by sharing links and resources empower learners and encourage them to develop their critical analytical thinking skills. According to Oravec, this is achieved by learners having to consider carefully what they write and ultimately standing by what they have written on a public forum. Drawing on educational theories such as Vygotsy's (1978) social constructivism, is also significant in assessing the formal learning value of blogs, for example learners will reflect and analyse their posts and share resources that can be revisited which enriches the learning experience.

The difference between formal and informal learning with blogs lies behind the role of the blogger. While learning informally with blogs, learners have no requirement to contribute their thoughts or comments and can be participating just by reading others' posts. This type of participation is commonly known as 'lurking' (Nonnecke and Preece, 2001). Lurking can encourage less confident learners to contribute to blogs by allowing them time to observe the behaviours of contributors (Allen, 2002). Nonnecke and Preece (2001) support this view maintaining that lurking is an important aspect of a blogging community and is a 'passive' contribution which improves the understanding of the lurker and provides a sense of belonging. For contributors, knowing that there are readers and potential contributors gives them the opportunity to present to a wider audience. The problem for less confident bloggers comes when contribution is a requirement for formal learning or assessment purposes.

2.6 Blended Learning

Considering the third objective of this research:

Objective 3. To examine what learners need to be effectively engaged with a blended learning programme,

it is important to explore what is meant by blended learning and critically review literature that has studied a blended learning approach to engage learners.

Blended learning is more than simply blending f2f and TEL. It is an opportunity for teachers to maximise the strengths of both approaches in order to create a more effective way to learn and is gradually becoming one of the most important mediums for education reform today (Picciano et al., 2014). All elements within a blended learning programme have the potential to contribute to learning (f2f, VLE, blogs, research, online communication etc.) (Jewitt, 2008). Research has found that blended learning programmes can offer a more meaningful learning experience than fully distance learning programmes (Tayebinik and Puteh, 2013). This could be due to a lack of peer and teacher interaction (Laurillard, 1993), learners not adjusting effectively to new technologies, learner procrastination and delayed teacher feedback (Lim, 2002) and lower motivation to read online materials (Lim and Kim, 2003) on distance learning programmes. A number of studies have endorsed blended learning programmes. Osguthorpe and Graham, (2003) claim that blended learning programmes enhance pedagogy, improves access to learning sources and revision, encourages social interaction amongst peers, increases teacher presence during learning and improves cost effectiveness. So and Brush (2008) suggest that blended learning can increase student satisfaction therefore impacting on retention (Liu et al. 2009) and Bielawski and Metcalf (2003) argues that blended learning programmes can cater better for different learning styles (Fleming and Baume, 2006).

However, with teachers using TEL as part of a blended learning programme, a level of digital competence is required. It is possible that today's learners will expect high levels of technological creativity and skill, especially with the abundance of resources available to teachers in higher education, such as VLEs. This places a certain amount of pressure on teachers to learn or update technological skills to keep up to date with advances in technology.

Blended learning originates from distance learning (Lim et al., 2014) and distance learning originates from what Morabito et al. (1999) describe as printed instruction, for example learners receiving books by post and studying at home rather than attending an HEI. Some HEIs, such as the Open University (OU) developed their distance learning programmes by introducing early technology in broadcasting systems alongside printed instruction. By 1990 approximately 2000 learners were using computer conferencing to learn with the OU (Open University, 2016). Web-based teleconferencing followed with educationalists and researchers discussing its affordances as far back as the early 1990s, for example McManus' paper entitled '*Special considerations for designing Internet based instruction*' was published in 1995.

Benefits of blended learning are the opportunities it provides teachers to combine human relationships between learners and teachers with current and emerging technologies, to produce a learner centred approach that enables collaborative inquiry. With the development of digital communications, Web 2.0 applications and the Internet have provided rich learning environments in HE (Laurillard, 2002). Learning in these rich collaborative environments can be termed in many different ways, for example: computer supported collaborative learning (CSCL) (McConnell, 2006); computer mediated communication (CMC) (Liu and Chang 2016) and computer supported cooperative learning (McConnell, 2000) and can be used synchronously (real time communication) or asynchronously (time lapse in communication), and all of these terms have been used in the literature within the last 12 months (Liu, and Chang, 2016; Goodyear et al., 2014). Within a blended learning model, CSCL is ideally placed to offer formal enhanced learning opportunities through collaborative inquiry and group discussions (Hutchings, 2002). HEIs are using social media to enable this collaborative inquiry and group discussion (EDUCAUSE Learning Initiative, 2007), for example educators are using blogging platforms to encourage discourse and shared projects between learners

(Pachler et al., 2012). The term social media defines a multiplicity of technologies that promote social aspects of connectivity through a channel of communication and is often linked to the term Web 2.0 (Dabbagh and Reo, 2011). Examples of social media include, Facebook, Twitter, Blogging, wikis, YouTube, LinkedIn and Apps that enable document sharing. Over 31 million people in the UK use Facebook (Social Media Today, 2014) and they are using such media for both informal and formal learning (Dabbagh and Kitsantis, 2011).

However, there are critics of using social media spaces for communication. Dreyfus (2002) argues that f2f communication is superior to online communication because cues and features that can be picked up in a f2f context are lost via, what he terms, CMC. Moreover, in his paper evaluating the public sphere via the internet Dahlberg (2001) proposes that there are key factors to be concerned about when communicating online: Government and corporate colonisation, where commercialisation and online surveillance of the internet threatens free speech over the internet; The quality of online communications cannot always be verified; The length of online postings can be restrictive, potentially losing detail of points made as well as the rapid exchange of posts in synchronous (real time communication) communication can exclude some from keeping up; Commitment to discourse, people can easily opt-out of online communication; Sincerity of information given such as identity deception; Equality and inclusion, where factors such as language differences or a lack of technological skills are exposed. Of course there have been improvements to manage some of these factors since these studies, such as the opportunity to see your fellow communicator, yet many of these factors are still common. There is potential for HEIs to use online communication between peers and teachers as an element of a wider collaborative approach to learning. The literature on blended learning reveals that it can be an effective and useful approach for teachers to create engaging TEL opportunities, CSCL and discourse but such opportunities need to be carefully managed.

In addition to the necessity for learners to participate in rich discussion and collaboration, Conole (2008) proposes that the object of what is being shared is more important than the relationship between the learners. Object-oriented sociality theory explains how effective social networks are not reliant on the relationships between the learners but on the value found in social objects, that is the real or virtual object that is of shared interest to the learners that encourages social interaction. This evidence suggests that possible implications in a blended learning environment could be that programme creators need to consider encouraging social networks built around social objects, that is subjects and activities that are of shared interest to the learners. This assertion by Conole (2008) reflects a less strict interpretation of what Wenger (2011) describes as a Community of Practice, by suggesting that only the object of shared interest is important.

Whilst the evidence from the literature would suggest that social media is ideally placed for both formal and informal learning opportunities, there are limitations to the extent in which it can contribute to effective pedagogy while being facilitated through a university's VLE. When technologies are accessed via a university's VLE, learners remain consumers of teacher creativity rather than a creator themselves. Although VLEs have developed and improved significantly to allow for the affordances of Web 2.0 and its associated technologies, applications and content will have been developed by institution experts or teachers, therefore learners are dependent on others' digital literacy skills and creativity, limiting the learning process. Additionally, learners remain part of a closed group when using social media via a university's VLE,

restricting the number of potential dynamic exchanges between learners. These limitations are in contrast to what Andrew's (2011) believes are the benefits of e-learning over f2f learning.

2.7 Digital Literacies

Learners who are digitally literate are more effective in their studies and more employable than learners who are not (JISC, 2012a). The term 'digital literacy' dates back to 1997 when Gilster (1997) described it as 'mastering ideas – not a keystroke' (p. 15). Developing this idea, Murray and Perez (2014) suggest that digital literacy is built on three accepted principles:

- skills and knowledge to access and use a variety of hardware devices and software applications;
- adeptness to understand and critically analyse digital content and applications;
- ability to create with digital technology (Media Awareness Network, 2010).

Using these principles as a foundation, the European Commission defines competencies related to digital literacy as the,

knowledge, skills, attitudes that are required to use ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment (Ferrari, 2013, p. 3).

Digital literacy is a key government concern and as such these competencies were converted into a framework which,

provides a reference of 40 competences as required and applied at the Information and Communication Technology (ICT) workplace, using a common language for competences, skills and capability levels that can be understood across Europe. As the first sector-specific implementation of the European Qualifications Framework (EQF), the e-CF was created for application by ICT service, user and supply companies, for managers and human resource (HR) departments, for education institutions and training bodies including higher education, for market watchers and policy makers, and other organisations in public and private sectors (The European e-Competence Framework (e-CF) 2014. p. 3).

In an HE context, the e-CF suggests competencies such as *addressing CPD (Continual Professional Development) needs of staff to meet organisational requirements* (p.32) which is a suggestion that is already accepted and understood by teaching staff to improve their own practice (Nicholls, 2014). A framework such as the e-CF can be a valuable tool for certain stakeholders to improve the use of ICT in their HEI for example, a Quality Improvement Team or other groups of leadership stakeholders responsible for staff training and not necessarily for teaching staff directly, although ultimately it would be beneficial to both teaching staff and learner. For example, the e-CF suggests to:

promote and market education and training provision and analyse feedback data and use it to drive continuous improvement of education and training delivery (p.32) which are suggestions that may not be directly achievable by teachers and lecturers in the first instance and without input from other stakeholders.

Frameworks that support educators with improving the learning experience for their learners can be useful however, constant research is required to ensure that ideas are up to date with current and emerging technologies and how they are used in the learning environment (Laurillard, 2006). UK based JISC funds projects to do just that and in the context of HE, they define digital literacy as,

the skill in using digital tools to undertake academic research; writing and critical thinking; as part of personal development planning; and as a way of showcasing achievements (JISC, 2013).

JISC's definition does not include communication or creation of content as elements of digital literacy. However, as part of the JISC LLiDA project, a review of digital literacies by Littlejohn et al (2012) found that institutions should consider the following when designing programmes for their learners; using, where appropriate, digital technologies in authentic programmes of study; assessment of academic and professional practice in digital environments; allowing academic and support staff the opportunity to explore ways to utilise digital technologies for scholarship and communication with and between learners; identifying learners existing knowledge and using it as a resource for learning. The same report also found that digital literacy support was being offered by a variety of stakeholders including: librarians; IT support staff; academic advisors; educational developers; outreach workers and careers advisors. With the amount of literature purporting the importance of digital literacy skills for learners, HEIs need to better understand the digital literacy of their learners (Beetham, 2010) and should implement inclusive digital literacy strategies (JISC, 2012b).

A briefing paper for JISC (2013) suggests that, although there is support available for learners for the use of personal devices, such as wifi within HEIs, learners feel less competent in their digital literacy skills for learning than they do for personal use. Today's learners may possess a variety of digital skills but these skills are not always transferrable in learning related practices. Beetham and Sharpe (2013) explain that digital literacy is the combination of 'digital knowhow' and academic practice and the current generation of university students have a higher and more varied level of digital knowhow than academic knowhow. The implications of this for this research are that blended learning programmes are ideally placed to be able to offer not only technological support to develop learner's digital knowhow but pedagogical support to develop learner's academic knowhow.

As well as considering learner's digital literacy skills, JISC (2013) suggests that a new trend is emerging where universities are utilising the digital knowhow of learners in the digital literacy development of their peers and university staff. JISC found evidence that some HEIs are engaging learners as mentors and pioneers who offer 'clinics' for support and sharing tips with peers and university staff and for the testing of new services or apps (Bournemouth University, 2016).

2.8 Emancipation and Power Relationships

According to Radford (2012), '*Knowledge construction should be carried out with freedom from authority*' (p.102). This idea is related to the concept of emancipation. However, in an educational context, allowing a learner the freedom to construct knowledge without authority can be problematic, particularly the relationship between freedom and truth. How can freedom be exerted and emancipation achieved if truth has been previously defined, for example by a teacher or an awarding body when specifying assessment criteria? In HE, educators attempt to guide their learners into becoming autonomous, not being taught but thinking and learning by themselves. To be taught by someone else, Piaget (1973) argued would be equivalent to relinquishing emancipation. This idea presents a problem for educators when a learner's constructions do not match the targeted knowledge. Teaching and learning activities often involve learners collaborating to socially constructed knowledge. To manage these types of situations, often the educator becomes a facilitator guiding the learning activity. However, if the learner is to be free and emancipated to construct their own

knowledge, the facilitator must ensure that they do not unintentionally impose their own meanings on the learner. These difficulties are best described by Brousseau (1997),

Everything that she [the teacher] undertakes in order to make the student produce the behaviors that she expects tends to deprive this student of the necessary conditions for the understanding and the learning of the target notion; if the teacher says what it is that she wants, she can no longer obtain it (p. 41).

If this is the case, when an educator demonstrates how to solve a problem to a learner, the learner cannot make it his or her own and therefore, learning has not occurred. Brousseau goes on to explain that learning occurs once the learner accepts the problem as if it was his or her own, works out how to produce the answer autonomously without the educator proposing the knowledge he or she wants to see produced. By becoming a facilitator only, the educator allows the learner the space for emancipation and autonomy to occur. So how does this idea of emancipation and autonomy sit within a blended learning programme, where there is a mix of face to face and technological elements, where much of the face to face interaction between learner and educator are in a lecturing context where the learner is 'taught' about a specific subject? Can there be an effective mix of emancipation and autonomy with a more traditional form of direct teaching?

A study on power relationships in higher education by Liao (2015) found that where lecturers added the academic title 'Dr.' or 'PhD' before or after their name, they conveyed that their qualifications and expertise gave them authority over their students. This practice creates an hierarchical structure in which there is a status difference between the learner and lecturer implying that '*students are subjects of rather than participants in the teaching program*' (p.18). Liao goes on to propose that where strict guidelines for unit outcomes and due dates for assignments are included in a programme, the educator's authority gives him or her the power over the learner, rather than sharing power. In addition, he suggests that the lecturer, not the learner, has control over the learning process and denies the learner of any decision making. Of course, where there are programme requirements and outcomes to be met to achieve a certain qualification, sharing the power between lecturer and learner is a challenge for HEIs. Providing opportunities for learners to share the power in some parts of a programme might be a solution. Learning activities, such as blogging, goes some way to address the unequal power relationships that can exist between lecturer and student, as they allow to some extent freedom for the learner to create their own content, but a lecturer's attitudes and decisions can significantly influence what and how something is learnt. Therefore, it is important for educators who wish to establish a more autonomous cohort of learners, to reflect and consider how they influence their student's learning process.

2.9 Chapter Summary

It can be seen from the literature that there is no shortage of research investigating how diverse groups interact with technology. Studies which include research on these groups go some way to explain the challenges that certain learners may face when using TEL within an HE environment. Fewer studies however, have considered learners that fall into more than one category, for example ethnic minority and older learners, and no study has investigated whether there are other characteristics that are identified by the learners themselves that may influence experiences of technology use (or non-use). E-learning pedagogy, which sets out effective strategies for online teaching and learning, seem to be either adapted from traditional pedagogical frameworks, are outdated in the context of emerging or disruptive technologies or are influenced by other forms of online learning such as distance learning. PLEs and blogging for informal and formal learning purposes appear to be two of the current and emerging technologies that have the potential to sustain

and engage learners on a blended learning programme as well as supporting the development of learners' digital literacy skills, although emancipation and the power relationships that can exist between educator and learner need to be carefully considered. There is a need for research that offers effective teaching and learning strategies in relation to experiences of digital inclusion and exclusion in blended learning programmes that considers current and emerging technologies to engage diverse learners. This research aims to fill this gap in the literature by meeting the objectives set out on in section 1.4. The following Chapter sets out the design of this research.

Chapter 3 Research Design

3.1 Chapter Introduction

This chapter will discuss the design of the research and will highlight the philosophical beliefs informing the choice of research methods (Denzin and Lincoln, 2000) and their appropriateness to this study. Having established that the research will adopt a critical realist philosophical approach, an acknowledgement of the role of the researcher (Day, 2012) will follow and a discussion on the data collection methods used, including the use of semi-structured interviews as the primary data collection method for Phases 1 and 2 will be critically justified. The chapter continues with an exploration of the data analysis methods and will critically justify the adopted method of thematic analysis which was used to analyse the primary data in Phases 1 and 2. A justification for rejecting a pre-validated questionnaire is included. The chapter concludes by discussing how the data was managed using an Nvivo database.

3.2 Research Paradigm

Philosophical worldviews are important because they inform theories and methodology. There is no one 'correct' view (Mahmood, 2005) and they differ for each researcher. A philosophical paradigm encompasses four concepts: axiology; epistemology; ontology and methodology (Denzin and Lincoln, 2000). Axiology concerns ethics and asks 'how will I be a moral person in the world?' Epistemology concerns how the researcher knows the world and asks 'what is the relationship between the researcher and what is known?' Ontology concerns the nature of reality and methodology concerns the means of gaining knowledge about the world.

One philosophical world view is positivism. According to Comte (1798 - 1857), the forefather of positivism, it is the view that the only authentic knowledge is scientific knowledge, and that scientific knowledge can only come from testing of theories through strict scientific methods such as experiments. In a positivist view of the world, science is regarded as the only way to uncover truth in order to predict and control phenomena and phenomena can always be observed and tested (Salmon, 1984). A positivist researcher is limited to data through an objective approach and findings are usually quantifiable, that is quantitative data are produced which is systematically collected via statistical or mathematical techniques such as surveys and experiments. A disadvantage of a positivist approach is in its application to the study of human participants where the complexity of human nature and the intangible nature of social phenomenon do not fit well with the order and predictability of the natural world (Cohen et al., 2005). A positivist philosophical approach would not allow for insight into in-depth issues which makes it an inappropriate approach for this research (Salmon, 1984).

Another world view that could be considered for this research is interpretivism. The interpretivist researcher perceives reality as intersubjective and based on the assumption that people cannot be separated from their knowledge. An interpretivist researcher will assume that reality is constructed through social interactions such as language and shared meanings. An interpretivist will often seek qualitative data to explore understanding. Qualitative research provides insights into a phenomenon by using data collection methods such as semi-structured interviews to illicit a participant's narrative (Denzin and Lincoln, 2005). A significant disadvantage of interpretivism relates to the subjective nature of the approach which can result in researcher bias and personal viewpoint data generated can lead to difficulties in generalising findings beyond that to which the study relates (Denzin and Lincoln, 2005).

The researcher believes that there is a reality independent of human thinking which is in contrast to interpretivism. Positivists also believe in a reality independent of human thinking however, they do not account for the possibility that the researcher is influenced by their cultural and life experiences and world views. This view leans towards a critical realist philosophical world view. In the social sciences, critical realism has been a prominent approach for the past thirty years (Miller and Tsang, 2011) and a key feature is that ontologically you believe in one real world that exists independent of human perception and construction, yet at the same time, epistemologically believe that the world can be interpreted in different ways by each of us (Frazer and Lacey, 1993). The forefather of critical realism, Bhaskar (1978) puts it another way,

“people do not create society. For it always pre-exists them and is a necessary condition for their activity. Rather society must be regarded as an ensemble of structures, practices and conventions which individuals reproduce and transform, but which would not exist unless they did so. Society does not exist independently of human activity (the error of reification). But it is not the product of it (the error of voluntarism,” (p.36).

According to Easton (2010) ‘The most fundamental aim of critical realism is explanation; answers to the question “what caused those events to happen?”’

As alluded to earlier, critical realism contrasts other paradigms in three noteworthy ways. Firstly, adopting a critical realist approach allows you to join ontological realistic assumptions with epistemological constructivist assumptions. Secondly, positivists argue that theoretical terms and concepts are logical constructions defined by observable data that can be used to make predictions and make no claim to reality (Salmon, 1984). In contrast, critical realists see theoretical terms as actual features of a real world (Devitt, 2005). This difference is significant to this research as participant’s meanings and understandings are central to the data analysis and although not directly observable are part of the real world, an assumption that would be rejected by a positivist. Thirdly, critical realists discard the idea of causality that is typical of recent empiricist successors to positivism (Murnane and Willett, 2010). This idea proposes that causality entails consistent patterns in the data and rejects that we can know about meanings that generate these patterns whereas critical realists maintain that meanings are central to understanding and explanation. This furthers a philosophical position that,

“there exists both an external world independent of human consciousness, and at the same time a dimension which includes our socially determined knowledge about reality,” (Danermark et al., 2002 p. 5).

Critics of critical realism, such as Denzin and Lincoln (2005) reject the key features of realism as weak and state that “we do not think that critical realism will keep the social science ship afloat” (p. 13). Others accuse it as not being able to account for the relationship between participant and object, (Oakes, 1970). Similarly, Smith and Deemer (2000) argue that joining ontological and epistemological assumptions is contradictory.

However, this research is concerned with participant’s experiences of digital inclusion and exclusion. It also seeks to identify if there is an association between learner characteristics and different aspects of digital inclusion and exclusion. Learner’s characteristics will be defined by the learners themselves and will be different for each participant as the primary method adopted will encourage rich, personal accounts. This does not support certain approaches such as positivism, which seeks generalizable, testable results which cannot be applied to the ‘messiness’ of real life human descriptions. Other paradigms, such as interpretivism, could be considered, however that philosophical stance does not account for the historical structures, such as

past experiences or the possible impacts of objective conditions like gender, age, ethnicity, geography, socio-economic status and educational background that can contribute to a participant's perceptions and accounts of reality. This favours a critical realist approach as the aim of the research is to gather participant's personal accounts of the use of technology in a blended learning environment.

3.2.1 The Role of the Researcher

Pertinent to meaningful research is acknowledgement of the role of the researcher (Day, 2012). Reflexivity requires the researcher to be aware of their effect on the research process on the basis that 'knowledge cannot be separated from the knower' (Steedman, 1991) and that results will be interpretations of the researcher. Moreover, how an educational researcher interprets data is influenced by their world view, their educational practice and themselves (Argyris and Schon, 1978). In the context of this research interpretive bias will be reduced by employing a number of techniques: firstly, member checking will be completed for Phases 1 and 2 and Step 1 of Phase 3 to check the researcher's interpretations of the data by the participants and secondly, a validation of the resulting preliminary conceptual framework will take place by different samples to that of Phases 1 and 2. The interpretations of this research will be grounded in the experiences of the researcher as a student who was enrolled on a blended learning programme and as a teacher who both uses and endorses blended learning approaches. Researcher perceptions will be acknowledged during data collection, by attempting a degree of open mindedness, in order to reduce the possibility of focusing on preferred data and disregarding unpreferred data. During the first two phases of this research, the participants own voices are used to specify characteristics that influence interaction with TEL therefore, careful execution of the data collection is required by using reliable recording equipment, systematic coding and thorough member checking processes. Importantly it is essential that the researcher remains objective during Phase 3 of the research when the validation stage of the research will commence. It is likely that not all participants will find the results useful so to prevent this reactivity, interaction with participants will be monitored.

3.3 Research Approach and Strategy

Having established the philosophical underpinnings of this research, the approach and strategy with which the research problem will be addressed will be discussed.

Methodology is the approach taken in research to identify a solution to a problem from a theoretical perspective using the collection and analysis of data (Remenyi et al., 2003). Saunders et al. (2009) presented a research methodology in the form of an 'onion' where layers, representing the different aspects to research, have to be 'peeled away' in order to penetrate the research problem in the centre. Each layer is important in determining the research methodology. Although different definitions and classifications of these terms exist, Saunders et al., (2009) identifies: research philosophy; approach; strategy choice; time horizon and techniques as the layers that needed to be peeled away. According to Saunders et al. (2009), a research approach can be inductive, deductive or a mixture of both. An inductive approach is exploratory and is informally said to be a 'bottom up' approach, whereas a deductive approach is concerned with testing hypotheses and is informally said to be a 'top down' approach (Research Methods Knowledge Base, 2015). Although having extensive experience of blended learning programmes as both a student and teacher, it was not the intention to approach the research with any assumptions about what data or findings would be produced, although it is recognised, as discussed in section 3.2.1, that it is impossible for a researcher to separate themselves from the research. To meet the first and second objectives addressed in Phases 1 and 2, it was necessary to elicit stories of participants in their own words which would suggest using a qualitative

approach. With this in mind, the first two phases of this research used an inductive approach to explore characteristics and experiences of participants using TEL in their own voice.

Qualitative research involves philosophical assumptions that guide the data collection and enables the researcher to gain a deeper understanding of participant's stories and explore the meaning of their experiences (Creswell and Plano Clark, 2007). Critical realists claim that the choice of data collection methods should be dictated by the nature of the research itself (Olsen and Morgan, 2004). The key, from a critical realist perspective is how the methods are used (Pratschke, 2003). The strength of qualitative methods, from a critical realist perspective, is that they are open-ended which allows themes to emerge that could not have been anticipated. Qualitative methods can uncover complex concepts that are unlikely to be exposed by predetermined response questions in a quantitative instrument.

However, the third phase of the research used a deductive approach, starting with analysed data to be validated by new samples. In order to elicit new sample's validations, they were required to share their thoughts about the findings to that point which would suggest continuing collecting qualitative data.

The research strategy can be defined as the 'general plan' (Bryman, 2008) of how the research will be conducted and should be selected based on the research objectives. Some of the most common research strategies used in educational research are: quasi-experimental research and surveys all of which are more commonly (but not exclusively) used for quantitative research, and ethnographic research; grounded theory research and case studies and are used most commonly (but not exclusively) for qualitative research (CPE, 2015). In determining the strategy for this research a case study was considered however, as this research is made up of different phases with different purposes a case study is not entirely accurate.

A case study can be defined as an,

“empirical inquiry that investigates a contemporary phenomenon within its real-life context, especially when the boundaries between phenomenon and context are not clearly evident” (Yin, 2003. p 13).

This research investigates a contemporary phenomenon within its real-life context but only during the first two phases and with two different samples. The boundaries of the unit of study were not clear. Participants were asked about their experiences of technology after a specific unit on their blended learning programme but their stories were not limited to experiences during this time. Participants provided stories of experiences that reached beyond this unit and this was considered of value by the researcher, to gain an insight into all experiences voiced by participants as these experiences could potentially have influenced the findings.

Dul and Hak (2008) elaborated on Yin (2003) definition and added another characteristic of a case study,

“a study in which (a) one case (single case study) or a small number of cases (comparative case study) in their real life context are selected and (b) scores obtained from these cases are analysed in a qualitative manner” (p 4).

The mix of samples and phases in the context of this research and the absence of a clear unit of study signifies that this research does not align with a case study strategy. It is recognised however, that a case study is the closest strategy in which to describe this research, for example an experimental and quasi-experimental strategy was not appropriate as the researcher had no control over the phenomenon being investigated. Moreover, an experimental research strategy is more commonly used to investigate cause-and-

effect relationships and often compares two (or more) groups: one as a control group (the participants who do not get the intervention) and one (or more) as an experimental group (the participants who do get the intervention). This strategy was not appropriate for this research as the experiences of all of the participants were of interest and no interventions were initiated. A survey strategy is more commonly used within positivist philosophical positioning (Collis and Hussey, 2009). As discussed in section 3.2, this research leaned towards a critical realist philosophical position and therefore a survey strategy was deemed unsuitable for this research. An ethnography strategy requires the researcher to be immersed into the context and setting of the phenomenon being investigated and become part of the participant group (Easterby-Smith et al., 2008). As the researcher was outside of the context in this research ethnography was unsuitable for this research. Grounded theory seeks to develop concepts that provide a theoretical explanation of phenomena (Corbin and Strauss, 1990) and is most commonly used when existing theories do not address the problem or population of interest. As this research did not attempt to develop a new theory from the data it was considered that grounded theory was not a suitable strategy to adopt. Although critics of a case study strategy would argue that a lack of accuracy, potential researcher bias and difficulties in generalisation (Yin, 2003) are common problems, a case study also allows for a comprehensive investigation of the phenomenon.

Given the critical realist philosophical nature of this thesis, research methods collected qualitative data using a 'cross-sectional time horizon' (Saunders et al., 2009) rather than repeating data collection with the same sample at different points of time. Semi-structured interviews were conducted to investigate the experiences of participants in relation to digital exclusion followed by a variety of data collection methods which collected qualitative data, using a number of samples over three years.

Table 9 illustrates how each phase of the research addressed the objectives and the relationship between each phase. Although each phase intended to address and build on one objective, it is recognised that some of the phases addressed more than one objective (indicated by the double arrows). The table also details how each phase influenced the next, the objective of that phase, the justification of each phase and the time frame of each phase.

Aim: The aim of this research is to develop a conceptual framework for effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes.			
Objective	Phase	Methods/analysis/development	Justification of phase
1. To explore the characteristics of learners and analyse their influence on digital exclusion and inclusion.	1	<ul style="list-style-type: none"> *Phase 1 (Oct 12-Jan14) *Qualitative interviews. *Thematic analysis. *Analysis informed qualitative methodology for Phase 2. *Secondary data collection (Literature review) 	<p>Exploratory phase. To gain first hand personal accounts of characteristics of learners in their own words. To record their stories of experiences with technology. Quantitative methods would not provide this opportunity.</p> <p>Themes which emerge will be investigated further in next phase.</p>
2. To investigate the usefulness of current and emerging technologies for pedagogy with a diversity of learners.	2	<ul style="list-style-type: none"> *Phase 2 (Feb 14-Jul 14) *Qualitative interviews. *Thematic analysis. *Analysis informs survey instrument for Phase 3. *Secondary data collection (Literature review) 	<p>To gain first hand personal accounts of characteristics of learners in their own words with a new sample but selected from a different cohort following the same unit at a later date which provides some control for limiting variables. To record their stories of experiences with technology.</p> <p>To investigate in more depth themes which emerge from Phase 1.</p> <p>To investigate the usefulness of current and emerging technologies for pedagogy from a learners' perspective.</p> <p>To create initial recommendations based on data from learners, for strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes. Quantitative methods would not provide this opportunity.</p>
3. To examine what learners need to be effectively engaged with a blended learning programme.	3	<ul style="list-style-type: none"> *Phase 3 Step 1 (Sep 14 – Dec 14) *Qualitative online survey *Secondary data collection (Current literature) Step 2 (Jan 15-Feb 15) *Instant reaction mobile interviews * Directed content analysis *Secondary data collection (Current literature) Step 3 (Jan 15-Feb 15) *Focus group *Directed content analysis *Secondary data collection (Current literature) Step 4 (Apr 15-May 15) *Teacher semi-structured interviews *Directed content analysis *Secondary data collection (Literature review) 	<p>Step 1. To revisit participants from Phase 2 in order to member check the researcher's interpretations and validate the findings.</p> <p>Step 2. To validate the proposed and recommended framework (from analysis of Step 1). To seek transferability with a wider sample.</p> <p>Step 3. To validate the proposed and recommended framework (from analysis of Step 1). To seek transferability with a wider sample.</p> <p>Step 4. To appraise framework with teachers/programme designers.</p>
4. To incorporate the findings into a conceptual framework for sustaining engagement with blended learning programmes	4	<ul style="list-style-type: none"> *Phase 4 (May 15-June 15) *Secondary data collection (Literature review) 	

Table 9. Research plan and the relationship between the objectives and phases.

By combining a sequential mixture of qualitative methods, the illustration below demonstrates how through the four phases of the research a conceptual framework was created.

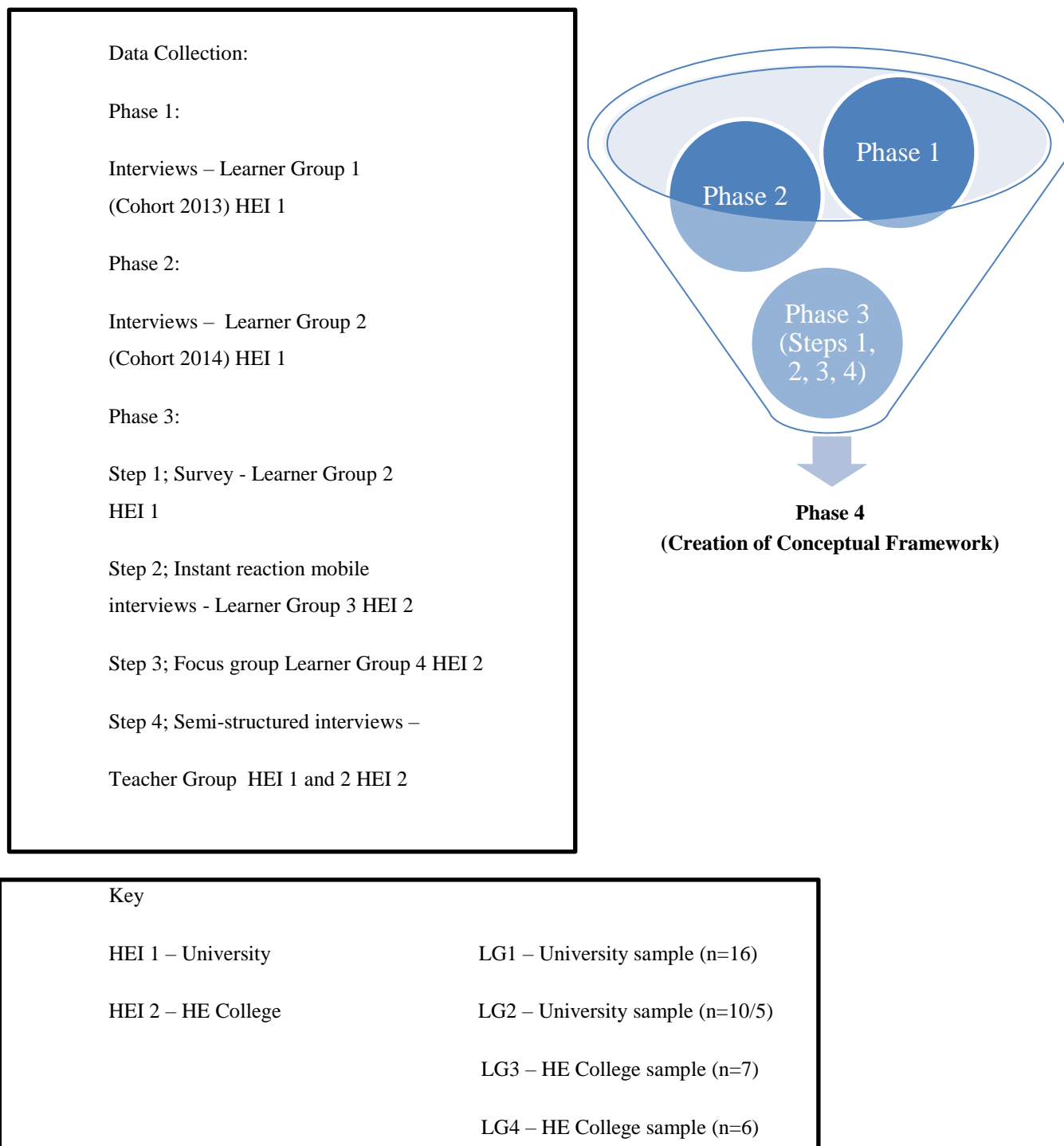


Figure 1. Research design

3.3.1 Sampling

The sampling strategy for each phase will be discussed in the individual chapters dealing with that phase.

3.3.2 Semi-structured Interviews – Phases 1, 2 and 3 (Step 4)

Semi-structured interviews were conducted in Phases 1 and 2 to collect qualitative data of participant's experiences of digital exclusion as well as their characteristics in their own voice. Phase 2 also collected data to explore themes that emerged in Phase 1 in more depth and to investigate the usefulness of 'current' technologies for pedagogy with a diversity of learners. Semi-structured interviews encourage rich descriptions from participants. Semi-structured interviews will allow descriptive data to be generated (Westby et al. 2003), that other methods, such as questionnaires cannot. Questionnaires go some way to exposing aspects of digital inclusion and exclusion but would not allow full participant stories and the opportunity to delve into responses as and when presented. Additionally, interviews will allow the participants to identify their characteristics in their own words. Semi-structured interviews will allow for understanding of 'why' and 'how' the participant feels the way they do about the technology they are using in their studies. It will not only reduce any potential researcher bias but also encourage the participant's voice to come through (Denzin and Lincoln, 2000).

The social world has an external and historical reality and influences the way we act and the way we perceive objects, (Elder-Vass, 2010). Critical realists use semi-structured interviews to not only investigate the interpretations of their participants but to explore the structures that influence those interpretations. Ackroyd, (2009) stresses critical realist interviewing is most valuable when it is used as part of a triangulation process. Bryman and Bell (2003) defines triangulation as 'using more than one method or source of data in the study of a social phenomena' (p.291) and is usually applied for three main reasons: confirmation, completeness and retrodution, which is the notion of observing patterns or regularities at all angles to discover what produces them (Risjord et al., 2001).

Although semi-structured interviews are considered to be the most appropriate method of data collection for Phases 1 and 2 and Step 4 of Phase 3 of this research, it is important to point out their limitations. The researcher needs to be aware that participants can tell them what they think they want to hear (Miles and Huberman, 1994). Likewise, the researcher can bias the interview by asking leading questions or using their voice or body language to manipulate the interview. For this research, the collection of memos will be documented during and after each interview and reflexivity and positionality will be considered and documented in a reflective account.

A mixture of f2f, Skype and telephone semi-structured interviews were conducted in Phases 1 and 2 and Step 4 of Phase 3.

F2f interviews are a popular method used by researchers to gather qualitative information. The advantages of being f2f with the interviewee allows the interviewer to pick up on social cues, for example body language and behaviour and an effective interview ambience can be generated by the interviewer encouraging a rapport to be built, which can put the interviewee at ease. This is important especially if personal information is being shared which can be difficult in f2f situations, (Mann and Stewart, 2000). On the other hand, visibility of the interviewer can lead to the interviewee being guided to answer in a certain way by unintentional interviewer behaviour, (Opdenakker, 2006). Additionally, Wengraf (2001) warns of the need

for 'double attention' which requires the interviewer to interact with the participant by posing counter-questions to their answers at the same time as keeping focused on the interview schedule.

Telephone interviews offer the same immediate response that f2f interviews offer with the added benefit of being able to reach a wider population, geographically and difficult to reach populations, such as interviewees less able to meet up and interviewees in limited access settings. There are few costs involved with telephone interviews and the interviewee has a degree of anonymity, as the interviewer will only speak to the interviewee and may never meet them. This factor might encourage the interviewee to be more open about their answers, (Morton-Williams, 1993). This point was reinforced by Chapple (1999) who conducted a study of women's health. She reported that although there were some disadvantages, due to the personal nature of the information shared, respondents reported preference for being interviewed over the phone. Although not a factor to consider in this research, a significant disadvantage of the telephone interview is the inability for the interviewer to judge the social context in which the interview is taking place, (Gordon, 1997). Contextual data, especially in ethnographic studies is vital however, like this research not all studies require participant observation. This is backed up by Burnard (1994) who points out that data do not always enrich the interpretation or comprehension of words. Therefore, loss of contextual data may not always weaken the quality of qualitative research. Additionally, the inability to see the interviewee's cues may make it difficult to know when they have finished answering which could result in interruptions. Not being able to control the environment in which the interview is set is a down side due to possible distractions and noise, (Novick, 2008).

Skype interviews in many ways offer a 'best of both worlds' option to f2f and telephone interviews. This is particularly so for studies where the research topic itself relates to online contexts, for example e-learning, (Kazmer and Xie, 2008). It offers the cost effective means to connect with a wider population but still gives the affordance of visible cues and some social context. Video conferencing software allows the interviewee and interviewer the option to see each other or choose non visual communication by turning the webcam off or choosing telephone to video modes. In full screen mode, emulation of a f2f interview providing visual cues will be somewhat accomplished, (King and Horrocks, 2010) thus responding to some of the common biases held in qualitative research regarding telephone interviews, (Novik, 2008). A specific disadvantage of using Skype that f2f and telephone interviews do not retain is the possibility of a time lapse. This could result in a break in the flow of the interview, (Booth, 2008). Using video conferencing also relies on computer dependability and a certain degree of IT skill requirement.

3.3.3 Questionnaire Survey- Phase 3 (Step 1)

There were two purposes to Step 1: first to member check the researcher's interpretations and second to validate the findings at that point. Key points interpreted from the data by the researcher were sent in an email along with a link to an online questionnaire survey in order for the participants to validate the findings. Surveys can be given out and collected f2f, sent by post or sent electronically. Data collected can describe variables in terms of distribution such as: frequency; central tendency or measures but in the context of this research was not used by the researcher to collect statistical data rather to give the participants the opportunity to validate the findings. McLafferty (2003, p. 79) offers some tips when designing a questionnaire survey:

- Keep it simple
- Define terms clearly
- Use the simplest possible wording
- Avoid long complex questions
- Avoid two or more questions in one
- Avoid jargon
- Avoid bias or emotionally charged terms
- Avoid negative words like ‘not’ or ‘none’.

Using a Likert (1932) scale can help the researcher find out participant’s opinions. A Likert scale offers a range of responses that participants can choose from, typically with two extreme opposing choices at each end of the scale (Robinson et al. 1991). 3, 5 and 7 are a common number of responses used in research (McLafferty, 2003). However, using a Likert type scale in this research was to give the participants an opportunity to think about the findings before making any validations therefore, this part of the survey was not analysed so no inferential statistics were made (Cohen et al., 2005).

3.3.4 Instant Reaction Mobile Interviews – Phase 3 (Step 2)

Instant reaction mobile interviews are conducted as the researcher and participant are on the move. This type of interview can be both conversational and less structured than a fixed location one to one interview or structured where rated answers can be given and there is no deviation in the interview schedule. This research sought to gather qualitative data so although the instant reaction mobile interviews were structured, participant narratives were gathered. Structured interviews are asked in a set order with no deviation from the interview schedule. Strengths of a structured interview are that they are easy to replicate and can be less time consuming however, their inflexibility would not be suitable to gather data where a researcher wants to explore the meaning behind a participant’s story (Britten, 1995).

An instant reaction mobile interview takes advantage of the spontaneous situation as the participant does not have as much time to consider their responses compared to an interview where both participant and interviewer are seated in a formal context (Brown and Durrheim, 2009). In the context of this research, participants were asked to validate a preliminary conceptual framework immediately after they had experienced using technology on a blended learning programme.

Instant reaction mobile interviews can also be referred to as ‘mobile interviews’ (Clark, 2008), ‘walking interviews’ (Edwards and Holland, 2013) and ‘go along interviews’ (Garcia et.al, 2012) and are often used in ethnographic studies. In ethnography, instant reaction mobile interviews gather contextualised perspectives by using participants as a navigational guide around their real or virtual world. In this research, instant reaction mobile interviews were conducted to gather participant’s views on a preliminary framework that could encourage and/or sustain engagement with technology on a blended learning programme immediately after the participants had been engaged (to some extent) in a blended learning programme.

Instant reaction mobile interviews is a method used when an immediate response is required about phenomena, asked within the context of those phenomena. By situating experiences and stories within their special context can encourage participants to articulate their thoughts. Additionally, the location being

walked through, in the case of this research the HEI, can provoke more discussion that may not take place in a traditional room based setting (Emmel and Clark, 2009). On a practical level, instant reaction mobile interviews do not take up as much time as a traditional one to one room based interview so participants are more likely to agree to be interviewed. The interview can fit in with the participant's everyday life. Limitations of instant reaction mobile interviews are that ethical considerations are raised during the interview if the participant or researcher are approached or over heard by a third party and this is discussed in section 4.4.3. On a practical level, recording the interview or making notes may become more difficult. Sensitive subjects may not be easy to investigate using this method as the participant could be anxious about being over heard and this could influence the data.

3.3.5 Focus Group – Phase 3 (Step 3)

To enrich the data with a different collection method, a focus group was initiated. Focus group interviews allow the researcher to hear from a number of participants at the same time, increasing sample size and breadth of perspective. In focus group interviews, structured and semi-structured questions are asked to encourage participants to talk with each other. It allows participants to discuss the questions and to agree or disagree with other participant's viewpoints. There is also the opportunity for the researcher to gauge to what extent others agree or disagree by the participant's reactions to the discussion. For example, nods or smiles can indicate agreement (Robertson, 2006). Participants viewpoints can change during a focus group interview as others opinions are considered (Marshall and Rossman, 2014). Focus groups are often more cost effective than one-on-one interviews, permitting the researcher to hear from many individuals almost simultaneously. However, focus groups are not appropriate for all research aims. Some participants may not feel able to participate if they are shy or intimidated. Or there may be some participants that are dominant who may influence the discussion.

Focus groups can also allow the researcher to tap into different forms of communication that participants use in everyday interaction, for example anecdotes or jokes. According to Kitzinger (1995) having access to this type of communication is useful as participant's experiences and attitudes are not always captured in reasoned responses to questions. Having access to such interpersonal communication is also important because it can highlight cultural values and differences. Through analysing this type of communication the researcher can identify shared experiences which make it an effective method that is sensitive to cultural variables. Cultural variables such as age, gender, authority, food and venues should be considered when planning a focus group interview (Edmonds, 1999). Where a focus group has participants from different cultures, effective communication within the group is achieved by understanding and respecting the differences between cultures (Carey and Asbury, 2016). A good focus group facilitator will observe how different cultures share information as well as any unique communication characteristics that individual cultures may display (Bauman and Sherzer, 1989). However, the downside of such group dynamics is that the articulation of group norms may silence less dominant participants. Some ethnicities can be influenced or restricted in speaking openly in the presence of other participants (Knodel, 1995) for example, a focus group study by Knodel (1995) split participants from the Philippines and Taiwan into two separate gender groups. This was because the researcher suspected the discussion would be dominated by male participants had the genders been mixed in the same focus group.

3.4 Justification for Rejecting a Pre-validated Questionnaire

The previous chapter highlighted a number of criticisms relating to the use of learning styles to categorise learners and the reliability of learning styles questionnaires (Spoon and Schell, 1998, Stahl, 2002, Claxton, 2009). It is for these reasons that a validated research implement, such as Honey and Mumford's Learning Styles Questionnaire (1982) was not used in this research to investigate characteristics of participants.

Additionally, the first two phases of the research consist of two primary questions only (Appendix 2.). The first to establish the characteristics of the participants in their own voice and the second to investigate their experiences of using technology on their blended learning programme.

3.5 Research Methods for Data Analysis

3.5.1 Thematic Analysis – Phases 1 and 2

Qualitative data analysis methods are driven by an epistemology that is reflective and centres on researcher's interpretation of human experience from the perspective of those concerned (Denzin and Lincoln, 2000). A thematic analysis method was adopted to analyse the data from the semi-structured interviews conducted in this research. At a rudimentary level, thematic analysis is a method for recognising, analysing, and reporting patterns within data. There is some debate surrounding thematic analysis concerning whether it is a data analysis method in its own right (Braun and Clarke, 2006) or whether it is a set of skills to use for qualitative analysis (Boyatzis, 1998) or a process as part of other major data analytical techniques (Ryan and Bernard, 2000). Thematic analysis is favoured for a critical realist approach (Roulston, 2001) although its flexibility allows it to be utilised across many epistemological and theoretical stances. Its flexibility is its main advantage, not being confined to strict guidelines as is such with some analytical processes: such as grounded theory (Glaser, 1992) and discourse analysis (Burman and Parker, 1993, Willig, 2003). The process of thematic analysis starts with recognising and identifying themes across the data set. Again, the flexibility of thematic analysis allows the researcher to do this in a number of different ways. For this research, frequency determined what constituted a theme. In other words, how many participants articulated a theme and how often.

Themes in thematic analysis can be identified in two different ways: inductively or deductively. As this research sought to create a conceptual framework and not test a theory, the themes were first identified inductively (Patton, 1990). A semantic level of analysis was the most relevant for this research. The data was coded and reorganised to expose themes and then interpreted in an attempt to theorise their relevance against the research objectives that drive this research (Braun and Clarke, 2006). Thematic analysis can be conducted within different philosophical paradigms moreover, within a critical realist approach it can be used effectively to theorise experience, motivations and meanings because a relationship is believed to exist between experience, meaning and the language used to communicate it (Widdicombe and Wooffitt, 1995).

Braun and Clarke's (2006) hierarchy for qualitative data analysis has been adapted for the thematic analytical process using Nvivo software by Nvivo (2014).

Analytical Process (Braun & Clarke, 2006).	Braun and Clarke Practical Application in NVivo	Objective	Iterative process throughout analysis
1. <u>Familiarizing yourself with the data</u>	Transcribing data (if necessary), reading and re-reading the data, noting down initial ideas. Import data into the NVivo data management tool	Explanatory Accounts <i>(Extrapolating deeper meaning, drafting summary statements and analytical memos through NVIVO)</i> ↑ Descriptive Accounts <i>(Reordering, 'coding on' and annotating through NVIVO)</i> ↑ Data Management <i>(Open and hierarchal coding through NVIVO)</i>	Assigning data to refine concepts to portray meaning
2. <u>Generating initial codes:</u>	Step 1 – Open Coding- Coding interesting features of the data in a systematic fashion across the entire data set, collecting data relevant to each code		Refining and distilling more abstract concepts
3. <u>Searching for themes:</u>	Step 2 - Categorisation of Codes – Collating codes into potential themes, gathering all data relevant to each potential theme		Assigning data to themes/concepts to portray meaning
4. <u>Reviewing themes:</u>	Step 3 – Coding on - Checking if the themes work in relation to the coded extracts (level 1) and the entire data set (level 2), generating a thematic 'map' of the analysis		Assigning meaning
5. <u>Defining and naming themes:</u>	Step 4 – Documentation (summary statements) Step 5 - Data Reduction - On-going analysis to refine the specifics of each theme, and the overall story [storylines] the analysis tells, generating clear definitions and names for each theme		Generating themes and concepts
6. <u>Producing the report .</u> Step 7 – <u>Testing and – Validating.</u> Step 8 <u>Synthesising Analytical Memos.</u>	Step 6 –Generating Analytical Memos - Step 7 – Testing and - Validating and Step 8 Synthesising Analytical Memos. The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back the analysis to the research aim, objectives and literature, producing a scholarly report of the analysis		

Table 10. Adapted from Nvivo (2014) (in Braun and Clarke, 2006) - eight steps of analysis.

3.5.2 Directed Content Analysis – Phase 3

Content analysis was used to analyse the data gathered in Phase 3 rather than thematic analysis which was used to analyse the data in Phases 1 and 2. This was because thematic analysis allows for more interpretation of the data which was appropriate in the beginning phases of this research whereas Phase 3 data were validations of more structured questions. Content analysis is defined by Hsieh and Shannon (2005) as,

“a research method for the subjectivist interpretation of text and data through the systematic classification process of coding and identifying themes or patterns,” (p.1278).

Content analysis is a flexible method for analysing text data (Cavanagh, 1997) and a unique characteristic is its ability to analyse data both inductively and deductively. Three separate approaches can be used: conventional; summative and directed. In conventional content analysis, codes emerge directly from text data. With summative content analysis, key words or content is counted or compared before interpreting the underlying meanings (Weber, 1990). With a directed content approach, analysis begins with relevant research findings or a theory as guidance for emerging codes. Because of this, a directed content analysis approach

was used to analyse the data in Phase 3 (Step 3, 4), over thematic analysis, as findings already exist from Phases 1 and 2. Content analysis focuses on the characteristics of language and the contextual meaning of the text (Budd et al., 1967, Tesch, 1990) and can be used to analyse data obtained from interviews, open-ended surveys, focus groups, observations and media print (Kondracki and Wellman, 2002). The goal of content analysis is “to provide knowledge and understanding of the phenomenon under study” (Downe-Wamboldt, 1992, p. 314).

When prior research already exists about a phenomenon that is incomplete, as in the validation phase of this research, directed content analysis can be used to validate or extend a theoretical framework. Existing research can provide propositions, consequently helping to determine the initial coding scheme (Mayring, 2000). Using prior research, you begin by identifying pre-determined codes (Potter and Levine-Donnerstein, 1999). In this research, each code was pre-determined by the elements of the strategy, for example each element represented one code and participant’s data was gathered to populate each code. The code was analysed to give accurate representations of the participant’s validations of each element of the strategy. The prior research conducted steered the findings. The directed content analysis was expected to either challenge, support or further enrich the theory or phenomenon being studied.

The directed approach to content analysis does raise some criticisms. Firstly, using prior research means the researcher will have an informed view of the phenomenon which could result in bias towards the findings therefore, it may be more likely to find evidence that supports a theory or phenomenon. Secondly, during the data collection stage, participants might get cues to answer the interview questions in a way to please the interviewer. To respond to this issue, an audit trail can be used to achieve unbiased results (Hsieh and Shannon, 2005) and for this research, this was achieved by using Nvivo to manage the data collection and analysis processes.

3.6 Data Management and Quality Criteria

The data analysis process was managed using QSR™ Nvivo software. Using Nvivo simplified the data management process and cross examination of the data as there were a number of advantages over traditional paper based methods of management (Nvivo, 2014). As an example, participant transcripts can be imported and synchronised into the Nvivo project from your computer, smart phone, tablet or Evernote. Not only will using a data base simplify the data management process it will also leave an extensive audit trail, one of the ways in which the researcher sought dependability (Miles and Huberman, 1994).

To ensure a level of trustworthiness and quality to the qualitative elements of the research, the researcher used a triangulation of methods as suggested by Guba and Lincon (1989, 1994) as well as the *Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist* adapted from Tong et al., (2007) and an example is given in Appendix 3. Adopting a critical realist position, Miles and Huberman (1994) recommended five criteria that attempt to address quality in qualitative research:

Objectivity;

The research is an iterative and reflexive (Guba and Lincoln, 1994) process. After each interview, reflection took place and an account was written on the interviewer’s execution of the questions, the feelings derived from the participant’s answers and how this might have affected subsequent questioning or interpretation of

data. In addition to the reflective account, notes were made during the interview alongside specific comments about what the text might mean or how it might relate to other subject matter. Crabtree and Miller (1999b, p.142-143) advise that a good qualitative researcher should, 'know yourself, your biases and preconceptions'. With this in mind, positionality will be considered.

Dependability;

The data analysis process was managed using Nvivo. The advantage of using this database was that it left an extensive audit trail. Photographs were taken of the manual processes involved, such as sorting the characteristics in each theme.

Authenticity;

After analysis of the interviews in Phases 1 and 2 was complete, member checking took place in order for the participants to check the researcher interpretations that were made. A summary of the main points of each interview was sent to the individual interviewees to check that it accurately represented what had been disclosed. Member checking is a common technique used by qualitative researchers to increase trustworthiness (Doyle, 2007) and credibility (Lincoln and Guba, 1985) in their studies however, caution should be observed to ensure that the participant is not made to feel embarrassed or disappointed by presenting them with excerpts of what they shared with you (Carlson, 2010). Participants can be given full transcripts or just small pieces of their interview to check although Creswell (2009) prefers to present interpretations of the interview such as patterns or themes that have emerged.

The summaries of the research were sent to all of participating learner groups by email and they were asked to inform the researcher if they did not correctly represent the content of the interview. In Learner Group 1, all 16 interviewees were sent summaries, 8 responded and were happy with the summaries, the other 8 did not respond. None of the interviewees expressed inaccuracies in the summaries. One participant expressed a change in circumstances of now being in possession of an iPad which was not the case at the time of the interview. After an inspection of this participant's interview transcript, it was of the researcher's opinion that this new information did not impact on the findings. None of the participants from Learner Groups 2 or 4 reported any misrepresentations.

Transferability;

The samples interviewed for this research, although small, were considered diverse (section 4.3). Phase 3 also addressed transferability and authenticity to some extent (Guba and Lincoln, 1994) by extending the study to learners at another HEI. The samples used at HEI 2 were studying at the same undergraduate level as Learner Groups 1 and 2 and although were studying different subjects, they were social science based subjects which to some extent are comparable.

Application;

Each phase of the research built on the previous phase extending understanding of the problem area.

3.7 Chapter Summary

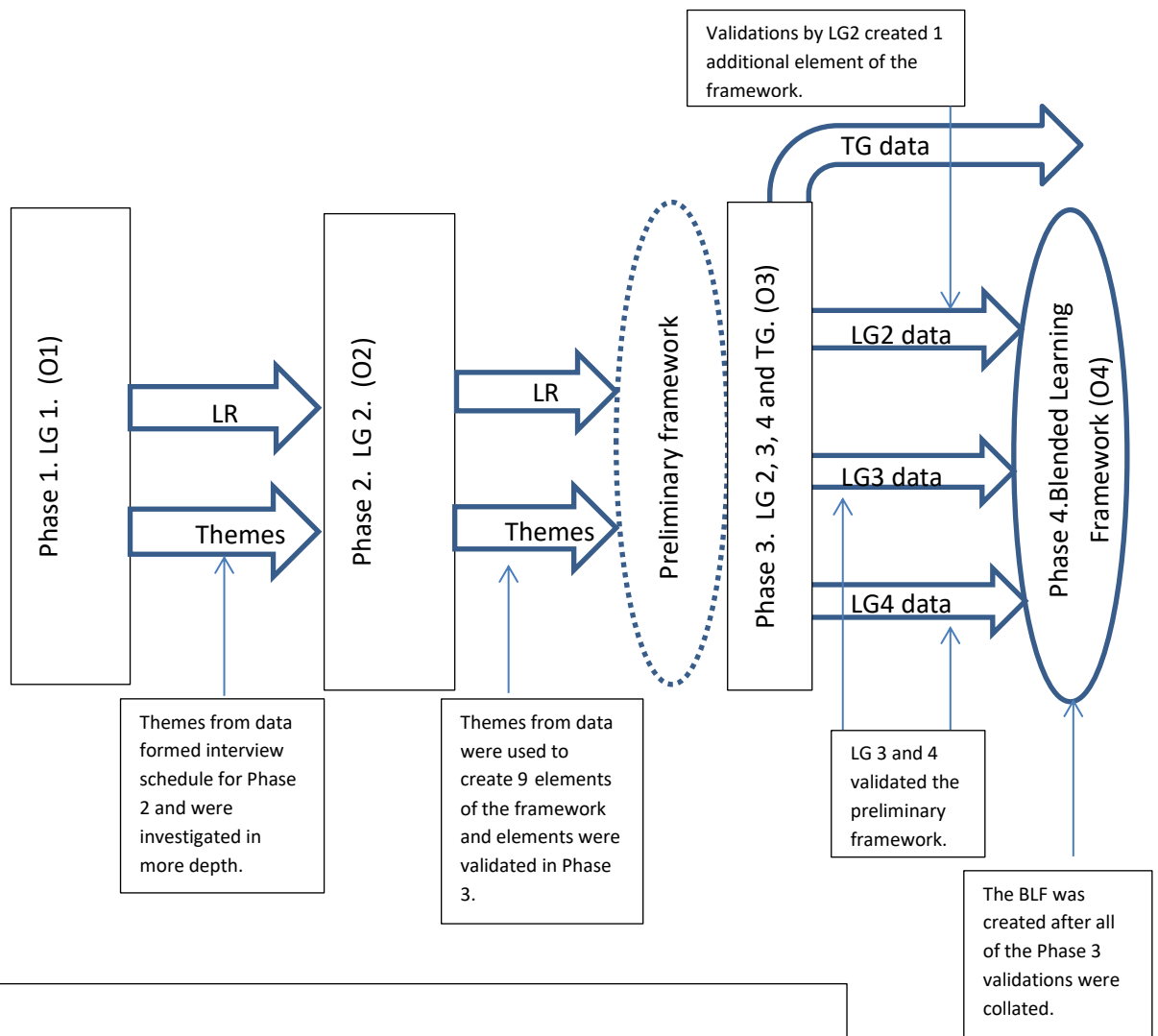
This chapter discussed how the critical realism philosophical approach informed the choice of data collection methods used for this research. Semi-structured interviews were justified as the primary data collection method and a range of other data collection methods were discussed, including questionnaire surveys and focus groups as validation approaches in the third phase of this research. The final part of the chapter explored and critically justified Thematic Analysis as the primary data analysis method used in this research. Directed Content Analysis was also discussed as the other method to analyse the data in the validation phase of this research. The next chapter will discuss the implementation of this design.

Chapter 4 Research Implementation

4.1 Chapter Introduction

This chapter sets out implementation of the research design. The chapter begins by setting out the samples and settings (Denzin and Lincoln, 2005) used in each phase and the ethical considerations involved with collecting data from each sample. The chapter then discusses the data collection, analysis and findings, addressing each phase in turn. Semi-structured interviews were used to obtain stories of experiences of digital inclusion and exclusion from participants in their own voice. These experiences were analysed and then validated by new samples by using a range of qualitative data collection methods, including structured and instant reaction mobile interviews, a focus group and semi-structured interviews. The chapter concludes by illustrating the findings by mapping themes that had emerged from the first three phases against the conclusions made, including participant extracts and vignettes to elucidate the findings.

Figure 2 illustrates how the data from each phase informed the subsequent phase and how the elements of the conceptual framework were created.



Key

LG1 – Learner Group 1. (University). Semi-structured interviews.

LG2 – Learner Group 2. (University). Semi-structured interviews.

LG3 – Learner Group 3. (HE College). Instant reaction mobile interviews.

LG4 – Learner Group 4. (HE College). Focus group.

TG – Teacher Group. (University and HE College).

SS Interviews – Semi-structured interviews.

LR – Literature review.

O – Objective.

BLF – Blended Learning Framework.

Figure 2. Data collection.

4.2 Pilot Study

A pilot study was conducted prior to Phase 1. It took the form of semi structured interviews with learners from external universities on blended learning programmes. This allowed the testing of planned interview techniques (Kvale, 1996), verification of the interview schedule and an opportunity to make any necessary changes to the questions. It also sought to test the equipment to be used. In this instance the equipment consisted of voice recording software on a tablet computer which allowed the transfer of audio files to a computer for analysis and storage. A back-up mobile phone with voice recording was also used. Transcribing software, specifically Dragon Naturally Speaking, was tested for efficiency and accuracy. Some changes were made as a result of the pilot study. The interview schedule recording form was re-formatted to make it easier to make notes of participant's answers. Also, the questions were re-ordered to allow the participants to disclose their characteristics and to share their experiences first before answering any demographic questions that could influence them.

4.3 Research Samples and Settings

Two higher education institutions were selected for this research (Fig. 1 p.58).

The first higher education institution is a university in the south of England (from here onwards this setting will also be referred to as HEI 1). HEI 1 has two campuses which are located in different parts of the conurbation. The school where the research was conducted is one of seven schools within HEI 1 and teach a range of subjects at undergraduate and postgraduate levels. Most of the programmes are modelled on a blended learning approach taking advantage of HEI 1's VLE. The school was initially chosen as it has a high number of mature learners enrolled, compared to other schools within HEI 1 with a number of learners re-training therefore seeing a diverse mix of learners. Learner data was sought from the Senior Programmes Officer for the school to check the diversity, for example the ages range from 18 to 51+. This setting was used as it was convenient for the researcher, being enrolled at the same HEI.

The second is a higher education institution in the centre of a city in the south of England: one of two campuses that offers higher and further education provision (from here onwards, this setting will also be referred to as HEI 2). This research takes place within the higher education campus of HEI 2 which offers a range of undergraduate and teacher training programmes. This HE department was chosen because of the similarity in the blended learning approaches used to the HEI 1. As with HEI 1, being a higher education department and the nature of programmes on offer, there were a high number of mature learners with a range of professional backgrounds compared to other departments within HEI 2, therefore seeing a diverse mix of learners. Most of the programmes are modelled on a blended learning approach taking advantage of HEI 2's VLE. This setting was used to enrich the data collection process by using samples from a different setting to those in the first two phases. HEI 2 was used as the researcher had previous knowledge of the types of blended learning programmes initiated and these were similar to the ones used by the participants in Phases 1 and 2. The researcher had convenient access to HEI 2, having been a teacher in the same department. It is recognised that this relationship between the researcher and HEI 2 could raise ethical and power issues and this is addressed in section 4.4.3.

4.3.1 Phase 1 Sample – Learner Group 1 – HEI 1(Semi-structured Interviews) n=16

The sample strategy for Phase 1 started with a purposive sample, (Patton, 2002). Second year learners were selected who were enrolled on 3 year, full time programmes (BSc, BA and Dip HE) within HEI 1 and will be referred to as Learner Group 1. This sample was chosen for three reasons: firstly, there was convenient access to the sample, being part of the HEI within which the researcher is based; secondly, it was anticipated that the school would include a diverse range of learners; and thirdly, this cohort had just completed a unit that makes extensive use of blended learning. A sample of 16 participants was interviewed in total. Table 11 illustrates participant profiles. Analysis was conducted throughout the interview stage. By the 13th interview, with learners from the first cohort of the unit, it was apparent that a saturation point had been reached (Seidman, 2013) and no new categories had emerged. To enrich the sample and check that no new categories could be exposed, a further three interviews were conducted with learners from the second cohort for the unit. The participants were interviewed after a specific unit during their programme which makes use of a blended learning model.

Date	Gender	Age	Mode	Ethnicity	SEN/SpLD	Disabilities	Married	Dependants	Employed
22.4.13	M	23	T	European	N	N	Single	N	N
10.5.13	F	20	F2F	European	N	N	Single	N	N
10.5.13	F	30	T	European	N	N	Single	N	P/T
14.5.13	F	20	T	European	N	N	Partner	N	N
14.5.13	F	31	T	European	N	N	Partner	N	P/T
15.5.13	F	30	T	European	Y	N	Single	N	F/T
17.5.13	F	28	F2F	Non-European	N	N	Partner	N	P/T
22.5.13	F	34	T	European	N	N	Single	N	P/T
22.5.13	F	22	T	Non-European	N	Y	Single	N	P/T
22.5.13	F	30	T	European	N	N	Single	N	P/T
22.5.13	M	33	T	European	Y	N	Single	N	P/T
25.5.13	F	22	F2F	European	N	N	Single	N	N
3.6.13	F	20	T	Non-European	N	Y	Single	-	-
23.7.13	F	20	T	European	N	N	Single	N	N
23.7.13	F	20	Sk	European	N	N	Single	N	P/T
1.8.13	F	49	T	Non-European	Y	N	Partner	Y	P/T

Key

F Female F2F Face to face Sk Skype Y Yes P/T Part time SEN Special Educational Needs
M Male T telephone N No SpLD Specific Learning Difficulties

Table 11. Learner Group 1.

4.3.2 Phase 2 Sample – Learner Group 2 – HEI 1 (Semi-structured Interviews) n=10

The sample (n=10) for Phase 2 were chosen because they had completed the same unit as the Phase 1 sample had the year before. The Programme Leader was approached to confirm that the unit remained the same from the previous year with no variables that could affect the analysis. The Programme Leader also provided copies of the timetable, staff rota, programme specification and scheme of work for clarification. Ten participants were interviewed. Table 12 illustrates the sample in Phase 2.

Date	Gender	Age	Mode	Ethnicity	SEN/SpLD	Disabilities	Marital status	Dependants	Employed
7.3.14	F	20	T	European	N	N	Single	N	P/T
7.3.14	F	23	T	European	SEN	N	Single	N	P/T
7.3.14	F	48	T	European	N	Y	Partner	Y	P/T
11.3.14	F	20	T	European	N	N	Single	N	P/T
17.4.14	F	41	T	European	N	N	Partner	Y	P/T
24.4.14	F	46	T	European	N	N	Separated	Y	N
25.4.14	F	45	T	European	N	N	Single	Y	N
29.4.14	F	44	T	European	N	N	Single	Y	N
1.5.14	F	41	T	Non-European	N	N	Single	Y	P/T
6.5.14	F	40	T	European	N	N	Single	Y	N

Key									
F Female	T Telephone	Y Yes	P/T Part time	SEN Special Educational Needs					
M Male		N No		SpLD Specific Learning Difficulties					

Table 12. Learner Group 2.

4.3.3 Phase 3 Samples – Learner Groups 2,3,4 – HEIs 1,2 (Interviews and Focus Group) n=18 and Teacher Group – HEIs 1,2 (Semi-structured Interviews) n=4

4.3.3.1 Step 1 Learner Group 2 – HEI 1 (Survey)

The participants in Phase 3 Step 1 were from the same sample that was interviewed in Phase 2. All of the participants from Phase 2 were emailed and asked to participate in the next phase of the research. At this stage, the participants had progressed to the third year of their programme at HEI 1. Five out of the ten participants that were contacted, replied to the request.

4.3.3.2. Step 2 Learner Group 3 – HEI 2 (Instant Reaction Mobile Interviews)

To guard against any bias that may exist by using participants from only one school, a new sample (n=7) from HEI 2 was used. Interviewing a new sample from another HEI highlighted glimpses of trends in a wider population. Potential participants from HEI 2 were contacted via their student email accounts. All the participants were studying at undergraduate level and were in either their first or second year. The sample for Step 2 was selected for four primary reasons:

- they used a blog for informal and formal learning
- they were on a blended learning programme
- they consisted of younger and older learners
- they were social science undergraduate learners from an external HEI.

The only demographic information that was recorded was the participant's age as analysis of the data in Phases 1 and 2 demonstrated that there was no one particular group of learners who experienced digital exclusion more than others and that every learner possesses their own unique set of characteristics. The age of the participants was recorded because it was pertinent in the validation stages of this research.

4.3.3.3 Step 3 Learner Group 4- HEI 2 (Focus Group)

To enhance the data collection methods, a focus group was formed in Step 3. The data collection methods up to this point had been individual contributions from participants sharing their individual personal experiences, validations and suggestions. It was considered at this point of the research that a focus group would add a new dynamic to the data collection, by allowing participants to discuss the preliminary conceptual framework within a group context. The sample (n=6) was taken from HEI 2 that were registered on the same programmes as the sample in Step 2. Participants were contacted via their student email accounts. The criteria for potential participants were the same as that specified in Step 2.

Again, the age of the participants were recorded because it was pertinent to the validation stages of this research.

4.3.3.4 Step 4 Teacher Group (Semi-structured Interviews)

Two teachers from HEI 1 and two teachers from HEI 2 were interviewed to seek their appraisals of the findings as educators who design blended learning programmes. The two teachers from HEI 1 have backgrounds in the subject area of education. They teach on education related programmes that utilise a blended learning approach including the use of blogs for formal and informal learning and assessment processes. They teach learners on Level 4 and Level 5 programmes including FdA and initial teacher training. It could be argued that interviewing teachers who have a subject specialism that is education may have a favourable disposition to educational research and therefore be more bias towards their appraisals of the conceptual framework however, it was of the researcher's opinion that an expert educational perspective as well as a teachers perspective would enrich the appraisal step.

Two teachers from HEI 1 were interviewed to seek their appraisals of the conceptual framework as educators who design blended learning programmes. The teachers teach on blended learning programmes within the same school as the initial samples of learners from Phases 1 and 2. They teach learners from undergraduate to post graduate levels within the school. It was considered appropriate by the researcher to seek appraisals from teachers from the same school teaching on similar programmes to the learner samples for continuity.

4.4 Ethical Considerations

There were different ethical considerations for each phase of this research and therefore are discussed in the relevant sections relating to each phase below. However, general principles of research ethics are that no harm should come to participants and that the research could potentially benefit the population to which is being studied (Shamoo and Resnik, 2009). As this research forms the thesis of a PhD the research was

confirmed by the universities Ethics Committee as compliant with their Code of Research. Additionally, consideration was given to relevant ethical guidelines, e.g. British Educational Research Association (BERA) (2011) and the British Psychological Society (2012). To ensure that the researcher was fully proficient at meeting the ethical standards of the university, a mandatory online ethics module was passed by the researcher prior to interviewing participants, in addition to the Research Ethics Checklist. A risk assessment was drawn up by the researcher, primarily to control or eliminate any psychological hazards potentially experienced by the participants (Appendix 4).

4.4.1 Phase 1 Considerations

The main ethical considerations in the context of this research were informed consent and emotional safety. The sample for Phase 1 was learners at a university and all over the age of 18. In order to ensure that participants were fully informed about research intentions and their role within the research, a participant information sheet (Appendix 5) with a detailed explanation of the intended research along with details of how to withdraw at any stage during the research, was emailed to their student email accounts. Before the interviews took place a consent form was completed by the participant and they were reminded again that they could withdraw at any time. It was also made clear that they were to only answer questions that they were happy to answer. Participants were advised that the interviews would be recorded and stored on the researcher's computer for analysis. They were assured that their contributions were for the purpose of the research and their identity would remain confidential. Once the recordings had been saved as an audio file to the researcher's computer, their recording was deleted from the smartphone and tablet. The final ethical consideration was researcher safety. Being the sole researcher gave rise to vulnerability when conducting f2f interviews. In order to maintain researcher safety during the f2f interviews, a professional and trusting environment was established as well as a recording device was used to record the interview.

4.4.2 Phase 2 Considerations

The same procedure was followed as with Phase 1. An ethical update was sought from the university's Ethics Committee to reflect the new dates and sample. As the methods were the same, this was completed and approved online.

4.4.3 Phase 3 Considerations

The instant reaction mobile interviews and focus group interviews raised some ethical issues. Firstly, it was not possible to maintain complete confidentiality of the participants taking part in the instant reaction mobile interviews as there was the possibility that they would be seen during the interview with the researcher, especially as the interview was taking place between lessons, from one classroom to the next. It was considered by the researcher that if the participant was approached during an interview, the interview would cease at that point rather than continuing at another time or informing the person who had approached of the fact that an interview was taking place and that recording equipment was being used. However, no one approached the researcher or participants during the interviews. Neither did the participants appear to be distracted or influenced by other learners passing by during the interview. Secondly, it was not possible to maintain complete confidentiality of the participants taking part in the focus group interviews due to the nature of the method, although confidentiality was maintained outside of the group. Thirdly, positionality was considered (Madison, 2005). As the participants were learners at the HEI where the researcher was a teacher, it was important to consider the potential impact the researcher has on the participant's readiness to

disclose information or opinions. The power balance of relationships between a teacher and student could potentially raise issues however, in the context of this research the learners were not students of the researcher so it was considered that the power balance did not significantly affect the data. Participants were assured that their contributions would be used for the purpose of the research only and had no bearing on their position as a learner at the HEI. An ethical approval update was sought from the university to allow for the change in the sample. A consent form and participant information sheet was sent to the participants before the data collection commenced via their student email accounts and they were asked to read them both carefully before they decided to participate. The participants were asked to confirm by return email that they had received the consent form and were happy to consent.

4.5 Phase 1 Data Collection and Analysis

4.5.1 Semi-structured Interviews

Semi structured interviews were used to collect the data for Phase 1. Three f2f interviews, one Skype interview and twelve telephone interviews were conducted. At the start of Phase 1, it was anticipated that all of the interviews would be f2f interviews however, arranging meetings that were convenient for the participants proved to be too challenging. The alternative of a telephone interview was offered and this proved to be more popular with the participants and easier to organise.

The three f2f interviews were conducted at HEI 1 in classrooms booked out for that purpose. This enabled the interview to be carried out in a controlled environment, in confidence with no interruptions. All three of these interviews were conducted during the participants' lunchtime and lasted between 36 and 55 minutes. All three had a hot drink during the interview and one ate food. It was considered important to allow this as the participant needed to feel comfortable. The participants seemed relaxed and enthusiastic to be taking part in a research study. The interviews were recorded using two electronic devices: a smartphone and a tablet. The tablet was used as the primary recording device where the audio file could be saved and later used for transcription. The smartphone was used as a backup device only. As well as the recording devices, notes and memos were taken by the researcher to aid analysis. The notes and memos were uploaded to Nvivo for analysis along with the transcripts.

One Skype interview was conducted. The participant was given the choice between this method or a telephone interview. The same process was followed as the f2f interviews, two recording devices were used to record the interview. The interview took place in the evening when the participant returned from work and lasted for 43 minutes. This could have had a negative effect on the quality of the data collected because the participant could have been tired and rushed the responses however, this did not appear to be the case. The recording was not as clear as it had been with the f2f interviews but was still clear enough to transcribe successfully.

Twelve telephone interviews were conducted. As stated in section 3.3.2, there are advantages and disadvantages to telephone interviews. The fact that the participants could not see the researcher seemed to allow them to be more critical in their answers, whereas participants who were interviewed f2f seemed to be more diplomatic when discussing negative experiences. The telephone interviews were conducted at different times of the day and lasted between 18 and 91 minutes. The interviews were recorded using a tablet and a

smartphone. The sound quality of the telephone interviews was not as good as the f2f interviews however, the quality was good enough to transcribe successfully.

Taking into account the aim, research objectives and current literature, the interview schedule (Appendix 2) was deliberated carefully and tested during the pilot study of this research. Appendix 2 also illustrates the rationale for the interview schedule. The table sets out the two primary interview questions, other areas to discuss if not previously mentioned by the participant, supporting theories and research aim/objectives that it attempts to answer. The two primary questions do not have supporting theories. This is because this part of the interview is attempting to find out new information (the contribution to knowledge that this research will endeavour to make). The remaining 'demographic' questions, asked at the end of the interview, were for comparison purposes after data analysis.

Since the research was concerned with identifying which characteristics could potentially influence digital inclusion and exclusion, the interview started with two primary, open questions: 1. To ask the participant about themselves and 2. To ask the participant about their experiences of using technology on their programme. This approach was preferred to using a validated research instrument because it was hoped that the two opening questions would firstly allow the participant to voice their characteristics in their own words without being influenced by any pre-determined (correct or incorrect) knowledge gained from literature, and secondly share their experiences of using technology in their own words, for example the following excerpt was taken from one participant,

... I am a mature student. I have two children, [...] and [...]. I worked in [...], my career in the beginning in [...]. We came to [...] in 2008 and wanted to change my career so that I'm doing a [...] degree. I always wanted to work in this kind of work with people [...], so the reason I decided to do [...] and that is quite hard at the moment because as you can imagine it was more than [...] years ago that I studied and now I'm going back to that sort of studying more. Everything is really hard work for me and English is my second language so it makes it even harder. (Participant 16)

The use of a learning styles questionnaire was considered but rejected and this is discussed in section 3.4. Participants were then given the opportunity to express their experiences of technology during their program. Any areas that were not discussed by the participant initially could be prompted by the researcher. It was not until the end of the interview, that usual demographic questions: gender; age; ethnicity; geography; socio-economic status and educational background, (ONS, 2013) were asked.

4.5.2 Thematic Analysis

In accordance with Nvivo (2014) analytical process table (Table 10) analysis progressed flexibly through 8 steps:

Step 1 – Open Coding- Coding interesting features of the data in a systematic fashion across the entire data set, collecting data relevant to each code.

Step 2 - Categorisation of Codes – Collating codes into potential themes, gathering all data relevant to each potential theme.

Step 3 – Coding on - Checking if the themes work in relation to the coded extracts (level 1) and the entire data set (level 2), generating a thematic ‘map’ of the analysis.

Step 4 – Documentation (summary statements).

Step 5 - Data Reduction - On-going analysis to refine the specifics of each theme, and the overall story [storylines] the analysis tells, generating clear definitions and names for each theme.

Step 6 –Generating Analytical Memos.

Step 7 – Testing and Validating.

Step 8 - Synthesising Analytical Memos. The final opportunity for analysis. Selection of vivid, compelling extract examples, final analysis of selected extracts, relating back the analysis to the research aim, objectives and literature, producing a scholarly report of the analysis.

In order to become familiar with the data, the transcripts were re-recorded in the researcher’s own voice to enable the transcription process using the Dragon software. Transcribing interviews is one way of familiarising oneself with the data (Reissman, 2000). Transcripts were open coded, categorised and themed using the process outlined above, in a systematic fashion across the entire data set. The next stage identified which learner characteristics populated each theme. Patterns were sought to identify what characteristics of participants were associated with digital exclusion themes. These results were then compared to the existing literature.

4.5.2.1 Step 1 Open Coding

In accordance with Braun and Clarke (2006) analytical process table (Table 10) the first step of the analysis process was to become familiar with the data from Phase 1. This was achieved by re-reading in turn the interview field notes and listening to the interview recordings. The interview recordings were then transcribed using Dragon Naturally Speaking software and imported to Nvivo data management software. The transcripts were open coded in a systematic fashion across the entire data set.

4.5.2.2 Step 2 Categorisation

Steps 2 and 3 (Braun and Clarke, 2006) (Table 10), merged and overlapped with each other reflecting the iterative process of thematic analysis. After all of the initial 13 interview transcripts were imported to the Nvivo database, they were carefully coded individually to generate ‘nodes’ (‘nodes’ are the name given to ‘codes’ in Nvivo). The nodes were labels that summarised interesting words or chunks of text emerging from the data. Bryman (2001) criticises coding techniques for losing context, so keeping enough of the text for each code is worthwhile for the latter stages. This process continued for all of the interviews however, by interview 13 no new nodes could be formed meaning that no new information emerged from the data.

Figure 3 illustrates a screen shot of the initial coding. The first column identifies the name (node) and the second column identifies the number of sources (participants) text coded from their interviews at that node. The third column represents how many references (pieces of text) there are included in that node across the entire data set.

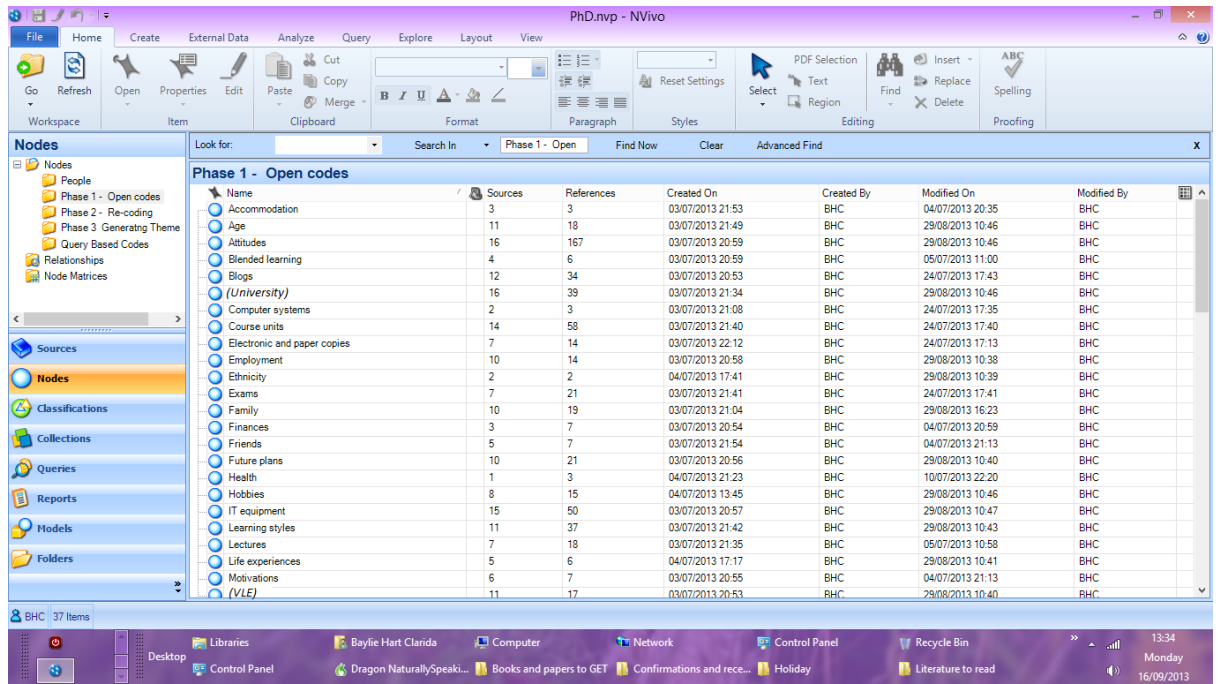


Figure 3. Screenshot that illustrates the nodes (from A – M).

4.5.2.3 Nodes and Text Examples

The 37 nodes created during the first phase of open-coding represent the interview data. As seen below, the interview transcript was brought into view on the right. The existing nodes were brought into view on the left. Any word or piece of text that needed to be coded would be highlighted and dragged across to the corresponding node. In this screenshot (Fig. 4) a piece of text was highlighted from the transcript of Participant 1 and dragged into the ‘VLE’ node.

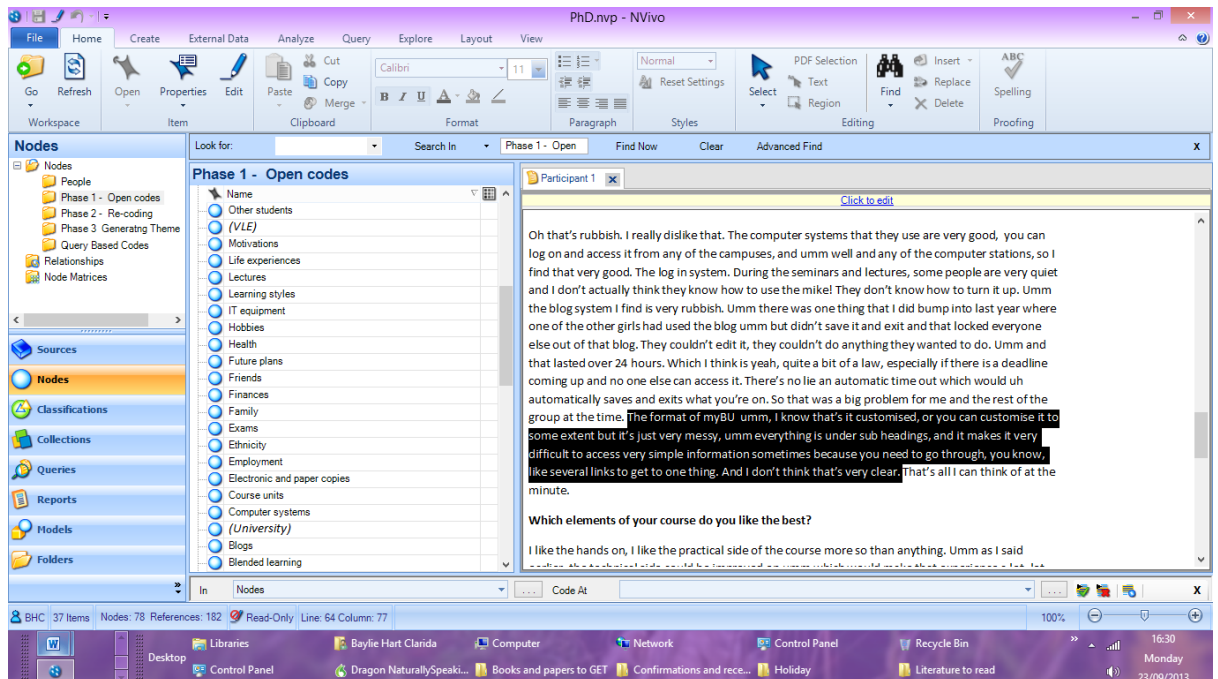


Figure 4. Screenshot illustrates how a node was populated.

4.5.2.4 Step 3 Coding On

When an extensive set of nodes emerged, the next step was to ‘code-on’ each node into sub-categories. Each node was categorised into: digital inclusion; digital exclusion and recommendations. The importance of this step was to ensure that the data could be represented openly into digital inclusion and exclusion before the nodes were defined as themes. It also served to manage the data more effectively on a practical level, ensuring no data was missed or coded incorrectly.

Figure 5 illustrates the coded-on nodes at this stage.

Name	Sources	References	Created On	Created By	Modified On	Modified By
Accommodation	3	3	10/07/2013 11:12	BHC	04/07/2013 20:35	BHC
Digital exclusion	0	0	10/07/2013 11:53	BHC	10/07/2013 11:53	BHC
Digital inclusion	0	0	10/07/2013 11:52	BHC	10/07/2013 11:52	BHC
Improvements	0	0	16/07/2013 16:45	BHC	16/07/2013 16:45	BHC
Age	8	10	10/07/2013 11:49	BHC	22/07/2013 10:20	BHC
Digital exclusion	1	2	10/07/2013 11:55	BHC	29/08/2013 10:59	BHC
Digital inclusion	0	0	10/07/2013 11:54	BHC	10/07/2013 11:54	BHC
Improvements	1	3	16/07/2013 16:45	BHC	29/08/2013 10:59	BHC
Attitudes	13	154	22/07/2013 10:20	BHC	22/07/2013 10:21	BHC
Digital Exclusion	13	23	22/07/2013 10:22	BHC	29/08/2013 16:18	BHC
Digital Inclusion	11	19	22/07/2013 10:21	BHC	29/08/2013 16:16	BHC
Improvements	9	15	22/07/2013 10:22	BHC	29/08/2013 16:18	BHC
Blended learning	4	6	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Digital exclusion	0	0	10/07/2013 11:55	BHC	10/07/2013 11:55	BHC
Digital inclusion	3	4	10/07/2013 11:55	BHC	10/07/2013 22:35	BHC
Improvements	0	0	16/07/2013 16:45	BHC	16/07/2013 16:45	BHC
Blogs	11	33	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Digital exclusion	8	18	10/07/2013 11:56	BHC	10/07/2013 22:43	BHC
Digital inclusion	7	8	10/07/2013 11:56	BHC	24/07/2013 18:46	BHC
Improvements	1	3	16/07/2013 16:44	BHC	16/07/2013 16:49	BHC

Figure 5. Screenshot illustrates ‘coding-on’ separating each node into 1. Digital exclusion, 2. Digital Inclusion and 3. Recommendations, (from A – B).

4.5.2.5 Steps 4 and 5 Documentation and Data Reduction

Step 4 of Braun and Clarke’s (2006) (Table 10) six step analysis model was addressed. Themes and patterns that emerged from the ‘coded-on’ nodes were identified. Themes should contain data that fits together meaningfully, while being distinctly different from other themes. All of the data in each coded-on node was re-read and any pattern was identified. As the nodes had been separated prior to this stage, it was fairly straightforward to identify the themes. Analytical memos were recorded on the individual interview forms where appropriate to support this stage. Memo writing assists the researcher in thinking of ideas about the data (Denzin and Lincoln, 2000) by linking analytic interpretation to the data.

Step 5 of the six step analysis model (Braun and Clarke, 2006) (Table 10) sees themes defined. Themes generated from each node were organised into bigger themes where appropriate to do so. This is illustrated by Figure 6

Name	Sources	References	Created On	Created By	Modified On	Modified By
Appropriate content	11	11	16/09/2013 17:08	BHC	16/09/2013 17:36	BHC
Clarity	6	10	16/09/2013 16:42	BHC	16/09/2013 17:37	BHC
Compatability	5	11	16/09/2013 16:48	BHC	16/09/2013 17:35	BHC
Digital Divide	6	7	16/09/2013 16:49	BHC	16/09/2013 17:37	BHC
IT Support	6	8	16/09/2013 16:47	BHC	16/09/2013 17:38	BHC
Logging in	4	5	16/09/2013 16:45	BHC	16/09/2013 17:37	BHC
M-learning	4	8	16/09/2013 16:51	BHC	16/09/2013 17:35	BHC
Navigation	3	6	16/09/2013 16:46	BHC	16/09/2013 17:33	BHC
Online submission	3	5	16/09/2013 16:43	BHC	16/09/2013 17:30	BHC
Peers	6	9	16/09/2013 16:52	BHC	16/09/2013 17:36	BHC

Figure 6. Screenshot of the generated themes, amount of sources and references.

Once the themes had been categorised, the next stage was to identify which learner characteristics populated each theme. Patterns were sought to identify what characteristics of participants were associated with digital exclusion themes.



Figure 7. How characteristics were sorted into each theme.

Figure 7 illustrates the process to form patterns within the characteristics that dominate each theme. Dominant characteristics were deemed to be characteristics that were present for more than half of the participants represented within each theme.

This stage of the analysis was completed manually because although it is possible to run ‘queries’ within Nvivo to identify words within text, the participants described their characteristics in different ways, so it would be easy for the software to miss a word or characteristic.

4.6 Phase 1 Findings and Implications for Phase 2

As a result of the data analysis, themes were generated from the nodes and characteristics were identified. As the nodes were coded-on to represent digital exclusion and inclusion, for clarity the themes are set out in the same way.

Digital exclusion is defined in this research as being unable to access or use technology, or use it in the way it was intended to facilitate the learning process for any reason. 13 out of the 16 participants disclosed attitudes towards digital exclusion in some form, for example most faced problems accessing support or being able to access the information they needed, therefore excluding them from learning in ways not intended by their teachers. Figure 8 illustrates this point.

Name	Sources	References	Created On	Created By	Modified On	Modified By
Attitudes	16	166	22/07/2013 10:20	BHC	22/11/2013 11:00	BHC
Digital Exclusion	13	24	22/07/2013 10:22	BHC	22/11/2013 10:57	BHC
Digital Inclusion	11	19	22/07/2013 10:21	BHC	22/11/2013 10:55	BHC
Improvements	9	15	22/07/2013 10:22	BHC	29/08/2013 16:18	BHC
Blended learning	4	6	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Blogs	11	33	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
(University)	13	31	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Computer systems	2	3	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Course units	14	55	10/07/2013 11:12	BHC	22/11/2013 11:09	BHC
Electronic and paper copies	6	13	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Employment	8	11	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Ethnicity	1	1	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Exams	6	20	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Family	9	17	10/07/2013 11:12	BHC	10/07/2013 11:48	BHC
Finances	3	7	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC
Friends	5	7	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC
Future plans	9	20	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC
Health	1	3	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC
Hobbies	6	13	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC
IT equipment	15	46	10/07/2013 11:12	BHC	22/11/2013 11:10	BHC
Learning styles	10	36	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC
Lectures	7	18	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC
Life experiences	4	5	10/07/2013 11:12	BHC	22/07/2013 10:20	BHC

Figure 8. Screenshot illustrates total number of sources that disclosed attitudes towards digital exclusion.

The nodes that consisted of the most references towards digital exclusion were: Time; Blogs and IT Equipment. All three of these nodes consisted of 18 references.

‘Time’, across 9 sources, included:

experiences of deadlines,

... They give you a list of things, so like the 5th of March you need to answer question about these articles then say 11th March this is the blog unit you need to do and then you look into it and actually I still don't get it. (Participant 7),

amount of time to get something working,

We did a module called ‘exploring evidence to guide practice’ and I spent between 9 to 14 hours trying to get my laptop to be compatible with programmes. (Participant 5),

amount of time spent working out what to do,
... *I didn't really know what I was supposed to be doing and there wasn't anyone to ask until we got to the lectures which at that moment was too late.* (Participant 12),
physical time,
... *I had a long break 30 years since I study and it's really difficult to get back into study.* (Participant 16).

'Blogs', with 8 sources, included:

experiences of compatibility and access problems,
... *It's not compatible with the iPad. If you try to open the wiki it will open the wiki, but when you want to add comments and stuff it starts going funny.* (Participant 13),
unclear instructions,
... *we'll get a question on there and I won't be able to make sense of that.* (Participant 2),
blog set up,
... *there was one thing that I did bump into last year where one of the other girls had used the blog umm but didn't save it and exit and that locked everyone else out of that blog. They couldn't edit it, they couldn't do anything they wanted to do. Umm and that lasted over 24 hours.* (Participant 1),
time management,
... *the blogs every week is just, you'll wait to the end of the week and you're just like "well I didn't blog, I've got to blog" and you'll put it off and dread it and then Sunday night you're just like "woah!", hahahah, and it takes forever! {writing the blog}.* (Participant 2).

'IT Equipment', across 10 sources, included:

experiences of mobile technology,
... *I tried to set up my phone to access my e-mail but for some reason it wouldn't set up.* (Participant 11)
outdated/old equipment,
... *My laptop is around 4 years old and takes about 35mins to load. It's so slow and switches off as soon as I unplug it. I'm looking at buying a new one which is also compatible with my GoPro camera -as I like diving in the summer and like to film and take photos, but I haven't been able to afford one up till now.* (Participant 5),
lack of resources,
... *yesterday we were trying to do our blog but we couldn't find any computers to sit down and use it.* (Participant 7).

Participants shared their stories of digital inclusion and exclusion as well as identifying their own set of characteristics. The following vignette came from Participant 1 after they were asked to tell the researcher about himself and gives a flavour of the stories shared in Phase 1. In brackets are themes that the data was coded to.

I umm got a triple Distinction at college. (Life experiences). I am the first one in the family to go to uni, neither of my parents did. (Family). They had normal jobs but not a lot of money. They split up when I was younger so money was tight. (Finances).....

Umm after college I was sort of mixed as to what sort of career path I wanted to do. Umm so I got any old job really which was as a care assistant (Employment). and umm from that I absolutely fell in love with it so I decided to progress myself from there on, and just loved it ever since. I've got a few ideas for the future. Umm, I mean I'm quite open to anything really but I am looking towards the army at the moment, cos I've got no ties here, umm and I like to travel the world so it's the best of both. Travel with the army, I'll continue to use my nursing, and develop my skills with nursing cos that's what I've come to love and adore and definitely keep excelling at that. (Future plans).

I go out with friends quite a lot as I have the same ones from school, not moving away has helped that. (Friends). But all in all I am enjoying it better than I thought. (Attitudes).

He goes on to say when asked by the researcher about his experiences with technology,

By technology do you mean-like the computers we use or systems or? If it's resources, that's rubbish. I really dislike that (IT equipment). The computer systems that they use are very good, you can log on and access it from any of the campuses, and umm well and any of the computer stations, so I find that very good. (Computer systems).

During the seminars and lectures, some people are very quiet and I don't actually think they know how to use the mike! (Lectures). They don't know how to turn it up. Umm the blog system I find is very rubbish. (Blogs). Umm there was one thing that I did bump into last year where one of the other girls had used the blog umm but didn't save it and exit and that locked everyone else out of that blog. They couldn't edit it, they couldn't do anything they wanted to do. Umm and that lasted over 24 hours. Which I think is yeah, quite a bit of a chore, especially if there is a deadline coming up and no one else can access it. (Attitudes). There's no like an automatic time out which would uh automatically saves and exits what you're on (Computer systems). So that was a big problem for me and the rest of the group at the time.

The format of [the VLE] umm, I know that's it customised, or you can customise it to some extent but it's just very messy, umm everything is under sub headings, and it makes it very difficult to access very simple information sometimes because you need to go through, you know, like several links to get to one thing. And I don't think that's very clear. (Computer systems). I like the hands on, I like the practical side of the course more so than anything. (Learning styles). Umm as I said earlier, the technical side could be improved on umm which would make that experience a lot, lot better, (Attitude). umm but as far as it goes the practice skills from that far exceeds everything else. But then that's my way of learning anyway (Learning styles). I would definitely say I like the blogs least of all. (Blogs). Although I'm gonna critique that now, I do like the comfort of being in my own home and doing it in my own time, but it's just that, the idea is fabulous, but how they've gone about it is not so (Attitudes). Umm I think they've got a good balance of it to be honest. We have our practice, we have our time in the university, and we do have set time on our own, our own research and study or like at the moment we just done this evidence guide to practice which is completely on...

cont..... yourself it's individual and you can do it at home. Though, all in all I think it's very evenly balanced (Blended learning).

The next part of this chapter will discuss the themes that emerged in more depth with examples from the interviews and a rationale for the creation of each theme is supplied in Appendix .6.

4.6.1 Appropriate Content

The data revealed that the most significant area of exclusion for the sample was in perceived irrelevant or confusing content. Experiences ranged from content given online that had answers but no questions to completing blogs that were not perceived as relevant to the programme, for example

...there was one unit that we started in our first year evidence to support guide practice. And it was just everyone hated it. There was no point in it and to be honest I don't think it should be part of the programme. I don't see how it makes us better practitioners. Replace it with something that is relevant. (Participant 9)

This finding mirrors a similar study by Beaudoin et al. (2009) who researched learner's online experiences that affected satisfaction. They concluded that the most important factor that influenced student satisfaction of learners (mostly US) was online content. As discussed in section 2.2.2, Anderson and Haddad (2005) found that female learner's perceptions of deeper learning were facilitated by online discussion. It could be the case that the learners were not participating as planned or did not appreciate why they were being asked to complete this part of the programme. Salmon (2002) would suggest that there are five key stages to pass through to achieve successful e-learning. The statement from Participant 9 also suggests that prior technological experiences will influence a learner's technological satisfaction throughout their university experience.

4.6.2 Compatibility

Another significant finding was the experiences of participants with compatibility. A common pattern was one experienced by Participant 3 who stated that,

...I can't access everything I need to access, and umm last week {May 2013} apparently- I had tried to look at the formative test but I could only see the answers I could select, I couldn't actually see the questions, and I can't, can't rectify this. Apparently it's because my operating system is too old to support the technology used. So I found that quite frustrating.

Other participants faced difficulties with iPads not being compatible with the university's VLE and smartphones that would not allow set up of student email accounts.

4.6.3 Clarity

The data showed that regardless of age, the learners in this sample need clear instructions and structure to online content for it to be effective. Participant 7 voiced this in the following way,

...OK we're adults we need to do self-study but you need to give clear structure to me and I'll be able to follow it.

Feelings of frustration and stress can be experienced by this sample if online content is not clear. Moreover, unclear content can influence the frustration when learners then work independently online. Participant 10 summed this up by saying,

... The programme would be more enjoyable if there were set guidelines that you can learn rather than being wishy washy like the [...] that we use. If you read it, there is so much research everybody reads it in a different way. It's not very point point point and this is what you need to do and a lot of people are getting a bit stressed about that at the moment.

4.6.4 Peers

For this sample, peers contributed to digital exclusion by not participating appropriately in collaborative tasks. This led to other learners feeling awkward and possibly not completing the task to their best ability. Participant 4 voiced that concern below,

... I suppose if you did have a number that didn't pull their weight as much, it would make it quite awkward.

Another exclusion experience regarding peers is when others forgot to log out of asynchronous communication tasks such as blogs. Participants 13 and 1 shared this below,

Participant 13 *...if someone is using it for an hour or two hours you have to wait till the person finishes and sometimes what happens is the person uses it for 15 min and then forget to logout then you have to wait and if you don't have any phone number or contact details, you just have to wait until they realise what is going on.*

Participant 1

... if there is a deadline coming up and no one else can access it. There's no like an automatic time out which would uh automatically saves and exits what you're on. So that was a big problem for me and the rest of the group at the time.

4.6.5 IT Support

The data reveals that IT support within the university is widely offered however, when it is accessed the outcome is not always satisfactory. The level of dissatisfaction among the participants was expressed by Participant 7,

... they {IT Services} need to change some aspect of the support they're giving to their learners.

There are a number of support networks in place. A reason for the dissatisfaction could be that learners are not aware of these support networks or how to access them. Or, it could be that the learner has not been troubled to do so.

4.6.6 M-Learning

One participant shared a negative experience with m-learning. The university app was installed on the participant's smartphone but was unable to use it effectively,

... the new [university] app crashes a lot sometimes. (Participant 13)

M-learning is described as the use of handheld technology that relies on wireless and mobile phone networks, to aid teaching, learning and support, (m-learning.org, 2014). With this in mind, the university app is very much part of the learner's support network.

'[the university app] is the official mobile application for [...] University. Created with student feedback, [the university app] allows you to access your academic timetable, search the staff directory, check bus time, search the library catalogue and much more' ([...] University, 2014).

Other participants shared experiences of incompatibility of iPads and smartphones and others shared experiences of needing a mobile device to learn more efficiently but for whatever reason (commonly financial) did not have one.

4.6.7 Equipment

The digital divide appeared to present itself in many ways. The data uncovered elements of the divide within the sample. Six of the participants stated that they do not have equipment that is fully functioning. Participant 2 was affected by this during the lectures disclosing that

... We ask for printing but they say to bring iPads but it's ok if you have one but I don't have an iPad.

Interestingly, of the participants that experienced aspects of the digital divide, none attributed it to bandwidth, only to old or non-existent equipment.

4.6.8 Navigation and Logging In

Navigation appeared to be significant to three of the participants. Participant 1 was the most vocal about navigational problems with the VLE system. They stated that,

... The format of [the VLE] umm, I know that's it customised, or you can customise it to some extent but it's just very messy, umm everything is under sub headings, and it makes it very difficult to access very simple information sometimes because you need to go through, you know, like several links to get to one thing. And I don't think that's very clear.

Negotiating through a number of tabs and entering your student password and ID three or four times to access one form causes some concern to the participants. Another explanation is that it is the participant's perception only, of multiple tabs when in fact there are only one or two.

Four participants shared their experiences of logging in. A typical account was summed up by Participant 5

... Cos I couldn't access resources at the beginning of the unit. Then throughout the 5 or 6 weeks of the unit there were continual problems with access to group blogs and formatting and [VLE] being continually down for servicing.

4.6.9 Online Submission

Some participants reported concerns regarding submitting forms and essays online. Participant 14 said of her placement form,

... you have to fill out your evaluation to get your next bit of placement time, so once you fill out the form it tells you where you are located next, so if the whole system crashes and you lose all of your answers, you lose your timetable for the next bit of your placement.

Others revealed that submitting essays online (Turnitin) can be problematic if left until the last minute as others were also trying to submit and the system can crash. This is particularly concerning when a deadline has to be met.

4.6.10 Theme Summary

The data revealed that the participants were part of a cohort that formed their own private Facebook group. This was used by the learners only and was a means of communication, support and information. One participant explained how she used the Facebook page to help her with an IT problem that enabled her to continue learning effectively,

... if I don't know we have like a Facebook group, like and I can just put on there "where do I find this?" and then someone will answer back "oh it's here". The group is useful because you can communicate together. I do use it if I have any queries and need to ask other people. (Participant 2)

Participants valued the f2f interaction with their teachers. Some used this communication opportunity to ask for IT support and for clarification of online content.

...I didn't really know what I was supposed to be doing and there wasn't anyone to ask until we got to the lectures which at that moment was too late. (Participant 12)

Peer interaction seemed to play an important part in the blended learning programme for this sample. Although participants enjoyed the self-study element of the programme, meeting their peers to communicate and socialise was important.

... I enjoy meeting new people and feels like I'm building lasting friendships. (Participant 5)

All of the participants interviewed thought that there was an appropriate mix of f2f and online content. Additionally, all of the participants enjoyed the flexibility of the online elements but regarded the f2f elements as an important component of the process.

... you need materials online so you can go up and look at it and revise it but there are certain things that if you learn it from the person then you can better understand the subject. (Participant 7)

This statement goes some way to suggest that there is an optimum blend of f2f and TEL elements within a blended learning approach.

...On a Thursday. I have a self-managed study day, which is quite good and you do that all on the computer and I like that aspect of it because it gives you a bit of freedom to do it as well. You do that at home. (Participant 4)

This sentiment was shared by all of the participants. They all enjoyed the flexibility of self-managed study.

The literature is clear about the benefits of CMC and an example of its benefit is below.

... I just look on what everyone else has written first. And then kind of get ideas from that. So that's kinda good, cos you can get ideas from other people. (Participant 2)

4.6.11 Characteristics

After the themes had been identified, characteristics that were revealed by the interview participants, were organised to indicate which were dominant, that is most prevalent in each theme. The first question asked during each interview was: 'Tell me a bit about yourself.' This gave the participant the opportunity to express their characteristics first before being influenced by the researcher asking any conventional demographic questions. The characteristics revealed by the participants are the characteristics perceived to be the most important to the participant. They are the characteristics with which the participants described themselves and are used in this research to group the participants. This research is concerned with any characteristic that was disclosed by the participant in an attempt to reorder learners into up to date and current groupings and consequently compare them to the conventional groupings of demographics that may be out dated in the context of technology. Table 13 illustrates the characteristics identified by the participants.

After the themes had	Appropriate Content	Compatibility	Clarity	Peers	M-learning	IT Support	Equipment	Navigation	Logging in	Online Submission
Sources	8	5	6	6	4	6	6	3	4	3
Characteristics	Geographics (6) Age (6)	Previous jobs/life experiences (4)	Geographics (4) Age (3) Year of study (2 nd) (3)	Age (5) Motivation for doing programme (3)	Age (3) Programme of study (3) Hobbies (3) Previous jobs (2) Year of study (2 nd) (2)	Programme of study (6) Geographics (5) Age (5) Family (5) Hobbies (3) Previous jobs/life experiences (3) Year of study (2 nd) (3)	Programme of study (6) Geographics (5) Age (4) Year of study (2 nd) (3) Family (3)	Previous qualifications (2) Age (2) Programme of study (2)	Hobbies (3) Family (2) Programme of study (2) Age (2)	Age (3) Year of study (2 nd) (3) Programme of study (3) Hobbies (2) Previous jobs/life experiences (2)

Table 13. Characteristics present in each theme.

Characteristics in each theme were deemed to be dominant if at least half of the participants represented within the theme perceived themselves as having those characteristics. The decision was taken to order the characteristics into dominant ones as to best describe the most common and therefore the most representative in this research. It could be argued here that all characteristics are valuable and potentially influential however, with the number of characteristics described, often by only one student (such as 'Pets') the list would be extensive. The numbers in the brackets above represent the number of participants that described themselves as having that characteristic.

Descriptions of each dominant characteristic revealed are:

Age; all but one participant declared their age as a characteristic during the interviews. Where age is expressed as a characteristic it refers to age in general and not a specific age.

Geographics; this characteristic represents any reference to where the participant came from originally or lives now.

Previous jobs/life experiences; this characteristic represents any reference to a job or life event experienced before the programme.

Year of study; this characteristic represents the year of study the participants are in. In this case it was year 2.

Programme of study; this characteristic represents the programme of study the participants are enrolled on but will not be individually disclosed due to confidentiality.

Motivations for doing programme; this characteristic represents any reference to reasons for doing the programme.

Hobbies; this characteristic represents any declaration by the participants about hobbies or interests.

Family; this characteristic denotes any mention of other family members.

Previous qualifications; this represents any mention of previous qualifications.

4.6.12 Participant Characteristics Compared to Traditional Demographics

The most interesting revelation from the data was that there appeared to be no age limit to digital exclusion or inclusion. Additionally, many of the learners who shared characteristics across a number of themes also fell into one or more of the conventional groupings. This highlights the complexity of learners and erroneous task of trying to group them in order to determine how they might engage with technology.

4.6.12.1 Age

For this sample, any age could potentially experience aspects of inclusion or exclusion. This is contrary to much of the literature that suggests that older learners experience digital exclusion more than their younger counterparts. A hypothesis for this could be that as technology evolves and becomes more ubiquitous in education and everyday life, older learners, or as Prensky (2009) would define 'digital immigrants', through experience have caught up with 'digital natives'. So even though older learners who are 'digital immigrants' due to being born before technology was commonplace, are now as comfortable using technology as their younger counterparts.

4.6.12.2 Gender

Although there was no link between gender and digital exclusion, it was one of the limitations of this phase. Of the 16 interview participants in Phase 1 only 2 were males. In this research, neither male nor female participants were more likely to experience exclusion more than the other.

4.6.12.3 Ethnicity

Again, there was no link between ethnicity and digital exclusion. Five of the 16 interview participants declared that their ethnicity was one other than White/British (three non-European). The five participants that declared their ethnicity as one other than white British experienced no more exclusion than any other participant. Of the personal accounts given, theirs were similar to white British participants. Much of the literature still suggests there is a digital divide existing between ethnic minorities (Fairlie, 2003, Sims et al., 2008) however, there is evidence from this research to suggest that this needs to be investigated further.

4.6.12.4 Geography

Four of the 10 themes included characteristics of geography. A dominant number of participants expressed characteristics of where they live or have lived in the past. This would seem to be important and further research could investigate this.

4.6.12.5 Socio-economic Status

None of the participants expressed their socio-economic status as a characteristic and upon analysing the conventional demographics of the participants, although some expressed low incomes due to being students, there was a mix of socio-economic backgrounds. In interpreting the findings, Micklewright and Schnepf (2007) offer a word of caution. They suggest that asking a participant's income by a single question can lead to misrepresentative answers and that females are more likely to play down their income than males.

4.6.12.6 Educational Background

Only one theme generated a characteristic of educational background. Participants made reference to previous qualifications undertaken or qualifications needed to access their current programme of study.

So far, this research suggests that there is no typical characteristic that is more closely associated with experiences of digital exclusion or inclusion than any other. Most of the participants that took part in this phase of the research experienced exclusion of some form or other during the unit studied. The sample from Phase 1 consisted of a diverse range of learners, from age ranges of twenty years to ethnicity and cultures from across the globe. Most of the participants felt exclusion in the form of the content being used to facilitate the unit and not their own digital literacy skills. Interestingly, the oldest learner stated that although she was comfortable with using IT because of her previous exposure to it during her career, she felt that 'her group' of older learners were at a disadvantage to the younger learners who had learnt IT at school. This could be due to preconceptions or a lack of confidence. In fact, the only participant to comment on their IT skills as being poor was one of the younger participants in the study. This learner's profile reveals that she entered her programme with traditional A level qualifications, lives in student accommodation and relies on the cohort's Facebook page for academic support. It could be argued that some learners feel that a break in education disadvantages them in some way by missing out on technological advances but with technology being so ubiquitous and widespread in our homes, learning to cope with technology is becoming a lifestyle. Technology is used for social activities outside of the class room and exposure to computers, tablets and smartphones forces everyone that uses these devices to learn as they operate them. It could also be argued that some younger learners are experts in using devices that allow them to operate on a day to day basis to communicate with others, such as smart phones, iPhones, apps and social media but not as proficient at other types of technology used for academic purposes such as researching, Microsoft programs or computer management, such as installing security software.

Another interesting observation from the research was how previous experiences of technology affect how the participants feel about the technology now. There is evidence from existing literature that suggests that prior experiences of technology use influence attitudes and perceptions towards current use of online learning (Muilenburg and Berge, 2005). This would explain some of the more negative perceptions of the participants. Additionally, general experiences during the programme can impact on how the participants feel about technology, as if the lines are blurred between technological and non-technological issues. There were a few

occasions during the interview process when participants were asked about their experiences with technology; responses would include non-technological experiences as well as if there were no distinction between the two. Many of the perceptions of the participants were similar. Even in the cases of misguided information about support networks for example. If you consider Salmon's (2003) five stage e-moderating model to communicating online, a prerequisite of achieving Stage 1 is that the learners know how and where to access help and support. It would seem that as learners talk with each other, a miscommunication of information or a 'Chinese whisper' scenario can develop amongst cohorts. This phenomenon was investigated during Phase 2.

The obligation by HEIs to provide competitive and innovative TEL programmes, results in an abundance of studies and reports into pedagogical must haves for successful designs however, further investigation is needed into whether this is being translated into practice, for example the disparity between what a learner needs to do to be a successful e-learner, what the learner actually does and whether they understand why they are doing it. As well as educator's expectations of learners, Voss et al. (2007) identified that learners have high expectations of educators and the experiences they will encounter at university. Their study into the service quality in higher education demonstrated that learners expect their teachers to be 'knowledgeable, enthusiastic, approachable, and friendly' (p. 957) and be able to select the most appropriate teaching methods to ensure that that they are prepared for tests and future careers.

The themes that emerged from Phase 1 were investigated further in Phase 2. Analysis of the themes and further reviewing of the literature also generated four analytical propositions that were investigated in Phase 2 (Table 14).

Analytical propositions for further investigation	Link to research objectives	Significance to research
Does the phenomenon of 'Chinese whispers' exist across a new sample of learners and why?	1 2	To investigate whether social circles via social media impact on constructing attitudes towards digital exclusion. Does this only happen on social media?
Are perceptions of technology influenced by previous experiences across a new sample and why?	1	The sample enrolled onto the programme via different routes eg. Access programme, ALevels. Participants would have faced different experiences of technology before starting. Is there a difference in previous experiences with technology between learners who have entered the programme from education or employment?
Are learners aware of all the support networks in place across a new sample of learners and if not why?	3	Support was a recurring concern across the first sample. Upon further investigation it came to light that there are more support networks available to this cohort than was shared during data collection. When and how was information shared about support networks? Would learners use all of the support networks available if they knew about them? Are the most effective support networks being utilised?
Does a 'blurred line' exist between technological and non-technological experiences across a new sample of learners and why?	2	When the sample was asked questions not related to technology, some still talked about technology. Why is this the case? Is that the case solely within a blended learning environment? Do the technological and non-technological parts of a blended learning programme 'blend' into one?

Table 14. Analytical propositions to be investigated further.

4.7 Justification and Explanation of Researcher's Interpretation of Data

As this phase collected qualitative data, the researcher was required to interpret the participant's experiences and stories. To ensure a level of quality in these interpretations member checking was implemented.

Additionally, analytical memos were recorded to aid data analysis. Nodes were created using participant's experiences and stories. Any expression of digital exclusion or inclusion was used to populate a node.

Themes were then generated by grouping similar nodes together. During the analysis process, the researcher perceived digital exclusion to be any experience, occurrence or factor that prevented the participant from using technology in the way it was intended by any stakeholder. The researcher perceived digital inclusion to be any experience, occurrence or factor that allowed the participant to use technology in the way it was intended by any stakeholder, for example Participant 5 stated, “*I couldn't access resources*”. This was interpreted by the researcher as digital exclusion because they were unable to use the technology in the way it was intended by their teacher. This statement formed part of the ‘VLE’ node and that node was included in the IT Support theme.

4.8 Phase 2 Data Collection and Analysis

4.8.1 Semi-structured Interviews

Phase 2 interviews used the same interview schedule as Phase 1 but with the addition of further areas for discussion and prompts (Appendix 7) to investigate themes that emerged from the data of Phase 1. The additional Phase 2 areas for discussion and prompts consisted of specific points raised by the participants from Phase 1 as well as analytical propositions that emerged from the analysis of Phase 1 data.

Taking into account that the purpose of Phase 2 was to meet the second objective of this research and to build on the findings from Phase 1, the interview schedule was focused to reflect this. Again, the interview started with the same two primary open questions to give the participants the opportunity to share their characteristics in their own words. They were then asked to share their experiences of technology during their programme, specifically the blended learning unit they had just completed. After the participants had shared their experiences, the focused areas were discussed if they had not previously been commented on.

Ten telephone interviews were conducted in Phase 2 and lasted between 24 and 54 minutes. The interviews were conducted during the afternoon or early evening and were recorded using a tablet and a smartphone. One interview was conducted while the participant was a passenger in a car. Although the data collected during this interview was valuable, the sound quality was expected to be poor so additional written notes (as well as memos) were made.

4.8.2 Thematic Analysis

To meet the second objective of this research: To investigate the usefulness of current and emerging technologies for pedagogy with a diversity of learners, two types of data were gathered: Semi-structured interviews were used to collect data from a second sample which investigated further the points made by the Phase 1 sample in terms of what current and emerging technologies are used and their experiences while using them, and a review of the literature investigated what current and emerging technologies are being used in HEI and how useful these could be to a diversity of learner.

The data analysis of the semi-structured interviews in Phase 2 followed the same process as Phase 1 analysis with two exceptions: firstly, a ‘Characteristics’ node was included in the data base, to more efficiently manage the participant’s characteristics and secondly, during Step 3 – Coding on, the nodes were not split into exclusion and inclusion as they were in Phase 1. The reason for this was that the researcher did not want to limit or restrict the analysis by forcing themes into these two sub categories. Instead a thematic map of the data set (Braun and Clarke, 2006) was allowed to emerge openly with no restrictions. As the research had

fostered an open approach with regards to the interviews by not having any pre-determined or expected hypothesis, it was considered to take a more open approach to the data analysis process at this stage to allow the themes to emerge naturally and holistically.

Figure 9 illustrates the generated ‘nodes’. The first column identifies the name (node) and the second column identifies the number of sources (participants) text coded from their interviews at that node. The third column represents how many references (pieces of text) there are included in that node across the entire data set.

Name	Sources	References	Created On	Created By	Modified On	Modified By
Access	2	7	23/05/2014 11:57	BHC	23/05/2014 14:17	BHC
Age	9	15	12/05/2014 15:15	BHC	29/05/2014 10:28	BHC
Appropriateness	1	2	23/05/2014 13:56	BHC	23/05/2014 14:18	BHC
Assessment	7	13	13/05/2014 10:53	BHC	29/05/2014 10:23	BHC
Attitudes	10	81	12/05/2014 10:57	BHC	29/05/2014 10:33	BHC
Blended learning	2	3	13/05/2014 10:51	BHC	29/05/2014 10:31	BHC
Blog	2	3	23/05/2014 11:41	BHC	29/05/2014 10:33	BHC
BU app	4	6	12/05/2014 11:01	BHC	23/05/2014 14:24	BHC
CHARACTERISTICS	10	59	12/05/2014 10:55	BHC	23/05/2014 13:48	BHC
Chinese whispers	5	8	13/05/2014 11:26	BHC	23/05/2014 13:57	BHC
Collaboration	2	3	23/05/2014 11:41	BHC	23/05/2014 14:30	BHC
Communication	5	8	12/05/2014 15:47	BHC	23/05/2014 14:24	BHC
Compatibility	1	2	13/05/2014 11:24	BHC	13/05/2014 11:24	BHC
Course content	10	40	12/05/2014 11:05	BHC	29/05/2014 10:28	BHC
Distractions	1	1	13/05/2014 12:12	BHC	13/05/2014 12:12	BHC
Employment	3	4	13/05/2014 11:28	BHC	29/05/2014 10:27	BHC
Equipment	7	29	12/05/2014 11:00	BHC	23/05/2014 14:25	BHC
Family	5	7	12/05/2014 15:22	BHC	23/05/2014 12:01	BHC
Feedback	1	1	13/05/2014 12:10	BHC	23/05/2014 13:48	BHC
Finances	2	2	13/05/2014 11:22	BHC	13/05/2014 12:08	BHC
Group work	5	9	12/05/2014 10:59	BHC	29/05/2014 10:25	BHC
Health	1	2	12/05/2014 15:52	BHC	29/05/2014 10:26	BHC
Holidays	1	1	13/05/2014 13:01	BHC	13/05/2014 13:02	BHC
Improvements	5	9	12/05/2014 11:14	BHC	29/05/2014 10:21	BHC
Independent work	3	4	12/05/2014 10:59	BHC	29/05/2014 10:15	BHC

Figure 9. Screenshot illustrates the nodes (from A – I).

Step 5 of the six step analysis model (Braun and Clarke, 2006) (Table 10) sees themes defined. Themes generated from each node were organised into bigger themes where appropriate to do so. It was considered that there were two ways to achieve theme emergence in this instance: First, to focus on the nodes with the most sources referring to it or second, to focus on the nodes with the most references referring to it. The decision was made to focus on the latter, the nodes with the most references made to it because where the questions during Phase 2 focused on specific points raised from Phase 1, it was possible that all or many of the participants would share at least one reference to every question asked. Even if it was just a “no, I don’t agree with that statement”. Therefore, the number of sources making reference to any node or theme may be misleading. The number of references though would demonstrate how many times a theme was referred to. If a node or a theme was referred to many times it was a point that the participant spoke about in depth. This is illustrated in Figure 10.

Name	Sources	References	Created On	Created By	Modified On	Modified By
Support	9	28	03/06/2014 16:39	BHC	03/06/2014 17:37	BHC
Social Media as a Source of Panic	5	9	03/06/2014 16:51	BHC	03/06/2014 16:52	BHC
Social Media as a Source for Support	6	9	03/06/2014 16:43	BHC	03/06/2014 16:52	BHC
Self Doubt and Perceptions of Technology	9	23	03/06/2014 16:40	BHC	03/06/2014 17:44	BHC
Self Confidence	8	11	03/06/2014 16:40	BHC	03/06/2014 17:42	BHC
Perceptions of Influence of Own Age	8	11	03/06/2014 16:39	BHC	03/06/2014 17:42	BHC
Perceptions of Influence of Others Age	8	9	03/06/2014 17:32	BHC	03/06/2014 17:42	BHC
Learning	8	26	03/06/2014 16:38	BHC	03/06/2014 17:41	BHC
Interactivity	2	3	03/06/2014 16:46	BHC	03/06/2014 17:40	BHC
Frustrations with the VLE	6	16	03/06/2014 16:41	BHC	03/06/2014 17:43	BHC
Convenience of Learning and M-Learning	7	32	03/06/2014 16:42	BHC	03/06/2014 17:44	BHC
Collective Opinions	7	13	03/06/2014 16:44	BHC	03/06/2014 17:44	BHC
Beginning of the Course	7	12	03/06/2014 16:42	BHC	03/06/2014 17:45	BHC

Figure 10. Screenshot illustrates emerging themes.

4.9 Phase 2 Findings and Implications for Phase 3

In Phase 2, two types of data were gathered: Semi-structured interviews were used to collect data from a second sample which investigated further the points made by the Phase 1 sample in terms of what current technologies are used and their experiences while using them.; a review of the literature investigated what emerging technologies are or potentially could be used in HEIs. Member checking took place after analysis and followed the same process as Phase 1. Five of the participants responded and none reported any differences in the researcher’s interpretation of the data to the stories elicited.

The following vignette from Participant 26 gives a flavour of the stories shared in Phase 2. In brackets are themes that the data was coded to.

I have problems with the Internet sometimes access and that sort of thing I find quite difficult from home. It depends on whether the Internet is working sometimes and when I’m doing research and things I need to get access and play around (Frustrations with the VLE). I don't use uni computers that much because we're ... based so don't go to ... My laptop crashed etc so I used the resources at ... once but think I struggled a bit with the evidence to guide practice. I found it a little bit too fragmented for me, it's hard to explain but you know, it's when I'm quite a methodical person but I didn't always get it (Learning). For example, it said if you haven't this piece of work, it shows you what we studied and how you've done it, to give us some more examples and so you can understand it better rather than just trying to teach something that makes sense. We have a Facebook group it's really helpful actually because I transferred from a different uni at the start of the second term (Beginning of the course). In some of the e-mails from uni I'm not getting copied into so. So I do find it quite helpful and people post on that, like the (Social media as a source of support) one if which is due next week, so it was put up just to let everybody know we have e-mail but it starts at nine and I never got the e-mail so that was really quite helpful me. There has been a bit of an argument on Facebook between two girls and someone said take this off Facebook. It's not appropriate it going on. But sometimes people will...

cont....put what time are we starting etc and if we get on the bus in ... someone will put 11.45 and someone else will put something about an e-mail sent 8:10 so it is good like that. It is quicker sometimes than the uni letting us know stuff. I'll check that kind of thing. I did the access course to get on this course. We just used basic Word, Google Scholar. In my past life I have been a PA and things like that and we used different stuff than searching and stuff. I don't think age plays any part in searching for things (Perceptions of influence on own age). I don't know if mature students are more into other sorts of technology. I think the younger students are into Facetime, things like that (Perceptions of influence of Others' age). I don't even know what they call that SnapChat, I have no idea about things like that. I see the younger ones using that and I think what is that?

On a couple of occasions, I have rung IT, I can't remember what for now, one evening cos I can't access something and that kind of thing. I had to go back over remotely and did something and then that sorted that out at the same with the library. (Support). I was trying to access some things which are fine. ... quite hard specially with the library searches. You know it will bring up a list of things, what you type in brings up the list but there's only a handful you can actually access. I just focus on the ones that I can access. I can't ever access the rest so I don't think it's cheating, but I have my old library search from a previous course at uni. I used to use that more because I can get more information.

Some of the stuff we're asked to do could be a little bit more clearer (Learning). Questions like the exploring evidence to guide practice, it did have some questions about that. Some people wanted a definitive answer. Some work will go back and you'd look through it again and you could tell people were getting frustrated. It weren't that they don't understand what we're supposed to be doing but it just kept looking at the same thing to me (Collective opinions). I need a specific answer (Learning). Anything online today is a good thing, not just for assessment as I find it easier to do, especially if it's got pictures and diagrams. I like being able to submit my essays online (Convenience of learning and m-learning). Sometimes I think I can get a little bit lost when you're going through when you want to open one thing in mind. It's not there, especially when you had to get the all that because I come from a previous place which was slightly different, it's taken me a bit longer to get into the flow of to be honest (Frustrations with the VLE). I'm still going through the different areas. Generally speaking I do navigate my way around pretty well. I didn't know there was an app, I know some of the girls say they can get their e-mails on the phone things like that. I didn't know there was that. I got a Kindle that I take to lectures, sometimes I find that helpful (Convenience of learning and m-learning) but quite like books but like I say because I'm not at that often I tend to use more journals. I have to print them off, read on paper. I am a reasonably competent IT user (Self confidence) but it would have been helpful to know how to use some of the stuff here as it's different from before (Beginning of the course). The Access course helped me get back into it because obviously it's been a long time since I was at school (Self doubt and perceptions of technology). Essay writing in particular. I did find that the Access helped it.

Focused questions that emerged from the data analysis of Phase 1 were added to the original interview schedule. An account of the analysis of these points follows:

****Does the phenomenon of ‘Chinese whispers’ exist across a new sample of learners and why?***

Eight of the 10 participants suggested that there was an element of a ‘Chinese whispers’ effect that happens on the group’s Facebook page. Five of which also said that this generated a sense of panic within the group. Looking at the characteristics of these five participants, there is no pattern as to which learners experience this. The two participants that did not voice opinions of ‘Chinese whispers’ did not use Facebook. One of the participants did however belong to a cohort ‘WhatsApp’ group but did not experience any generation of panic with this method of communication. Although most of the participants experienced a ‘Chinese whisper’ phenomenon, this did not deter them from using the Facebook group as a support network, as what they gained from it appeared to be more beneficial to them. The social circles within this sample that are created using social media play a part in constructing attitudes towards digital exclusion in as much as misinformed or incorrect posts lead to anxiety and concern., and not being able to use Social Media in the way it was intended in this instance.

The following data supported the opinions of eight of the participants,

“We have a group Facebook page that is part of our cohort. I have different views about Facebook, sometimes it can be productive you can clarify quick questions on it but other times it can be a generator of panic if someone puts something on there, it doesn't take long for it to cascade out and cause a bit of uncertainty, so I'm 50-50 on that whether it's good or not” (Participant 21)

This did only seem to happen on social media sites, as although rumours could spread verbally in a f2f context this did not seem to cause any panic as it was limited to the immediate social circle and not the whole Facebook group.

****Are perceptions of technology influenced by previous experiences of technology across a new sample and why?***

This Phase did not find that previous experiences influenced current perceptions of technology per se. It did however find that the technology used previously, generated a feeling of self-doubt. Nine of the 10 participants voiced feelings of uncertainty (prior to programme commencement) with the technology to be used on the programme and whether they had used it before. The older participants (40+) who had enrolled onto the programme after a long period of employment perceived the technology to be different to that they had been using at work or at home and therefore difficult to use. These feelings of self-doubt were experienced prior to the programme starting but developed into positive experiences when the programme commenced. Whereas the younger participants (<40) who shared similar views were not anxious about the technology until after the programme had started and they knew which technologies they were to use. One participant stated that,

“The technology aspects of the programme was one of the things that scared me the most. Because it's been many, many years since my first degree and technology has obviously moved on significantly. Whilst I was

using computers at work, I was trained at what I needed to do and programs I needed to use but over and above that my skills were quite limited. So actually I was a little bit anxious about how I might be able to access the information and what was expected to be done electronically. That in itself has been a huge learning curve for me but something that I have actually quite enjoyed.” (Participant 19, age 48)

Whereas a younger participant stated that,

“At the start I was a bit lost with it because I didn't realise how much online it was going to be compared to school and college and things like that so that was an adjustment for me and getting the hang of what you need” (Participant 17, age 20)

The older participants all agreed that their self-doubt had not materialised in practice and that they were able to use the technology without any problems that related to their skills. Additionally, none of the older learners shared any experiences of digital exclusion due to a lack of personal technological skills. Any experiences they had faced with new technologies, such as blogs, they had met with a positive approach which allowed them to pick up the new skills quickly.

****Are learners aware of all the support networks in place across a new sample and if not why?***

Support was a recurring form of exclusion in Phase 1. Upon further investigation*¹ it came to light that there were more support networks available to learners within the school than were shared during data collection. One of the propositions to investigate during Phase 2 was to discover whether the learners were aware of all the support networks available and if so how they knew about them. The vignette below from Participant 25 highlights learner awareness regarding support networks available.

This unit was really really fraught to be honest with you with regards to the technology. I couldn't really access the information needed for the course [equipment]. I can go in and see the technology support. I had to go to the IT support just to see how to access stuff and to get the information but when I did that it was all right. It was just a very fraught course with things we had to read for the examination but very fraught. There are lots of support systems, I call my mates... sometimes I just go and speak to the teacher handling the course. I say I'm struggling with this or that, like with the content. I have a lot of support around me. I think that my age doesn't mean that I am not as good as younger students (Support)

Again, with the Phase 2 sample, support was a significant theme that emerged from the data. The formal support networks at the university that were commonly used by this sample were IT support and Library support. The group's Facebook page was an important informal source of support (academically and emotionally) and some participants relied on peers and teachers for f2f support. One participant knew about

¹ *A search of the university's website found that there were a number of other sources of support available to learners.

the Learning Technologist as a source of support and one participant said if she needed any type of support she would look on the VLE for information. Seven of the 10 participants were aware of being informed about support networks during their induction at the start of the programme however, as the support was not needed then, they did not store the information. The following data demonstrates this sentiment,

“I think someone came in at the beginning of the programme and told us about IT support but because it was at the start you don't remember it because so many things are going on and you've been given so much information, I don't know where I filed it.” (Participant 23)

This raises an important point. Most universities will prepare a carefully organised induction for their new learners in order to inform them of all the necessary information that they may need during their time at university, yet it could be argued that most of that information is lost and only the information that is significant at that time is remembered. There is a case here for universities and other HEIs to stagger the induction process so that certain information is given later at a time when it might be more relevant. Another theme that emerged involving support was the addition of a session or short programme where learners could come in and ‘play around’ with the VLE and/or learn the study and academic writing skills required for the programme. One participant stated,

“I think a pre-degree crash programme would be a fantastic idea. We can come down in September and even if we had a week to go through the systems and just go through it and everyone feels really familiar by the time you start. That would be fantastic because I can still go into [the VLE] now and go straight to my homepage. I have no idea what else is going on because it's not part of what I'm involved in. So yeah it would really be really good to have a crash programme a couple of days just getting to know the system and to show us what we are looking for.” (Participant 22)

****Does a ‘blurred line’ exist between technological and non-technological experiences across a new sample and why?***

When the participants were asked directly the difference between technological and non-technological experiences on their programme, they were clear about the distinction, for example one participant answered,

“It's massively helped with learning and also just in terms of access to worldwide resources. That's a huge influence through technology on the programme. Really the non-technological resources are people's expertise and the teachers and placement is another area where you don't necessarily rely on technology.” (Participant 24)

When the participants were asked at the beginning of the interview about their experiences of technology on the programme, in line with Phase 1, Phase 2 participants also talked about non-technological aspects. So it could be argued that this happens because the participants are on a blended learning programme and elements ‘blend’ into one however, further research would be required to validate this suggestion.

4.9.1 Other Key Findings

Phase 2 supported the findings from Phase 1 with regard to the digital native/immigrant debate. Phase 1 identified that for that sample, age played no part in digital exclusion. During Phase 2, this theme was investigated further. Interestingly, the younger participants, considered by some to be digital natives, perceived the older participants, considered by some to be digital immigrants, as facing certain challenges with technology yet none of the older participants interviewed shared this view. One participant stated,

“We have a few mature learners that are kind of in their 40s and they sometimes can't get to grips with technology. They make sure they spend extra time on the computer and finding out things so they don't struggle. They all say that technology is not their forte.” (Participant 20, age 20)

Whilst the older learners would admit that some technologies were new to them, they did not consider this to be exclusion only an opportunity to learn something new. Furthermore, the older learners perceived the younger learners as having previous knowledge and experience of using new technologies, therefore an advantage. One participant stated,

“I feel that younger learners possibly have an advantage in IT because they learnt it at school. Things like my Endnote. They already knew about it and I was like ‘what's that?’ I may have to work a bit harder to go and find out what it is.” (Participant 21, age 41)

The younger learners also perceived themselves as having an advantage with technology however, this did not translate into practice. The younger learners in this sample appeared to be limited in which technologies they used, being very capable of using social media and other methods of communication but not as capable at using sites for research or some applications on the VLE. This runs parallel with the literature from the Technology Acceptance Model (TAM) (Davis, 1989) which emphasises younger learners' perceived ease of use with ubiquitous technology (Teo, 2009) and using technology for consumption and not creation (Bennett and Maton, 2010). The Technology Acceptance Model is an information systems theory that attempts to illustrate how users come to accept and use a technology. The theory proposes that there are a number of factors that influence one's decision of how and when to use a new technology, specifically: Perceived usefulness (PU) and Perceived ease-of-use (PEOU). Although widely accepted and adapted (Adams et al., 1992, Hendrickson et al., 1993, Szajna 1994) Chuttur (2009) criticises it for its lack of heuristic or practical value. In the context of this research the TAM is inadequate as it proposes that potential users make 'decisions' on using technology based on its perceived usefulness and ease of use however, where learners are not given a choice of technologies to use in formal learning situations such as blended learning programmes, decisions on whether to use the technology are redundant. There may be a conflict between users willingness to invest time in a technology based on TAM principles and the requirements of a programme where the technologies to be used in formal learning situations are usually chosen for them. However, there are technologies that are chosen by learners to use in an informal learning context, such as a group Facebook page, where TAM principles may apply.

4.9.2 Themes

The accounts below discuss the themes that emerged from the Phase 2 analysis. The numbers in brackets illustrate how many participants (sources) contributed narratives to the theme and how many times (references) a narrative occurred within that theme.

4.9.2.1 IT Support

(Sources 9 References 28)

Support was the most dominant theme with 28 references across nine of the 10 participants. In addition to the analysis above (section 4.10) support was also heavily relied on for technological problems. Participants also turned to library support and teachers for technological support. If a participant experienced a technological problem, they would not only contact IT Support but in some instances would ask for support from a teacher. In some cases it was because it was more convenient to ask a teacher as the problem arose prior to a lecture. The participants who asked a teacher assumed that they would be able to offer the support that they needed. This highlights a common dilemma in HEIs and other educational establishments where teachers are asked to bring their classes into the 21st century and make use of a VLE. But it is not always the case that teachers are qualified, able or often willing to create innovative lessons using technology. And if they do and their learners experience any sort of technological barrier or cannot use the technology in the way it was intended, should the creator of such lessons also be able to manage any obstructions?

The participants were not as enthusiastic about the support that was offered by the library. A number of participants experienced issue with receiving the help that they needed.

“It seems that whenever you go into the library to ask someone's help or ask someone how to research there's always a bit of a problem or they just want to rush through it. I do think it's a bit of a problem.”
(Participant 22)

The library was also perceived to be a place that could potentially be more useful to them if they were given an opportunity to explore what was on offer at a relevant point in their programme.

“It would be really good if we could have gone in {to the library} and said right go and search stuff and have a little play on the system. I never felt that we really got that I just feel that I still don't really know how to research because it's all such a blur the first couple of months.” (Participant 22)

This participant went on to discuss the personal support they get from a divisional library,

“Actually, a very good form of support on a one-to-one is down at { }, we have a division there. They have a library and the librarian there is absolutely fantastic. Sitting down and working through the whole system. So because there was only { } of us in that year she was just wonderful. Whenever you go in there and say I don't know how to research and you can ask her, I find this brilliantly helpful.” (Participant 22)

It would appear from the data that the participants would value an opportunity to go into the library at a time that is relevant, to independently explore but with professional 1:1 or small group support if required. This could provide a worthwhile opportunity for new learners to investigate what could be useful and give them the confidence to access the facility freely when they need to.

4.9.2.2 Self Doubt, Self Confidence, Perceptions of Technology and Beginning of the Programme

(Sources 24 References 46 – combined themes)

Eight of the 10 participants expressed narratives of self-confidence when using technology. This confidence was built from experiences of using technology at work.

“I worked in an office for 10 years I know how to use a computer, so I don't have any problems.” (Participant 23)

Older participants had built up confidence using new technology encountered on the programme. Some older learners had claimed that they had experienced feelings of anxiety before the programme had started due to not knowing what technologies they would be exposed to during the programme. Additionally, some participants felt that they should have the opportunity to experience the technologies they are to use at the beginning of a programme,

One participant stated that,

“I think when you first go in to university you should get a half day looking round the library. I feel that I don't know how to use them.” (Participant 22)

This sentiment was shared by seven of the participants that thought the beginning of the programme was an important time to allow the learners to explore the resources they would have to use. Additionally, much of the information given at the induction was lost on the learners due to only storing information that was immediately relevant to them. So information regarding support networks, such as IT support, was not relevant to them at that time so it was not remembered.

4.9.2.3 Learning Styles and Optimum Blend

(Sources 8 References 26)

The findings suggest that eight of the 10 participants made adjustments to accommodate the teaching and learning methods used on this unit. Many found that a blended learning approach enabled a greater degree of flexibility which was appreciated, especially by the participants who had to travel further in to university and by those participants who had childcare commitments. For this sample, a blended learning approach has the potential to suit the learning process beyond a conventional classroom.

Learners are aware of learning styles and this was evident in the findings. Although learning styles were not always discussed in terms of: visual; aural; read/write and kinaesthetic etc., learners knew how they learned best and which teaching methods suited them.

During the unit, eight of the 10 participants discussed learning and how a blended learning approach facilitated the learning process. All eight participants disclosed that this was the first time they had experienced a blended learning approach and there was a degree of adaption for all of them.

“I've had to accommodate that sort of learning at home. It means I have to login at home and access all the services I find I need at home. So in a way that has been quite useful to me” (Participant 19)

The blending of f2f and TEL methods on the whole suited these participants, although some thought that a long lecture was not a useful way to learn.

“I find it hard way to learn sitting in the lecture with people talking at me and being with people that I am not necessarily that comfortable with in a classroom.” (Participant 18)

Lectures have become a significant part of the university experience and are a cost effective way of reaching the most learners with the fewest teachers. If technology could be used to enhance this method to create a more interactive experience, it may engage learners, for example using interactive voting systems, twitter or web quests.

Being able to engage with the learning process from home was convenient for many of the participants and will be discussed in section 4.10.2.5.

4.9.2.4 Learners Perceptions of Age

(Sources 8 References 11 and Sources 8 References 9)

The themes representing age were categorised into two separate themes: ‘Perceptions of Influence of Own Age’ and ‘Perceptions of Influence of Others’ Age’ because there was an interesting distinction between the two. This is discussed in section 4.10.1 but some examples follow.

Eight of the 10 participants said that their age influenced their experiences with technology however, none of these experiences were related to digital exclusion. Of the older participants (40+) that thought that their age influenced their experiences with technology, all perceived their maturity to be an advantage in encountering and adapting to new methods. An example of this attitude is below,

“I don't feel that my age plays a factor in anything negative at uni because I came straight off the access programme it really prepared me so I don't feel I had any bad experiences.” (Participant 21, age 41).

Of the younger participants (<40), all thought that their youth was an advantage because they would have experienced similar methods at school. An example of this attitude is below:

“I'm quite fine with that because we got brought up with computers at school and that and in terms of finding the work and that it's fine.” (Participant 18, age 23)

Eight of the 10 participants thought that others’ ages influenced others’ perceptions and use of technology. Older participants (40+) thought that younger peers did not worry about the technology and had an advantage over them due to learning with technology at school: although they did not perceive this to be a disadvantage for them, the older participants viewed this as a challenge to motivate them. The younger participants (<40) thought that this age gap was a disadvantage for the older participants. This is interesting because all of the participants that expressed others’ ages as an influence of exclusion thought that older learners were at a disadvantage, although in reality this was a false perception. It would seem that no matter what the reality is with regards to older learners using technology, the perception is that they are at a disadvantage or will not be able to use it as effectively or as confidently as younger learners. But when you consider that 72% of organisations in the UK and 90% of the public sector use e-learning to train their staff (CIPD, 2013), it

should not be a surprise that older learners, who may have had a career before their university programme, are as capable as younger learners in using technology for learning.

4.9.2.5 Convenience of Learning and M-Learning

(Sources 7 References 32)

The convenience of learning came from not only the TEL methods used but the location in which to access those TEL methods. TEL methods that can be used in different situations allow a learner to fit their learning into their lifestyles, for example Participant 22 shared their appreciation for m-learning below:

“I could put the podcasts on while I was cooking and listen to the podcast. We don't have that anywhere on the [...] units. It was nice to have that so you can download and listen to it when walking.” (Participant 22)

Being able to access programme content in different locations gave the participants freedom to choose the most convenient time and place to learn, whether it was at home working independently or at university with peers.

“We have a study day where we can choose to go into uni to work in groups on the computer or we can work at home separately on the computer so it is however you choose.” (Participant 18)

This is important because a modern day learner is used to being in constant contact socially and used to finding information instantly with the aid of mobile devices. Theorists such as Chan et al. (2006) and Chee-Kit et al., (2010) see this phenomenon as seamless learning: the convenience of learning anything, at any time at any place. If the learner population have become accustomed to continual connectivity, the borders between home and university could be viewed as barriers to learning. On the other hand, a persistent nexus between formal and informal learning, with no respite could be detrimental and would warrant further research. Whether online activities are kept to specific study days or incorporating ‘down time’ from studying, might reflect a more balanced lifestyle. Additionally, some say that m-learning suits some learners more than others such as mature, gifted, international, remote and SEN learners (Savill-Smith and Kent, 2003, Strom and Strom, 2002). Never the less, this research shows that for these learners m-learning is convenient and valued.

4.9.2.6 Collective Opinions and Chinese Whispers

(Sources 7 References 13)

Whilst sharing their stories during the interviews, seven of the participants regularly backed up their statements by including views that they thought would be shared by their peers, for example,

“I don't feel that I am learning, not taking anything in. I'm more interested in the online elements and it's the same with quite a few people in my class.” (Participant 17)

This was usually to back up negative comments. A reason for this could be to offer a collective opinion to gain support or produce further evidence for their possible controversial comment.

4.9.2.7 User Friendly VLE

(Sources 6 References 16)

Six participants expressed frustrations with the VLE. This ranged from the number of times a password is requested to user unfriendliness. An example of this exclusion is below,

“It's not self-explanatory when you're logging on and looking for information or trying to locate stuff.”

(Participant 17)

On the other hand, some frustrations come from the content on the VLE rather than access or navigation. One participant stated that,

“I think [the VLE] is easy to navigate, but I think the content on there should be so it's only relevant to you because lots of stuff on there is not relevant to me.” (Participant 21)

4.9.2.8 Social Media as a Source of Support and Panic

(Sources 6 References 9) and (Sources 5 References 9)

Analysis of this theme has been discussed in section 4.9 however, to summarise the key points and to give further examples, one participant stated that,

“There is a Facebook page that people use when we are doing assessments to share information with.”

(Participant 19)

More than half the participants valued the cohort's Facebook page as a source of support. The narrative above gives some indication of what the participants used it for and although half of the participants thought that Facebook was a generator of panic, they all thought that the benefits far outweighed the disadvantages. It would seem that as the programme goes on, the learners learn to be selective in what they take from it. This is demonstrated by the narrative below,

“Facebook certainly does spread Chinese whispers, especially in the first year I think probably maybe in the first half year people would put things on like ‘how does this work, where does this go, we got an essay’ and that did frighten quite a lot of people but now coming up to the end of our second year people have realised that there are certain individuals on there that panic and that will put information on there that others will read. You've got to sort through and read through the lines.” (Participant 22)

4.9.2.9 Interactive and User Friendly TEL

(Sources 2 References 3)

‘Interactivity’ was expressed as a solution by two of the participants as a way to engage learners with elements of the programme that were often disengaging, such as lectures.

“because we're at a different campus, they use this big white board and it's an interactive thing so they give us a blank thing and it comes up with a question on the board and then you have to click 1 2 3 4 on the answer. So that is quite good actually that gets everyone involved.” (Participant 20)

4.9.3 Usefulness of Current Technologies for Pedagogy with a Diversity of Learners

The data revealed that availability of tablets and smartphones that are compatible with university resources and content is useful due to its convenience. Many of the participants had families and jobs within which university studies had to fit in. Being able to access resources and content at home or on the move made for effective time management. Older learners found completing the blogs for formal learning a useful process to consolidate what they had learnt from researching and from lectures. Younger learners were resistant to completing the blogs and therefore did not find them useful and according to Participant 17 '*a waste of time*'. Being able to join and participate in a group Facebook page appeared to be the most useful current technology the participants used. There is evidence from the data that the Facebook group was used for academic, technological, emotional and pedagogic support as well as a virtual social meeting place. Of the few participants that were opposed to joining a social media group page at the start of the programme succumbed to its advantages by the end of the first year, recognising the potential for support networks that it offered. What was surprising was the university app was not considered useful. This was due to it regularly crashing and some elements of it not being compatible with all mobile devices.

4.9.4 Characteristics

The most dominant characteristics, according to the number of sources, are: Previous Jobs; Age; Year of Study; Children; Motivations; Family; Geographic.

Figure 11 illustrates which characteristics were shared by the participants, the number of participants that shared the characteristics and the number of references made to each characteristic. This is predominantly in line with Phase 1 characteristics albeit the number of sources are different, the addition of Children and the exclusion of Hobbies and Previous Qualifications (Hobbies and Previous Qualifications were shared as characteristics in Phase 2 but were not considered as dominant). Characteristics were deemed to be dominant if there were four or more participants that shared that characteristic. During Phase 1, characteristics were deemed to be dominant if at least half the sample shared the characteristic however, it was necessary to lower the threshold for dominant characteristics to four (which is just under half) during Phase 2 as there were only 3 characteristics that were shared by more than half of the Phase 2 sample. This finding demonstrates that learners possess their own unique set of characteristics.

The screenshot shows the NVivo software interface with the following components:

- Menu Bar:** File, Home, Create, External Data, Analyze, Query, Explore, Layout, View.
- Toolbar:** Document, External, Memo, Video, Framework Matrix, Node, Relationship, Create As Node, Create As Case Nodes, Create As Static Model, Set, Folder, Search Folder, Source Classification, Node Classification, Attribute, Relationship Type, Classify Nodes from Dataset.
- Left Panel (Nodes):**
 - Characteristics
 - People 1
 - People 2
 - Phase 1a - Open codes
 - Phase 1b - Re-coding
 - Phase 1c - Generating T
 - Phase 2a - Open codes
 - Phase 2b - Re-coding
 - Phase 2c - Generating
 - Query Based Codes 1
 - Sources
 - Nodes** (selected)
 - Classifications
 - Collections
 - Queries
 - Reports
 - Models
 - Folders
- Main Window (Nodes Table):**

Name	Sources	References	Created On	Created By	Modified On	Modified By
Year of Study	5	6	13/06/2014 10:15	BHC	13/06/2014 10:25	BHC
Geographics	4	4	13/06/2014 10:09	BHC	13/06/2014 10:43	BHC
University	2	2	13/06/2014 10:22	BHC	13/06/2014 10:25	BHC
Time in previous employment	3	3	13/06/2014 10:19	BHC	13/06/2014 10:20	BHC
Sports	1	1	13/06/2014 10:07	BHC	13/06/2014 10:08	BHC
Single	3	3	13/06/2014 10:22	BHC	13/06/2014 10:27	BHC
Returning to education	1	2	13/06/2014 10:24	BHC	13/06/2014 10:25	BHC
Renting	1	1	13/06/2014 10:27	BHC	13/06/2014 10:27	BHC
Previous qualifications	3	6	13/06/2014 10:09	BHC	13/06/2014 10:15	BHC
Previous jobs	6	9	13/06/2014 10:10	BHC	13/06/2014 10:26	BHC
Previous accommodation	2	4	13/06/2014 10:12	BHC	13/06/2014 10:27	BHC
Practical	1	2	13/06/2014 10:06	BHC	13/06/2014 10:08	BHC
Pets	1	1	13/06/2014 10:21	BHC	13/06/2014 10:21	BHC
Married	1	1	13/06/2014 10:16	BHC	13/06/2014 10:17	BHC
Like a challenge	1	1	13/06/2014 10:11	BHC	13/06/2014 10:11	BHC
Leader	1	1	13/06/2014 10:18	BHC	13/06/2014 10:18	BHC
Health	1	1	13/06/2014 10:13	BHC	13/06/2014 10:13	BHC
Friends	2	3	13/06/2014 10:07	BHC	13/06/2014 10:10	BHC
Fortune	1	1	13/06/2014 10:14	BHC	13/06/2014 10:14	BHC
Family	4	4	13/06/2014 10:06	BHC	13/06/2014 10:27	BHC
Enthusiastic	2	2	13/06/2014 10:08	BHC	13/06/2014 10:21	BHC
Course of study	3	3	13/06/2014 10:17	BHC	13/06/2014 10:25	BHC
Children	4	6	13/06/2014 10:16	BHC	13/06/2014 10:27	BHC
Motivations	4	5	13/06/2014 10:07	BHC	13/06/2014 10:42	BHC
Age	6	7	13/06/2014 10:14	BHC	13/06/2014 10:26	BHC

Figure 11. Screenshot of characteristics.

All of the themes from Phases 1 and 2 were analysed and merged into larger themes of: Technology; Pedagogy and Human. The illustration below shows how the smaller themes were grouped.

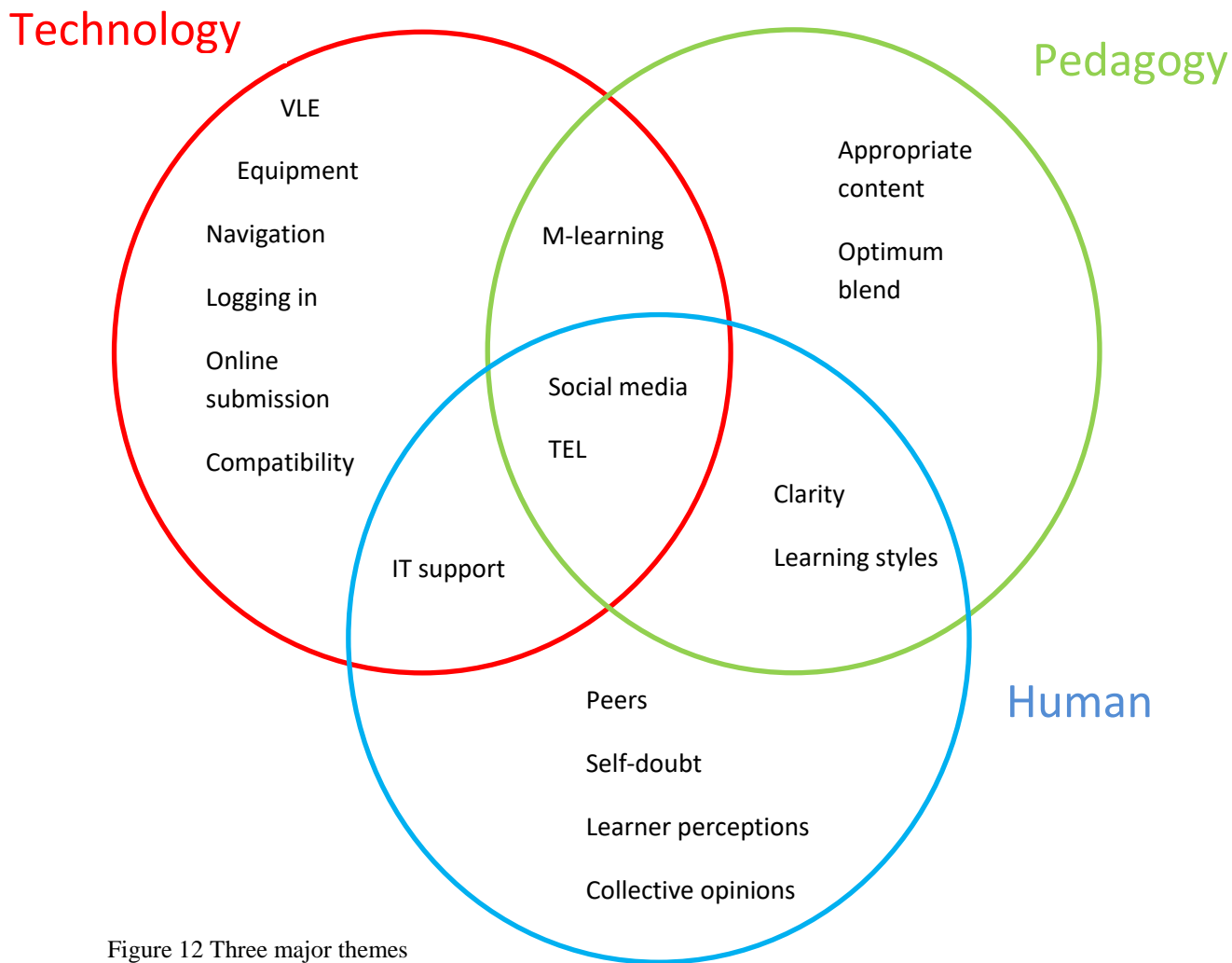


Figure 12 Three major themes

Figure 12 illustrates how the smaller themes were grouped into: Technology; Pedagogy and Human. Initial analysis of the smaller themes identified some that fitted easily into one of the three major themes however, some were more difficult to categorise for example ‘Optimum blend’ relates to the mix of technological and face to face content. Furthermore, categorisation by the researcher was influenced by having the previous knowledge and experience of being present during data collection for example, the smaller theme ‘Learning styles’ was initially categorised under Pedagogy however, after some reflection by the researcher was later moved to a shared section with Human. This was because during data collection, analytical memos and interview notes were made by the researcher that related to how the participant learns best, how they like to study, and resources that make them feel comfortable, and all of these have aspects of human feeling. Moreover, some of the stories voiced regarding ‘Learning styles’ related to aspects of technology for example, interactivity with technology. On reflection, most of the smaller themes from Phases 1 and 2 could potentially fit into the centre section of the above Venn diagram, as most have aspects of ‘Technology’, ‘Pedagogy’ and ‘Human’ feelings. The three major themes above were used to develop a conceptual framework (see Figure 18).

The conceptual framework at this stage consisted of nine elements. Figure 17 illustrates how each element of the preliminary conceptual framework is mapped against the themes that emerged from the data analysis in Phase 2. Findings from the literature review support the elements included, for example studies of PLE's (Johnson, 2011) found that they not only enable learners to collaborate with peers but offer opportunities to reflect on their own learning, such as writing blog posts or RSS feeds which encourage self-regulated learning.

The elements that make up the preliminary conceptual framework were member checked and validated by the Phase 2 participants and were validated by new samples in Phase 3 illustrated by Figure 2.

4.10 Justification and Explanation of Researcher's Interpretation of Data

As this phase collected qualitative data, as with Phase 1 the researcher was required to interpret the participant's stories. To ensure a level of quality in these interpretations member checking was implemented. Additionally, the data analysis was used to create a list of elements that were then validated by the same sample in Phase 3.

Nodes were created using participants experiences and stories. Any expression of digital exclusion or inclusion was used to populate a node. Themes were then generated by grouping similar nodes together. During the analytical process, the researcher perceived digital exclusion to be any experience, occurrence or factor that prevented the participant from using technology in the way it was intended by any stakeholder. The researcher perceived digital inclusion to be any experience, occurrence or factor that allowed the participant to use technology in the way it was intended by any stakeholder. Where a participant shared experiences of a technology being useful, supporting their learning or promoting their engagement with the programme, it was considered by the researcher that the technology was perceived as useful to that participant, for example Participant 19 stated, *"There is a Facebook page that people use when we are doing assessments to share information with."*

4.11 Phase 3 Data Collection and Analysis

After analysis of Phases 1 and 2 which proposed that all learners possess their own unique collection of characteristics suggesting that all learners are diverse, it was considered necessary by the researcher to shift the focus of the research at this point from diverse learners to a diversity of learner in relation to sustaining engagement on a blended learning programme.

Phase 3 addressed the third objective which was to examine what learners need to be effectively engaged with a blended learning programme. The findings from Phase 2 were analysed and were used to create a preliminary conceptual framework that consisted of nine elements at this stage. The elements were mapped against the themes that emerged from the Phase 2 data (Figure 17).

As stated above, the purpose of Phase 3 was to examine what learners need to be effectively engaged with a blended learning programme. In order to achieve this, the elements born out of the Phase 2 findings were validated in Phase 3 by following four steps:

Step 1 consisted of member checking and an online questionnaire survey (Appendix 8). The Phase 2 participants (Learner Group 2) were sent an email with key points that were interpretations of their stories by

the researcher as well as a link to an online questionnaire survey. The survey consisted of the elements that had emerged from the findings to this point, in order for the participants to validate. The recommendations offered by the participants were analysed using directed content analysis and at this stage a further iteration of the data from all phases was initiated. As a result, one more element was added to the preliminary conceptual framework. This particular element was supported by existing literature.

Step 2 consisted of instant reaction mobile interviews with participants from the HEI 2 (Learner Group 3). They too were asked to validate the elements which were structurally listed (Appendix 9). The instant reaction mobile interviews were analysed using directed content analysis.

Step 3 consisted of a focus group with participants from the HEI 2 (Learner Group 4). They too were asked to validate the preliminary conceptual framework. The purpose of conducting the focus group in addition to the instant reaction mobile interviews was that it allowed participants to discuss each of the elements within a group environment where points may have arisen that they may not have considered in a 1:1 interview. The focus group data was analysed using directed content analysis.

Step 4 consisted of semi-structured interviews with teachers who design blended learning programmes from both HEI 1 and HEI 2. The purpose of this step was to appraise the individual elements of the preliminary conceptual framework from a teachers' perspective. Although it was not the intention for the data from this step to influence any changes in the preliminary conceptual framework it was considered important to gain their appraisal. Their data was not intended to influence any changes in the preliminary conceptual framework because the data collection processes to this point had been entirely from a learners' voice which was a value that was important for the grounding and nature of this research. Some might consider the collection of the teacher data immaterial in light of this assertion but it was conducted to highlight any factors that may not be possible in practice or any flaws in the preliminary conceptual framework that the researcher had not considered. The semi-structured interviews were analysed using directed content analysis.

4.11.1 Pilot Study

A pilot study was conducted before the implementation of Step 1 and followed the same process as the pilot study in Phase 1.

4.11.2 Step 1 – Questionnaire Survey (Learner Group 2)

A questionnaire survey was created from the data analysis of the findings to this point. The survey questions were made up of nine proposed elements. The survey was given to participants from Phase 2 (Learner Group 2) to validate and offer any recommendations that could improve the preliminary conceptual framework for them. The survey was created using Survey Monkey online software. The online questionnaire survey had a response rate of 50%.

4.11.3 Step 2 – Instant Reaction Mobile Interviews (Learner Group 3)

Instant reaction mobile interviews were conducted with participants from the HEI 2 (Learner Group 3). The elements were structurally presented to the participants to validate. Participants were asked to give comments of how each element might influence their engagement with a blended learning programme. The participants were shown each element of the preliminary conceptual framework by the researcher immediately after they had been using technology for formal learning purposes. The instant reaction mobile interviews took place

while the participant was walking from the IT suite to another classroom for a f2f lesson. The interviews were recorded by the researcher's smartphone and lasted between five and fifteen minutes. The purpose of conducting instant reaction mobile interviews was so that a spontaneous response was given as close to using technology on their blended learning programme as possible (Evans and Jones, 2011).

Before the instant reaction mobile interviews took place, the participants were emailed and informed that they would be asked to give their thoughts on elements that could sustain engagement on a blended learning programme. The participants were informed that they would be asked to comment on each element on how likely they felt they would influence their engagement with a blended learning programme. The words 'digital exclusion' and 'technology' were not explicitly used in the pre interview email or in the interview itself as findings from Phases 1 and 2 showed that a blurred line exists between what is and what is not technological on a blended learning programme, although the words were contained in the Participant Information Sheet. This demonstrates that as a blended learning programme consists of f2f elements as well as technological elements, it is important to consider a blended learning programme as a whole rather than two separate parts (f2f and TEL). No specific instructions were given about how the instant reaction mobile interview would be conducted, only that the researcher would meet the participant at the end of their lesson by the computer where they had been working and the researcher would ask about the preliminary conceptual framework while walking to their next lesson. They were also advised that the interview would be recorded by the researcher's smart phone and instructions about how to withdraw from the research could be found in the participant information sheet. The brief instructions given prior to the interview was to ensure that the appropriate data could be collected but also open enough to allow participants to communicate their views in a way that they wanted to. At the start of the interview, the participants were asked to consider each element in turn, and if they thought the element would encourage and/or sustain engagement on a blended learning programme. As the instant reaction mobile interviews were short, in-depth lengthy conversations were not engaged in; instead the participants were asked to give a validation about each element.

The walk from the IT suite to the next classroom was approximately 300m and took between 5-10 minutes. The next classroom was in another building on a different level, so there was also a flight of stairs to climb.

The instant reaction mobile interview was recorded using the researcher's smartphone. It was recognised by the researcher that some of the responses may be distorted due to movement, and background noise could affect the sound quality of the recording. However, this was considered by the researcher as a necessary nuisance. With this in mind, the researcher had a list of the elements with a ratings scale by the side that was annotated and scored as they were discussed as a secondary method of recording the data.

Out of the seven participants that were interviewed, three had shared their views on all of the elements by the time the both participant and researcher had arrived at the next classroom. The other four participants still had elements to comment on by the time their classroom had been reached, therefore for these participants the completion of the interview was stationary, stood outside of the classroom.

4.11.4 Step 3 – Focus Group (Learner Group 4)

Data was collected from the interaction between the participants in the focus group (Learner Group 4). The focus group consisted of six undergraduate learners from the HEI 2. The participants were in different

cohorts however, they would have been familiar with each other as the department is small, consisting of only five cohorts in their subject area. The fact that the participants knew each other had the advantage that comments could be related to actual incidents in their shared lives. The preliminary conceptual framework was explained to the focus group and participants shared their validations of it within a group setting. That is, participants were able to interact with each other, something that cannot be achieved during a one to one interview. Focus group participants provide an audience for each other which can potentially encourage a variety of communication: jokes; facial expressions and anecdotes, which can add to the data by exposing dimensions of understanding that often do not occur in one to one interviews or questionnaires (Denzin and Lincoln, 2005).

The comments and conversations made during the focus group session were recorded using two devices: a laptop that was placed in the centre of the room and a smart phone that was passed to the participants as they spoke. Passing the smartphone around the group had limitations because participants would start to talk and then realise they did not have the phone so would stop and wait until the phone was passed to them. This occasionally interrupted the flow of conversation. However, any comments that were not captured by the smartphone were captured by the laptop recorder. The focus group meeting took place at the institution the participants attended (HEI 2) and lasted for 59 minutes. The focus group meeting commenced with the researcher explaining the purpose of the meeting and confirming that each participant had received a Participant Information Sheet and returned the Consent Form. The participants were informed that they were to discuss if each element could influence their engagement with a blended learning programme. Again, the words 'digital exclusion' and 'technology' were deliberately not explicitly used in the introduction of the focus group for the same reasons pointed out in section 4.11.3. The researcher went on to show the participants the individual elements on an Interactive Whiteboard. Each element was explained in turn, and participants gave their validations before moving to the next element. Because the elements were shared as a list on one slide there were six times when a participant made comment about an element that was not being discussed at that time. This resulted in the transcription process being more difficult to manage. On reflection, a more effective way to manage the illustration of each element would have been to illustrate one element at a time on a single slide.

4.11.5 Step 4 – Semi-structured Interviews (Teacher Group)

The teacher interviews were conducted with two teachers from the same external HEI that Step 2 and 3 participants were enrolled at and two teachers from the same school as the HEI participants in Phases 1 and 2 were enrolled at. So far, the research has collected data from learners. To enrich the data, teachers who have experience in designing blended learning programmes were interviewed to appraise the elements of the preliminary conceptual framework from their professional point of view. Prompt cards each containing one element were created. The cards not only included the individual elements but a relevant quote from a participant whose data influenced the relevant element and an example of how the element could be put into practice. Post it notes were either completed by the participant and placed on the relevant prompt card or by the researcher to summarise points made. The cards were also colour coded to aid the researcher in note taking during the interview in identifying where on the preliminary conceptual framework the element featured, for example elements 1-3 at the bottom, which represent the 'Preparation' stage were coloured green, the middle elements 4-6 which represent the 'Design' stage were coloured yellow, the top elements 7

and 8 which represent the 'Engagement' stage were coloured pink and the two elements at the side representing the 'Ongoing' stage were coloured blue. With the cards being colour coded, the researcher was able to identify where in the preliminary conceptual framework the element was featured which aided analytical memos to be recorded without the researcher having to look at the preliminary conceptual framework during the interviews. The structure of preliminary conceptual framework was not shown to the participants before or during the interview, only the individual elements. This was to ensure that the participants were not given any cues as to which elements may or may not be as important or at what stage of a blended learning programme they should be implemented. As well as making notes on post it notes, the interview was recorded using the researcher's laptop. The interview was then transcribed using Dragon Naturally Speaking software. The main purpose of recording the interview was to ensure that no important comments were missed by the note-taking process. Both the teacher interviews at HEI 1 were conducted in an empty classroom and both the teacher interviews at the HEI 2 were conducted in private offices within the university. All four interviews were conducted during the normal working day and no interruptions occurred.

4.12 Directed Content Analysis

Directed content analysis was used to analyse the data in Phase 3. The purpose of Phase 3 was to validate the elements of the preliminary conceptual framework with a range of samples. The nine elements at this stage were:

1. Prepare learners for technology enabled learning. Consider having a pre-programme taster workshop.
2. Organise guidelines and plan their time release. Only give information (f2f and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme.
3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available templates or past work as examples.
4. Give learners an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.
5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for learners to develop their skills.
6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident learners.
7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.

*8 Note this element was not added until after Step 1 had been completed – see data analysis in section 4.12.1.

9. Provide opportunities to personalise technology enabled learning activities and tools throughout the programme. Consider encouraging learners to create a blog for informal learning to prepare for when online discussions are required for formal learning.

10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.

4.12.1 Step 1 – Learner Group 2

Step 1 was initiated to undertake member checking of the researcher's interpretations of the data in Phase 2 and for the participants to validate the preliminary conceptual framework. Key points that had been interpreted from the participant interviews by the researcher were sent in an email along with a link to the online questionnaire survey. The elements were presented to the participants in the form of a survey adapting a Likert type scale in order for the participants to think about each element before giving their validations. A comment box was included after each element in order for the participants to give their validations. No inferential statistics (Cohen et al., 2005) were made as only qualitative data was required. To analyse the data of the questionnaire survey, directed content analysis was used. The participants validated each element of the preliminary conceptual framework for its influence on their engagement with blended learning programmes by offering comments on each one.

Element 1. Prepare learners for technology enabled learning. Consider having a pre-programme taster workshop.

Four of the five participants thought that this element would be highly likely or likely to influence engagement on a blended learning programme. Data from the initial phases revealed that some older learners experienced feelings of anxiety prior to the commencement of a programme, due to uncertainty about what teaching and learning methods would be used. This centred specifically on TEL elements of the programme where a learner may not have had any previous experience using a particular method for learning. Participant 26, who is considered an older learner in the context of this research, was unsure whether this element would positively influence engagement on a blended learning programme. Revisiting the transcript for this participant revealed that they had recently completed another programme of study before enrolling on their current programme which is likely to have influenced this response. The analysis of Phase 2 data is in contrast to the analysis of Phase 1 data that found that current perceptions of technology are influenced by previous experiences of technology. However, it would seem in the case of Participant 26, the encounters experienced previously could have influenced their perceptions of the technology to be used. With confidence in their technology skills, little or no anxiety could be present. Therefore, preparing learners for TEL with a pre-programme taster workshop would be unproductive for a learner with this background. These findings are similar to Park (2009) who contends that 'both e-learning self-efficacy and subjective norm play an important role in affecting attitude towards e-learning and behavioural intention to use e-learning' (p. 158), which he goes on to justify, comparing it to Bandura's (1994) social motivational theory, which argues that greater self-efficacy breeds a more active learning process.

2. Organise guidelines and plan their time release. Only give information (face to face and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme.

Four of the five participants thought that this element would be highly likely or likely to influence engagement on a blended learning programme. One participant was unsure whether this would influence engagement on a blended learning programme. Data from the initial phases found that learners often do not remember information given at the start of a programme during the induction process. This research found that during the first weeks when induction takes place, learners are often excited, anxious or apprehensive and often only remember information that they will need at that point in time. Information about support services, such as IT or the library can be forgotten because it is not relevant at that point and possibly not anticipated to be services that will be used. The data revealed that learners would benefit more from having certain information at more appropriate times for example, information about support services to access when problems arise with the VLE. The literature reports that inductions help to ease learners into university life and enables them to be aware of university values and behaviours that they might become exposed to (Walker, 2000). Inductions allow learners to socialise with peers and create a sense of belonging which can reduce anxiety (Tucker, 1999). However, White and Carr (2005) found shortcomings in university inductions. In line with this research, they found that information was not always delivered at the most appropriate time which resulted in new learners becoming disengaged. Some learners in this research had to cope with an abundance of information during the induction and could not fully acknowledge the significance and value of certain information that would be important later. A sentiment shared with Hassanien and Barber (2008) who suggests that a successful induction relies upon a number of factors including, timing, duration, content and organisation

3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available templates or past work as examples.

Four of the five participants thought that this element would be highly likely to influence engagement on a blended learning programme. One participant was unsure whether this would influence engagement on a blended learning programme. This research found that learners rely mainly on peer support via social media to assist with TEL elements of a programme. This created some problems within social media groups where a 'Chinese whispers' phenomenon would ensue due to misguided or inaccurate information being shared. This regularly resulted in unnecessary anxiety or panic. By planning in checkpoints throughout the programme to ensure that all learners understand what is required would go some way to alleviate this. By providing resources such as templates and past work examples would give learners a source to reference when no other useful support is available.

4. Give learners an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.

Three of the five participants thought that this element would be highly likely or likely to influence engagement on a blended learning programme. Two participants did not think this would influence engagement on a blended learning programme. This research highlighted that learners require interactive and

relevant content to be engaged. Many learners spoke about learning styles and how they learnt best and that often coincided with programme content that was perceived to be directly relevant to their chosen career path and content that was on some level, interactive. Content that can be created and managed by the learner or content where the learner had some element of input was proposed to be the most effective way to learn. As technology is omnipresent in the lives of today's learners, they have higher expectations of TEL (Dahlstrom et al., 2012). Involving student ambassadors could bridge the gap between teacher and learner when it comes to innovative TEL. The Student Ambassadors for Digital Literacy (SADL) project which was funded by the Higher Education Academy aimed to understand the needs, beliefs and abilities of under graduate students in terms of digital and information literacy. The project identified that student ambassadors were more aware of the various technologies that could help students to find, manage and use information effectively (Secker et al., 2014).

5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for learners to develop their skills.

All five participants thought that this element would be highly likely to influence engagement on a blended learning programme. This research has shown that learners value the TEL elements of a blended learning programme but get frustrated when their time is taken up by working out how to use it. The data showed that learners experience exclusion when programme content cannot be accessed at home due to incompatible equipment. Learners also experienced problems with having to use different browsers for different content. Older learners experienced feelings of anxiety towards the technology to be used prior to commencement of the programme but embraced the new challenges once the programme started. This type of learner would benefit from opportunities to develop their skills. Younger learners only experienced feelings of anxiety towards the technology to be used once the programme had started. This type of learner would benefit from opportunities to develop more confidence when facing new challenges in the form of technology.

6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident learners.

Four of the five participants thought that this element would be highly likely or likely to influence engagement on a blended learning programme. One participant was unsure whether this would influence engagement on a blended learning programme. This research revealed that older and younger learners have mistaken perceptions of each other's technological abilities. Both older and younger learners perceive older learners to be less capable than younger learners at using technology, although this did not translate in practice. Neither younger nor older learners were more or less capable than the other when it came to technological competence. Additionally, when confronted with unfamiliar TEL, younger learners are more reluctant to accept and embrace the challenge whereas older learners welcome the opportunity to learn new skills. By encouraging collaboration with mixed age groups would go some way to dispel this perception. Moreover, younger learners may become more cooperative when confronted by new technological challenges if they are working with older learners whose enthusiasm to learn may influence them. Perceptions of older learners being less capable at using technology may be a factor that influences their feelings of anxiety before a programme starts, so it is worthwhile attempting to dissipate this misconception.

7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.

Four of the five participants thought that this element would be highly likely or likely to influence engagement on a blended learning programme. One participant was unsure whether this would influence engagement on a blended learning programme. This research has shown that learners would be more engaged if units were taught consistently within one programme, for example learners wanted to be able to access unit information in the same way and in the same place across all units. Standardising unit requirements in relation to using resources could engage learners by giving them more time to study rather than work out how to do something that is different from the last time they had to do it.

(Please note that Element 8 was created after and due to the collection of data from this sample)

9. Provide opportunities to personalise technology enabled learning activities and tools throughout the programme. Consider encouraging learners to create a blog for informal learning to prepare for when online discussions are required for formal learning.

Three of the five participants thought that this element would be likely to influence engagement on a blended learning programme. Two participants were either unsure or did not think that this would influence engagement on a blended learning programme. Interestingly, Participant 20, who is considered a younger learner, thought that it would be likely to influence her engagement. This research found that younger learners were the least enthusiastic about completing blogs for formal learning so this datum is encouraging. Recent literature reports that PLEs are the emerging technology that is anticipated to have the greatest impact on teaching and learning (Johnson et al., 2011). There are many reasons for this, for example its potential to enable learners to produce learning content and to reflect on their own learning, such as completing blog posts. PLEs can integrate both informal and formal learning (McGloughlin and Lee, 2010) so can be used by learners who are not confident using blogs for formal learning by introducing this form of TEL gradually.

Further investigation, that was not possible with this data collection method, would be needed to understand the reasons why one participant did not think this element would influence engagement. However, one reason could be that the participant did not fully understand what was meant by ‘personalise technology enabled learning activities and tools’.

10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.

Four of the five participants thought that this element would be highly likely to positively influence engagement on a blended learning programme. One participant was unsure whether this would influence engagement on a blended learning programme. This research showed that most learners rely on peers via social network groups for technology support instead of IT support provided by the university. This was mainly due to convenience but there were also reports of less than satisfactory experiences with IT support and processes. Dahlstrom et al., (2012) study found that learners consider university VLEs crucial to their HE experience but seldom make full use of it. They go on to say that learners need guidance when using TEL. IT support was the most common theme that emerged from the data in Phase 1 yet learners do not seem to be

accessing the support available. This data led to the investigation into Phase 2 of whether learners were aware of all of the support services available. The data revealed that they thought they knew but were unsure due to that information being given during induction, which had been forgotten or not taken in. Designing blended learning programmes collaboratively with IT support staff could benefit the student by offering more innovative resources and could benefit the IT support staff as they will be in a better position to offer more appropriate support when learners ask for it.

After the validations were analysed a further iteration of the data from all phases collected to this point was initiated. As a result, a further element (#8) was added to the preliminary conceptual framework with supporting evidence from the literature (Gedik's et al., 2012). This element was numbered 8 due to its positioning within the BLF.

8. There should be an optimum blend of technology and f2f methods during a blended learning programme. Consider designing individual units within a programme collaboratively.

4.12.2 Step 2 -Learner Group 3

The next step of this phase was to conduct instant reaction mobile interviews with participants from a new sample from HEI 2. The ten elements were collated and used to form a structured interview where the participants were asked to validate each element. Summaries of validations for each element follow.

1. Prepare learners for technology enabled learning. Consider having a pre-programme taster workshop.

This is a good idea, assuming that you are able to attend.

I would definitely go to a workshop to prepare for what I might need.

Learners might be embarrassed about attending.

2. Organise guidelines and plan their time release. Only give information (face to face and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme.

This is a good idea because you never remember what's said.

We are sort of told about referencing help and that sort of stuff at the start, which I never remember so we then have sessions throughout the programme, so it would make sense just to have the info when it's needed.

It would be good if you could have a proper induction at the start and then re caps throughout the year.

I like to know what's what at the start.

3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available templates or past work as examples.

This would be very helpful because you are never sure what is expected.

Great idea. You never know until you get your marked work back or when it too late.

4. Give learners an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.

Where possible, would be a good idea. Sometimes topics aren't really relevant or are not in your interest area.

Involving learners in content design would make the content more student friendly. Sometimes I think that it has been a long time since teachers have been learners and so forget what a student wants.

Can't see how this would work. Also to have student ambassadors might make the IT content too geeky for older learners.

5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for learners to develop their skills.

Great idea if they were voluntary. You don't want to sit through an IT session about something that you already know how to do.

This would be good if there was some sort of student input into what the sessions would cover.

Not sure if people would go. If I have a problem with IT I usually just got to YouTube or ask someone else.

We sort of have these already but they are generally mandatory and part of the lesson, which is a waste if you already know it.

6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident learners.

You do feel that when there is any sort of group work using IT that younger learners have the advantage. In theory this would be good but actually people like to pick their own groups and that is usually similar age groups.

You could learn from each other as everyone has unique skills.

If there is a mix of ages in the group then this is a good idea as it will also encourage the group to mix with people you might not always immediately click with.

7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.

It would make life easier.

I think this is what they try to do already but doesn't always work.

In theory this is good but our teachers obviously have different levels of IT ability so wouldn't always work in practice.

8. There should be an optimum blend of technology and f2f methods during a blended learning programme. Consider designing individual units within a programme collaboratively.

Good idea. There are advantages to both methods.

I think it is important to have a good mix but would depend on the individual group. If you have got younger groups they may prefer more online stuff.

You'll never please all of the people all of the time. I prefer doing my work online but know others that prefer the classroom.

9. Provide opportunities to personalise technology enabled learning activities and tools throughout the programme. Consider encouraging learners to create a blog for informal learning to prepare for when online discussions are required for formal learning.

It would encourage learners to be more engaged with their studies if they had some input.

This could improve your IT skills.

Not sure if people would be bothered to do it.

10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.

This is very important. IT support is not always good enough and there is never anyone to help you with non IT stuff unless you have Dyslexia or something that you need help with.

This is crucial for these sorts of programmes (blended learning).

We have IT support but I don't often use it because I choose other options first, like my teacher. You can't usually get through to them. If the process was easier I would probably use it more.

4.12.3 Step 3 –Learner Group 4

Having completed the instant reaction mobile interviews, the next step was to validate the elements using a different method to enrich the data collection at this stage. The focus group data was analysed using directed content analysis. A summary follows of validations from the focus group for each individual element of the initial conceptual framework.

1. Prepare learners for technology enabled learning. Consider having a pre-programme taster workshop.

I would definitely use that service

A good idea but I might not be able to attend or be bothered before the programme

A good idea if it's not compulsory as some learners don't need it

Would alleviate any worries that I had before the start of the programme

It could put people off if they get to know what they're in for

It's an extra service provided

2. Organise guidelines and plan their time release. Only give information (face to face and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme.

You always forget what you've been told early on

Reminders would be useful

You are always nervous at the start of a programme and don't really concentrate on those things

Never see the point of inductions apart from the icebreakers

Being staggered would be more sensible

This would definitely make more sense

3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available templates or past work as examples.

Sometimes you think that you are doing something right until it's too late

Learning should be challenging not be made easy

Would take up too much time, we should concentrate on the subject that we are here to learn about

Very helpful

We have tutorials for this but nothing is ever implemented

This would ensure that I am developing my skills in the right way

4. Give learners an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.

Good idea because some teachers are out of date with technology

Unsure if this could work in reality

Good idea if it could be done

We have set topics

Be good to get a student's view on the programme beforehand

5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for learners to develop their skills.

Technology should be easy to use but sessions shouldn't be compulsory

Only use technology if it makes the learning process better

Sometimes you can't find what you need, it's frustrating

There is a lot of logging in issues with our VLE

It's not always the student that doesn't understand, it is IT that doesn't set it up properly

Definitely. You need to know more as you go along through the programme

Yes especially when you have a new teacher who uses something new or wants you to use something you haven't used before

6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident learners.

I think sometimes older learners prefer to mix with other older learners. They have more in common

You can learn other skills from younger learners and vice versa

Just because you are old doesn't mean you are no good at technology

Younger learners struggle as well so mixing wouldn't necessarily work

Everyone can help each other

Younger learners don't always know how to use IT but have a different approach and different ideas to older learners

Younger learners don't seem as afraid as older learners

Older learners might hold back the younger learners

Good idea. Would encourage people to work together

7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.

Definitely agree with this

Good idea but never happens

Would make life much easier

Information and technology parts of the programme should be the same

But I like the different teaching styles of the teachers

The way certain methods are used should be the same to make life easier

Keep teacher individuality

8. There should be an optimum blend of technology and f2f methods during a blended learning programme. Consider designing individual units within a programme collaboratively.

Some people prefer more technology

I like the technology elements but it depends on how busy I am with other stuff

I like a bit of both

I would be happy with a distance learning programme but they don't offer it

Some technology parts are useless

Teachers do it because it is easier for them

Definitely agree

Nice to have half f2f and half online

I like seeing the teacher

I like being in the classroom because I feel that I learn more

It is nice to do stuff at home, just not sure I learn as much

9. Provide opportunities to personalise technology enabled learning activities and tools throughout the programme. Consider encouraging learners to create a blog for informal learning to prepare for when online discussions are required for formal learning.

I don't really like blogs, prefer f2f talking

Writing a blog before you need it would be good but not sure if people would do it

Practising with blogs would make it easier for when we do it for our assessment

Blogs are ok if everyone does it properly

I don't like doing the blogs

I don't do blogs apart from at college

Our VLE is very outdated

Being able to personalise your own VLE pages would make using it more enjoyable and would get more from it

Not geared up for people who like modern methods

The more you have on your home page the more complicated it is to use

10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.

Good idea

We have IT support but you can never get through and they don't open at weekends when you need them

Would be good to have someone to go to to help with work.

Programmes would be more technologically advanced if IT helped

Programmes would be more interesting

We have IT support but no support for other stuff

4.12.4 Step 4 -Teacher Group

Having completed all of the learner participant data collection, it was pertinent to enrich the data collection process to identify how the preliminary conceptual framework may (or may not) work in practice. A teacher group of participants were asked to give their appraisals about each individual element using semi-structured interviews. Prompt cards showing each element were shown to the participant and their comments were recorded on post it notes and stuck to the relevant prompt card. Photographs were taken of the prompt cards with the responses and summary examples are shown below.

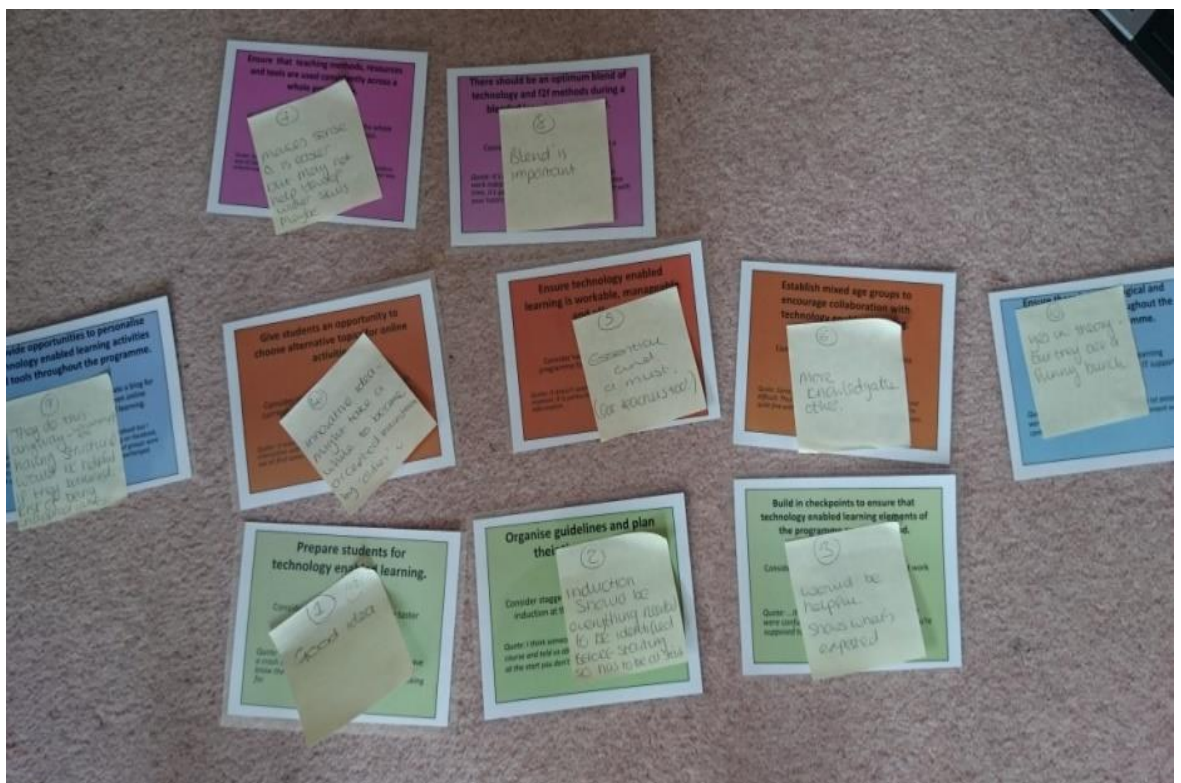


Figure 13. Photograph of prompt cards summary for Participant 38.

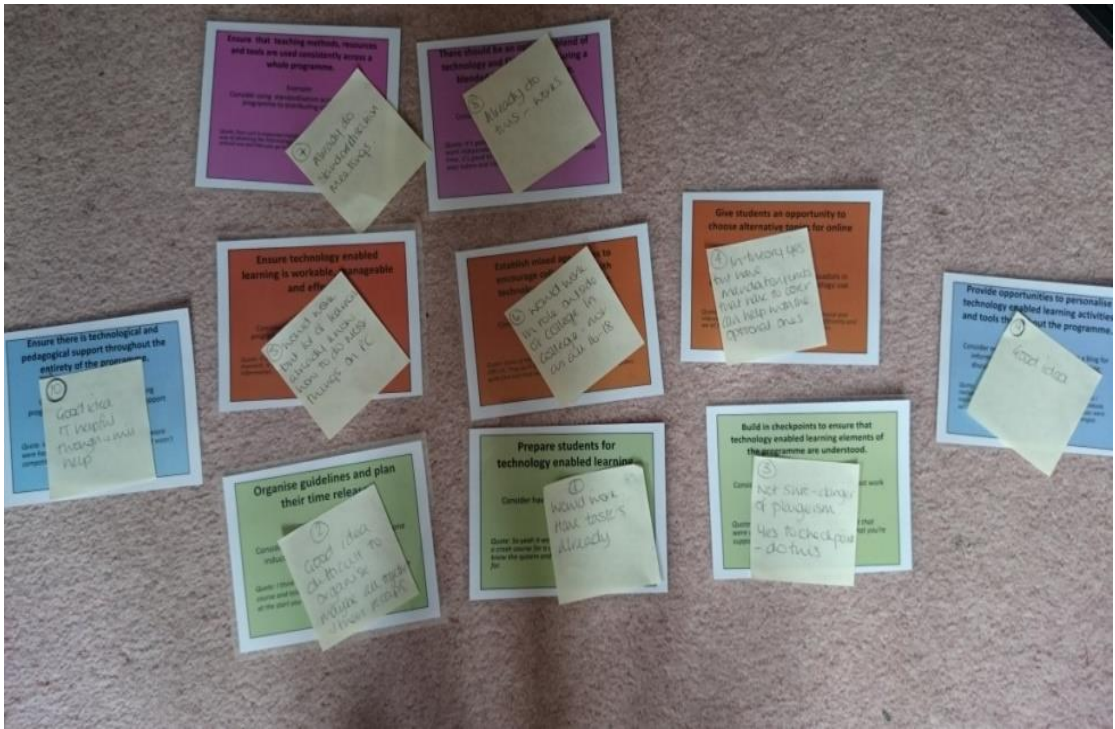


Figure 14. Photograph of prompt cards summary for Participant 39

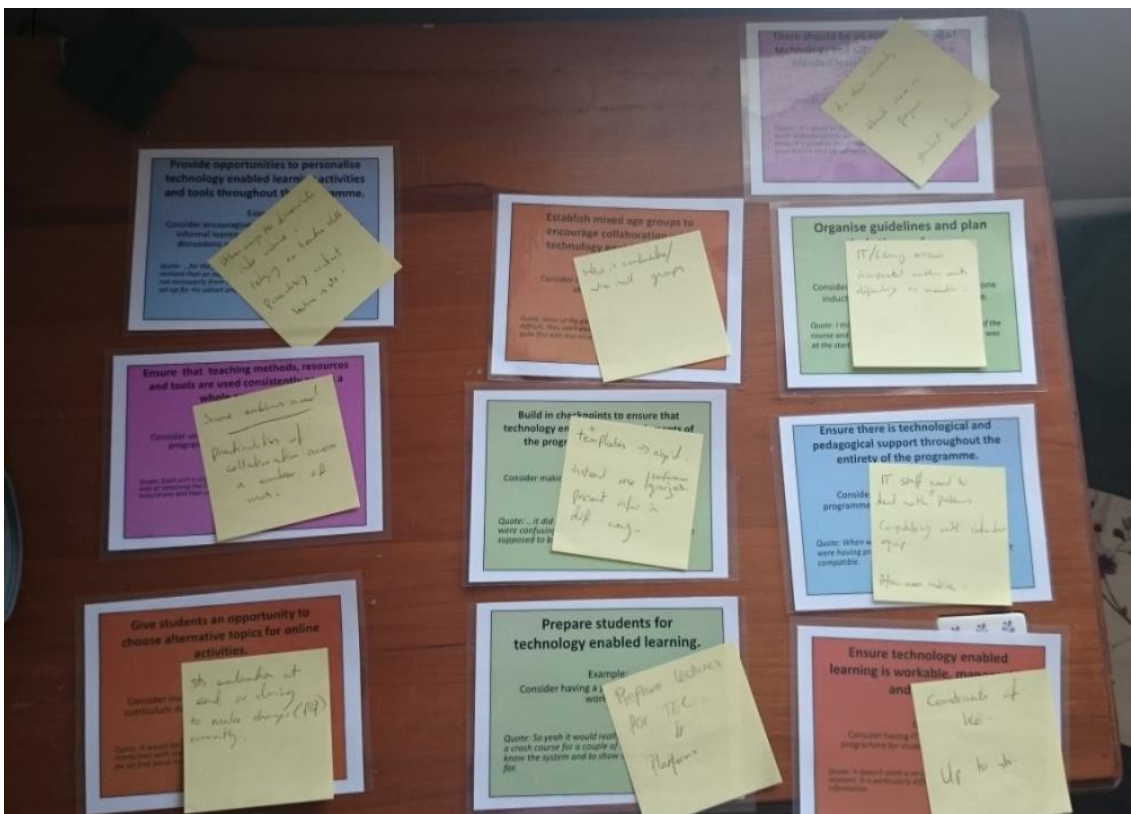


Figure 15. Photograph of prompt cards summary for Participant 40.

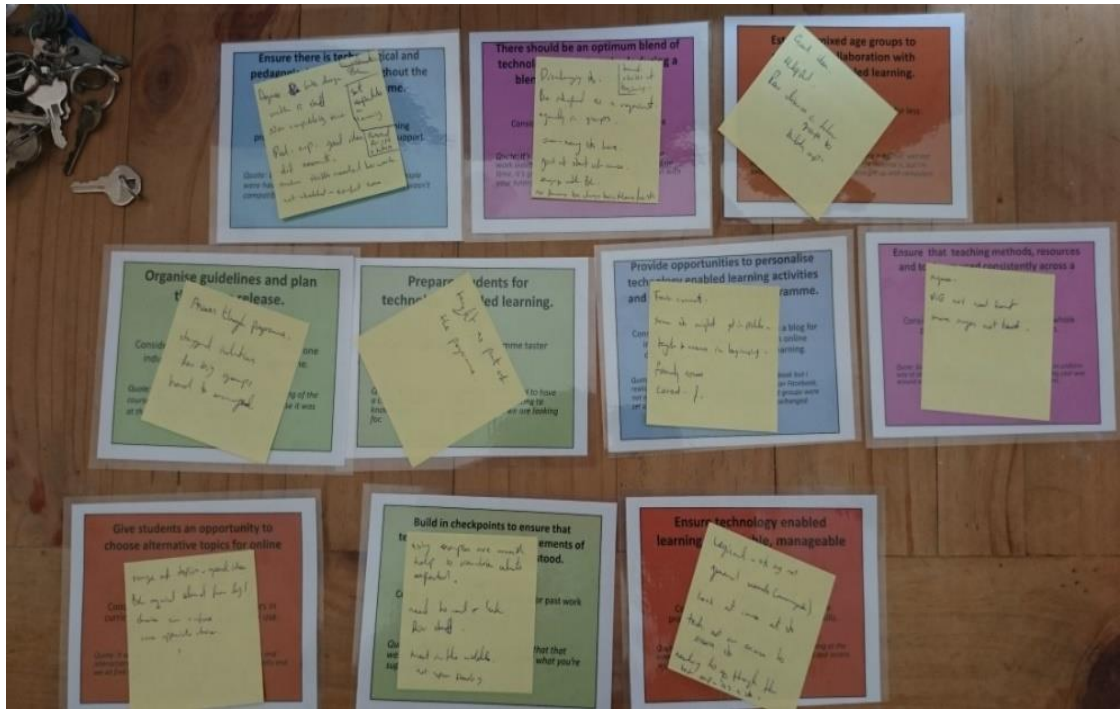


Figure 16. Photograph of prompt cards summary for Participant 41.

A summary of the appraisals follow, addressing each element in turn.

1. Prepare learners for technology enabled learning. Consider having a pre-programme taster workshop.

Have general taster days already

This should prepare teachers for TEL

Teachers need to know how to use different platforms

TEL should be taught as part of the programme

Having programmes before the start of a programme is a good idea

2. Organise guidelines and plan their time release. Only give information (face to face and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme.

Everything needed for the programme should be at the start during induction

Good idea but difficult to organise

Maybe have an induction at the start and then recaps

We have IT and library sessions incorporated within units depending on needs

This should be assessed through the programme

It would be hard to manage staggered inductions for big groups

3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available templates or past work as examples.

Danger of plagiarism

Already implement checkpoints to assess learning

Giving templates would make it too rigid, instead I use conferences and quizzes getting them to present the same information but in a different way

Using examples are a good idea. Will help to visualise what is expected

Learners need to read and look for stuff themselves

We should meet in the middle, not spoon feed.

4. Give learners an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.

An innovative idea

Might take a while to become accepted by older teachers

In theory yes but have mandatory units

Could work with optional units

We currently ask the learners to validate the units either at the end or during the programme for feedback on the content

A range of topics is a good idea

Blended learning expectations need to be shared from day one

A choice of subjects may confuse some learners but be appreciated by others.

5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for learners to develop their skills.

Essential and a must, for teachers too

Would work but most learners already know how to do most things on a PC

We are limited by the constraints of the VLE

IT sessions would be up to the learners to source

TEL needs to be logical

'workable', 'manageable' and 'effective' are general words

You need to look at the programme and the technology from a learners' perspective

Technology is not an excuse to assess learners

6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident learners.

Based on the principles of MKO

Would work for mixed age group cohorts

It would be better to ask who is comfortable using technology and who isn't, and then mix rather than go by ages

This would be helpful

You could encourage peer discussion during teacher group time to buddy up less confident learners

7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.

Makes sense but may not develop wider skills

Already have standardisation meetings

We use the same emblems on the VLE

It would not be practical to collaborate across a number of units

The programme would be boring if all the teaching methods were the same

Agree

The format of the VLE here is not formatted well

VLEs need more images and less text

8. There should be an optimum blend of technology and f2f methods during a blended learning programme. Consider designing individual units within a programme collaboratively.

Blend is important

Already do this-it works

We think of the programme as a whole

We are very student focused

We are disadvantaging learners if we spoon feed them

Independence needs to be a requirement as well as working in groups

Learners can be over-nannied

An optimum blend is good at the start of a programme but the learners need to learn to work independently

Learners should be taught these skills at the start of a programme

9. Provide opportunities to personalise technology enabled learning activities and tools throughout the programme. Consider encouraging learners to create a blog for informal learning to prepare for when online discussions are required for formal learning.

Learners do this informally

Having structure would be helpful if the learners bothered with it

Risk of being inappropriate

Good idea

There are other ways to disseminate information online

This relies on teacher skills

We use other methods, such as visuals to personalise content

Some learners might get in a pickle

Learners TEL abilities should be formally assessed at the start of a programme

Our VLE is covert

10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.

Good idea in theory

IT are helpful and will help

IT staff need to deal with technological problems

I don't get involved in IT issues

We have compatibility problems, especially with the international learners

Some international learners, eg. Africans use their mobiles to access everything so we need to consider that in the design

We design the units with IT staff

Pedagogical support is a good idea but learners need to be stretched outside of their comfort zone

Learners need to learn modern skills for work

There needs to be a mutual respect between learners and academics

Set learning expectations early in programme

Although seeking appraisals of the elements from the teacher sample was considered to enrich the data collection of this research, it should be remembered that the elements are directly linked to data obtained from learners in their own voices. Therefore, the teacher appraisals offer a professional perspective only on how the elements may or may not work in practice. Their contributions have not influenced any changes to the preliminary conceptual framework but have offered some useful guidance to the researcher on how it may be used. Their contributions also indirectly offered some insight on some current or emerging technologies that they use and this was explored during the literature review.

4.13 Phase 3 Findings and Implications for Phase 4

The following section synthesises the themes and validations from Phase 3 and justifies the inclusion of the elements into the conceptual framework.

The findings from Phase 3 demonstrate that the majority of learner participants who validated the preliminary conceptual framework agreed that it could influence engagement with blended learning programmes. Of the teacher participants that were interviewed, most agreed that most of the elements could influence engagement with blended learning programmes. However, there was a noticeable difference between the learner sample and the teacher sample. The learner samples validations were overall more encouraging about the individual elements than the teacher sample and appeared to be more open to new ideas and different ways of doing things on a blended learning programme. The teacher sample although encouraging about features in most of the elements, appeared to be more ‘set in their ways’ and less open to new ideas and ways of doing things. Considering that the elements were created directly from learner data, including recommendations, this was surprising. This raises an important question about whether teachers are willing to accept that a new generation of learner potentially requires different support and pedagogical approaches than those that have been used in the past.

With this in mind, no amendments were made to the preliminary conceptual framework. All of the analysed validations from the learner samples in Phase 3 were collated and used to create a final conceptual framework in Phase 4.

Figure 17 illustrates how each element is mapped against the themes that emerged from the data analysis in Phases 1, 2 and 3(Step 1).

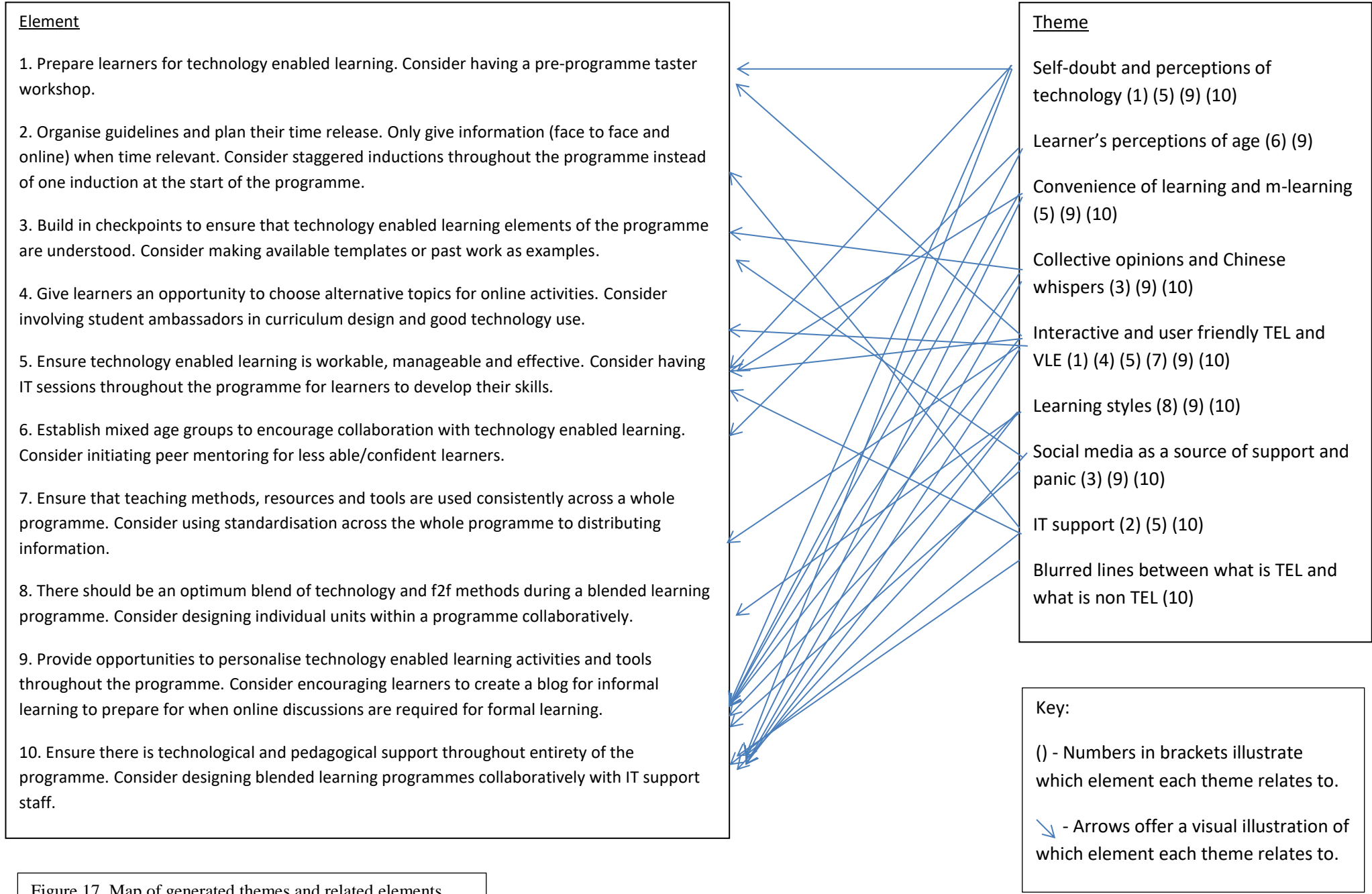


Figure 17. Map of generated themes and related elements.

Table 15 provides a summarised explanation of how each element (Phase 3) addresses a theme (Phase 1 and 2), a summary of data that validated each element (Phase 3) and a summary of analytical memos made during data collection (Phases 1,2, 3).

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Self-doubt and perceptions of technology	#1 Prepare learners for technology enabled learning. Consider having a pre-programme taster workshop.	Older learners experienced feelings of self-doubt prior to the commencement of the programme, and whether they would be able to use the technology used on the programme. By offering a non-compulsory pre-programme taster workshop would give these learners an opportunity to try the technology before they formally started. This would go some way to alleviate any feelings of self-doubt. It would also go some way to diffuse any previous negative perceptions of technology that may be present from previous experiences.	A good idea. Would alleviate some worries. Non- compulsory would be better.	A good idea. Some have general taster days. Teachers should also have TEL workshops.	Perhaps teachers have self-doubt before a programme? Any extra service offered would be welcomed if given the choice to attend.
Interactive and user friendly TEL and VLE		Preparing learners before using technology on the programme would make for easier use during the programme. A non-compulsory pre-programme taster workshop would ensure that learners can use the technology on the programme from the start.			

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
It support	#2. Organise guidelines and plan their time release. Only give information (face to face and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme.	Learners did not remember all of the information given to them during their induction at the start of the programme. Some remember receiving talks from IT and Library Support but not specific information. Scheduling staggered inductions throughout the programme would ensure that information was given to learners at a relevant time. This could reduce the amount of IT support they would need. Additionally, Mayer and Moreno (2003) showed that programme content needed to be presented in manageable chunks to ensure that learners did not get overwhelmed with workload.	A good idea. Never remember information given out at the start of a programme. Inductions are pointless. Important to have the information at the start but with reminders throughout the programme.	Should be assessed throughout programme. Inductions should be at the start of a programme. A good idea.	Difficult to assess all learners needs with regards to what information they have remembered/understood. Participant (teacher) seems closed to this idea.

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Collective opinions and Chinese whispers	#3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available	When learners are unclear about expectations or outcomes they can turn to peers for clarification or advice. This can often lead to Chinese whispers that spread uncontrollably throughout the cohort. Ensuring that learners are clear about what is expected during the programme in terms of presentation and assessment will go some way to reduce the Chinese whisper effect.	A good idea. Would steer you in right direction before it's too late. Might make it too easy.	Risk of plagiarism. Useful. Already assess learning throughout programme. Too rigid.	Assessing learning is not the same as assessing TEL use/engagement/ understanding.
Social media as a source of support and panic	templates or past work as examples.	This theme is closely linked to the theme above. When learners are unclear about expectations or outcomes they can turn to peers for clarification or advice. The cohorts Facebook group is used extensively by learners for support but it also breeds panic among learners. Chinese whispers can spread extremely quickly via social media so ensuring that learners are clear about what is expected during the programme in terms of presentation and assessment will go some way to reduce panic on social media sites and enable a more appropriate source for support.		Up to learners to manage themselves.	

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Interactive and user friendly TEL and VLE	#4. Give learners an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.	Learners appreciated content that allowed a certain amount of interactivity. Offering a choice of subject matter for formal online discussions would give the learners an opportunity to choose content that is the most appropriate or interesting to them. This will not only encourage engagement with that content but make the programme more interactive.	Good idea. Teachers are out of date. Would be more student friendly. May become too geeky.	Innovative idea. Good in theory but may be limitations in practice due to unit content. Student evaluations take place already regarding content. A choice of subjects may confuse some learners but be appreciated by others.	Reference here from 'younger' teacher regarding 'older' teacher's ability to accept new ways of using TEL. This could suggest that it is not only learners who have preconceptions about older 'peoples' ability to use TEL.

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Self-doubt and perceptions of technology	#5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for learners to develop their skills.	Older learners experienced feelings of self-doubt prior to the commencement of the programme, and whether they would be able to use the technology used on the programme. Ensuring that the TEL methods used during the programme are easy to use will alleviate some of the negative perceptions that learners may have.	A good idea. I would attend if voluntary. Voluntary is important as you will waste time is already IT literate.	Essential for learners and teachers. Most learners already know how to use technology. Limited to VLE constraints.	If she sees someone struggling with IT she will organise a session. This just deals with IT skills but what about other info, also how can you assess the needs of multiple learners you are relying on them coming to you to ask for help. Comment 'look at tech from a student's view'. This contradicts data from same participant who made negative comments about involving student ambassadors in curriculum design. Very positive comments from learner sample.
Convenience of learning and m-learning		Learners appreciate being able to access learning materials and programme content at convenient times to them, including convenient places. Ensuring TEL methods are easy to use will encourage this attitude and engagement to learning.	Would need student input into what is required.	IT sessions are up to the learners to source.	
Interactive and user friendly TEL and VLE		TEL and VLE are essential elements of a blended learning programme. Ensuring that both elements are user friendly and easy to use will encourage engagement with the programme.		'workable', 'manageable' and 'effective' are general words	
IT support		Ensuring that TEL methods are easy to use will reduce the amount of IT support learners will need.		You need to look at the programme and the technology from a learners' perspective	

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Learner's perceptions of age	#6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident learners.	Older learners perceived younger learners to be at an advantage when using technology yet this did not always translate into practice. Younger learners also perceived that they had an advantage over older learners when using technology. Yet their attitudes towards the technology used on the programme were different. Older learners were positive, taking advantage of the learning opportunity whereas, younger learners were more negative, questioning why they had to use it or the way it was used. By having an equal spread of age groups among collaborations would dispel any inaccurate perceptions about age among the cohort.	<p>Good idea.</p> <p>Older learners might hold back younger learners.</p> <p>Older learners know as much about IT as younger learners.</p> <p>You could help each other.</p> <p>Younger learners aren't as afraid of IT.</p>	<p>Based on the principles of MKO.</p> <p>Would work for mixed age group cohorts.</p> <p>It would be better to ask who is comfortable using technology and who isn't, and then mix rather than go by ages.</p> <p>Good idea.</p> <p>Helpful.</p> <p>You could encourage peer discussion during teacher group time to buddy up less confident learners.</p>	<p>To ask student who is comfortable with IT then mix may not work: student too embarrassed to admit in front of others; they may not know what to expect therefore impossible to judge what skills are required. Plus, this element is about reducing false perceptions about 'older' learners and not IT ability. The findings show that there is no difference in IT skill level across ages, only perceived skill level.</p> <p>Younger learner perceptions of older learners appear to be the same in this sample.</p> <p>One participant mentioned 'fear'. This has not been explored.</p>

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Interactive and user friendly TEL and VLE	#7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.	Learners experienced similar TEL methods across the programme but these methods were used in a different way or with different software. This gave rise to some problems and digitally excluded some learners from using the TEL methods in the way they were intended. Being consistent across a whole programme would reduce these problems.	<p>Good idea.</p> <p>Would make life easier.</p> <p>Like different teaching styles but methods could be standard.</p> <p>Teachers have different level of IT skill so good in practice but in reality probably wouldn't work.</p>	<p>May not develop wider skills</p> <p>Already have standardisation meetings.</p> <p>It would not be practical to collaborate across a number of units.</p> <p>The programme would be boring if all the teaching methods were the same.</p> <p>Agree.</p> <p>The format of the VLE here is not formatted well.</p> <p>VLEs need more images and less text.</p>	<p>Comment: 'programme would be boring if all teaching methods were the same...' teaching methods with regards to what is used and how could help learners. Teaching styles is also what differentiates teachers and this is different to teaching methods.</p>

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Learning styles	#8. There should be an optimum blend of technology and f2f methods during a blended learning programme. Consider designing individual units within a programme collaboratively.	Although there is controversy about how much consideration should be given to learning styles, learners recognise that they possess certain styles. By offering an appropriate blend of f2f and online content, learning styles (in the context of this study) will be considered. Some learners prefer to work independently or collaboratively online and some learners like to interact in a f2f environment. Most learners like a mix of the two. By not overusing TEL methods, learners still benefit from the f2f environment and the interaction with Teachers.	<p>Good idea.</p> <p>There are advantages to both methods.</p> <p>I think it is important to have a good mix but would depend on the individual group. If you have got younger groups they may prefer more online stuff.</p> <p>You'll never please all of the people all of the time.</p> <p>You don't learn as much online.</p>	<p>Blend is important.</p> <p>Already do this-it works.</p> <p>We are disadvantaging learners if we spoon feed them.</p> <p>Independence needs to a requirement as well as working in groups.</p> <p>An optimum blend is good at the start of a programme but the learners need to learn to work independently.</p>	<p>An optimum blend will depend on the individual and group. What is optimum for one will not be optimum for another.</p> <p>Reference to younger learners preferring online content made by older learner.</p> <p>Indirect reference to learning styles.</p>

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Self-doubt and perceptions of technology	#9. Provide opportunities to personalise technology	Learners who have negative perceptions of technology will have more control over what technology they use within their PLE.	Writing a blog before you need it would be good but not sure if people would do it.	Learners do this informally.	Comment: 'learners TEL skills should be formally assessed...' this element is not about TEL skill level it is about building confidence when using technology such as social media in a way that is not normal for them (particularly assessment).
Learner's perceptions of age	enabled learning activities and tools throughout the programme.	A PLE is managed and created by the learner so is unique to them. Learners can choose which tools to use so the PLE is adaptable to suit different learning styles.	Practising with blogs would make it easier for when we do it for our assessment.	Having structure would be helpful if the learners bothered with it.	
Convenience of learning and m-learning	Consider encouraging learners to create a blog for informal learning to prepare for when online discussions are required for formal learning.	Social software tools and an aggregation of multiple sources suitable for mobile devices can be included within the PLE.	I don't like doing the blogs.	Risk of being inappropriate.	
Interactive and user friendly TEL and VLE		PLEs allow learners to be creators of content so are interactive. PLEs are a means to find information about learning opportunities and content from peers via tags and RSS feeds etc.	Our VLE is very outdated.	Good idea.	
Learning styles		The content within the PLE is organised in multiple, Web-based tools and ownership is controlled by the learners themselves. This ensures that the learner (with pedagogical support) can choose material and content that suits their needs.	Being able to personalise your own VLE pages would make using it more enjoyable and would get more from it.	This relies on teacher skills.	
Social media as a source of support and panic		PLEs allow for multiple social communities unlike a VLE that allows for closed groups. This would enable learners to have access to a wider community of learners.	The more you have on your home page the more complicated it is to use.	We use other methods, such as visuals to personalise content. Some learners might get in a pickle. Learners TEL abilities should be formally assessed at the start of a programme.	

Theme	Element	Explanation of how the element will address the theme.	Learner data	Teacher data	Analytical memos
Self-doubt and perceptions of technology	#10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.	Older learners start the programme with feelings of self-doubt and perceptions of technology influenced by previous experiences. Additionally, older learners were positive about the technology, taking advantage of the learning opportunity whereas, younger learners were more negative, questioning why they had to use it or the way it was used. Technological and pedagogical support would enable the continuous benefit of the learning opportunities older learners' experience. Technological and pedagogical support would go some way to educate younger learners about the pedagogical benefits of the TEL methods used.	Good idea. We have IT support but it is not always satisfactory. Support with academic work would be useful. This would make programmes more innovative.	Good idea in theory. IT staff need to deal with technological problems. I don't get involved in IT issues. We have compatibility problems, especially with the international learners. Some international learners, eg. Africans use their mobiles to access everything so we need to consider that in the design. We design the units with IT staff. Pedagogical support is a good idea but learners need to be stretched outside of their comfort zone.	During Phase 1 and 2, IT support was found to be the most important element to digital inclusion however, consistently across all 3 phases IT support seems to be unsatisfactory. Further investigation needs to be done in this area.
Convenience of learning and m-learning		As TEL and m-learning is a significant element of a blended learning programme, it is essential to have IT support that efficiently manages the technology issues learners may have.			
Collective opinions and Chinese whispers		Having efficient IT and pedagogical support would reduce the amount of inaccurate peer support.			
Interactive and user friendly TEL and VLE		Having efficient IT and pedagogical support would sustain engagement with the TEL methods and effective use of the VLE.			
Learning styles		Pedagogical support for learners could improve their learning experience ensuring			

		individual learning styles (in the context of this study) is considered.			
IT support		IT support was a significant theme that emerged from all of the learners. Ensuring effective IT support throughout the programme is essential for a blended learning programme.			
Blurred lines between what is TEL and what is non TEL		A blended learning programme consists of f2f and online elements. All of those elements contribute to a programme of study. Learners do not necessarily consider the f2f and online elements as different, rather as one whole element that makes up their programme. Therefore, pedagogical support is as important as IT support on a blended learning programme.			

Table 18 Summary of data for Phases 1,2 and 3.

4.14 Justification and Explanation of Researcher's Interpretation of Data

As discussed earlier, this research took a critical realist philosophical approach. This approach has taken into account historical factors that could have influenced the participant's stories, such as previous experiences with using technology. Direct experiences and stories from the Phase 2 sample were used to form the basis of the conceptual framework and therefore true accounts of digital exclusion are represented. The quality of data interpretation was considered by the researcher and a number of methods to achieve quality were implemented, for example researcher reflexivity and positionality were considered as well as analytical memos recorded.

The elements were then validated by other samples from a different HEI. Again direct quotes and experiences were given during data collection. Because of this, little researcher interpretation was needed during this phase.

4.15 Chapter Summary

This chapter set out the implementation of the research design. The chapter began by setting out the samples and settings (Denzin and Lincoln, 2005) used in each phase and the ethical considerations involved with collecting data from each sample. The chapter then discussed the data collection, analysis and findings, addressing each phase in turn. Semi-structured interviews were used to obtain stories of experiences of digital inclusion and exclusion from participants in their own voice. These experiences were analysed and then validated by new samples by using a range of qualitative data collection methods, including structured and instant reaction mobile interviews, a focus group and semi-structured interviews. The chapter concluded by grouping the smaller themes into larger themes of: Technology; Pedagogy and Human and were supported by participant excerpts and vignettes.

The findings suggested that while digital exclusion has been associated with gender, age, ethnicity, geography, socio-economic status, educational background, and learning styles, these characteristics do not present a sufficiently nuanced perspective to explain why some learners feel included or excluded. For the participants in this research, digital exclusion was found to be influenced by organisational factors, such as elements of the programme content. The findings suggest that current technologies, such as social media, and emerging technologies, such as Personal Learning Environments, may offer useful opportunities to effectively engage a diversity of learners on blended learning programmes. The results from the first three phases were collated and a conceptual framework for sustaining engagement with blended learning programmes was created. The conceptual framework was the final objective and Phase 4 of this research. A support model, the Blended Learning Framework (BLF) was created and is an original contribution to knowledge and is presented in Figure 18. The BLF provides strategies which could engage diverse learners in HE on blended learning programmes and could support teachers in delivering successful blended learning programmes in similar contexts.

Chapter 5 The Blended Learning Framework - Discussion

5.1 Phase 4

Phase 4 addressed the fourth objective:

To incorporate the findings into a conceptual framework for designing and sustaining engagement with blended learning programmes.

All of the 10 elements of the preliminary conceptual framework were reviewed based on the appraisals collected in phase 3 and used to create The Blended Learning Framework (Fig. 17). Each element includes an example as a guideline for how educators and designers of blended learning programmes can implement each element. The elements and examples are set out below:

1. Prepare learners for technology enabled learning. Consider having a pre-programme taster workshop.
2. Organise guidelines and plan their time release. Only give information (f2f and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme.
3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available templates or past work as examples.
4. Give learners an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.
5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for learners to develop their skills.
6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident learners.
7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.
8. There should be an optimum blend of technology and f2f methods during a blended learning programme. Consider designing individual units within a programme collaboratively.
9. Provide opportunities to personalise technology enabled learning activities and tools throughout the programme. Consider encouraging learners to create a blog for informal learning to prepare for when online discussions are required for formal learning.
10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.

The BLF (Figure 18) is a support model which has been divided into four sections. The four sections are: Preparation; Design; Engagement and Ongoing. Preparation and Design is intended to be implemented before the initiation of a blended learning programme at the initial planning stage. Engagement and Ongoing is

intended to be implemented during and throughout the blended learning programme. The words used for each section of the framework were chosen from key words that were used by participants during the interview process in Phases 1 and 2. It is of the researcher's opinion that the words chosen succinctly define at what stage of the blended learning programme the sections should be implemented. The three major data themes that emerged from Phases 1 and 2: Technology; Pedagogy and Human, have been used to develop the BLF. Each element relates to one of the major data themes and are colour coded on the illustration to highlight the differentiation, for example the 'Human' theme has influenced the creation of Element 9. *Opportunities to personalise TEL*. On the BLF, Element 10 has been split to highlight the technological and pedagogical differences between the elements for example, Preparation, Design and Engagement elements were created mainly from smaller themes grouped to the major Pedagogical data theme.

This chapter continues with a discussion of the findings and the resulting BLF in more depth. The discussion will analyse the findings of this research and consider how they relate to current literature and their potential for future educational research.

The Blended Learning Framework (BLF).

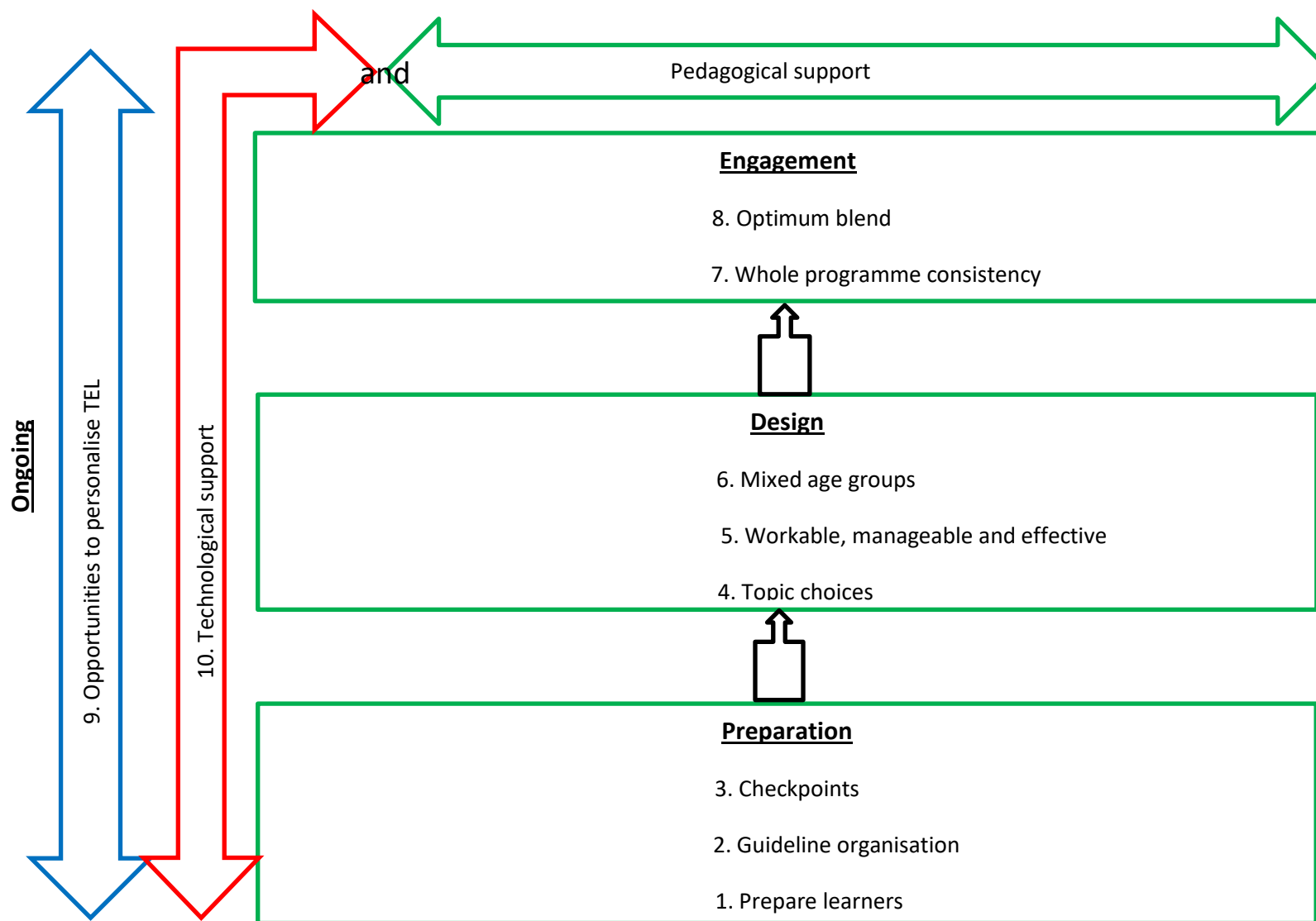


Figure18. The Blended Learning Framework.

This discussion will reflect on the findings of this research and discuss how they relate to relevant research. A summary of each phase is provided to consolidate the findings concluding with an in-depth discussion on how the conceptual framework was created and designed, addressing each objective in turn.

5.3 Phase 1 - Summary of Results

Participants in Phase 1 identified their characteristics as: age; geographic; previous jobs/life experiences; year of study; programme of study; motivations for doing programme; hobbies; family and previous qualifications. No two learners shared the same set of characteristics and when compared to conventional groupings (gender, age, ethnicity, geography, socio-economic status and educational background) all of the participants fell into more than one group. All of the participants experienced digital exclusion in some form suggesting that there is no one group of learners more likely to experience digital exclusion than another. Additionally, every learner possessed their own unique set of characteristics suggesting that every learner is diverse.

This makes anticipating how learners will interact with technology challenging. A number of themes emerged from the data and were investigated further in Phase 2.

5.4 Phase 2 - Summary of Results

Participants in Phase 2 identified their characteristics as: previous jobs; age; year of study; children; motivations; family and geographic. Every participant possessed their own unique collection of characteristics suggesting that every learner is diverse. Grouping learners to determine how they will interact with technology is therefore not useful. Additionally, as discussed in section 1.2 evidence from current literature supports this claim (Garner, 2000; Cubeta et al., 2001; Coffield et al., 2004; Klein et al., 2007). Propositions from Phase 1 that were investigated in Phase 2 showed that a ‘Chinese whispers’ effect can occur on social media which can cause unnecessary anxiety. Previous experiences that were found to influence perceptions of technology in Phase 1 was not supported in Phase 2 but the data did reveal that previous experiences (or lack of) can influence feelings of anxiety for learners. Phase 2 found that learners may not be aware of all the support networks available to them at university because the information given to them at induction can be forgotten. Phase 2 identified that there is a blurred line between what is technological and what is not on a blended learning programme. This highlighted the importance of all of the elements of a blended learning programme: f2f and TEL, as they together create an holistic approach to teaching and learning. Table 18 shows the themes that emerged in Phase 2. These themes were used to create the elements of the preliminary conceptual framework that were validated in Phase 3.

A review of the literature identified a range of current and emerging technologies with the potential to engage learners. The technologies identified centred on the affordances of m-learning - The use of handheld technology that relies on wireless and mobile phone networks, to aid teaching, learning and support, (m-learning.org), ITS, social media, text to speech software and Google software. Current and emerging technologies have the potential to be used for technological, pedagogical and pastoral support, personalisation by the learner and for teaching and learning. Table 19 summarises some of the technologies identified and illustrates how they might be used to engage learners. The table is divided into ‘Support’, ‘Personalisation’ and ‘Pedagogy’ which represents the range of potential uses by learners or teachers.

5.5 Phase 3 - Summary of Results

As phases 1 and 2 of this research identified that all learners are potentially diverse, having their own unique collection of characteristics, Phase 3 focused on engagement of all learners. Following Phases 1 and 2, a list of nine elements were collated. These elements formed the preliminary conceptual framework and were given to participants from Phase 2 to validate (Phase 3, Step 1). After the validations were analysed a further iteration of the data collected to this point was initiated. As a result a further element (#8) was added to the preliminary conceptual framework. This element was numbered 8 due to its positioning within the BLF. Each element is mapped against the themes that emerged from the data analysis in Phase 2. Each theme links to one or more element. Moreover, every theme is linked to either element 9 or 10 which should be in place throughout the entirety of the programme.

The resulting 10 elements were validated by new samples of participants in Steps 2, 3 and 4 of Phase 3.

The participants in Phase 3 validated the ten elements. A questionnaire survey, instant reaction mobile interviews and a focus group were conducted with learners from a different HEI and semi-structured interviews were conducted with teachers. Most of the learner participants thought that the ten elements would influence their engagement on a blended learning programme. Most of the teacher participants thought that the ten elements would encourage learner's engagement on a blended learning programme but were less encouraging than the learner participants.

5.6 Phase 4 - Summary of Results

The aim of this research was to develop a conceptual framework for effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes. The results from all three phases were gathered and a conceptual framework for sustaining engagement with blended learning programmes was created. The Blended Learning Framework (BLF) is a support model which comprises of a list of ten elements that make up a strategy and has been divided into four sections: Preparation; Design; Engagement and Ongoing.

The overall aim of the research was divided into four specific objectives and the remainder of this chapter will address each objective in turn. It will discuss how each has been met and how each contributes to the overall aim with supporting evidence from the literature.

5.7 Discussion

Phases 1 and 2 were entered into by the researcher with an open mind, with no preconceptions, assumptions or hypotheses with regards to what type of learner will experience exclusion while using technology. This research has highlighted that blended learning learners do not see their programme of study as two separate parts: online and f2f, but as one programme with different elements that merge and supplement each other. This means that teachers of blended learning programmes may have to plan and design units where one element complements the other to engage their learners.

5.7.1 Objective 1

The first objective of this research was to explore the characteristics of learners in their own voice and analyse their influence on digital exclusion and inclusion. In the past, researchers have studied different groups of learner to identify what effects their shared characteristics have on their interaction with technology. More recently there have been studies that suggest that classifying learners into groupings is not

an accurate way to determine their interaction with technology, (Bennett and Maton, 2010). This research concurs with this point of view but achieved the findings in a unique way: by allowing the learner to specify their own characteristics, whatever they might be. No predetermined groupings were stipulated. What was found was that every learner possesses their own unique set of characteristics arguing that every learner is diverse. Although learners can belong to a certain 'group' for example 'ethnic minority', it cannot be used to determine whether they will experience digital exclusion or not. Furthermore, learners can belong to more than one 'group'. Every learner brings with them a variety of educational, employment, social and cultural backgrounds and experiences (Haggis, 2006). Additionally, learner characteristics can change and evolve over time. Whether the change occurs from the start of the programme whilst developing their skills and confidence to a change in circumstance in their personal life, it is not sufficient to determine learner outcomes with technology by their demographic make-up. This poses a problem for teachers who attempt to group learners into categories to manage diversity. Whilst characteristics did not seem to influence digital exclusion in this research, it did play a part in learner perceptions of technology and of each other.

This research identified that age was a key factor in learner perceptions of technology used on their programme. Similarly, as recognised by Ryan et al., (1992) in an earlier study of mixed aged learners, younger learners perceived older learners to be at a disadvantage when using technology for formal learning. In this research, younger participants cited a possible lack of technology being taught and used when older learners would have been at school as a major factor for their perceptions. Older learners also perceived themselves as having a disadvantage to their younger peers whilst using technology for formal learning, citing the same factor however, their perceptions were not translated in practice. Older learners, although perceived as being at a disadvantage, were no more digitally excluded than their younger peers. Element 6 of the BLF: *Establish mixed age groups to encourage collaboration with technology enabled learning*, suggests that teachers could consider initiating peer mentoring for less able/confident learners which could potentially address these misperceptions. This element is supported by research by Leidenfrost et al., (2011) whose study of mentoring styles in higher education found that mentoring had positive effects on academic success for mentors and mentees. Initiating peer mentoring among cohorts could benefit both older and younger learners by modelling each 'group's' relevant positive attitudes to technology.

From the data collected, it could be suggested that age influences how learners feel about technology before a programme starts. Older learners experienced feelings of self-doubt and anxiety when they considered the use of technology on the programme. However, once the programme started, older learners used the new technological experiences as an opportunity to learn new skills and embraced technology as an enabler to learning. Younger learners however, did not report any feelings of self-doubt or anxiety before the programme started. Once the programme had started and they were faced with new ways to use technologies that they may not have experienced before, they then experienced feelings of self-doubt, anxiety and exclusion. Unlike their older peers they did not embrace the new technological experiences as opportunities to enable learning or improve their skills; they instead questioned why they had to use it. These findings support research by Berman and Hassell (2014) who suggests that digital immigrants adapt to learning with new technologies such as blogs, better than digital natives. This could be due to technology always being a ubiquitous part of younger learner's lives, so they have never had to think about how to use it academically. It has always been there, they have grown up with it around them so to some extent have not had to learn how to use it. There has been no transition in the way they learn. Technology has to some extent, always

been in the classroom and it has always been at home. Whereas older learners have had to learn how to use technology. There has been a transition in the way they learn, from traditional f2f methods only to a mixture of f2f and TEL. This could suggest that older learners are used to being faced with new technological challenges so are better equipped to deal with it when it arises. These findings have the potential to impact on the services and support that establishment's offer, before and during the university experience. Element 1 of the BLF: *Prepare learners for technology enabled learning*, could offer a solution to these challenges that learners face. Teachers could consider having a pre-programme taster workshop to give learners the opportunity to discover which technologies would be used on their course and the option to update or acquire new digital literacy skills.

This research suggests that experiences of digital exclusion are potentially attributed to organisational factors, such as IT support, rather than learner characteristics. The 'Age' characteristic influences learner perceptions of technology but does not impact on being excluded from using technology in the way it is intended by the educator. These findings provide an opportunity for HEIs to offer targeted support for their learners which focus on factors that can be managed by the organisation, such as IT support rather than focusing on certain groups of learners. The BLF consists of elements that could support teachers with this challenge, for example Element 2: *Organise guidelines and plan their time release*, suggests that teachers should consider giving information (f2f and online) to learners when it is time relevant. This could be achieved by staggering inductions throughout the programme instead of one induction at the start of the course. This element was included in the BLF due to the findings of this research revealing that learners often forget large sections of information given during inductions at the start of a programme. This is because only information that is needed at that time is remembered and other information, such as IT support which potentially would not be needed until further into the programme, is forgotten.

5.7.2 Objective 2

The second objective of this research was to investigate the usefulness of current and emerging technologies for pedagogy with a diversity of learners. Having established in the first two phases of this research that all learners are potentially diverse, the investigation into the usefulness of current and emerging technologies with a diversity of learners will centre on all learners and not separate learners into specific groups. The data from this research showed that current pedagogies centre on the affordances of Web 2.0, such as social media discussion pages. Participants in this research used social media for formal and informal learning. Formal learning was enabled utilising blogs. Learners collaborated on tasks which were formally assessed by their teachers. Younger learners displayed some resistance to this method and delayed completing such tasks for as long as possible and this resistance could be due to publicly sharing what they have learnt. Dabbagha and Kitsantasb (2011) study of the affordances of PLEs found that using blogs for informal learning first could encourage learners to eventually share posts for formal learning purposes. This research did not uncover the reasons for this resistance but being open to criticism or judgement in such a forum is a new phenomenon for many learners in a formal learning context and could be a factor. Additionally, the added element of assessment could influence some resistance with learners to share publicly their responses to set criteria. It could be the case that younger learners are less resistant to completing blogs that are to be assessed formatively, where constructive feedback is given and results of the blog are not recorded formally. Rather, results are used to measure against session learning outcomes or assessment for learning. Or it could be the case that whether the blogs are assessed formatively or summatively has no impact on resistance but merely the fact that they are to be viewed by their teachers is the trigger for resistance. Further research is required to

explore these possibilities. However, the BLF addresses these challenges for younger learners by suggesting that teachers encourage the use of PLEs. Element 9 of the BLF: *Provide opportunities to personalise technology enabled learning activities and tools throughout the programme*, could offer learners the opportunity to participate in blogging for informal learning purposes in order for them to build confidence in posting comments. This could prepare learners and potentially increase engagement when they are required to participate in online discussions for formal learning purposes.

Although younger learners displayed some resistance to using blogs for formal learning, no learner expressed any experiences of exclusion and used the blogs as they were intended. The Web 2.0 offers obvious benefits to teachers and learners. Being able to communicate and collaborate across time and space enables learning that can be self, peer and teacher assessed anytime, anywhere. More research needs to be done to investigate whether the added element of formal assessment impacts on sustaining learner engagement with such technologies. Nonetheless, blogs and other similar forms of social media are useful resources for any teacher to have in their toolkit to promote collaborative learning.

What was interesting about social media as a current technology was how useful it was to learners in an informal learning context. Participants in this research belonged to social media groups, such as Facebook, which was set up informally by the learners themselves. There was no element of teacher input with these groups but they were relied upon by the learners for technological and pedagogical support. Dahlstrom et al., (2012) concurs that, as he calls it 'DIY support' is more readily used than traditional forms of support in today's universities. Often, the groups Facebook page was the first point of contact when an academic, personal or technological problem arose. Findings from this research found that some learners who initially were not part of their cohorts Facebook group felt excluded. They felt that they were missing important or useful information as well as peer interaction. This is supported by Madge et al. (2009) whose study investigated how British university students engaged with Facebook. Their study found that Facebook helped the participants to settle in to university as well as being used for informal learning purposes during their programme of study. If social media is relied upon so significantly by learners for this type of support, it is worth considering whether this channel of communication could be more effective for student support than some that are more commonly used, for example ICT telephone hotlines. On the other hand, if a social media group page was subject to HEI input, learners may lose ownership and may not feel able to express concerns openly without fear of castigation. Although there is no evidence in the literature to support this suggestion, the findings in this research found that some learners were resistant to posting comments where teacher input was required. With this in mind, the BLF addresses these concerns by suggesting that teachers: *Element 9: Provide opportunities to personalise technology enabled learning activities and tools throughout the programme*. An example of this could be to encourage learners to create PLEs which could include social media sites such as Facebook to use for support and informal learning purposes, (Dabbagh and Kitsantas, 2012). Having the opportunity to offer and receive support from peers using social media could influence digital inclusion because it enables learners to continue with their learning without the need to involve formal support networks such as IT support or teachers. Additionally, peer support is often explained in a different way to teacher support which could benefit some learners (Yang et al., 2007).

Despite the usefulness of social media group pages like Facebook for informal learning, this research found that caution should be exercised by learners when relaying or repeating information. Pages like Facebook, can cause a phenomenon that some might describe as a 'Chinese whisper' effect. Information placed on such

a page can become distorted when repeated verbally and information given to specific learners by teachers can be shared on the page that does not relate to others. This can potentially cause confusion and in some instances panic amongst cohorts. Findings from this research revealed that although learners used Facebook significantly for a range of support networks, they also needed to be selective about which information to rely on. There is no literature to support this claim but is an area where future research could be undertaken.

Mobile technologies were perceived as useful to diverse learners in this research mainly due to the opportunity to access content and resources anytime and anywhere which supports digital inclusion. This is in line with research by Cochrane (2010) whose comparative account and analysis of mobile Web 2.0 projects found that learners used their mobile devices for formal and informal learning but identified critical success factors that influence how successful this usage was in a formal setting: pedagogical integration of the mobile device into course assessment; lecturer demonstrations of the pedagogical use of the mobile device; consistent formative feedback to learners and suitable mobile devices to support the underlying pedagogical model being used. These findings support Element 10 of the BLF that suggests *technological and pedagogical support is available throughout the entirety of the programme*.

A literature review was carried out throughout all phases of this research and found that current and emerging technologies centre on the affordances of m-learning (Hamm et al., 2014), including wearable technology (Skiba, 2014), as well as intelligent tutoring systems (ITS) and virtual assistants for pastoral support (Sosnovsky et al., 2014), quantified self (track and analyze your body, mood, diet, spending etc.) (Johnson et al., 2014), text to speech software (McNaught, 2015), Google docs and Google Classroom (Google, 2015). It seems that many of the technologies emerging in education focus on the individualisation and personalisation of the student, for example ITS such as boibot (Existor, 2016) have conversations with learners instead of a teacher, and will give personalised advice based on what the learner asks. Still in the early stages of development, ITS rely on set commands and requests with the exception of technologies such as 'bots' that develop their vocabulary the more they verbally interacted with a human. There is potential to use ITS and 'bots' in blended learning programmes where larger cohorts can exclude some learners from accessing support due to the restricted amount of time lecturers potentially have with individual learners. Three of the elements of the BLF address some of the exclusion learners may encounter when faced with emerging technologies on their programme. Element 1: *Prepare students for technology enabled learning*, suggests that teachers could consider having a taster workshop for learners prior to their programme starting. This could support learners with technology that they may not have encountered before. Emerging technologies are just that, emerging, so may not be widely used by most new learners. Element 5: *Ensure technology enabled learning is workable, manageable and effective*, suggests that teachers could consider having IT sessions throughout a programme. This would go some way to ensure that learners were not being excluded from using any TEL elements of a programme and give them an opportunity to develop their technology skills. In addition, Element 5 could be managed as part of the internal quality assurance process (such as course development) and CPD, which relates to the e-CF which suggests competencies such as self-assessment of how ICT is used to ensure that up to date and relevant technologies are being used effectively by staff and students. Element 10: *Ensure there is technological and pedagogical support throughout entirety of the programme* could go some way to ensure that there is learner support with any emerging technology being used on a programme. Additionally, Beetham and Sharpe (2013) suggests that digital literacy is the combination of 'digital knowhow' and academic practice and the current generation of university student

have a higher and more varied level of digital knowhow than academic knowhow. Element 10 could ensure that not only technological support is available but pedagogical support is available to develop learners' academic knowhow therefore, impacting on their digital literacy skills.

Text to speech software, although not an emerging technology is being used in new ways to support and include learners in formal summative assessment contexts such as exams, (McNaught, 2015). The potential of this is that it could improve reader/interpreter bias, positively support print impaired learners and reduce any exclusion with exam taking. Additionally, text to speech mobile applications are available to download which could support learners when using m-learning in an informal context. The implications of this are that more learners will be able to use such applications in a mobile context whereas previously they would be restricted to using support software within the university. Element 9 of the BLF: *Provide opportunities to personalise technology enabled learning activities and tools throughout the programme*, could offer learners the opportunity to add 'DIY support' websites and apps to a personal virtual space such as a PLE, (Dabbagh and Kitsantas, 2011).

Quantified self is a new phenomenon which allows people to track and analyze their body, mood, stress levels, diet, spending etc. (Skiba, 2014). This could potentially be very useful for educators and learners if learners could track and analyze their body, stress levels, mood and diet in order to maximize their learning. Identifying triggers that could have a negative impact on learning could be very useful for learners to prepare themselves to be in optimum condition for maximum success. Element 10 of the BLF: *Ensure there is technological and pedagogical support throughout entirety of the programme*, could be a useful channel of communication for teachers to inform learners of the potential benefits of such technology. Quantified self technology also has the potential to be of benefit to teachers. Lupton's (2013) study which set out to identify the social and cultural meanings of self-tracking practices via digital devices, found that these types of technologies, which were initially used exclusively by health professional are now being used by professionals outside of the health profession.

Most learners are used to being connected to the internet constantly with smartphones and able to communicate with others using a variety of social media instantly, suggesting that learners are developing from consumers of content to becoming creators of content (Schaffert and Hilzensauere, 2008). Implications of this developing learner role for this research is that teachers may need to use technology's affordances to mirror these preferences to engage and include all learners. If learners are becoming the creators, they will potentially require the freedom to choose topics in which they can have the creativity to learn in a way that is more relevant for them, which is related to the concept of emancipation (Radford, 2012). The BLF addresses this challenge by suggesting that teachers could offer personalised and flexible opportunities to adapt to learner needs. An example of this is Element 4: *Give students an opportunity to choose alternative topics for online activities* and goes on to suggest that teachers could involve student ambassadors in curriculum design and good technology use. This would not only go some way to ensure that learners have a choice about topics but that technologies popular with a modern learner were being incorporated into blended learning programmes. The inclusion of this element is supported by research by Conole et al., (2008) who explains that effective social networks are not just reliant on the relationships between the learners but on the value found in social objects. Additionally, the literature provided insight into how constructing knowledge should be carried out with freedom from authority (Radford, 2012). Yet it was established that in an educational context, such as in an HEI, allowing a student the freedom to construct knowledge without authority can be

problematic, particularly the relationship between freedom and truth. In HE, educators can guide their students into becoming autonomous learners, not being taught but thinking and learning by themselves but can be restricted by the requirements of Professional Bodies, HEIs and National organisations such as the HEA. Where there is a mix of face to face and technological elements, such as in a blended learning environment, this research has found that for these participants, complete freedom did not always engage them and that some direction from their lecturer, for example during lectures and face to face elements of the programme is important to their learning process. So by giving students a choice of alternative topics to study, as with Element 4 of the BLF, some degree of freedom is achieved.

Evidence from the literature would suggest that many of the technologies emerging in education do not seem to be new in themselves but in how they are used. An example of this is text to speech software (McNaught, 2015) which is being used in education for learner support, such as an alternative to traditional note taking for learners with specific learning differences such as Dyslexia (Lukes, 2015), whereas in business text to speech software has been used since the 1950s (ReadSpeaker, 2016). It could be argued that the way in which teachers use technology or what technology is used for will change and develop with the changing landscape of an HE learner.

5.7.3 Objectives 3 and 4

The third and fourth objective of this research was to examine what learners need to be effectively engaged with a blended learning programme to incorporate the findings into a conceptual framework for sustaining engagement with blended learning programmes. As phases 1 and 2 of this research suggested that all learners are potentially diverse, having their own unique collection of characteristics, Phase 3 focused on engagement of a diversity of learner, that is all learners.

The data collected found that learners could benefit from being prepared for TEL. The findings from this research found that older learners could potentially experience feelings of self-doubt prior to the commencement of a programme. As suggested by some of the participants in the first two Phases of this research, it is possible that these feelings could be alleviated if HEIs considered offering a pre-programme taster workshop. This could give learners an opportunity to identify and if required, learn how to use the technology utilised on the programme. As illustrated in the challenges column of Table 8 adapted by Schaffert and Hilzensauere (2008), both learners and educators could benefit from ensuring that learners know how to search, utilise and organise the technological resources that are available to them. These findings are supported by research by Haggis (2006) who proposes that due to the diversity of a modern university population, some learners will not ‘know what to do’ (p. 1) when faced with conventional university tasks, such as referencing. This could also go some way to reduce feelings of self-doubt and could diffuse any previous negative perceptions of technology that may be present from previous educational experiences. Additionally, it is important to check learner’s engagement with technology during the programme. Element 3 of the BLF suggests that teachers *build in checkpoints to ensure that technology enabled learning elements of the programme are understood*. This could also include checking on learner’s perceptions of what is required in terms of expectations or outcomes when using TEL elements of their blended learning programme (Haggis, 2006). Findings from this research found that when some learners are unclear about what is expected from then in terms of completing the TEL elements of their blended learning programme they can turn to peers for clarification or advice. This potentially leads to ‘Chinese whispers’ which can spread uncontrollably throughout the cohort. Despite this challenge with social media, the data

reveals that learners use sites, such as Facebook extensively. They engaged learners in academic, pastoral, social and technological support as well as informal learning. This is supported by Yang et al. (2007) who suggests that learning support can be provided by both peers and technology and is often delivered in a different way to that of the teacher, which can enhance engagement and reduce exclusion. Use of social media sites could be encouraged among cohorts but advice and guidance before initiation may reduce the unnecessary distress and panic it can sometimes cause.

The findings from this research identified that learners found access to learning materials and programme content at convenient times and places useful to them. A report of iPad use in HE by Manuguerra and Petocz (2011) found similar findings. Their report found that mobile technologies, such as the iPad encouraged learner engagement with learning activities. TEL and VLEs are essential elements of a blended learning programme. Ensuring that both elements are user friendly and easy to use could encourage engagement with the formal and informal process of learning. Element 5 of the BLF suggests that teachers consider planning IT sessions in to and throughout a programme for learners to develop and update their digital literacy skills. This intervention could reduce the amount of IT support learners will need as well as potentially alleviating some of the negative perceptions that learners may have from previous technological experiences in their past. This research found that effective IT support is essential if a learner is to stay engaged with their programme of study, especially if the programme of study is a blended learning programme where TEL and m-learning are significant elements of the programme. A study by O'Driscoll et al. (2010) suggests that some learners felt that a lack of support and training was the main barrier to learning excluding them from participating in some online elements of a programme. Participants in this research told stories of turning to peers for IT support in the absence of effective institutional support. Element 10 of the BLF: *Ensure there is technological and pedagogical support throughout entirety of the programme*, is included to deal with these potential barriers. Additionally, some of the participants in this research relied on their teachers for IT support, making use of f2f parts of the unit to address these technological issues. This could potentially increase pressure on teachers to be able to assist where possible. The BLF suggests that teachers consider designing blended learning programmes collaboratively with IT support staff, therefore exploiting the skills of both professionals. Data supported previous research which found that the f2f and online components are both considered to be important parts of blended learning and together merge into one to form a programme. Participants in this research did not value one component more than another. Learners do not necessarily consider the f2f and online elements as separate and both elements play their part in engagement. Therefore, this research suggests that pedagogical support is as important as IT support on a blended learning programme.

Learners who participate in different units or have different teachers are likely to experience similar TEL methods across the programme but used in different ways or with different software. This research found that some learners invested time into learning how to use new technologies in a specific way, but were excluded when a new unit commenced where the same or similar software or tools were used but in a different way, for example themes arose in Phase 2 where learners had experienced different ways of receiving information online from different teachers, which contributed to the learners not knowing where or how to access information and potentially excluding them from receiving communication. Currently there is no literature to support these claims so further research would be required however, validations of the preliminary conceptual framework during Phase 3 found that Element 7: *Ensure that teaching methods, resources and*

tools are used consistently across a whole programme which suggests that teachers consider using standardisation across a whole programme to distributing information could potentially reduce these problems and make it easier for learners to know where and how to access it.

Although there is much controversy about how much consideration should be given to learning styles in the classroom (Coffield et al., 2004), learners recognise that they possess certain styles. Some of the participants in this research talked about their learning style or how they learned best but did not specify any particular style. They none the less had awareness that certain ways of teaching improved their learning process. The implications of this are that a shift to personalised learning is important, to facilitate learning opportunities but in a way that is personal to learners. From experience, we attempt to challenge learners and using methods that makes learning 'comfortable' for them is not a challenge. If a student does not prefer or finds it hard to learn using a specific style, then there is potential to restrict learning (Claxton, 2009). Additionally, limiting a learners' preferred way of learning to single styles is unrealistic in a modern learning environment, where technology is commonplace and was not a consideration when researchers such as Fleming created his VARK model in 2001. This could mean that learners need to be offered personal learning opportunities but in a way that will challenge them and in a way that they will appreciate the benefits. Making available pedagogical support throughout their programme could go some way to ensure that this is possible (Cochrane and Bateman, 2010).

By offering an appropriate blend of f2f and online content, different ways of learning will be catered for. It is possible that some learners prefer to work independently or collaboratively online and some learners like to interact in a f2f environment. This research found that most learners like a mix of the two which concurs with research by Jewitt (2008) who studied the different elements of blended learning. By not overusing TEL methods, learners still benefit from the f2f environment and the interaction with teachers and peers, while still having the opportunity to learn using technology conveniently across time and space. This research supports Gedik's et al. (2012) study which sought students' perceptions of blended learning and suggests that there is an optimum blend of technology and f2f methods during a blended learning programme. Of course, the 'appropriate blend' will be dependent on the learner however, to ensure that as far as possible TEL is not overused, educators could consider designing individual units within a programme collaboratively. *Elements 7: Ensure that teaching methods, resources and tools are used consistently across a whole programme* and *8: There should be an optimum blend of technology and f2f methods during a blended learning programme*, of the BLF deals with these challenges if implemented at the planning stage.

Findings from Phases 1 and 2 of this research found that some learners were resistant to completing blogs for formal learning purposes. A review of the literature to investigate emerging technologies, identified a study by Dabbagh and Kitsantas (2012) that sought to discover the potential of PLEs as a pedagogical approach for both integrating formal and informal learning using social media in higher education. They suggest that implementing a PLE and encouraging learners to create a blog for informal learning purposes would eventually encourage them to write posts for formal learning purposes. *Element 9: Provide opportunities to personalise technology enabled learning activities and tools throughout the programme*, suggests that teachers could consider encouraging learners to create a blog for informal learning to prepare them for when online discussions are required for formal learning, for example, PLEs could be used by learners throughout a programme to take ownership of their own learning. Haggis (2006) argued that with so many diverse learners attending university, personalised support could be unrealistic. The implications of this are that if there is a

shift towards personalised learning but with evidence of such diversity the learner needs to take some responsibility for ‘DIY support’ (Fox, 2014) themselves. A PLE could offer an alternative to conventional HE support by allowing the learner to identify their own personal needs and offering a virtual space where support networks and resources can be referred to and used in their own time and in their own way. The potential of a PLE is its multiple uses, for example using social software tools to access multiple social communities. This is backed up by Dabbagh and Reo (2011) who suggest that the social aspect of learning is a key aspect to encourage the creation of personal and social learning spaces to enable learner centred ‘personalised’ experiences in HE. A PLE is an emerging technology with many documented benefits to encourage engagement with a modern learner. As an emerging technology, to benefit from its affordances, it will require teachers and learners to both embrace its possibilities and to continually update digital literacy skills.

Teacher appraisals of the preliminary conceptual framework suggest that it could positively influence digital inclusion in a blended learning environment. However, despite the findings generated from learners in this research, there was still some dismissal from the teachers interviewed in Phase 3, about some of the elements and suggestions as to what a modern learner needs to be effectively engaged with a blended learning programme. Prensky (2001) believes that,

“...it is ineffective to presume that (despite their traditions) the Digital Immigrant way is the only way to teach, and that the Digital Natives' "language" is not as capable as their own of encompassing any and every idea.” (p. 6)

The sentiment of this statement was reflected by some of the teachers in this research, by not being open to the possibility that learners benefit from new approaches to enable learning. On the other hand, Jones et al., (2010) criticises Prensky’s statement and proposes that digital natives’ neurological structures have not changed significantly from digital immigrant’s and that to abandon methodologies used in the past would deny digital natives valuable pedagogies. In other words, it is possible that the way in which a modern learner learns has not significantly changed rather that teacher and learner views of what constitutes effective TEL are different.

Currently there is no mandatory requirement for university academics to complete teacher training qualifications as there are in schools.

“In the United Kingdom, significant funding follows high research ratings, whereas funding for teaching is not related to quality ratings, so institutions reward good research more than good teaching. Academics have to divide their time between the two activities: the one in which they are professionally qualified and judged by their peers; the other in which they are neither qualified nor judged. Inevitably, research wins.” (Laurillard, 2013 p. 140).

Perhaps for this reason, student learning at university level is under researched, (Laurillard, 2013). However, increasingly many HEIs require their staff to gain some formal teaching qualifications as a result of Government and Higher Education Academy influences. The proposed introduction of the Teaching Excellence Framework (TEF) for HE teachers was introduced by the Government to widen participation and drive up teaching quality (Department for Business, Innovation & Skills. 2015). At the time of writing a Green paper has been proposed and HEIs / stakeholders are being consulted. The aims of the TEF are:

- to ensure all students receive an excellent teaching experience that encourages original thinking, drives up engagement and prepares them for the world of work

- to build a culture where teaching has equal status with research, with great teachers enjoying the same professional recognition and opportunities for career and pay progression as great researchers
- to stimulate a diverse HE market and provide students with the information they need to judge teaching quality – in the same way they can already compare a faculty’s research rating
- to recognise those institutions that do the most to welcome students from a range of backgrounds and support their retention and progression to further study or a graduate job.

The BLF addresses elements of these aims for example, the aim emphasises that ‘*all students receive an excellent teaching experience that encourages original thinking...*’ Element 9: *Provide opportunities to personalise technology enabled learning activities and tools throughout the programme* encourages learners to identify for themselves what resources, websites and support they may need to learn, fostering an environment where learners learn to think for themselves, to become creators rather than consumers of content. The third aim ‘*provide students with the information they need to judge teaching quality – in the same way they can already compare a faculty’s research rating*’ suggests that HEIs will need to implement some form of grading process, such as Ofsted’s lesson observation grading system that has been used in schools and colleges until 2015 to judge individual teachers on ‘teaching, learning and assessment’ (Ofsted, 2014). There was much debate as to the value of these individual grades which in part influenced the move to grading school’s and college’s ‘teaching, learning and assessment’ as a whole (headguruteacher, 2016). However, a discussion on the merits of grading teachers is outside the scope of this research but importantly more dialogue between teacher and learner could potentially foster a more collaborative approach to teaching, learning and assessment in HE. The BLF suggests that, as far as possible, teachers could involve learners in the design of learning activities for example, inviting student ambassadors to contribute to curriculum design and good technology use on a programme. This could go some way into providing learners the opportunity to assess the quality of teaching being provided and suggest alternatives if necessary. Additionally, JISC (2013) suggests that utilising the digital knowhow of learners by engaging them as mentors and involving them in the development of technological elements of a programme could support the development of digital literacy skills of peers and university staff. This would not only go some way to address the power relationship balance between learners and academics that can exist in HE (Liao, 2015) but also contribute to CPD for ICT educators, which is one of the competencies suggested by the e-CF discussed in section 2.7.

In their book which looks at ‘reshaping the educational experiences of 21st-century learners’ Jukes et al., (2010) suggests that both learners and teachers have new roles to play in education in the future. A more collaborative approach between educator and learner could be employed to design programmes to bridge the gap that exists between what a teacher requires a learner to learn and what a learner needs to enable them to learn it.

5.8 Chapter Summary

This chapter began by introducing the BLF (Phase 4). The chapter continued with a summary of each phase to consolidate the findings and was followed by an in-depth discussion on how the conceptual framework was created and designed, addressing each objective in turn.

The chapter discussed and justified why it suggests that all learners are diverse and therefore categorising learners to determine their interaction with technology is not useful. It was suggested that current and emerging technologies that are being used in education are not new technologies but the ways in which they are being used is new. Learners' experiences of digital exclusion are influenced by organisational factors rather than learner digital literacy skills. Taking into account these findings, the BLF was created which consists of ten elements, together provides a range of strategies that could sustain engagement on blended learning programmes with a diversity of learners. Each element was discussed with regard to how it was conceptualised with supporting evidence from current literature.

The next chapter will reflect on the research and address the conclusions to be made. It is recognised by the researcher that although the BLF was validated in Phase 3, the samples were small and findings only apply to the participants in this research. As such the next chapter will also discuss opportunities for further research.

Chapter 6 Conclusions

6.1 Statement of the Problem – Addressed

As stated in the introduction, educators have historically tried to match learner characteristics to the teaching and learning methods used in the classroom (Hunt, 1971) by identifying factors that may create barriers to learning, such as certain diverse learner groups (Prensky, 2001). The evidence from this research backs up earlier studies highlighted in the literature review that suggest grouping learners cannot be used to accurately determine which teaching and learning methods will and will not suit learners (Garner, 2000, Coffield et al., 2004, Klein et al., 2007).

This research aimed to develop a conceptual framework to develop effective teaching and learning strategies for managing student diversity in relation to experiences of digital inclusion and exclusion in blended learning programmes. This was of particular interest as a former student and now teacher on blended learning programmes. The research focused on student experiences on blended learning programmes to see if learners associate particular characteristics with a sense of digital inclusion or exclusion, and while gender, age, ethnicity, geography, socio-economic status, educational background, and learning styles had previously been associated with digital exclusion, did not present a sufficiently nuanced perspective to explain why some learners feel included or excluded. To determine learner characteristics, participants were not forced into pre-determined groupings, rather identified their own characteristics. There was previously no research that had explored learner characteristics in this way.

The data from the first two phases of this research identified that no one particular ‘group’ of learners experienced digital exclusion more than others. Additionally, every learner had their own unique set of characteristics and on that basis the research concluded that every learner is a diverse learner, for example two participants in this research could both be conventionally categorised as ethnic minorities could also be separately categorised as an older/younger learner, as one was 20 and was 49, one had disabilities but one did not, one had SEN and one did not. Additionally, during data collection both participants specified different characteristics to describe themselves. Participant’s self-described characteristics were grouped into: age; geographic; previous jobs/life experiences; year of study; programme of study; hobbies; family and previous qualifications and there were no two participants that shared the same collection of characteristics.

Technologies were reviewed by the researcher for their usefulness by collecting data from primary and secondary sources and an investigation was conducted of how a diversity of learners identify what they need to be effectively engaged on a blended learning programme. This PhD research suggests that current technologies, such as social media, and emerging technologies, such as Personal Learning Environments, may offer useful opportunities to effectively engage a diversity of learners on blended learning programmes. For the participants in this research, digital exclusion was found to be influenced by organisational factors, such as elements of the programme content rather than learner digital literacy skills. Additionally, for these learners the face to face elements of their programme was as important as the online elements, although the effective use of technologies such as blogs opened possibilities towards a greater shift to student-centred learning. This empowered learners to manage their own learning to some extent, such as completing elements of their programme at home. These findings raise questions around emancipation and autonomy and whether learners want to be or are as engaged with their blended learning programme when they are free from

authority. Moreover, can a learner ever be emancipated when there is any form of teacher input, such as learning outcomes or assessment requirements?

6.2 Contribution to Knowledge

As discussed in section 2.4, Conole (2010) suggested that many of the popular e-learning models available can be theoretically misunderstood by teachers who usually adopt a 'surface application' in practice which could be due to the many components the relevant theories, frameworks and models have. The findings from this research, although limited in terms of sample size, proposes that the BLF could address these criticisms by offering a simple framework that is potentially easy to understand and use in practice in a variety of ways, and adds to an evolving body of literature concerning learner diversity and digital inclusion in a blended learning context. The BLF is an original contribution to knowledge and provides a foundation for teachers who design and facilitate blended learning programmes. The possible impact of the BLF may not only be on teachers practice but with other stakeholders who have an interest in blended learning programmes or researchers who may wish to develop the BLF to suit their own needs. The BLF is unique because it was created directly from participant's experiences of using technology on their blended learning programme as well as participants identifying their own characteristics rather than having characteristics imposed on them. The BLF has been divided into four sections: Preparation; Design; Engagement and Ongoing (Figure 18). Each section comprises a set of elements and each element gives an example of how teachers can implement that element in practice.

Not all of the elements need to be implemented to sustain engagement on a blended learning course and the elements can be implemented in a variety of orders to meet the needs of a diversity of learners. The BLF provides a foundation for teachers to select strategies that will sustain engagement, recognising that no two learners will be the same. Some of the elements of the BLF could sustain engagement of some learners more than others, for example offering the opportunity to attend a pre-course taster session to familiarise learners with technologies that will be used on the blended learning programme will potentially engage older learners more than younger learners as it was older learners in this research who experienced feelings of self-doubt before programme commencement. Other elements of the framework could help to sustain engagement on a blended learning programme for a diversity of learners, such as building in checkpoints to ensure that technology enabled learning elements of the programme are understood or organising guidelines and planning their time release so important information is retained by learners. It is intended that elements could be used in isolation, as a whole framework or in a different order offered in this research. Some elements will be more relevant to some teachers than others so not all elements have to be initiated for the others to influence impact. Additionally, some of the elements such as Element 4 which suggests involving student ambassadors in curriculum design and good technology use, will also support university staff in developing their digital literacy skills. This also links to the e-CF which suggests a competency of *addressing CPD needs of staff to meet organisational requirements* (The European e-Competence Framework (e-CF) 2014. p. 32).

Although these findings cannot be generalised to other learners outside of the samples used in this research, it is suggested that the BLF provides a foundation on which teachers can design and deliver a blended learning programme in HE and an opportunity to further investigate its transferability, which is discussed in section 7.2.

6.2 Strengths and Limitations

As this research utilised interview data collection techniques and was grounded in critical realism beliefs, it is subjective and based to some extent on personal interpretations of the researcher. A strength of Phase 1 is that data collection reached a point of saturation. The findings from Phase 1 were limited to one sample (n=16) within one school at a HEI 1. The participant's programme utilised a blended learning approach but it is recognised by the researcher that other programmes/units may have a different blend of f2f and technology elements. It is also recognised that the sample in Phase 1 was small. Narratives of digital exclusion outnumbered narratives of digital inclusion in Phase 1 even though all of the participants described their programme as enjoyable. The reasons for this could be that: only participants that have had any negative experiences volunteer, assuming that that is what the researcher wants to hear about; they were the experiences that the participant remembers.

Again, data collection reached a point of saturation in Phase 2. Limitations of Phase 2 were the small sample size (n=10) and absence of male participants. However, as the purpose of this stage was to explore themes from Phase 1 in more depth these limitations were not considered to be significant.

Phase 3 offered the opportunity to validate the findings from the first two phases. It used a mixture of data collection methods to draw out qualitative validations from new samples of participants (n=22). This was a significant strength of this research. A limitation of Phase 3 was the small educator sample size (n=4), two of which specialised in education related subjects, which could have influenced their validations of the elements.

6.3 Further Research

This PhD research has provided some opportunities to further investigate some of the findings that emerged. The findings identified that younger learners displayed some resistance to completing blogs for formal learning purposes. This research did not identify the potential reasons for this resistance but suggested that being open to criticism or judgement in such a forum is a new phenomenon for many learners in a formal learning context and could be a factor. Additionally, the added element of assessment could influence some resistance with learners to share publicly their responses to set criteria. Further research is required to explore these possibilities and to identify whether the type of assessment (formative or summative) could be a factor.

Additionally, participants in this research belonged to social media groups, such as Facebook, which was set up informally by the learners themselves. There was no element of teacher input with these groups but they were relied upon by the learners for technological, pedagogical and personal support. Often, the group's Facebook page was the first point of contact when an academic, personal or technological problem arose. Further research would be useful to identify whether social media sites such as Facebook would be used as engagingly by learners where teachers had input into the creation, set up or population of such a group. Despite the usefulness of social media group pages for the participants in this research, many experienced a 'Chinese whisper' effect where information posted can become distorted when repeated and information given to specific learners by teachers can be shared on the page that does not relate to others. This caused experiences of confusion and in some instances panic amongst cohorts. At the time of writing, there is no literature that has investigated this phenomenon but would be useful for teachers to gain some insight into this phenomenon in order to guide and support new cohorts that may want to set up such a group.

As discussed in 6.1, the findings from this research cannot be generalised to other learners on blended learning programmes however, it is suggested that it offers a foundation for a diversity of learners to be engaged on blended learning programmes. Opportunities to use and validate the BLF in practice were outside the scope of this research but could be beneficial to learners and teachers. The BLF was validated using a variety of qualitative methods with small samples in Phase 3. Further validations of the BLF in practice from a larger sample in different subject areas would be useful to identify whether the BLF could sustain engagement with a variety of learners in different settings in HE, such as the natural science based subjects. Additionally, further research using the BLF in practice could be implemented with samples from other educational sectors such as adult or further education.

Models exist to validate learning programmes such as the Learning Evaluation Model (Kirkpatrick, 1994). The Learning Evaluation Model is a framework for measuring impact and identifies four levels of evaluation: Reaction (feelings); Learning (knowledge); Transfer (practice) and Results (Success).

Essentially these levels measure:

- reaction of student - what they thought and felt about the training
- learning - the resulting increase in knowledge or capability
- transfer - extent of behaviour and capability improvement and implementation/application
- results - the effects on the business or environment resulting from the trainee's performance

This model could be used by teachers and researchers to measure the impact the BLF has on learner outcomes, such as results, satisfaction and service quality.

6.4 Implications for Practice

As discussed in 6.3, the findings from this research cannot be generalised beyond those who participated in this research however, it is suggested that the BLF offers a foundation for a diversity of learners to be engaged on blended learning programmes. It was outside of the scope of this research to use and validate the BLF in practice. However, the framework has been presented at a joint Workers Educational Association (WEA) and Royal Bank of Scotland conference (2016) to illustrate how the WEA intend to plan their blended learning programmes using the BLF. The WEA is a UK charity that delivers adult education to learners within a community setting, for example groups of people who share an interest and want to learn more about that interest locally, perhaps at the local school or library. As many of the WEA programmes are funded by the Skills Funding Agency (SFA) they have a duty to provide high quality provision that is inspected by Ofsted. As such, in line with Ofsted (2016) requirements they are moving towards technology to enable certain aspects of both the formal and informal learning experience. The WEA national Curriculum and Quality Team are using the BLF to guide the development of some of the planned blended learning programmes to engage their learners. In these types of settings, where a digital divide can exist in terms of a lack of up to date equipment, reliable internet or limited learner/teacher digital literacy skills, the BLF could impact on how learners are introduced to using technology for learning and how engagement can be sustained throughout the programme. It may be necessary for learners to use their own equipment, such as smart phones or tablets to access certain elements of a programme which will allow a certain amount of personalisation and where there are learners that are less confident or competent in digital literacy, peer

mentors can be organised. Additionally, preparing older learners for the technology that they are likely to use on their programme will go some way to eliminate any feelings of self-doubt or anxiety. In the early stages of implementation, the BLF has the potential to impact on WEA teaching and learning policy.

6.5 Researcher Reflections

Reflecting on the PhD journey, there were a number of personal and practical lessons learned.

At the beginning of this thesis, the personal context (1.3) and the position of the researcher within the research was discussed. The research was conducted as it was a particular area of interest as a former student, teacher and a teacher training educator who has used blended learning models. As the PhD journey progressed, the area also became of interest as a researcher of blended learning.

From a teacher's perspective, the research provided an opportunity to gain a better insight into the experiences of learners on blended learning programmes. What was learnt was that learners require more than innovative teaching materials and lessons to be engaged. Underestimating the different types of support that learners gain from peers could be a mistake and potentially unproductive. If peer support, whether technological, pedagogical or personal, can be utilised better, it could be an effective and productive use of resources.

From a researcher's perspective, there were aspects of the research process that could have been done differently. In the early stages of data analysis during Phase 1, the researcher separated themes into inclusion and exclusion rather than allowing the themes to emerge and develop naturally. This was as a result of researcher inexperience and was rectified in Phase 2. Additionally, participant recruitment was underestimated. It was anticipated at the start of the research process that larger samples would be used however, recruiting for participants was a challenge and as such will be carefully considered ahead of any further research design and implementation.

On reflection, the early phases of the research focused predominantly on diverse learners but it became apparent that although that focus was an important aspect of the data collection process, less emphasis was placed on diversity as the findings and current literature suggested that grouping learners could not be used to accurately determine potential experiences of digital exclusion. Having proposed that all learners are diverse in their own right, suggested that any collection of learners are a 'diversity of learners'. From this assertion, the research evolved into focusing on engagement with a diversity of learners.

Finally, at the start of the PhD journey, the PhD candidate was an experienced teacher who faced some challenges as a new researcher in adapting to the rigorous and systematic process involved in collecting research evidence (Scott and Usher, 1996). Having completed this PhD, and learning valuable lessons along the way, these roles now have the potential to unite on an equal standing, utilising the benefits of both to produce evidence that is grounded in systematic analysis as well as good practice and assessment to achieve successful outcomes with a diversity of learners.

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Glossary

Blended Learning: the facilitation of teaching and learning using a combination of f2f and online methods, where technology replaces elements of a unit.

Computer Mediated Communication (CMC): Communication that occurs through the use of technological electronic devices. Communication can be synchronous which happens in real time, such as chat rooms or the communication can be asynchronous which happens outside of real time, such as email, discussion boards or wikis.

Communities of Practice: “a group of people who share a concern, a set of problems, or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an on-going basis.” (Wenger, et al. 2002:4).

Demographics: are the quantifiable statistics of a given population which characterise that population.

Digital Divide: the term ‘digital divide’ in this document refers to the disparity between people, geographic areas, communities, businesses and households with reference to accessing and using technology.

Digital Exclusion: being unable to access or use technology, or use it in the way it was intended to facilitate the learning process for any reason. For example, lack of equipment, poor design, digital literacy or limited bandwidth.

Digital Inclusion: being able to access and use technology and not being prevented in using it the way it was intended to facilitate the learning process.

Digital Immigrants/Natives: Digital immigrants are the generation born before the ‘digital era’ who may learn to use and become competent with technology but not fully understand ‘digital natives’ who are born during the ‘digital era’, (Prensky, 2009).

The difference between ‘digital natives and ‘digital immigrants’ is likened by Prensky to people who learn a language and people who are native speakers of that language.

Distance Learning: A mode of programme delivery where the student and teacher are separated by time and space.

Diverse Learners: groups of non-traditional learners that are underrepresented in Higher Education. Diverse groups could be (but not exhaustively) defined by: age, ethnicity, previous education, socio-economic mobility, socio-cultural factors, learning styles.

E-learning: refers to information and communication technology (ICT) enabled learning by delivering content and activities via (but not limited to) the Internet, intranet/extranet, audio/video tape, satellite broadcast, interactive TV, radio and CD-ROM.

E-pedagogy: The method and practice of teaching using technology.

Face-to-face: communication that takes place between individuals in an environment where they are physically present and are able to see each other and hence benefit from body language and other non-verbal communication clues.

Online Learning: learning that takes place in an Internet connected environment.

Mature Student: A learner who is aged 21 or older.

Mobile learning (M-learning): The use of handheld technology that relies on wireless and mobile phone networks, to aid teaching, learning and support, (m-learning.org).

Pedagogy: The method and practice of teaching.

Personal Learning Environment: ‘tools, communities and services that constitute the individual educational platforms that learners use to direct their own learning and pursue educational goals’ (EDUCAUSE Learning Initiative, 2009, p. 1).

Social Network: An online platform that facilitates building social networks and relations among people who can interact using Computer Mediated Communication (CMC), (Barker, 2012).

Technology Enabled Learning: The facilitation of learning that is enabled by the use of technology, that otherwise may not have been possible, (eg. peer collaboration to edit a shared document in real time across a distance).

Virtual Learning Environment (VLE): is a learning management software system that enables learner access to a number of learning tools.

Appendices

Appendix 1. Diverse groups references. References included in the table below support any references to digital inclusion or exclusion in the literature review.

Source	Purpose	Setting	Sample	Method	Critique/questions
Yorke and Longdon, (2008)	Student perceptions of their experiences at university.	25 UK universities.	7,109 first-year full-time students in a number of contrasting subject areas during Term 2. Age range of sample were mixed.	Survey	There was no way to determine the extent of any bias attributable to the way in which institutions distributed questionnaires, or to student absence or unwillingness to complete the survey.
Coffield et al., (2004)	Learning styles and pedagogy in post-16 learning	NA	NA	Systematic literature review.	Secondary data collected.
Knowles, (2011)	A book which discusses andragogical theory (adult learners) which is based on four assumptions which differ from those of pedagogy: (1) changes in self-concept,(2) the role of experience, (3) readiness to learn, and (4) orientation to learning. As a guideline for developing programs and for selecting and training teachers, the andragogical model of HRD is discussed.	NA	NA	11 page Bibliography	Analysis or assumptions were weak (Jarvis, 1985)
Swain and Hammond, (2011)	A paper which examines the motivations and outcomes for mature students who study part-time in higher education (HE) in the UK	HEIs, UK	1539 Survey 18 interviews (graduates)	Quantitative survey and narrative interviews.	Small sample size. No transparency on interview process.
Garcia, P. and Qin, J., (2007)	A paper which attempts to identify the generation gap and any associated differences in HE.	HE, USA	280 participants on blended learning courses.	Online survey	Were participants also perceived as excluded when expressing levels of uncomfortableness?
Dziuban, C., Moskal, P. and	A paper which explores generational	HE, USA	491 participants on blended	Online survey	Difficult to compare perceptions of individuals.

Hartman, J., (2005)	perspectives in blended learning environments.		learning courses		
Berman and Hassell, (2014)	A paper which investigates digital native/immigrant use of scholarly networks for research.	Various	988 post graduate doctoral students.	Survey	Supports existing literature that found that digital immigrants possess higher levels of social reliance than digital natives while contradicting other literature that found that digital natives tend to use the internet for social networking higher rates.
Wehrwein et al. (2007)	To assess for gender difference in learning style preferences.	HEI, USA	86 university undergraduates	Questionnaire survey	Current literature criticises the use of VARK learning styles to characterise students so can identifying gender differences in learning styles preferences be of any value?
Anderson and Haddad, (2005)	To compare expression of voice, control over learning, and perceived deep learning outcomes in face-to-face versus online course environments.	Midwestern regional university, USA	109 online students	Survey	Self-selection sample used which could potentially result in researcher bias and the sample not being representative. Refers to distance learning not blended learning.
Lorenzo and Dziuban (2006)	A report which explores the challenges of functioning in an information-rich environment where students must blend skills in finding information, using technology, and thinking critically.	UK	NA	White paper	Does technological confidence (or lack of) result in digital exclusion in relation to gender?
Kay (2008)	Chapter that explores gender differences in three key areas: computer attitude, ability, and use.	Various	Various	Past research examined.	Research examined is up to 25 years old, before computers were widely used in education.
González-Gómez et al., (2012)	The paper investigates whether or not gender differences exist in e-learning	University in Spain.	1185 students	Questionnaire survey.	Is it the case that the gender of the student influences the outcomes of e-learning or can it be a combination of factors? Based on distance learning.
McNaught and Vogel (2004)	The paper examines the relationships which exists within trans-national	International /various	International /Various	Examination of one research paper.	Only one example paper analysed.

	educational programs and in particular, the role technology can play in supporting interactions between learners when there is significant language and cultural variation.				
Ashong and Commander (2012)	A paper which investigated the impact of ethnicity and gender on perceptions of online learning. Specifically, the study examined African-American students' perceptions of online learning as compared to those of their White-American counterparts.	USA	120 undergraduate students	Online Learning Environment Survey (OLES	Concerns distance learning in USA.
Okwumabua et al. (2011)	Exploratory research concerning African American students' attitudes toward online learning.	A positive youth development program, USA	124 African American students.	Online Tutoring Attitudes Scale (OTAS; Graff, 2003)	Research was of school aged students (7-16 years).
Merrills (2010)	A qualitative study that examined how communication preferences, learning preferences, and perceptions about online learning affect non-traditional African American students' participation in online courses.	University, USA	10 <i>non-traditional</i> students.	Interviews	Small sample size and based in USA with only one ethnic group.
Chin et al., (1999)	A paper which explores how cultural differences influence students' perceptions of web-based learning.	HEI, Australia	157 students	Questionnaire survey	Dated research and based on distance learning.
Munro-Smith's (2002)	A paper which examines the emergence of differing student behaviour in the use of ICT in Melbourne and Singapore	HEI, Australia	Unknown	Draws largely on Hofstede's framework for cultural analysis.	Not all of the research questions were answered. A lack of information on methodology.

Boyette (2008)	A PhD which investigates the online learning environment in HE through the observations and perceptions of students of colour.	USA	500	Observations and survey.	Based on distance learning in USA.
Heemskerk et al. (2005)	A review on gender, ethnic and socioeconomic status differences related to ICT in primary and secondary education.	Netherlands	50 papers	Literature review	Relates to primary and secondary education.
Cubeta et al. (2001)	A study to assess the predictive validity of the Risk and Promise Profile	HEI, USA	542 students	Self-reporting questionnaire	Relates to USA
Chen and Wellman (2004)	A paper which discusses the proliferation of the Internet in developed countries and the digital Divide between North American and other developed countries.	Canada	Unknown.	Unknown	Limited information on methodology
Lichy (2011)	A paper which takes a multidisciplinary approach to investigating emerging trends in Internet use across different territories.	France and Britain	585	Survey	Concerns 13-15 year olds.
O'Driscoll et al. (2010)	A project which sought to understand how e-learning is experienced by non-traditional students.	HEI, UK	400+	Mixed methods	Four of the five focus groups had low attendance eg. one participant. Can this be described as a focus group?
Czerniewicz and Brown (2013).	Research into South African students' digitally mediated learning and social practices.	HE, South Africa	18	Interviews	The report concerns students under 22 years old.
Wooden et al., (2001)	A report which covers a study of barriers for older workers in obtaining and benefitting from training.	Australia	6 Focus groups (no specific sample size available)	Mixed methods	Dated research. Relates to Australian students.
O'Driscoll et al., (2010)	A project which sought to understand how e-learning is experienced by	HEI, UK	400+	Mixed methods	Four of the five focus groups had low attendance eg. one participant. Can this be described as a focus group?

	non-traditional students.				
Helsper (2011)	A paper which sets out the theoretical and political history of the debate around digital exclusion and divides and explain why it is relevant for those wishing to tackle barriers to online civic engagement.	UK	5	Case studies	No information about how sample characteristics options were determined.
Koivusilta et al. (2007)	The role of ICT in adolescents' lives was studied, with emphasis on whether there exists a digital divide based on sociodemographic background, educational career, and health.	Finland	5090 students	Postal survey	Relates to 12-18 year olds in Finland
DeTure (2004)	A study which sought to identify learner attributes that may be used to predict student success (in terms of grade point average) in a Web-based distance education setting.	USA	Six courses	Completion of the Group Embedded Figures Test and the Online Technologies Self-Efficacy Scale	Concerns distance education in USA.
Waschull (2005)	An article that addresses factors associated with student success in online psychology courses	Greece	Unavailable	Students completed various measures inc. self-discipline and motivation.	Concerns distance learning. Predetermined student characteristic options.
Claxton, (2013)	A book on thinking styles.	NA	NA	NA	Relates to compulsory education. Can the same be applied to HE?
Stahl, (2002)	To review the literature on learning styles.	USA	NA	Literature review.	No information on how the selected literature was chosen.
Spoon and Schell (1998)	The research examined the nature of the learning experience when congruence and incongruence between the learning style of the student and the teaching style of the teacher are evidenced.	Adult education institute, USA	201 students and teachers	The Principles of Adult Learning Scale (PALS)	Study based in USA. Predefined demographic options.
Longley and Singleton (2008)	A paper which develops a cross classification of material deprivation	England, UK	NA	Matching the 2004 Index of Multiple Deprivation	Does not explore potential underlying intrinsic factors for disengagement.

	and lack of digital engagement in England.			(IMD) with a nationwide geodemographic classification of access and use of new ICT, aggregated to the unit postcode scale.	
Longley et al. (2006)	A paper which describes the development of a detailed, nationwide household classification based on levels of awareness of different ICTs, levels of use of ICTs, and their perceived impacts upon human capital formation and the quality of life.	England, UK	NA	Using a classification system, aggregated to unit postcodes.	Limited information on methodology.
Koivusilta et al. (2007)	The role of ICT in adolescents' lives was studied, with emphasis on whether there exists a digital divide based on sociodemographic background, educational career, and health.	Finland	5090 students	Postal survey	Relates to 12-18 year olds in Finland

A range of sources used in literature review for demographic and learning style groupings.

Appendix 2. Primary Interview Questions and Other Areas for Discussion, Supporting Theories and Research Objective Numbers.

Interview Questions and Variables	Supporting Theories	Research Aim and Objectives
<p>Primary questions –</p> <p>1. Tell me a bit about yourself</p> <p>2. What are your experiences of using the technology during this unit?</p>	<p>This Research’s Contribution to Knowledge</p>	<p>Aim</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p>
<p><i>Other areas for discussion - Your programme</i></p> <p>Can you tell me about your programme</p> <p>How is technology used on your programme?</p> <p>On scale of 1-10, how much are you enjoying your programme and why</p> <p>Are there any expectations that you had before the programme that haven’t been met</p> <p>What would make your programme easier to complete</p> <p>What would make you enjoy the programme more</p> <p>Which elements of the programme do you like the least</p> <p>Which elements of the programme do you like the most</p>	<p>Unfamiliar teaching and learning environments (Yorke and Longden 2008)</p> <p>Support (Haggis 2006)</p> <p>COP (Lave and Wenger 1991, Wenger 1998)</p> <p>Affinity spaces (Gee 2004)</p> <p>Blended learning (Bonk and Kim 2005, Means et al. 2009)</p> <p>Diverse student monitoring (McNaught and Vogel 2004)</p> <p>Constructing knowledge (Salmon 2004)</p> <p>Retention (Hughes 2007)</p> <p>Models of online programmes (Mason 1998)</p> <p>Experiential learning (Kolb1984)</p> <p>Cognitivism (Piaget 1953)</p> <p>Interaction design (Ravenscroft 2003)</p> <p>E-moderating (Salmon 2003)</p> <p>Zone of proximal development (Vygotsky 1978)</p>	<p>Aim</p> <p>2</p> <p>3</p> <p>4</p>
<p><i>Other areas for discussion - Technology</i></p> <p>What technological equipment do you use to access the online elements of your programme</p> <p>Tell me about any problems you have had with the technology on your programme</p> <p>How were any problems you had resolved</p>	<p>Support (Dodgson and Bolam 2002)</p> <p>Support (Haggis 2006)</p> <p>CMC (Pilkington 2003)</p> <p>M-Learning (Holzinger 2005)</p> <p>Blended learning (Means et al. 2009)</p> <p>Responses to technology (Taylor 2010)</p> <p>Diverse Learners (McNaught and Vogel 2004)</p> <p>Constructing knowledge (Moule 2007)</p> <p>eLearning pedagogy (Britain and Liber 2004, Alexander 2006, Conole 2010)</p> <p>VLEs (Brown et al. 2006)</p>	<p>Aim</p> <p>1</p> <p>2</p> <p>3</p> <p>4</p>

Do you enjoy the technological elements of the programme/why	eLearning design (Laurillard 2002) Wikis (Bower et al. 2006) Self-directed study (Deepwell and Malik, 2008) Digital strangers (Czerniewicz, L. and Brown, C. 2013) Learning styles (Coffield et al. 2004)	
<i>Other areas for discussion - Demographics</i> Name Age Gender Any siblings Ethnicity Religion Marital status Any SEN/SpLD Any disabilities How would you describe your personality	Older learners (Knowles 2011) Digital immigrants (Prensky 2009) Digital natives (Lorenzo et al. 2006) Gender (Wehrwein et al. 2006) BME groups (Richardson 2008) Digital inclusion (Madon et al. 2009) SEN (Warnock 2010) SpLD (Seale,2014)	Aim 1
<i>Other areas for discussion - Commitments/external pressures</i> Any children/ages/genders Where do you live Do you own your own home/rent/student accommodation Employment status/where/hours	Emotions and e-Learning (O'Regan 2003)	Aim 1
<i>Income</i> Would you say your household income is low, medium or high When you were growing up, would you say your parents' income was low, medium or high	Socioeconomic status (Currie 2009) Parental effects (Dubow et al. 2009)	Aim 1
<i>Other areas for discussion - Motivation/Role models</i> What were your parents' professions Did your parents go to university Did/does any other family/friends go to university Is there someone that inspired you to go to university	Motivation (Martin and Dowson 2009)	Aim 1

<p>What is your motivation for doing the programme</p> <p>What are your plans when you have finished the programme</p>		
<p><i>Other areas for discussion - Educational performance</i></p> <p>What was your highest level qualification when you left school</p> <p>What is your highest qualification now</p>	<p>Previous educational experiences (Wooden et al. 2001)</p>	<p>Aim 1</p>

Appendix 3. Consolidated criteria for reporting qualitative studies (COREQ): 32-item checklist (adapted from Tong et al., 2007)

Research Team	
Interviewer	Baylie Hart Clarida
Credentials	BA (Hons) MA QTS FIFL
Occupation	Full time student
Gender	Female
Experience and Training	Limited experience of research interviewing. A number of PGR training workshops attended including Interviewing workshop and Qualitative Research workshop attended.
Participant Knowledge	Phases 1 & 2: No relationships were established before or after the interviews. All of the participants were unknown to the interviewer. Phase 3: Participants were students at the HEI that the researcher had worked but were not students of the researcher.
Interviewer Characteristics	Interested in findings for PhD purposes only. No bias presented. Reflexivity considered and will be documented in final thesis.
Study Design	
Methodological Orientation and Theory	Qualitative methods. Thematic analysis. And Directed Content Analysis.
Sampling	Initially purposive. Convenience and snowball methods.
Method of Approach	Email. A short presentation with a sign-up sheet.
Sample Size	16 (Phase 1) 10 (Phase 2) 22 (Phase 3)
Non-participation	Approx. 150 potential participants were approached. 16 took part in Phase 1. Approx. 150 potential participants approached, 10 took part in Phase 2. Approx. 60 potential participants approached, 22 took part. None dropped out during data collection, analysis or since.
Setting of Data Collection	At { } in booked empty class rooms (f2f), telephone interviews and Skype. Offices of teacher sample.
Presence of Non-participants	Interviews were conducted with interviewer and participant only, except 1 f2f interview took place with another person present (friend of participant) in phase 1.
Description of Sample	Undergraduate learners (see participant profile tables)

Interview Guide	Interview schedule provided in appendix. Pilot studies completed to test interview schedule and equipment used.
Repeat Interviews	None
Audio/Visual Recording	Voice recorder used (ProVoice app) on PDA. Dragon Naturally Speaking software used to transcribe.
Field Notes/Memos	Memos were written on interview schedule during the interview. A reflection was also written after each interview.
Duration	Interviews ranged in length and all under 90 minutes.
Saturation	Interviews were conducted until no new nodes emerged.
Transcripts Returned	Member checking was carried out for Phases 1 and 2.
Analysis and Findings	
Number of Data Coders	1 (Baylie Hart Clarida)
Description of the Coding Tree	Braun and Clarke (2006) Thematic Analysis Framework.
Derivation of Themes	Derived from the data.
Software	Nvivo. Screenshots included.
Participant Checking	Member checking completed.
Quotations Presented	Quotations provided with participant numbers.
Data and Findings Consistent	A discussion and rationale was included to justify themes and findings.
Clarity of Major Themes	Major themes were clearly presented and justified.
Clarity of Minor Themes	Diverse cases were discussed.

RESEARCH HEALTH & SAFETY RISK ASSESSMENT FORM

PART 1: RESEARCH ACTIVITIES

What do you intend to do? (please provide a brief description of your project and details of your proposed methods)

Interview participants

Who will this involve? (please provide a description of your proposed sample/case study site)

Under graduate learners from {} University

If relevant, what location/s is/are involved?

{} University

Neutral location

Will you be working alone or with others?

Researcher and Participant

PART 2: POTENTIAL HEALTH AND SAFETY ISSUES/HAZARDS

Potential health and safety issues arising from proposed fieldwork?

Participant may become upset

Driving to location

Person/s likely to be affected?

Participant

Researcher

PART 3: PRECAUTIONS/RISK REDUCTION & RISK ASSESSMENT

Existing precautions:

Interview recorded

Advice given on how to access support if necessary

Risk Evaluation (Low, Medium, High)

Completed by: (name)	Signature	Date
Baylie Hart Clarida		20/1/13

PARTICIPANT INFORMATION SHEET

- You are being invited to take part in a research study. Before you decide it is important for you to understand why the research is being done and what it will involve.
- Please take time to read the following information carefully and discuss it with others if you wish.
- Take time to decide whether you wish to take part. Thank you for taking the time to read this information sheet

What is the purpose of the study?

The study forms the basis of a PhD thesis and its purpose is to create a conceptual framework of effective approaches for Technology Enhanced Learning (TEL). The study will inform educational provision in higher education and in the wider context, will improve the educational experience for online learners.

1. To explore the characteristics of learners and analyse their influence on digital exclusion and inclusion.
2. To investigate and assess the usefulness of current and emerging technologies for pedagogy with a diversity of learners.
3. To examine what learners need to be effectively engaged with a blended learning programme.
4. To incorporate the findings into a conceptual framework for sustaining engagement with blended learning programmes.

Why have I been chosen?

We would value your participation as a student member of the University involved in blended learning programs.

Do I have to take part?

There is no obligation for you to participate. We appreciate your time is at a premium but would welcome your contribution to inform future use of online learning programs. Your experiences will provide valuable data, recommendations and information that may be used in publications including conference proceedings and journal articles.

You will be asked to provide consent by reading the attached Participant Consent form and emailing confirmation that this has been done. You can still withdraw at any time during the study.

.

What do I have to do?

You will be asked to take part in a 1:1 interview with the researcher at the end of your online unit.

Afterwards, the interviews will be transcribed and analysed as part of my PhD thesis. Data generated will be

kept in a secure location and in accordance with the Data Protection Act 1998 and at completion will be destroyed.

What are the possible disadvantages?

Apart from requiring some of your time, we can think of no other disadvantages of participation.

What are the possible benefits of taking part?

Your participation will inform educational provision and could potentially improve e-learning programs.

Will my taking part in this study be kept confidential?

Comments made during the interviews will be handled in strictest confidence by the interviewer. {}
University may be identified in the content of reports and publications. You will not be identifiable in any reports or papers published as part of this project.

What will happen to the results of the research study?

The results of this study will inform the researcher's PhD Thesis. There may also be reports and published papers, including future conference presentations and journal articles that will be informed by these findings and could include quotations or information from the interviews but will not name any participant.

Who has reviewed the study?

The study has been reviewed and agreed by the researcher's Supervisors who are Academics at {}
University.

Contact for further information?

Supervisor: {}

Thank you for taking part in this study

Appendix 6. Theme Rationale. Theme rationale table lists themes in order of number of references made within that theme (most dominant theme first) and defines the specific aspects of each theme.

Theme	Number of Sources	Number of References	Definition of theme	What is interesting about this theme	Why is that interesting	Analysis of theme	Relationship to research objectives
Appropriate Content	8	11	Any reference to content that is not relevant or unenjoyable	The text within this theme is dominated by narratives of content that does not appear to be relevant to the course of study.	The narratives come from participants of all ages from 20-34 (not just mature sts) and the place where participants come from appears to be important.	All sts need to know that what they are doing is relevant to the course of study and they will learn from it. If the content appears to be irrelevant, sts will not buy into it and therefore not enjoy it.	Sts of all ages need to know relevance of content to course of study.
Compatibility	5	11	Any reference to compatibility issues due to equipment or applications	The text within this theme is dominated by narratives of dissatisfaction and frustration to personal IT equipment not being compatible with VLE content.	This is interesting because not only does it include old and outdated IT equipment but also iPads and Smartphones. The narratives come from sts whose previous jobs are important.	Sts become frustrated when their equipment (old or new) is not compatible with VLE content. This may be due to having previous jobs where equipment was always compatible.	HEIs need to ensure that VLE content is accessible for old and new equipment.
Clarity	6	10	Any reference to online content that should have clear instructions and to using VLE.	The text within this theme is dominated by narratives of sts requiring clear instructions of course content. Any instructions should be clear and link to appropriate tasks. Also, the VLE should have clear navigation and clear instructions on use.	Narratives are by sts that display the following characteristics: have moved to the area, aged 20-23, course and year of study. There does not appear to be a clear characteristic that presents this issue but affects a variety of sts.	Having clear instructions to complete course content and navigate/use VLE saves time and makes course more enjoyable.	All content and instructions should be clear and easy to understand.
Peers	6	9	Any reference to other students, whether on the same course or not	The text within this theme is dominated by narratives of how other sts can influence the success of coursework for better or worse.	Narratives are by sts whose ages range from 20-49 showing no clear distinction between digital natives/immigrants. Other sts can help with coursework or support but can also hinder.	It seems that other sts play an important role in course success. From groupings of mixed ability/age to ensuring that all sts understand how their contributions/behaviour affect other's success.	Thought should be given prior to grouping sts to allow for a mix of ability and age. HEIs should also ensure that all sts contribute equally to group work and know in what ways they could detrimentally affect others.
IT Support	6	8	Any reference to IT support or asking staff for IT support	The text within this theme is dominated by narratives of sts requiring immediate support for problems and being dissatisfied when this does not happen.	The content of this theme is interesting because there is no one dominant characteristic. Characteristics range from: age (20-49), new to area, course and year of study, family, hobbies and previous jobs.	It seems that IT Support is important for all sts to experience digital inclusion.	Immediate IT support should be available for all sts.
M-learning	4	8	Any reference to mobile technology use for university	The text within this theme is dominated by narratives of m-learning applications such as MyBU app not working and not being able	The content of theme is not dominated by one characteristic. Course, age, hobbies, year of study and previous job are represented. Although sts	If HEIs invest in mobile apps they should be fit for purpose. Some sts are still using desktops/laptops. This may be because they cannot financially afford	Mobile apps should be fit for purpose. Sts choose to

				to access VLE due to lack of mobile technology.	attend a blended learning program some rely on university equipment or home desktop/laptop. Others with mobile technology feel let down by mobile apps or unable to connect smartphone.	mobile technology. Most sts have a Smartphone so could use this instead.	use desktop/laptops instead of mobile technology sometimes due to finance. Support should be readily available to set up mobile phones.
Digital Divide	6	7	Any reference to the digital divide, eg. lack of equipment or services etc.	The text within this theme is dominated by narratives of lack of up to date equipment or equipment that connects to VLE etc. In some cases, lack of equipment hampers learning.	All 6 sources were characterised as 'course of study' within this theme. With regards to the 'digital divide' only lack of equipment was mentioned.	'Digital divide' is in the form of lack of suitable equipment.	If financial support is not available for sts to purchase up to date technology, HEIs should ensure computers are available at all times to use or hire out.
Navigation	3	6	Any reference to navigating around VLE or finding content online	The text within this theme is dominated by narratives of sts being dissatisfied with the VLE. Navigation is unclear and it is difficult to find content. There are multiple tabs and PW	This theme has no clear dominant characteristic. It is made up of: course, age (20, 23) and previous qualifications.	As these sts have attended other institutions, perhaps they have experienced a better VLE.	VLEs should be user-friendly, with minimal passwords.
Logging In	4	5	Any reference to logging in to blogs or My BU etc	The text within this theme is dominated by narratives of failure to be able to log in to blog if someone forgets to log out.	Family and hobbies are the dominant characteristics within this theme. Sts are trying to log in to the blog, even though it is not assessed but are unable if someone else is using it or forgets to log out.	If sts are using the blog educators need to ensure smooth running of it/ user friendly otherwise sts may be discouraged to use it.	Ensure that blogs etc. have time out functions or reminders to ensure sts log out after use.
Online Submission	3	5	Any reference to submitting essays or forms etc. online	The text within this theme is dominated by narratives of difficulty submitting essays and other forms online.	This theme has no dominant characteristics, (age and course/year of study). Difficulty submitting content seems to cover essays and other forms, such as placement evaluations. As submitting essays is a new initiative within this school, it is surprising that there were not more concerns.	Essays are usually submitted near the 'end' date so sts submit at the same time, resulting in crashes.	Submission of content online should be user friendly and capable of accepting multiple forms/essays.

Appendix .7. Prompts added to the interview schedule from Phase 1.

1. Online programme content should have clear questions and instructions
2. Online tasks that do not form part of an assessment are unproductive
3. Online programme content should contain illustrations and diagrams to make it more interesting and easier to understand
4. Enjoying group work (online and offline) depends on all the members contributing
5. Submitting essays online is a good thing
6. VLEs should be easy to navigate
7. Online content should be compatible with all types of home equipment (such as older computers and iPads)
8. Having a university app that can be installed on a smartphone is beneficial
9. Private, student centred social media group pages are very useful to ask other learners questions about programme related content/issues
10. I feel/would feel at a disadvantage at university without an iPad/tablet
11. It is easier to read journals/books/articles on paper rather than on a computer screen
12. Blogs/wikis can be used at university for group tasks without any problems
13. University would be more enjoyable if we were given just one assessment to do at a time
14. Lots of passwords to remember on the VLE is a nuisance
15. Setting up my smartphone to access my university email and VLE is easy
16. IT support at the university is good
17. There are always computers available to use at university
18. I wait to see my teacher face to face if I have any problems with technology
19. A non-compulsory, pre- degree crash programme to help with study skills/IT/essay writing etc. would be beneficial
20. I am a competent IT user
21. *Does the phenomenon of 'Chinese whispers' exist across a new sample of {} learners and why? Do you take advice or receive information from peers about any problems or issues with the programme or IT?*

22. *Are perceptions of technology influenced by previous experiences across a new sample from {} and why? Do you think that your previous technological experiences have influenced your perceptions about the technology you are using/experiencing now?*
23. *Are learners aware of all the support networks in place across a new sample of {} learners and if not why? What sort of support can you access at university and how were you informed about it?*
24. *Does a 'blurred line' exist between technological and non-technological experiences across a new sample of {} learners and why? Can you explain the differences in technological and non-technological elements of your programme?*
25. *Do learners younger than 20 and older than 49 experience similar experiences of digital inclusion and exclusion? Does your age influence how you use technology? How do you use technology?*
26. *Are perceptions of digital exclusion and inclusion the same across a new sample of {} learners experiencing the same unit and why? Tell me about your experiences of technology on your programme.*
27. *Are there other areas of digital exclusion and inclusion being experienced by a new sample of {} learners and why? Tell me about your experiences of technology on your programme.*

Appendix 8. Survey for Phase 3 Step 1.

The screenshot shows the SurveyMonkey design interface for a survey titled "PhD - Phase 3 Step 1". The browser address bar shows "https://surveymonkey.com". The interface includes a left-hand navigation menu with sections: BUILDER, QUESTION BANK, LOGIC, OPTIONS, and THEMES. The "OPTIONS" section is expanded, showing settings for Logo (None), Survey Title (checked), Exit Link (unchecked), Progress Bar (Off), Page Titles (checked), Page Numbers (unchecked), Question Numbers (On), and Required Asterisks (checked). The main content area displays a question: "2. Organise guidelines and plan their time release. Only give information (face to face and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the programme." Below the question is a five-point Likert scale with labels: Highly Unlikely, Unlikely, Unsure, Likely, and Highly Likely. Each label has a corresponding radio button. A "Comments" text box is located below the scale. A blue "Next" button is positioned at the bottom center of the question area. At the bottom of the interface, there is a "PAGE 2" indicator, "Page Logic" and "More Actions" dropdowns, a "P2" page selector, and a "Feedback" button on the right edge. A dark blue footer bar at the very bottom contains the text "PhD - Phase 3 Step 1".

Appendix 9. Phase 3 Interview Recording Sheet

Element	Researcher's perceptions from comments made.					Comments
	Highly Unlikely	Unlikely	Unsure	Likely	Highly Likely	
1. Prepare students for technology enabled learning. Consider having a pre-programme taster workshop.						
2. Organise guidelines and plan their time release. Only give information (face to face and online) when time relevant. Consider staggered inductions throughout the programme instead of one induction at the start of the course.						
3. Build in checkpoints to ensure that technology enabled learning elements of the programme are understood. Consider making available templates or past work as examples.						
4. Give students an opportunity to choose alternative topics for online activities. Consider involving student ambassadors in curriculum design and good technology use.						
5. Ensure technology enabled learning is workable, manageable and effective. Consider having IT sessions throughout the programme for students to develop their skills.						
6. Establish mixed age groups to encourage collaboration with technology enabled learning. Consider initiating peer mentoring for less able/confident students.						
7. Ensure that teaching methods, resources and tools are used consistently across a whole programme. Consider using standardisation across the whole programme to distributing information.						

<p>8. There should be an optimum blend of technology and f2f methods during a blended learning programme. Consider designing individual units within a programme collaboratively.</p>						
<p>9. Provide opportunities to personalise technology enabled learning activities and tools throughout the programme. Consider encouraging students to create a blog for informal learning to prepare for when online discussions are required for formal learning.</p>						
<p>10. Ensure there is technological and pedagogical support throughout entirety of the programme. Consider designing blended learning programmes collaboratively with IT support staff.</p>						

Participant

Name.....Date.....

Researcher Comments

Appendix 10. Phase 3 Samples.

Participant	Age	Date
20.	20	4.10.14
22.	46	4.10.14
26.	40	6.10.14
24.	44	6.10.14
21.	41	7.10.14

Learner Group 2 (Phase 3).

Participant	Age	Date
27.	50	22.10.14
28.	28	22.10.14
29.	27	22.10.14
30.	32	22.10.14
31.	28	5.11.14
32.	33	5.11.14
33.	37	5.11.14

Learner Group 3

Participant	Age
27	50
30	32
34	46
35	45
36	25
37	34

Learner Group 4

Participant	Programme Area
38	Education
39	Education
40	Social Science
41	Social Science

Teacher Group HEI 2.

Published Material (Peer reviewed)

Authors: Hart Clarida, B., Bobeva, M., Hutchings, M. and Taylor, J.

<http://eprints.bournemouth.ac.uk/22658/>

<http://iafor.org/>

Journal: IAFOR Journal of Education

Volume: 3

Issue: 2

Publisher: IAFOR (International Academic Forum)

ISSN: 2187-0594