“We can’t go back to the way things were”

A case study into how the Covid-19 pandemic influenced changes to Technology Enhanced Learning and Universal Design for Learning practices in an Irish college of Further Education.

Laura Fitzpatrick

20101279

Centre for Education and Lifelong Learning

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Student Number: 20101279

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List of Abbreviations and Acronyms

ACCA	Association of Chartered Certified Accountants
AHEAD	The Association for Higher Education Access & Disability
AONTAS	Irish translation: Aos Oideachais Náisiúnta Trí Aontú Saorálach English translation: Irish National Adult Learning Organisation
BERA	British Educational Research Association
BTEC	Business and Technology Education Council
CIBTAC	Confederation of International Beauty Therapy and Cosmetology
EA	External Authentication
ETB	Education and Training Board
ETBI	Education and Training Boards Ireland
FE	Further Education
FET	Further Education and Training
GDPR	General Data Protection Regulation
HEA	Higher Education Authority
ITEC	International Therapist Examination Council
IV	Internal Verification
LMS	Learning Management System
NFQ	National Framework of Qualifications
PCK	Pedagogical Content Knowledge
QQI	Quality and Qualifications Ireland
SOLAS	Irish translation: An tSeirbhís Oideachais Leanúnaigh agus Scileanna. English translation: Further Education and Skills Service.
TEL	Technology Enhanced Learning
TPACK/TPCK	Technological Pedagogical Content Knowledge
UDL	Universal Design for Learning
VET	Vocational Education and Training
VLE	Virtual Learning Environment

Abstract

The Covid-19 pandemic triggered a global lockdown in March 2020, forcing all education online in an unprecedented change to learning for educators and students. The impact of this seismic shift in educational delivery is still felt today, three years on. One such educational body which has changed a variety of their teaching, learning and assessment methods as a direct consequence of the pandemic is the Further Education (FE) sector in Ireland. As the research on this period is still emerging, there are some areas that require further investigation. One topic of interest is the effect of the pandemic on Technology Enhanced Learning (TEL) and Universal Design for Learning (UDL) practices within FE colleges as the literature surrounding this sector is limited overall. In light of this gap in knowledge, this study offers the unique perspective of the FE teacher and their experiences while integrating TEL and UDL into their practice, before, during and post pandemic. This qualitative research took the form of a case study underpinned by interpretivism which employed semi-structured interviews as the data collection method. Seven FE teachers took part and offered illuminating accounts surrounding their experiences with TEL and UDL. Thematic analysis was utilised to extract rich, meaningful insights from this qualitative data. The findings that emerged from this novel study indicated that the FE sector has been digitally transformed post pandemic with UDL at the forefront of their agenda thus promoting a thoroughly inclusive and accessible education environment for all adult learners. While this digitalisation has had an overall positive impact such as contributing to more environmentally sustainable format of education, challenges associated with Artificial Technology (AI) pose a threat to academic integrity and assessment. Overall, a clear relationship between TEL and UDL has been established which all learners, regardless of learning needs, can benefit from.

Keywords: Technology, TEL, UDL, Inclusion, Further Education

Chapter 1: Introduction

1.1 Introduction

This initial chapter serves to introduce the research topic at the centre of this study which aims to investigate the current teaching practices in Further Education (FE) in Ireland surrounding Technology Enhanced Learning (TEL) and Universal Design for Learning (UDL) and the impact that the Covid-19 pandemic has had on the sector in this regard. Within this chapter, a brief overview of the topic is presented with some commentary surrounding the background and rationale for pursuing research in this area. The overall research aims, and objectives are discussed with the intended outcomes of the study explored. A short account of the methodology is explained followed by a description of the structure of this dissertation before finally, a synopsis of each chapter provides an indication of what the reader can expect from each section.

1.2 Background and Rationale

It has now been 3 years since the onset of Covid-19 pandemic, but its impact can still be felt within the education sector while many studies examining these effects are only now beginning to emerge. Unprecedented changes to practices that were previously considered sacrosanct were completely overhauled and required a rethink from educators to allow learning to continue during the emergency remote learning period (Almpanis & Richard, 2022). As a student teacher during the initial lockdown in 2020 and subsequent blended learning periods in the academic year 2020 to 2021 within the Further Education and Training (FET) sector, I saw first-hand the enormous effort of each member of staff within the FE college I was teaching in, to adapt to the rapid change in education delivery from fully in person classes to teaching completely online. Technology usage within the FE sector was gradually increasing in the last few years pre pandemic but the infrastructure in place at that time was not capable of a shift to complete online learning overnight nor were teaching staff trained to do so (SOLAS, 2014; SOLAS, 2020). Nonetheless, the pandemic forced all education online with students and teachers given no time to prepare for this immense change. Learners with

disabilities, neurodiversity or additional needs were presented with yet another barrier to their education when remote online learning was introduced (Healy, 2023). Prior to the pandemic, while inclusion was discussed within FE, it was not widespread common practice to implement the principles of UDL in teaching, learning and assessment (Quirke & McCarthy, 2020). The Covid-19 pandemic and subsequent move to online learning led to an increase in awareness of active inclusion and highlighted accessibility issues for all learners not just those with a disability or requirement for specific accommodations (Ryder, 2020a). With the onset of the pandemic, in person written examinations were no longer possible and alternative assessments were required to take the place of these assignments to appropriately assess the learning outcomes of the modules being delivered (Mottiar et al., 2022). Quality and Qualifications Ireland (QQI) is the awarding body for many courses offered by FE colleges across Ireland, which published guidelines for educators when devising alternative assessments in lieu of written examinations to protect the academic integrity of the qualifications being pursued by students in FE (QQI, 2020a). While teaching during this time, I strived to embed the principles of UDL into my practice by offering learners a choice in how they engaged with class materials and assessments where possible. However, the official guidelines provided by QQI (2020a) increased the assessment options available for learners to avail of and demonstrate their learning. Many of the students expressed their relief at the alternative assessment in place of closed book examinations, while it has also been discussed within the literature how written exams are not suitable for many learners overall as this form of assessment strategy generally fails to accommodate the UDL principles (MacEochagáin, 2021).

As an educator, I value the use of TEL as a core aspect of my teaching strategy and I believe that it can encourage student engagement, either online or in the classroom and can also support the integration of the principles of UDL. This became even more evident during the emergency remote learning period in 2020; technology supported the continuation of teaching, learning and assessment and even facilitated alternative options for learners to engage with course materials and assignment submission formats to suit their individual needs. The pandemic has offered education

providers the opportunity to restructure how course content is delivered and explore the use of new and emerging educational technologies that can increase inclusivity for the diverse range of adult learners attending FE colleges (O'Shaughnessy, 2021). Considering this background and my own personal experiences as an FE educator, I was eager to explore what teaching practice looks like post pandemic now that in person teaching has resumed within the FE sector. As part of this MA in Educational Practice, I am interested in discovering how the forced uptake of technology and online learning impacted teaching and assessment within FE and if teaching practice has reverted to pre pandemic standards or changed as a result of the lessons learned during that time. I am also interested in exploring if and how FE tutors are implementing the principles of UDL in module design and assessment practices while investigating how much of a role that technology plays in this capacity. From an exploration of the literature on this topic, it appears that active inclusion and UDL are on the top of the agenda for Education and Training Boards (ETBs) across the country (SOLAS, 2020). However, there are no studies conducted on how UDL is put into practice by FET providers in Ireland and as such, I am curious about how the adoption of UDL principles and the associated guidelines, as set out by education providers in their policies, translates to the practice of FE tutors. Overall, the literature surrounding TEL and UDL within FE in Ireland is sparse, and I hope to generate new knowledge to fill this gap while also contributing to the creation of an increasingly accessible and inclusive educational landscape supported by technology within this sector.

1.3 Purpose of this Research

The background and rationale outlined in the previous section formed the foundation from which a number of research aims and objectives were developed. A multitude of sources were thoroughly examined before an overarching research question was formed. The focus of this research is to explore how UDL and TEL are being utilised by FE tutors in their teaching, learning and assessment practices while investigating how the Covid-19 pandemic has impacted the profession. Previous research investigating technology in education has highlighted how typically, educators have been reluctant to change their traditional teaching practice in favour of modern technology

enhanced methods (Hartman et al., 2019; Oriji & Amadi, 2016; Ryan et al., 2020). This research study aims to explore the benefits experienced by FE teachers as they have increased their technology use post pandemic and to examine any challenges that they or their students have faced when integrating these digital tools. The literature surrounding UDL documents the theory behind this framework, the principles and the overall benefits for the learner but does not provide practical examples of how educators can integrate UDL into their practice (Flood & Banks, 2021; Heelan & Tobin, 2021; Tobin, 2018). There is also the need to investigate the impact that the pandemic has had on inclusivity and accessibility practice within education (Kilpatrick et al., 2021). Admittedly, there are some papers that discuss the relationship between technology and UDL but this original research aims to explore this connection in depth, examining the potential of technology to improve accessibility for learners while identifying the impact of the Covid-19 pandemic on these practices (Marcus-Quinn & Clancy, 2022; Finn, 2022; McMahon & Walker, 2014). Overall, the main objective of this research is to discover the lived experiences of FE teachers before, during and post pandemic while utilising technology and applying the UDL principles in their classrooms which serves to further understand how these topics relate to each other. Finally, an underpinning purpose of this project is to contribute original research and findings to the literature surrounding the FE sector in Ireland which is severely lacking in the research context.

As such, an overarching research question was devised to guide this study:

What are the current TEL and UDL practices being implemented in the FE sector and how has this evolved post pandemic?

The following sub questions focus on other important elements that were considered throughout this research to achieve a deeper understanding of this subject:

What are the challenges faced by staff in FE when implementing UDL principles and integrating TEL into their practice?

How do TEL and UDL relate to one another in practice?

1.4 Methodology

The premise of this research study is to gain an insight into the teaching practices that are currently in place in the FET sector post pandemic. The methodology chosen to achieve this goal is grounded in interpretivism, which is the ideal research paradigm to underpin a study such as this as it supports the immersion of the researcher into the world of the participants, who are the focus of the study, while achieving an understanding of their experiences (Taylor & Medina, 2013). Research conducted within the interpretivist paradigm is not concerned with finding a definitive answer to a question but rather developing a deeper understanding into the unique human experience (Farrow et al., 2020). Qualitative research methods are often associated with interpretivist studies with this approach attempting to discover "the meaning individuals or groups ascribe to a social or human problem", (Creswell, 2006, p. 4). In order to fully explore the true impact that the Covid-19 pandemic has had on TEL and UDL in FE colleges and subsequently on teaching, learning and assessment strategies, obtaining narratives based on the lived experiences of FE staff provided invaluable data for this study. To achieve this objective, it was decided that a case study centred around an individual FET college would be the most suitable methodology for this particular research project employing semi-structured interviews with teaching staff as the main form of data collection. Semi-structured interviews are entirely appropriate for a study such as this; while this method of data collection can accurately capture individual accounts of certain situations, it also provides the researcher with increased flexibility to delve deeper into topics if the conversation diverges from the prescribed questions, which in many cases can uncover further valuable perspectives (Bryman, 2016). The narrative obtained from these interviews was analysed using Braun and Clarke's (2006) thematic analysis to assess the most pertinent topics that appeared during the enlightening conversations with FE teachers. This study design, coupled with thematic analysis of the data collected, has yielded the opportunity to understand the various experiences of these teachers as they have navigated the challenges of teaching during the pandemic and beyond.

1.5 Intended Outcomes

This research study has an overarching research question and aims associated with it but beyond this, it also has a number of intended outcomes. This study is centred around FE provision in Ireland which is a largely neglected sector within the wider research and literature. It is hoped that this case study will contribute valuable findings and perspectives from educators working in this field which caters to a wide range and diverse population of learners. Technology driven education is now embedded in the future of teaching with the pandemic accelerating this push to digitise learning at an unprecedented speed. It is important to document these changes within education delivery in order to reflect on the enormity of the modifications that have occurred in a very short timeframe. An intended outcome of this research is to highlight the benefits associated with the use of digital tools and educational technologies for the adult learner thus encouraging continued innovation in the sector. The pandemic also inadvertently demonstrated that Further and Higher Education are lacking with regards to their policies and practices surrounding inclusion and accessibility, issues that were exacerbated by emergency remote learning. By examining UDL and associated inclusive practices in place currently while highlighting the challenges educators face when they attempt to create a more accessible learning environment for all, it is hoped that this study can contribute to an improved experience for all learners accessing FET services in the future. As an outcome on a more personal level, I hope to learn from the overall research experience and identify areas of my own practice that could be improved using TEL and through the application of the UDL framework. This work is important to me as an educator and as I forge my own path within this profession, I aim to make a meaningful contribution, not only to my own practice but to my colleagues in the wider field with this original research project.

1.6 Outline of Dissertation

This dissertation is divided into five chapters each discussing an important aspect of this research project. Chapter One, this chapter, has provided a brief overview of the research contained within this dissertation while also providing the background, rationale and intended outcomes for

this project. Chapter Two will follow this and contains a review of all the sources consulted during this research process. This literature review critically evaluates several relevant studies, policies and seminal sources relating to this topic. This chapter provides context for the research by exploring the key themes of FE in Ireland, TEL, UDL while demonstrating how this study contributes original findings to the existing literature within this area. This chapter also features a discussion surrounding the theoretical framework that underpins this study before finally the research questions guiding the study are stated. Chapter Three offers a detailed description of the methodology chosen for this research project. The research paradigm supporting the study design is explored while justification for the use of a case study as the method of data collection is elaborated on. An overview of the data analysis process consisting of thematic analysis is presented while ethical considerations and issues relating to the quality and trustworthiness of the findings are explored. Chapter Four outlines the findings that were determined based on a thematic analysis of the interview transcripts that were the result of the semi-structured interviews carried out with FE staff. This chapter is organised thematically according to the themes that were most prominently featured in the analysis, with a discussion in relation to the literature interweaved throughout each of these subsections. Relevant quotes from the participants are included, anonymised to protect the identity of the interviewees. Finally, Chapter Five concludes this dissertation, providing a summary of the key findings while also exploring the implications of this research for teaching practice, policy and further investigation into this subject. Following on from this, a list of the sources that were engaged with throughout the course of this research are listed before appendices containing relevant documentation significant to this study are presented.

1.7 Conclusion

This introductory chapter to the dissertation as part of this MA in Educational Practice has presented a brief overview of the research topic at the centre of this project. It has outlined the background and rationale for the research study which highlights the significance of this project in the FE context and for my own professional development as an educator in this sector. The purpose

of this study and its associated aims and objectives are defined before the overall methodology proposed to fulfil these goals is explained. The intended outcomes for this case study are stated before finally, guidance surrounding the format and structure of this paper is provided for the reader. The next chapter offers a detailed literature review of papers, studies and other relevant documentation pertinent to this research.

Chapter 2: Literature Review

2.1. Introduction

The purpose of this chapter is to explore and analyse the wider literature surrounding technology use in teaching, the impact of the Covid-19 pandemic on education delivery within the FE sector and the UDL framework coupled with the potential application of these principles for adult education. Firstly, a background to this study is explored to provide a clear context and rationale for this research project which discusses the Covid-19 pandemic and its effect on the continuation of learning during that time. Next, the current literature on the FE context in Ireland provides a basis for the research to expand from and highlights the current policies regarding technology and inclusion in place. A broad overview of adult learning theory is then presented which examines the importance of a tailored approach for adult learners entering FE while showing how UDL and TEL can be incorporated to effectively embed the principles of Andragogy into professional practice. Following on from this discussion, the more pertinent concepts of TEL and UDL are explored in depth, drawing upon seminal texts surrounding these subjects to synthesise an appropriate analysis from which to anchor this study. Subsequently, the critical evaluation of these sources will ultimately yield the formation of a theoretical framework from which to base this research upon with key sources discussed surrounding this theory to further support this study. The research question is stated following on from the detailed analysis of a variety of sources in the field to reiterate the necessity of this study and to demonstrate where this research contributes to the wider literature and practice within the FE sector. Finally, the conclusion to this chapter provides a summary of the arguments and findings presented while highlighting the gap in knowledge that was discovered through the wider reading of studies in this field thus creating a valuable opportunity for this study to contribute original research to the academic discourse in the field.

2.2. Background and Context

The purpose of this case study is to examine how the landscape of FE has changed since emergency remote learning was introduced during the pandemic in 2020 and discover, which, if any, changes to delivery, practice and assessment have been adopted now that in-person teaching has resumed and normal practice has returned to the education system. The pandemic intensified challenges with accessibility for all learners in Further and Higher Education in Ireland which highlighted the need for a more inclusive approach towards teaching and assessment overall (Fovet, 2021). The immediate shift to remote learning was facilitated by technology with various digital tools and applications utilised, which allowed classes to continue, but the effective use of TEL was necessary to encourage student engagement with the new method of content delivery (Doherty & McLaughlin, 2021). Educators embraced technology and the multitude of educational software and tools that became popular during the remote learning period which subsequently offered students increased flexibility with regards to their learning experience and a choice of how they chose to engage with course material, a change which may not have happened so rapidly if not for the Covid-19 pandemic (Taylor, 2023; Bell & Barr, 2023; Kilpatrick et al., 2021).

Considering this context, this research study seeks to investigate how inclusivity and the principles of UDL are being implemented by FE tutors in their teaching, learning and assessment practices while examining if and how, TEL can be used to support this, following on from the lessons learned during the pandemic. This research aims to discover how UDL and the associated guidelines, as set out by education providers in their policies, translates to teaching practice. This literature review discusses both UDL and TEL in two distinct sections while commenting on the connection and possible complementary nature of the two concepts in practice for the benefit of the learner.

2.2.1. The Covid-19 Pandemic and Emergency Remote Learning in the Irish FE Sector

March 2020 saw an unprecedented change in the Irish education system; a complete and immediate switch to emergency remote learning as a response to the Covid-19 pandemic (Barbour et al., 2020; Mottiar et al., 2022). Educators were given little to no time to prepare for this immense

shift in educational delivery. Staff and students alike had to quickly adjust to the new online learning environment. At this point, many FET colleges were using some technology within their education provision such as Virtual Learning Environments (VLE) and Learning Management Systems (LMS) prior to the pandemic but these resources were used to supplement content delivery in the physical classroom rather than being the sole source of teaching, learning and assessment (SOLAS, 2014; QQI, 2020b). FET centres across the country began to implement contingency plans that allowed for a smooth transition to online learning which involved significant levels of staff and student training alongside the provision of digital devices (SOLAS, 2020). This 'new normal' was adopted quickly by staff and students for the remainder of the 2020 academic year and a blended learning model was also implemented in the 2021 academic year as government health restrictions continued to be imposed (Dowdall et. al., 2020; Drumm & Jong, 2020; Leonardo & Cha, 2021).

Technology enhanced learning and teaching now became a necessity as a pedagogical tool rather than an optional extra (Marcus-Quinn & Clancy, 2022; QQI, 2020b). Online platforms such as Adobe Connect, Google Classroom, Blackboard, Zoom and Microsoft Teams facilitated this move to the online classroom and allowed for continuity in learning for Further and Higher education providers across the country, despite these technologies being relatively unfamiliar to students and teachers alike prior to the onset of the mandatory lockdown in March 2020 (Hamill, 2020; Flynn & Noonan, 2020; Almpanis & Richard, 2022). This move required teachers to adapt all their teaching material and assessments for online learning which, in itself, was an arduous task but in the case of many practical subject areas, required a complete overhaul of course materials (Flynn & Noonan, 2020; MacEochagáin, 2021).

Fostering student engagement and motivation were also major challenges for educators when adapting to online learning (Haleem et al., 2022; Hamill, 2020). Taylor (2023) argues that the flipped classroom method is ideal for online teaching as it can be adapted to suit the online environment and actively encourages deep learning while alterations to tasks can be made to ensure all students' learning needs are met. The flipped classroom approach uses the concepts of

synchronous and asynchronous content delivery and became popular during this period as a method of encouraging student engagement and deeper learning through the substitution of the "traditional transmissive lecture and replaces it with active in-class tasks and pre-/post-classwork", (Abeysekera & Dawson, 2015, p.1). Synchronous and asynchronous learning, which are now ubiquitous when discussing online teaching and learning, are two modes of delivering educational content in the online classroom (Yang, 2021). Synchronous delivery through live online classes allows for real-time interaction and feedback between learners and teachers while asynchronous delivery involves learning activities and tasks that can be completed flexibly, at the students own pace, in their own place, with or without guided supervision (Taylor, 2023). These asynchronous tasks can be directed activities that are monitored, with formative assessments, or merely suggested readings, in a softer flipped classroom approach (Tobin, 2018). Abeysekera and Dawson (2015) state that technology enables teachers to implement the flipped classroom approach which supports a tailored educational experience for learners, thus supporting a more inclusive learning environment.

Although online learning offered a solution to educators during the emergency remote learning period, many students experienced a range of issues and challenges associated with the move to the online only classroom in relation to "digital competency, engagement, access, learning community support, group assessments and isolation", (Doherty & McLaughlin, 2021, p. 21). Currently, there is now an expectation for digital learning to be a key tool used by educators when delivering course material, regardless of whether education is delivered online or face-to-face, an expectation that was "strengthened by the increased reliance on technology due to Covid-19 restrictions", (Gleeson, 2023, p. 19). This change in content delivery during the pandemic also in some cases required a change in assessment methods as in-person exams could no longer take place and as such, alternative assessments were devised to protect academic integrity and to ensure learning outcomes for modules were accurately assessed (QQI, 2020a). Mottiar et al. (2022) argue that technology actively facilitated this change in assessment practices and supported the "opportunity for academics to trial, in a relatively low-risk environment, assessment strategies they

had previously considered but had not implemented", (p. 4). Moreover, MacEochagáin (2021) highlights that these changes to assessment strategies allowed for the increased accommodation of UDL principles.

Advances in technology enabled the continuation of learning during the pandemic and supported the integration of software and applications that actively encouraged inclusivity within teaching, learning and assessment which may not have been previously possible or explored (Cloonan, 2022; Casey, 2020). However, now that life is slowly returning to normal, we are only able to see the impact of the pandemic on education as current studies emerge relating to the effect the lockdowns have had on students, their experience of online learning and how teaching, learning and assessment practices have changed post-pandemic (Healy, 2023; Mottiar et al., 2022; Finnegan, 2021). Embracing technology enhanced learning and teaching was invaluable for educators to allow them to navigate that unpredictable period in 2020 and ensure continuity in learning for students (Yang, 2021; Andrews, 2021). This study hopes that by exploring UDL, TEL use and any teaching, learning and assessment changes that have occurred in FET colleges since the pandemic, an insight into the current landscape of FE in Ireland can inform best practices for inclusivity and digital learning for all adult learners in the future.

2.2.2. Further Education and Training sector in Ireland

The current structure of the FE sector in Ireland was established in 2013 when the Further Education and Training Act became law, abolishing the previous system that was governed by FÁS (SOLAS, 2014). Under this legislation, SOLAS became the government agency responsible for managing the provision of Further Education and Training (FET) programmes which are facilitated by 16 Further Education and Training Boards (ETBs) across the country (SOLAS, 2023). The definition of Further Education is "education and training that happens after second-level schooling, but which is not part of the third-level system" (Department of Further and Higher Education, Research, Innovation and Science, 2020).

The FET sector provides a number of education services that include Post-Leaving Certificate courses (PLC), apprenticeships, traineeships, Youthreach, along with several community and adult education services that centre around adult literacy and numeracy courses (FET, 2023). The courses and qualifications that are offered through FET range in level from 1 to 6 on the National Framework of Qualifications (NFQ) (ETBI, 2023). A varied cohort of adult learners attend FE colleges across the country with the profile of learners accessing these services varying significantly in both educational backgrounds and motivations for engaging with FET (Maloney, 2020). SOLAS (2014) offers a summary of the potential profile of learner that accesses FET:

> FET learners come from a variety of backgrounds and from different life experiences. They may be school-leavers, employed, unemployed, single parents, carers or those who may be inactive. They may be old or young, highly educated or unqualified or they may have a disability. They may be recovering from addiction, offenders in prison or ex-offenders. They may be highly motivated to learn and to work or they may be hard to reach and require additional supports. They may be studying to improve their skills in work or to progress to higher education and training, learning for personal development, to improve their unemployment situation, to change career or to improve their ICT, literacy and numeracy skills. (p. 41)

The educational services that are offered by FET providers are invaluable to this diverse learner population, facilitating access to a wide range of accredited and non-accredited courses which can subsequently lead to higher education access and/or increased employment opportunities (Dunlop, 2020). The Irish Further Education system is unique in comparison with other European countries where FET is commonly referred to as Vocational Education and Training (VET), in that it offers those who avail of these services multiple pathways to work and qualification options to help all learners achieve their potential (Brownlee, 2022). There are a number of awarding bodies, both Irish and international, that provide certification through courses offered by ETBs such as BTEC, ITEC, City & Guilds, CIBTAC, ACCA and many others (McGuinness et al., 2014). FET is becoming an increasingly integral part of Irish society, catering to all types of learner “from the apprentice to the

adult literacy student, from the school leaver to the lifelong learner, and everyone in between" (Brownlee, 2022, p. 4).

2.2.3. Andragogy and Adult Learners in the FET context

Andragogy, or Adult Learning Theory is important to consider during this study as it has implications for how adult learners engaging with FET courses respond to the TEL and UDL methods that are utilised within teaching, learning and assessment strategies. As discussed above, a widely diverse population of adult learners avail of the multiple services provided by FET centres in Ireland, each with their own varied educational needs which tutors need to account for (SOLAS, 2020; Brownlee, 2022). Andragogy refers to the practice of teaching adults as opposed to pedagogy which is commonly associated with education involving children (Peterson & Ray, 2013). The concept of andragogy and the teaching of adults can be traced back to the 1800s in Europe but it became prominent in the 1920s when it started to become more apparent that traditional pedagogies were not suitable for adult learners (Loeng, 2023). Lindeman (1926) explored the concept of adult learning and defined some characteristics of the adult learner without using the term andragogy to label his theories. Lindeman (1926) also first introduced the theory of adult education to America from Europe but Malcolm Knowles, the leading figure among the literature on this subject, didn't adopt the title of andragogy until 1968 (Knowles, 1968). Now, andragogy is synonymous with Knowles' teachings of Adult Learning Theory which has been widely accepted among theorists in the field (Knowles, 1970; Loeng, 2018).

Knowles (1980) defined andragogy as "the art and science of helping adults learn" (p. 43). Subsequently, Knowles (1984) devised a set of assumptions surrounding adult learners which offers educators helpful guidelines on the best practices to follow and to be cognisant of when teaching adult learners. These assumptions form the basis of Adult Learning Theory, the key aspects being that adult learners take responsibility for their learning, they have their own motivations for engaging in education and that they require their learning to have value and real world applications in order to view the material as important (El-Amin, 2020; Loeng, 2018). However, Loeng (2023)

challenges Knowles' (1970) division of pedagogy and andragogy, claiming his proposed differences to be a false dichotomy as some of the andragogical principles are relevant when discussing children's education also. McGrath (2009) argues that the opposite could be true when considering adult learners, who can often assume pedagogical strategies will be used and become overly reliant on the educator. The adult educator will need to decide based on the unique cohort of learners that they are presented with which approach to take; some groups may need a pedagogical approach at the beginning of a new course to ascertain new knowledge but this should be followed by a gradual transition to self-directed learning as espoused by Knowles' andragogical assumptions (Bright, 2018).

With regards to FET in Ireland, andragogy should be a key consideration for FE tutors as adult learners "enter the educational activity with a greater volume and more varied experiences" (Knowles et al., 2014, p. 50). As such, a carefully designed approach that recognises all prior learning experiences and shows the validity of the content being taught is required to motivate the adult learner (FESS, 2007). Adult learners have a varied set of needs, but they also have their own strengths and have a variety of life experiences which can enrich their education as a whole (Veiga-Branco, 2018). The reasoning behind learning activities and assessments is much more important to learners in adult education as they need to be able to recognise the value in the content they are being taught (Maloney, 2020). The principles of UDL can integrate effectively with andragogy because the "learner-centred orientation of the UDL approach helps to promote autonomy and self-directedness, both of which are critical elements for effective adult learning" (Finn, 2022, p. 104). UDL when applied effectively within the FE context, is inclusion in action through multiple means of engagement, assessment and expression, thus breaking down barriers and facilitating an emancipatory experience of education for the adult learner.

As the learner population of the FE sector in Ireland is incredibly diverse and varied, the UDL principles can provide guidance surrounding teaching and assessment strategies to ensure that all students can engage fully in the classroom and are motivated to learn (Stewart, 2022). Technology and digital tools can, when used effectively, be used to aid the integration of UDL and there are

specific educational and assistive technologies that can “help facilitate diverse learner needs and flexibility” (Cloonan, 2022, p. 6). TEL can also support andragogy as a teaching strategy overall by encouraging self-directed learning and supporting learners to take responsibility for their studies for example through synchronous and asynchronous learning activities facilitated by technology and applications (Henschke, 2016). Andragogy forms the basis of teaching and learning within the FE sector in Ireland, which UDL and TEL, can not only support, but improve adult teaching practices, encourage student engagement and foster increased accessibility and deeper learning overall (Wang et al., 2021).

2.3. Current FET Policy on TEL and UDL

The FET sector actively promotes lifelong learning and accessibility for everyone, inclusion being a key priority for all of its educational services (Dunlop, 2020). ETBI has an active inclusion policy which enables everyone including individuals who are “experiencing barriers to the labour market (for example, people with a disability, early school leavers or those with lower levels of skills) to fully participate in society; to access a range of quality services including education and training” (SOLAS, 2014). Equality and inclusion is the prominent theme of the current National Access Plan policy published by the Higher Education Authority (HEA)(2022) which emphasises and creates new supports for all learners, regardless of socio-economic background, disabilities or whether or not they belong to a marginalised or vulnerable group within society. This policy also comments on the severe impact that the Covid-19 pandemic had on disadvantaged or vulnerable student groups, effectively excluding some learners from continuing their education during the emergency remote learning period and “exacerbating pre-existing educational disparities” (HEA, 2022, p. 39). The report from QQI (2020b) on the impact of the modifications to teaching, learning and assessment in Higher and Further Education as a result of the pandemic echoes this sentiment stating that “marginalised and vulnerable groups were particularly disadvantaged by the experience of remote teaching and learning” (p. 4). Similarly, a study conducted by AONTAS, the Irish National Adult Learning Organisation, highlights the importance of learning from the issues that were experienced by

students during the emergency remote learning period and recognising that existing problems were exacerbated by the pandemic, to ensure that going forward these challenges for learners can be resolved or mitigated (Dowdall et. al., 2020). The Covid-19 pandemic ushered in unprecedented changes to educational delivery in FE and because of this, “it is essential to continually listen to learners to ensure that learner voice remains at the heart of the future of FET” (Dowdall et. al., 2020, p. 28).

Fostering inclusion is one of the strategic priorities within the current FET strategy for 2020 to 2024 with the adoption of UDL mentioned as a prominent approach when designing future teaching, learning and assessment strategies across all FET services (SOLAS, 2020). The previous FET strategy for 2014 to 2019 did not mention UDL in any capacity despite discussing their active inclusion policy at length which focuses mainly on access to education in a social inclusion context rather than how education is delivered as part of the courses that are offered through their provision (SOLAS, 2014). Post-pandemic however, integrating the principles of UDL into course design is now the dominant theme for FET providers across the country, as “UDL is now an explicit goal for the entire FET sector” (Heelan & Tobin, 2021, p. 9). When applied effectively, the principles of UDL can increase student support, improve accessibility and ensure equality across FET for all learners (Ryder, 2020b; Emmers et al., 2022; Merry, 2021).

SOLAS and ETBI are cognisant of these pertinent issues relating to inclusion and accessibility based on the overall learner population that access FET provision and as such have discussed this at length in their current strategies and policies (SOLAS, 2020; ETBI, 2021). Subsequently, Heelan and Tobin (2021) have created supporting documentation specifically for the FE sector, which offers guidelines for the implementation of UDL principles into practice to help FET practitioners to adapt their teaching and assessment methods to be more accessible. This document stresses the importance of supporting all adult learners and not just those with disabilities or neuro diversity because “every learner encounters some barriers on their learning journey. Some barriers might be immediately obvious and overt, such as inaccessible classrooms or language barriers. But many less-

obvious barriers to learning exist as well" (Heelan & Tobin, 2021, p. 16). Embedding UDL into curriculum design ensures that no student feels "marginalised", (Flood & Banks, 2021, p. 340). The effective application of the principles of UDL in practice, aids the removal of barriers to learning so that all learners "feel "a part of" rather than "apart from" their learning. This approach helps them to do their best work and to thrive" (Heelan & Tobin, 2021, p. 3).

Embracing TEL is also an issue of high priority for FET post pandemic, for the future of teaching and learning within FE in order to remain relevant in the current educational landscape stating that "education providers will have to fully embed technology in the delivery of learning or else risk becoming irrelevant" (SOLAS, 2020, p. 6). The importance of digitising education and TEL is further supported by the current FET funding model which allows for significant investment into improving digital infrastructure and for the digital transformation of FET (SOLAS, 2022; Brownlee, 2022). The current policy set out by SOLAS (2020) stresses the importance of establishing "capability in technology enhanced learning (TEL) across FET, focusing on using technology in pedagogical approaches to teaching and learning and using tech-led approaches to the provision of education and training" (p. 58). This highlights the current appetite among education providers to learn from the emergency remote learning period during the Covid-19 pandemic and to use this opportunity to restructure content delivery to ensure their current educational model does not become outdated (O'Shaughnessy, 2021; Healy, 2023; Kilpatrick et al., 2021). This is also reflected in SOLAS and ETBI's Professional Learning and Development Statement of Strategy for 2020 to 2024, which aligns with the FET 2020 to 2024 strategy, in that there is an increased emphasis placed on training and professional development for FE tutors and staff by "prioritising critical professional and learning development areas including teaching and learning, literacy, numeracy and digital skills, learner supports, management and leadership, enterprise engagement, ICT, technology enhanced learning" (SOLAS & ETBI, 2020, p. 9).

The 2020-24 FET strategy emphasises that the needs of the adult learner are the central focus for all decisions made concerning education provision within ETBs and as such they are

cognisant of the need to accommodate “new models of delivery which can meet their rapidly evolving needs” (SOLAS, 2020, p. 24). This is where technology can directly impact the way in which further education is delivered and ideally “transform teaching and learning practices” (Kirkwood & Price, 2013, p. 21). The combination of inclusive practice, UDL and TEL can help achieve a flexible and personalised learning experience for all FE students (Kilpatrick et al., 2021). TEL can be used in a number of different ways which will complement the integration of UDL; this includes the added flexibility in which module content is delivered and accessed by learners as well as flexibility for formative and summative assessments, offering students a choice in how they demonstrate their learning (Meyer et al., 2014; Flanagan & Goldthwait-Fowles, 2023). Although technology is not always needed in order to apply the principles of UDL, it can play a significant role in making learning materials more accessible, offering multiple ways for learners to engage with content and subsequently apply their knowledge (Heelan & Tobin, 2021).

The above policies and strategies discuss creating a more inclusive learning environment for all students and separately highlighting the importance of digital technology in education for future provision post pandemic. However, these policies fail to discuss, not only, the relationship between the two areas but also what practices are currently in place on the ground within FE colleges from before or since the pandemic. The Covid-19 pandemic and subsequent transition to emergency remote learning was a powerful catalyst for change within the FE sector which escalated advances in how technology is used in teaching, learning and assessment which needs to be examined further than what is presented in the current studies and policies. Thus, this research project will attempt to address this gap in the literature, by exploring the teaching experiences of tutors surrounding UDL and TEL within the context of FET and how this has developed and changed since the onset of the Covid-19 pandemic.

2.4. Technology Enhanced Learning

The term technology enhanced learning is quite broad and ambiguous but overall, it encompasses the “application of information and communication technologies to teaching and

learning" (Kirkwood & Price, 2013, p. 1). There are a wide variety of educational technologies that can be used as tools to enhance learning and teaching which are mainly digital in nature currently because of the vast increase in the use of technology, which is now integrated into everyday life. Post pandemic, technology driven education is now an expectation of learners when they enter any form of Further or Higher Education (Bell & Barr, 2023; Marcus-Quinn & Hourigan, 2022). The key aspect of using TEL is the effective use of technology to shape the existing learning environment to be more student centred and engaging for learners (Winter et al., 2021). Educational technology can and should be used to promote flexibility and self-directed learning which is important for adult learners (Hartman et al., 2019; Stewart, 2022). Any digital tools utilised should improve or enhance the learning experience and used as part of a "pedagogy empowered by technology" (Supple & Fennell, 2020, p. 11).

Digital tools used as part of TEL strategy can have a variety of different uses that "range from 'operational technology', involving day-to-day uses such as managing and distributing content, to enhancing teaching and learning through the use of 'educational technology'", (Gleeson, 2023, p. 20). Gamification can be used as an application of TEL, which involves applying game based elements to the educational context (Rivera & Garden, 2021). Of course gamification and game-based learning can be employed as part of a teaching strategy without the use of technology but it is becoming increasingly common for apps and digital tools to facilitate the implementation of this concept (Howard, 2022). TEL when used in combination with gamification, is an innovative and complementary teaching strategy that can actively encourage learner engagement and increase their motivation to learn (Boudadi & Gutiérrez-Colón, 2020). Some examples of educational tools that can be used to apply gamification in an educational context are Kahoot!, Duolingo and Mentimeter (Howard, 2022; Trinidad et al., 2021; Ahshan, 2022). The flipped classroom and flipped learning model is also actively supported by technology, particularly since the onset of the pandemic and is another example of how TEL can be incorporated to enhance teaching and learning as "technology enabled online platforms when synergized with a well-structured, activity based flipped

classroom model is the recipe for successful and relevant instruction methodology today" (Bishnoi, 2020, p. 36).

Advances in technology, coupled with the impact of the Covid-19 pandemic, forced education providers to rapidly integrate online learning and digital tools while this innovation has created opportunities for education delivery to be adapted to incorporate new learning technologies which can improve teaching, learning and assessment methods (Chiu et al., 2022). Judge (2021) describes this succinctly, stating that "traditionally, education has been slow to change, particularly when it comes to technology adoption, one of the unanticipated consequences of Covid-19 is how schools have had to rapidly adapt to new digital environments for continuity in teaching" (p. 419). Prior to the pandemic, many educators resisted technology usage and rejected any changes to their practice which required digitalisation in favour of their tried and tested teacher centred approaches (Oriji & Amadi, 2016; Hartman et al., 2019). Ryan et al. (2020) attests to this, arguing that the gap between institutional policy and teaching practice is to blame for this perceived reluctance among FET staff to embrace technology enthusiastically. TEL application in education is dependent on, not only the digital competence of the educator but also their willingness to embrace change (Falloon, 2020; Hartman et al., 2019).

2.4.1. Technological Pedagogical Content Knowledge

How educators are utilising digital technology to support teaching and learning is vital to the successful implementation of TEL combined with the knowledge of when is appropriate to use technology and how to do so effectively (Wekerle & Kollar, 2022; Winter et al., 2021). Koehler and Mishra (2005) offered a solution to this quandary when they presented the Technological Pedagogical Content Knowledge (TPACK/TPCK) Framework, which offers educators guidelines for successfully integrating technology into their practice. A visual representation of this framework can be seen below in Figure 1.

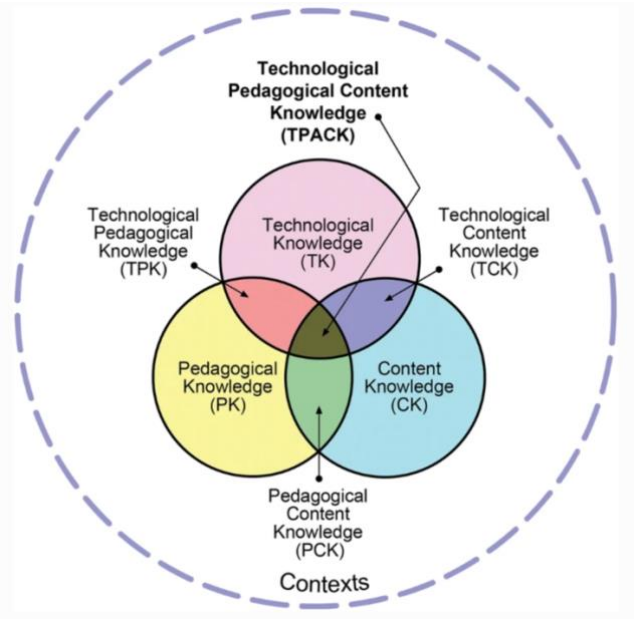

Figure 1: TPACK Framework (Falloon, 2020)

The TPACK framework focuses on three areas that underpin the model; technological knowledge, content knowledge and pedagogical knowledge (Koehler et al., 2016). This framework builds upon the Pedagogical Content Knowledge (PCK) model devised by Shulman (1986) which discusses how a teacher's subject knowledge within their area of expertise (content knowledge or CK) interacts with their knowledge of teaching and assessment strategies (pedagogical knowledge or PK), leading to an interplay between the two elements to form pedagogical content knowledge (PCK). Shulman's (1986) PCK framework articulates the educator's professional knowledge but the growing trend of embedding technology within education of all levels made it necessary for this model to be reassessed and updated with the technological knowledge aspect (Koehler & Mishra, 2005). For the successful adoption of educational technologies into any learning environment, the educator must consider that when "applying TPACK to the task of teaching with technology requires a context-bound understanding of technology, where technologies may be chosen and repurposed to fit the very specific pedagogical and content-related needs of diverse educational contexts" (Koehler et al., 2016, p. 28).

Knowing how a specific digital tool works is not enough to effectively apply this to educational practice (Falloon, 2020). The educator must adapt the TPACK framework to their own

teaching context and alter it depending on the unique relationship between content, pedagogy and technology (Koehler & Mishra, 2005; Koehler et al., 2016). Learning to integrate TEL and digital educational tools into their teaching practice with the guidance of the TPACK framework can allow for educators to reflect on their current practice and explore how it can be improved with the addition of technology (Mei et al., 2019). However, the technology that educators have access to and the level of training that they are provided with at their institution can act as a barrier to utilising TEL and integrating it in an effective manner (Koh et al., 2014). There are other models available for the adaption of teaching strategies to integrate digital technologies such as Puentedura's (2006) Substitution, Augmentation, Modification, Redefinition (SAMR) model, a visual of this is shown below in Figure 2. The SAMR model offers a simplistic approach and represents a hierarchy of steps to follow when adopting a digitised teaching practice which can be helpful as a guideline to follow when trialling new digital tools in practice (Falloon, 2020). However, SAMR has been criticised for its rigid structure which does not offer clear examples of how to implement the suggested stages, unlike the more holistic model offered by TPACK (Blundell et al., 2022; Koh et al., 2014; Falloon, 2020).

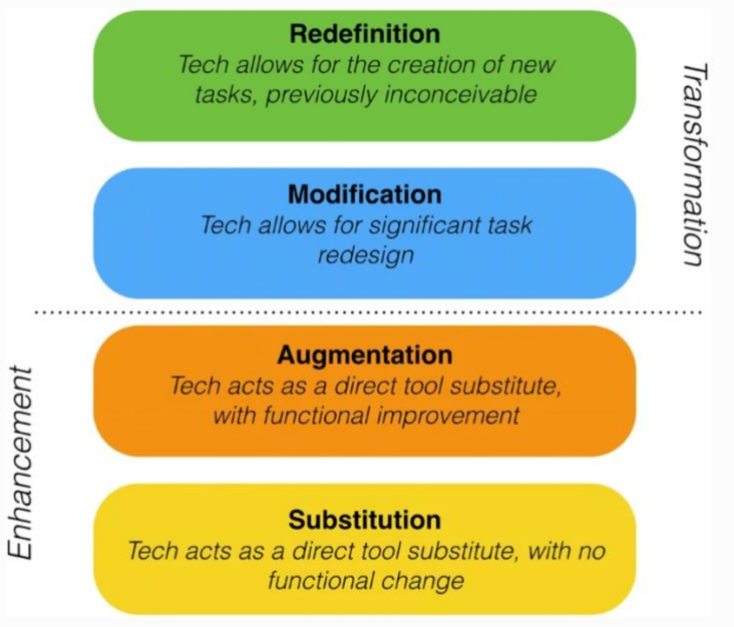

Figure 2: SAMR Model (Puentedura, 2006)

Winter et al. (2021) argues the importance of professional development and training for teachers with regards to technology use in the classroom because the efficacy of TEL is reliant on the technological skills and competence of the educator to know "how and when to use technology which, when used appropriately, is an important tool in the classroom" (p. 236). Whether the technology used does enhance learning, is reliant on educators being fully trained and competent in the digital technology they are using, highlighting the importance of CPD for educators (Ryan et al., 2020; Scully et al., 2021; Supple & Fennell, 2020).

2.4.2. TEL and UDL

TEL can provide useful digital tools to aid in the implementation of the UDL principles in teaching and assessment beyond assistive technologies such as Edpuzzle, Nearpod, Pebblepad and Kahoot (Cloonan, 2022; Griggs & Moore, 2022; Judge, 2021). Effective TEL implementation can increase inclusivity in education by facilitating choice within assessment and providing multiple means to engage with the course content and which ultimately leads to deeper learning and understanding of the material (Edyburn, 2021; Finn, 2022). Pre-pandemic, the LMS and VLE were the main method of how teachers integrated technology into their practice but these platforms were mainly used to supplement the content covered in the classroom (Phipps & Lanclos, 2019; Kilpatrick et al., 2021). Post pandemic, the VLE has a number of functions, such as management of assessment, presentation of course materials and communication with peers, all of which can be adapted to increase accessibility and inclusivity for the learner (Heelan & Tobin, 2021). The pandemic has highlighted how previous teaching and assessment strategies can be altered to be more effective through the use of technology and as a consequence, more inclusive for example, by facilitating choice in engagement and assessment through alternative digital formats for presenting class materials and the submission of assignments (Flanagan & Goldthwait-Fowles, 2023).

Although technology can serve to enhance learning and teaching, it is important not to overwhelm students with multiple forms of digital technology and tools because offering "multiple gadgets, functions, information, and resources could be counterproductive, through inadvertently

inducing technology overload" (Cloonan, 2022, p. 6). Being cognisant of this is important, particularly for mature adult learners who are often more anxious about using technology than younger students (Staddon, 2020). The focus when implementing any new technology in the classroom should be the benefit of the learner with "pedagogy first, technology second" (Supple & Fennell, 2020, p. 10). Bayne (2015) argues that what constitutes TEL would be more appropriately referred to as technology enhanced teaching, which in some cases has the focus of achieving and aligning with "institutional goals, rather than to the aims or cognitive gains of individual learners" (p. 14) which educators should be cautious of. Within the FET sector, the needs of the adult learner must be at the forefront of any teaching strategy, involving technology or otherwise, while educators should "adopt a learning-centric view of technology and consider it as a tool to be integrated into their learning and teaching strategies, rather than simply a convenient method of posting 'content'", (Wang et al., 2020, p. 337).

The literature surrounding TEL often discusses its benefits and capabilities but there is very little discussion within the FE sector overall and what changes have been implemented using TEL since the pandemic. There is also a lack of discussion surrounding the very obvious and beneficial relationship that TEL can have with UDL. This is where this research project steps in to supplement this gap in knowledge. The context of this study, based on the experiences of adult educators within an FE college in Ireland, provides a unique perspective of the FE sector in relation to implementing inclusive and tech led practices and what the reality of this looks like since the pandemic.

2.5. Universal Design for Learning

The concept of Universal Design for Learning (UDL) was developed by Anne Meyer and David Rose at the Centre for Applied Specialist Technology (CAST) in the 1990's and stemmed from the concept of Universal Design in relation to altering buildings and architecture to adapt to the needs of those with physical disabilities (Rose & Meyer, 2000). When applied in an education context, UDL promotes inclusivity and flexibility in teaching strategies to ensure accessibility for all learners (Flanagan & Goldthwait-Fowles, 2023). The UDL framework is based on three principles of

engagement, representation and action and expression (Meyer et al., 2014). These principles were developed based on research within the fields of education, neuroscience, and emerging technologies (Edyburn, 2010). The overarching aim of the UDL principles is to support learners in achieving their full potential on their educational journey regardless of ability or needs (Merry, 2021).

The first principle, providing multiple means of engagement, encourages educators to design learning material that is not only relevant but motivates learners to participate (McMahon & Walker, 2014). The second principle, providing multiple means of representation, is concerned with the educational material being available in multiple formats to allow learners to fully engage and interact with the material to accommodate all learning styles (Tobin, 2018). The third principle, providing multiple means of action and expression, highlights the need for educators to provide a number of different methods for learners to demonstrate their knowledge to ensure that all students can express what they have learned effectively, depending on their learning needs (Flood & Banks, 2021).

These guidelines provide a clear framework from which a more inclusive approach to teaching, learning and assessment can be developed which is essential for modern education given that UDL is now a firmly established practice (Ryder, 2021). When applied, UDL creates flexibility for both the teacher and the learner, providing numerous formats for presenting information, more engagement options for learners and ways to demonstrate learning (Quirke & McCarthy, 2020). The main goal of UDL in education is to allow all learners to access equal opportunities for learning regardless of their "identities, competencies, learning strengths, and needs" (Flood & Banks, 2021, p. 342). Through the integration of UDL principles within curriculum design, learner variability can be accounted for, this is especially important within FE, which has a diverse population of adult learners availing of courses in FE colleges across the country (Dowdall et. al., 2020). There is no 'one size fits all' approach to education and similarly, there is no one approach to implementing UDL, each individual setting will use different methods (Merry, 2021; Flanagan & Goldthwait-Fowles, 2023). An

effective yet simple change that can be implemented by educators is the 'Plus-One Mindset' devised by Behling and Tobin (2018) which encourages educators to review their teaching content and assessments and offer one more option for learners to engage with or interact with which is already a small step in the right direction for increasing inclusion. The adoption of UDL is akin to a lens through which to reflect and assess current teaching and learning practices to identify any areas that could be posing as barriers to some students and reduce these access issues to create a more inclusive learning environment overall (Heelan & Tobin, 2021).

McMahon and Walker (2014) have stated that the "use of technology is vital to the implementation of UDL" (p. 40) as advances in learning technologies have increased the number of tools available for assisting educators with classroom instruction. Although the framework of UDL can be used effectively without digital tools, the use of technology in combination with UDL can increase flexibility and accessibility within teaching and learning (Griggs & Moore, 2022). Embracing TEL to support the creation of an accessible learning environment for all students can ensure that the UDL principles are easier to adopt and implement by educators while learners benefit from this adaption (Cloonan, 2022; Kilpatrick et al., 2021).

Throughout the literature examined, the definition of UDL is clear but there are very few practical examples of UDL being implemented in the context of adult education and much less within the FE sector in Ireland. There is the guidance provided by SOLAS written by Heelan and Tobin (2021) in relation to practical steps for implementing UDL but this does not mention how these practices have changed since the Covid-19 pandemic which is the unique focus offered by this study. If UDL is to become the standard practice adopted by educators, clearer guidance and practical approaches to curriculum design and assessment methods must be discussed, with training provided by FET centres for all staff (Kilpatrick et al., 2021). This lack of discussion surrounding UDL outside of the various policies set out by SOLAS (2020) and ETBI (2021), highlights a significant research gap for this study to explore the practical implications when integrating UDL standards into existing teaching practice. There is also a distinct lack of discussion about the relationship that exists between UDL

and TEL, and the educational technology that is currently in use within FE. Overall, the academic studies surrounding UDL and TEL fail to examine the experiences of educators in relation to the practicalities of adapting their teaching methods to reflect modern practices in education and how this has evolved since the pandemic. This study aims to explore the experiences of FE tutors when applying TEL and UDL in practice post pandemic while examining the challenges that they may face while doing so, thus attempting to contribute current and original knowledge on this subject to the literature in this field.

2.6. Theoretical Framework

After a thorough exploration of the relevant literature surrounding this research, Bronfenbrenner's (1979) Ecological Systems Theory emerged as the most suitable theoretical framework to support this case study and its methodology. Bronfenbrenner, an American psychologist, devised this theory as a more complex method of analysing child development based on external influences such as their environment and the impact of this over time, labelling the aspects of this model as systems, each interlinked and arranged in order of the influence on a child's development; they are known as the microsystem, mesosystem, exosystem, macrosystem and the chronosystem with each system having a different impact on the child (Evans, 2023). A visual representation of the original, unadapted version of Bronfenbrenner and Ceci's (1994) Bioecological Model can be viewed below in Figure 3.

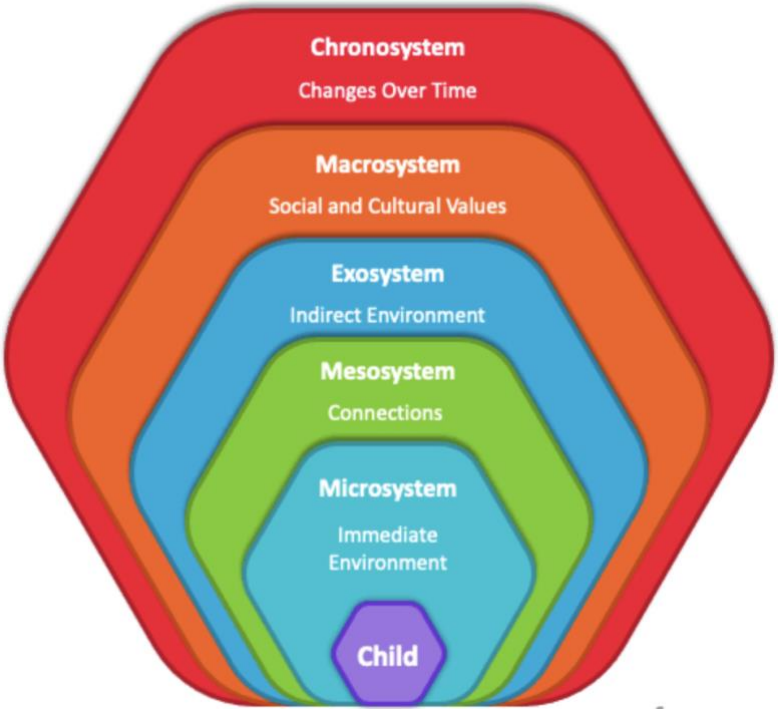

Figure 3: Bronfenbrenner's Bioecological Model (SCU, 2023)

Bronfenbrenner's (1979) Ecological Systems Theory was chosen to underpin this study as it has the ability to focus on the FE teacher at the core of the Bioecological Model while also effectively allowing for the analysis and understanding of the systems in place that influence FE tutors in their teaching strategy in general, but also when they are utilising technology and adapting their practice to be more inclusive. In this study, the Bioecological Model is a lens through which to observe the FE teachers' experiences before, during and after the pandemic while this model also offers a clear framework from which to build upon and achieve a greater understanding of the educators' environment which ultimately influences their practice (Boison & Dzidonu, 2017). This research is shaped by the FE teacher's perspective and as such, this underpinning theory places the educator at the centre of the model offering further clarity surrounding all environmental influences upon their practice (Zwemer et al., 2022). The pandemic and subsequent move to online learning was a monumental change for all educators which completely altered their teaching practice and their working environment at a rapid pace. Bronfenbrenner and Morris (2006) comment on how significant changes to the individual's environment can have a profound impact on their

development, acknowledging that “environmental changes across historical time can produce significant developmental changes” (p. 822). When considered in the context of this research, the pandemic and its influence on education over time contributed to significant changes to teaching strategies and overall accepted practices. They go on to say that these changes, while often abrupt can “offer to the person new, at once more stable and more challenging opportunities that enhance psychological growth” (Bronfenbrenner & Morris, 2006, p. 822). This is especially true in this case study as these changes to educational delivery during the pandemic, despite being overwhelming and daunting at first have paved the way for a more streamlined workflow for FE teachers and offered the opportunity for those educators to upskill with regards to technology usage in their teaching strategy. Bronfenbrenner’s (1979) Ecological Systems Theory highlighted the impact of these external influences quite clearly within this study. The microsystem, in this instance, refers to the immediate environment that the educators find themselves in; the educational institution which is their place of employment and also includes their colleagues, management and their students. The exosystem is an important layer to consider here as the management and governing authorities within the ETB reside in this system with their decisions and policies having direct consequences upon a teacher’s practice. Finally, the time aspect within this model is the chronosystem which accounts for transitions and major events that occur over time in the educators life, the main event in this study is the Covid-19 pandemic. When the relationship between the microsystem, the exosystem and the chronosystem are considered in tandem and applied to the context of this research, which is from the educators’ perspective as they explore the changes to their teaching practice in their work place post pandemic, this model offers a clear definition of each of these external factors and demonstrates the interplay between them (Evans, 2023; Supple & Fennell, 2020). The Bioecological Model also aligns with the interpretivist paradigm to support and strengthen this research further, which will be explored in more detail in the next chapter (Boison & Dzidonu, 2017). An adapted version of this model to include the FE teachers at the centre can be seen below in Figure 4.

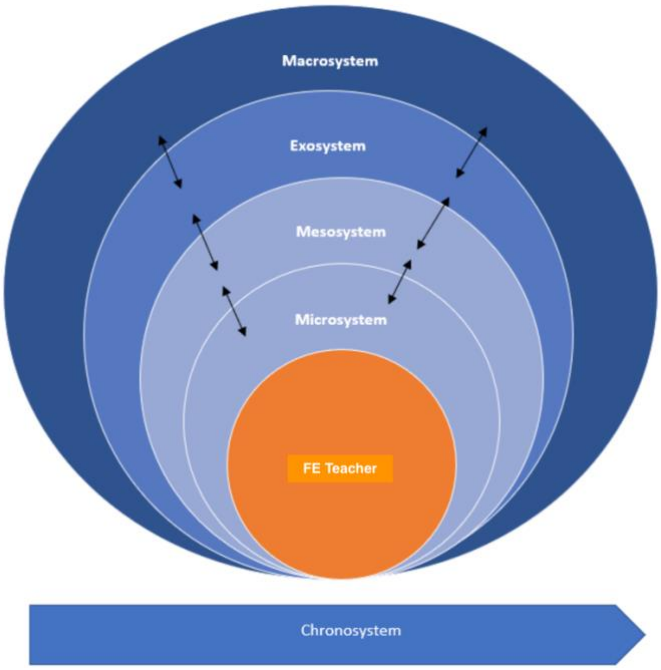

Figure 4: Bronfenbrenner and Morris (2006) Bioecological Model adaption by Rath (2021)

2.7. Research Question

As a result of this perceived gap in knowledge within the literature explored in the commentary above, the following research question has been designed to provide a focus for this research study:

What are the current TEL and UDL practices being implemented in the FE sector and how has this evolved post pandemic?

The following sub questions, while exploring other aspects of this research problem, were considered to be integral to the study thus achieving a clearer understanding of this phenomenon:

- What are the challenges faced by staff in FE when implementing UDL principles and integrating TEL into their practice?
- How do TEL and UDL relate to one another in practice?

2.8. Conclusion

This chapter and review of the literature has presented a comprehensive overview of a variety of sources, both seminal studies and other research conducted within the field of technology and inclusion in the adult education context. Each section details key points made by the authors during the discussion of various components relating to the pandemic, UDL, TEL, adult learners and FE, highlighting some important considerations in this area and the key policies from SOLAS and ETBI. The literature surrounding both UDL and TEL regarding FE in Ireland is limited and has presented an opportunity for further research to be conducted in order to fully explore these topics. The nature of this research requires the combination of information from two extensive subject areas while attempting to discover common ground between the two, situated uniquely in the FET sector in Ireland, in the aftermath of the Covid-19 pandemic. The next chapter will explore the methodology employed to conduct this research.

Chapter 3 Methodology

3.1. Introduction

This chapter discusses the research methodology used to investigate the experiences of FE tutors, post pandemic, when integrating TEL and UDL into their teaching practice. The first section of this chapter will explore the philosophical stance of this study combined with a discussion surrounding the research paradigms underpinning the methodology. The overall study design is explained along with the data collection methods, as well as a thorough justification the selection of these methods. Next, the participant selection criteria is described followed by a detailed examination of the data analysis process. Ethical considerations along with issues of quality and rigour of the data collected will be highlighted as an area of utmost importance for this study. A commentary on the position of the researcher is then presented before the limitations of this project that have been considered will be discussed. Finally, a conclusion providing a summary of the key points presented closes the chapter.

3.2. Research Paradigms and Philosophical underpinnings

The term paradigm, first used by philosopher Thomas Kuhn in relation to scientific research, describes the underlying principles or philosophies that set the precedent for research (Kuhn, 1962). However, within the realm of social sciences, a paradigm refers to the researcher's "worldview" (Mackenzie & Knipe, 2006). In educational research, the paradigm can be viewed as akin to a "conceptual lens through which the researcher examines the methodological aspects of their research project to determine the research methods that will be used and how the data will be analysed" (Kivunja & Kuyini, 2017, p. 26). The researcher's philosophy forms the foundation of the research undertaken and has a profound influence on the methods chosen as the research approach (Creswell, 2009). Guba and Lincoln (1994) state that research paradigms may be described "as Basic Beliefs Systems based on Ontological, Epistemological and Methodological assumptions" (p. 107).

Ontology, epistemology, axiology, and methodology combined constitute the main components of a research paradigm (Creswell, 2009).

Crotty (1998) refers to ontology as "the study of being. It is concerned with 'what is', with the nature of existence, with the structure of reality" (p. 11). Ontology is vital to consider because it forms the basis of what we perceive to be reality and allows us to explore our own underlying philosophical beliefs about the world and the nature of existence (Scotland, 2012). Identifying the ontological assumptions that a researcher has before any research is conducted is often the best approach as this has an impact on every other aspect of the study (Mack, 2010). Epistemology is relating to "how knowledge can be created, acquired and communicated, in other words what it means to know" (Scotland, 2012, p. 9). As any research project serves to generate new knowledge, the epistemological position taken by the researcher enables a clearer alignment with the methods chosen to acquire this knowledge (Farrow et al., 2020). There are also a number of epistemological stances that a researcher can choose from which include objectivism, constructionism, and subjectivism, each of which can have a significant impact in how research is carried out (Crotty, 1998). The nature of knowledge, how it is formed and what it means is intertwined with the researcher's ontological stance and subsequently shapes the overall research methodology (Guba & Lincoln, 1994). Axiology is concerned with ethical issues, the researcher's values and what is considered to be appropriate behaviour in the research context (Khatri, 2020). The axiological aspect of the research paradigm is "typically built into research paradigms and exists "below the surface", (Farrow et al., 2020, p. 12). As part of educational research, axiology should be carefully considered as this provides the ethical standards and values underpinning the research which ensures that participants are safe and there is no risk to them by being involved in the research process (Kivunja & Kuyini, 2017).

The methodology aspect of the research paradigm relates to the research design, overall methods, data collection instruments and analysis techniques used as part of the research process (Kivunja & Kuyini, 2017). The methodology is supported by the ontological, epistemological, and

axiological components while the researcher should consider that “the methodological question cannot be reduced to a question of methods; methods must be fitted to a predetermined methodology” (Guba & Lincoln, 1994, p. 108). The theoretical perspective that aligns with the researcher and which is the most appropriate for the study will dictate the methodology and methods employed for data collection and analysis (Crotty, 1998). As this project investigates the lived experiences of FE tutors, interpretivism appeared to be the best fit for answering the research question and aligned with the overall goals of the study.

3.2.1. Interpretivism

The interpretivist research paradigm centres around the human world and experiences with the intention of gaining a deeper understanding into individual interpretations of situations or phenomena within a certain context (Kivunja & Kuyini, 2007). Scotland (2012) identifies the key principle of interpretivism as reality being “individually constructed; there are as many realities as individuals (p. 11). Interpretivism is often used in conjunction with qualitative methods rather than quantitative because qualitative methodologies such as case studies, phenomenology, and ethnography often yield more insightful data into how people have experienced events, which can’t be discovered through statistics and measurements alone (Creswell, 2009; Thanh & Thanh, 2015; Scotland, 2012). The collection of qualitative data underpinned by the interpretivist stance allows for a clearer understanding of human stories by providing “rich and in-depth descriptions of meaning, feelings and experiences” (Chetty, 2013, p. 40).

Research conducted through the lens of interpretivism should illuminate individual experiences and examine the data gathered “by learning to ‘stand in their shoes’”, (Taylor & Medina, 2013, p. 3). Given that this study is primarily concerned with exploring the various experiences of FE tutors when utilising UDL and TEL and endeavours to gain an understanding into the changes in practice that have taken place post-pandemic, the interpretivist paradigm aligns quite clearly with this objective. This stance is further supported by the underpinning theoretical framework, Bronfenbrenner’s (1979) Bioecological Model as discussed in Chapter Two. Each tutor has a different

story and varied experiences which are as valuable to explore as the commonality that they all share. Interpretivism, at its core, has "the goal of understanding the complex world of lived experience from the point of view of those who live it" (Schwandt, 1998, p. 221). Capturing these perspectives allows for meaningful research to be conducted thus adding new insights to the literature. This interpretivist approach combined with the collection of qualitative data, contributes to the creation of new knowledge which is unique because of its "contextual depth" (Chowdhury, 2014, p. 434).

To elaborate on the fundamentals of this research paradigm, relativism is the ontological position of interpretivism (Scotland, 2012). According to Guba and Lincoln (1994), relativism means that everyone's reality will be different; it is dependent on the individual's experience and the meaning that they assign to it which can be explored by the researcher to derive further insights and understanding of a situation. Simply put, relativism, is the view that "the situation studied has multiple realities", (Kivunja & Kuyini, 2017, p. 33). This is especially true when considering the context of this research; every FE tutor will have a different perspective on how TEL and UDL practices have changed since the pandemic. Each teacher will have adapted their practice in differing ways, but it is to be expected that similarities will exist; "elements are often shared among many individuals" (Guba & Lincoln, 1994, p. 110).

The epistemology of interpretivism is subjectivism which is based on the researcher creating their own interpretation of the situation being studied after interaction with their participants, thus the meaning that they construct is formed and shaped by this interaction (Scotland, 2012; Crotty, 1998). Taylor and Medina (2013) argue that the epistemology of interpretivism should be labelled "inter-subjective knowledge construction" (p. 4), because of how this knowledge is acquired. The knowledge in question is generally not created based on a specific theory or universal law, as is the case with scientific centred paradigms such as positivism and post-positivism, with the data that is generated providing rich insights and offers new ways to understand phenomena (McChesney & Aldridge, 2019; Mackenzie & Knipe, 2006; Scotland, 2012). The epistemology of interpretivism aligns with and supports the aims and objectives of this research project which seeks to "understand

rather than explain", (Mack, 2010, p. 8). Kivunja and Kuyini (2017) state that interpretivism adopts a balanced axiology, which "assumes that the outcome of the research will reflect the values of the researcher, trying to present a balanced report of the findings" (p. 34). This is important to consider and aim for, as stated above, interpretivist research is highly subjective in nature with objectivity being "virtually impossible" (Chetty, 2013, p. 41). The axiological stance of interpretivism subsequently influences the validity of the data produced and should be carefully considered throughout the process (Saunders et al., 2007; Scotland, 2012).

Other paradigmatic stances could have been adopted for this study such as pragmatism, however, it often favours a mixed methods approach, while the "emphasis is on solving a pressing problem" (Farrow et al., 2020, p. 18), which does not resonate with this study. Similarly, positivism was not appropriate for the level of understanding and context required for this research as it relies on quantitative data and argues that there is a single truth to be discovered (Chetty, 2013; Kivunja & Kuyini, 2017). Furthermore, the use of the critical paradigm was not in alignment with the goals of this research but could prove useful to consider if the study was more focused on challenging the ETB governance as to why UDL has not been a focal point of content delivery previously (Scotland, 2012; Taylor & Medina, 2013).

Overall, interpretivism appears to be the most suited and complementary paradigm to this research topic, with the consensus across the literature being that interpretivism can "support education research" (Mattar & Ramos, 2022, p. 252). In this case study, the main goal is to gain an understanding into TEL and UDL practices within the context of FE which is clearly aligned with the interpretivist stance. Of course, there are some limitations associated with interpretivism, the key concern relating to the validity of the data produced with safeguards such as member checking and peer reviews necessary to confirm the trustworthiness of the knowledge generated (Scotland, 2012). These issues of validity and credibility will be discussed in more detail later in this chapter.

3.3. Research Design

When planning a research design, the researcher should be cognisant of the fact that it is "the logic that links the data to be collected (and the conclusions to be drawn) to the initial questions of study" (Yin, 2003, p. 19). During the preliminary drafting of potential research questions this study, it became clear that qualitative research was the most suitable methodology because it aligns clearly with the goals for this project and has the ability to answer the research question posed. A qualitative study involves the researcher acting as an observer or enquirer of, participants while "attempting to make sense of or interpret phenomena in terms of the meanings people bring to them" (Denzin & Lincoln, 2018, p. 43). It was decided that a qualitative case study based on an FE college would be an appropriate approach to satisfy the objectives of the study and provide answers to the research questions thus ensuring that the study design is cohesive and aligned throughout (Yazan, 2015).

When considering the various methods that could be employed to gather data as part of this case study, the critical question proposed by Schwandt and Gates (2018), "what is this a case of?", (p. 601) provided focus with regards to selecting the best tool for this investigation. After much deliberation, semi-structured interviews, were chosen as the data collection method because they allowed for the uncovering of insights from FE tutors based on their experience of teaching during and after the pandemic and had the potential to highlight the overall changes in practice relating to TEL and UDL, meeting the overarching aim of this study.

3.3.1. Case Study Methodology

The case study methodology is commonly used as a qualitative research methodology within educational research (Yazan, 2015). However, there are differing accounts by researchers in the field as to the best approach for the research design because a "case study is not prescriptive in its structure, content and data collection tools and so can't be defined in these terms" (Hamilton & Corbett-Whittier, 2013, p. 8). Yin (2003), a seminal author on the topic provides a definition of the case study 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" (p. 13). Merriam (1998), another leading figure in this area, offers a variation of this description and states that a "qualitative case study is an intensive, holistic description and analysis of a single instance, phenomenon, or social unit" (p. 27). Furthermore, Miles and Huberman (1994) refer to a case study as "a phenomenon of some sort occurring in a bounded context" (p. 25). All three definitions mention a phenomenon bounded within a specific context. The phenomenon in this instance is the Covid-19 pandemic that triggered a change in content delivery while the context is an FE college in the Northeast of the country.

There are a variety of approaches that can be taken when utilising this methodology as there are differing opinions on the steps involved when applying the theory to practice (Rashid et al., 2019). Yin (2003) categorises case studies as exploratory, descriptive, or explanatory. This case study can be categorised as exploratory in the Yinian view as exploratory case studies focus mainly on answering research questions centred around 'what' questions which aligns with the main research question of this project thus providing "justifiable rationale for conducting an exploratory study" (Yin, 2003, p. 6). This case study design also corresponds with the interpretive description proposed by Stake where the researcher relies on their own judgement based on the interaction with the participants; the meaning behind the observations is "directly recognized by the observer", (Stake, 1995, p. 60). This defining characteristic also ensures that this research design is fully compatible with the interpretivist paradigm supporting this study (Yazan, 2015).

With regards to the method applied to collect data, Yin (2003) recommends that the typical case study should rely "on multiple sources of evidence" (p. 14). However, the implementation of the case study methodology varies from researcher to researcher with the main argument throughout the literature being "what constitutes a case is disputed" (Schwandt & Gates, 2018, p. 600). Yazan (2015) explicitly states that the case study does not have "a 'codified design' like the other research strategies" (p. 140). Thus, once the method chosen is ethically appropriate, grounded in the underlying theory and can sufficiently answer the research question then it can be employed

as part of a case study (Fusch et al., 2017). Furthermore, the issues of validity, reliability and rigour are associated with qualitative research overall regardless of its use as part of a case study (Creswell, 2009). Hamilton and Corbett-Whittier (2013) advise the use of triangulation to ensure validity of the data collected which "means the use of two or more forms of data collection tools or two or more perspectives contributing to an understanding of the topic" (p. 15). Once this criteria is satisfied, this provides justification for the use of any means to achieve the goals of the research project through the lens of a qualitative case study.

This research methodology implements a mono method case study relying only on semi-structured interviews with FE staff within the chosen organisation as the definitive data source for analysis. In-depth interviews ranging between 40 minutes to an hour were carried out with seven members of staff, each staff member with varying roles within the institute of further education. These roles included a deputy director with the responsibility of quality assurance processes in the institute, two interviewees were on the teaching and learning committee with their roles focusing particularly on TEL and UDL integration, one teacher was a head of school and the remaining three participants are teachers of different disciplines within the college. This data was not only insightful but it was also "exhaustive, rich in depth and information" (Njie & Asimiran, 2014, p. 36). These seven perspectives relating to experiences of teaching during the pandemic and in the years that followed combined with commentary relating to UDL and TEL practices within the FE centre provided a wealth of information. The multiple perspectives captured during this project also align with Hamilton and Corbett-Whittier's (2013) definition of triangulation for a case study as cited previously and offers further support to this study design through the rich insights gathered from each individual as they offer their unique story. While many authors comment on the disadvantages of a mono method case study, Lobo et al. (2017) praises this method for its ability to "assess a variety of research questions, settings, cases, independent variables, and outcomes" (p. 3).

During the study design phase, it was considered that document analysis relating to policies concerning teaching, learning and assessment practices within the FE college could be utilised but

this was not considered feasible by the management at the institute as this raised issues surrounding privacy and GDPR policy; upholding these standards are of paramount importance to the FET sector. A quantitative survey with questions relating to how TEL and UDL are employed in the FE classroom was also considered in order to satisfy the Yinian guidelines for a case study but it was decided that this quantitative aspect would not yield the level of insight that was desired for this interpretivist study (Stake, 1995). Consequently, this case study evolved to be mono method in design with the data collected and analysed based solely on the semi-structured interviews. Yin (2003) defines the overall research design as "the logical sequence that connects the empirical data to a study's initial research questions and, ultimately, to its conclusions," (p. 20). By this logic, if the data collected is "relevant data", (Yin, 2003, p. 20) and pertinent to the answering of the main research question while providing sensible and valuable conclusions, the research design of this case study is entirely suitable and valid.

3.3.2. Participant Selection and Engagement

Purposive sampling was used to facilitate participant selection for this study. The nature of this research requires a tailored selection process because this yields "in-depth understanding not available through random sampling" (Reybold et al., 2013). The suggested sample size for case studies is not an exact figure but Schoch (2020) offers a guideline, affirming that "sample sizes in case studies are typically small, which is common in most qualitative research" (p. 249). The inclusion criteria for this study stated that each individual should be a qualified tutor in FE, had been teaching before and after the Covid-19 pandemic so that they were able to discuss the changes that have occurred, and they should be familiar with the concepts of UDL and TEL. When choosing the FET college for this research project, I decided to approach an institute of Further Education in the Northeast of Ireland that I have a prior connection with. Firstly, consent was sought from the deputy director of the FE college in question prior to contacting any participants and permission was granted to conduct the study with their staff members. Next, I sent an invitation to take part via email to each of the heads of School who subsequently shared this invite with members of teaching

staff at their next school meeting. Those who were interested in participating in the study made contact with me through email. An information sheet and consent form were provided to participants prior to the interviews being scheduled, with instructions stating that both forms must be read, signed digitally and returned before any data could be obtained (see Appendix 2 and 3).

3.4. Methods

3.4.1. Semi-structured Interviews

Semi-structured interviews were the chosen method of data collection as they offer the ability to gather insightful and meaningful data from participants about their experiences with the added flexibility of allowing the conversation to flow naturally (Bliss, 2016). The flexibility of semi-structured interviews also allows for further follow up questions with the interviewees if there are some inconsistencies with their answers, something not accommodated by structured interviews (Bryman, 2016). However, this added flexibility also decreases the validity of the data gathered; this issue was anticipated and accounted for in the study design and overall data reliability measures which are discussed later in this chapter (Zohrabi, 2013). It was made clear to participants that my sole intention for the interviews was to conduct an exploration into UDL and TEL practices in the FE sector for the purposes of this research project. I wanted to reassure the tutors that I was not using this study to scrutinise their practices or lack thereof, as this could have had an impact on the quality and honesty of the answers given (Andrews, 2021). One disadvantage of carrying out interviews as part of the research process is that they are quite time consuming both in the planning and execution stage but also when analysing the subsequent data (Farrow et al., 2020).

Overall, seven participants agreed to an interview. One participant was a deputy director while another participant was a head of school at the institute. Two participants were dedicated TEL tutors from the teaching and learning committee within the FE college and the remaining three teachers were from other departments in the college to document any differing practices within the different academic disciplines. Before the interviews took place, a pilot interview was conducted which allowed for a trial of the interview questions (see Appendix 1) to be conducted and helped to

identify any major issues with the structure of the questions, the length of the interview and highlighted any modifications that were required before the study began (Majid et al., 2017).

The semi-structured interviews were conducted online using Microsoft Teams to provide greater flexibility to participants and allow for the recording of the interview and immediate subsequent storage on NCI's secure cloud storage to ensure the data is protected. With MS Teams, the meeting file is automatically recorded by default with both the video and audio included but in order to protect the anonymity of the tutors, the audio file was stripped from the video file and then used to generate a transcript document. The original meeting file was then deleted. All files associated with this case study were stored on NCI's secure cloud storage which is also password protected. Online interviews may provide the participants with greater flexibility but there is the disadvantage of not being able to fully observe the interviewee's body language which can be important when determining the overall response to a question (Bryman, 2016). This did not have a significant impact but it was a factor to consider before deciding on the format of online interviews. Overall, the questions were open ended serving to encourage participants to elaborate on their experiences, fulfilling my role as the interviewer which involves "seeking descriptions of how interviewees experience their world, its episodes and events" (Brinkmann, 2018, p. 1003). While each interview had a predetermined set of questions and themes to be explored, I adapted the questions as required, enabling the participants to lead the conversation (Saunders et al., 2007). I also had a separate set of questions for the deputy director which were similar but altered slightly as this role is different to a teaching position in the college, see Appendix 1 for both sets of questions.

Upon reflection, a variety of other methods could have been adopted for this research. A focus group was considered, however, this would require more time than individual interviews, which would perhaps inconvenience the FE tutors who have a full teaching schedule and varying timetables would not allow all tutors to be present at the same time (Johnston & Christensen, 2014). Focus groups also have associated social pressure which can increase the chance of inauthentic responses (Farrow et al., 2020). Observations of tutors implementing UDL and/or TEL practices in the

classroom might also have been another option for a data source to add to this case study and can often lead "the researcher toward greater understanding of the case", (Stake, 1995, p. 60). However, time constraints of the tutors and issues surrounding learner privacy in the classroom might have arisen making it a less suitable option for this study.

3.5. Data Analysis

With qualitative data, there are a number of options available for analysis of the information gathered which provide a "framework that is meant to guide the analysis of data" (Bryman, 2016, p. 566). Some possible approaches include but are not limited to, are narrative analysis, Interpretative Phenomenological Analysis (IPA) and thematic analysis. Narrative analysis centres around the individual's story, their voice and their feelings surrounding certain situations or events, taking into consideration not only the words they speak but their expression, their language and the overall impact of their story (Josselson & Hammack, 2021). Overall, narrative analysis was not suitable because the focus of this study was not to highlight the individual tutor's story rather each of their stories contributed to an overall greater understanding of TEL and UDL in practice (Earthy et al., 2016). IPA focuses particularly on the psychological aspect of the qualitative data with the central theme being how the participants make sense of their experiences (Smith et al., 2009). While IPA was considered as it is supported by the interpretivist positioning of this study, phenomenology is a core aspect of this method of data analysis which did not align with the methodology of this research (Spiers & Riley, 2019). Consequently, the data analysis method identified as the best approach for this case study was Braun and Clarke's (2006) thematic analysis.

Thematic analysis is a technique used within qualitative research that involves "identifying, analysing, and reporting patterns (themes) within data" (Braun & Clarke, 2006, p. 6). Thematic analysis is ideal for this case study because it allows for the main areas of discussion to become clear and aids the identification of the common themes discussed by each interviewee (Braun & Clarke, 2012). Compared with other qualitative data analysis methods, thematic analysis provides flexibility in its approach and implementation which is ideal for novice researchers (Nowell et al., 2017).

However, this can lead to an analysis that is vague as well as uncertainty surrounding rigour and clarity relating to the research paradigm underpinning the study because thematic analysis is not predefined by any one theoretical position (Kiger & Varpio, 2020; Braun & Clarke, 2006). The steps provided by Braun and Clarke (2006) include mechanisms to account for these inconsistencies throughout the research design, which were implemented throughout.

The outline that Braun and Clarke (2006) have provided, includes six phases to follow. Firstly, I began the analysis process by familiarising myself fully with the data (Braun & Clarke, 2006). The interviews were recorded through MS Teams and they automatically generate a speech to text transcript file alongside the recording. However, this text file is not always accurate so I listened back to each meeting and corrected the transcripts as necessary. Once the transcripts were generated and were deemed accurate, I deleted the original meeting recording to ensure that the anonymity of the tutors was protected. Each transcript was anonymised and safely stored on NCI's secure cloud storage which is password protected to further safeguard against the individuals' identities being revealed. This process of reading and rereading the transcripts whilst listening to the audio alongside this ensured that I became very familiar with the data while I continuously made notes regarding individual transcripts and the data set as a whole to prepare for the next stage (Braun & Clarke, 2012).

The next phase of Braun and Clarke's (2006) framework consisted of creating codes alongside the transcripts. These codes are the "building blocks of analysis" (Braun & Clarke, 2012, p. 61). With the codes assigned, the data was analysed manually using Microsoft Word to organise the data management rather than using a specific software dedicated to qualitative data analysis such as NVivo because I wanted to immerse myself fully in the process and there are still ongoing debates surrounding how useful these programmes actually are (Hamilton & Corbett-Whittier, 2013). The next step focuses on using the generated codes to collate a list of potential themes (Braun & Clarke, 2006). During this phase I also compiled a list of useful and pertinent interviewee quotes to include. Braun and Clarke (2012) quite rightly mention that themes do not emerge as if the analysis is a

passive activity for the researcher rather "searching for themes is an active process, meaning we generate or construct themes rather than discovering them" (p. 61). At this point, with multiple lists of codes, themes and quotes collated, I created a thematic map to clearly illustrate the main findings from the data (Braun & Clarke, 2006).

The data analysis process as part of a case study that is underpinned by the interpretivist paradigm asks the researcher to "rely on his or her own instincts" (Merriam, 1998, p. 42). The themes that are considered to be important are reliant on me, the researcher and my own interpretations and meaning surrounding the data (Creswell, 2009). This method of analysis aligns with the interpretivist epistemology of subjectivism which was also supported by Bronfenbrenner's Ecological Systems Theory when examining the work environment's influence on the tutors (Scotland, 2012; Bronfenbrenner & Morris, 2006). A collection of documents relating to the thematic analysis process and audit trail of this research can be viewed in Appendix 4.

3.5.1. Issues of Quality and Rigour

The trustworthiness of the research process and findings should be of paramount concern for the researcher. There have been many debates over the reliability and validity of qualitative data when compared with quantitative results (Bryman, 2016). To account for this, Lincoln and Guba (1985) established quality criteria to ensure qualitative inquiries are credible and aligned with quantitative data in terms of reliability and validity. Lincoln and Guba (1985) advocate for five key areas to be assessed in qualitative research for quality and rigour: credibility, transferability, dependability, confirmability and authenticity.

Credibility is concerned with the accuracy of the findings and whether the results represent the experiences of the participants (Birt et al., 2016). Credibility within a qualitative study can be verified using member checking and peer debriefing (Nowell et al., 2017). Member checking was utilised in this case study by returning the interview transcripts and thematic analysis to the interviewees to ensure the analysis and interpretation is accurate while peer debriefing was achieved through regular meetings with my supervisor and discussions with my peers (Creswell &

Miller, 2000). This approach reinforces the validity of the conclusions drawn from the findings (Yin, 2003). Ensuring transferability requires proof that the findings are relevant in the wider literature on the subject by providing detailed descriptions of all responses gathered and the researcher's interpretations to allow transferability to be evaluated (Lincoln & Guba, 1985). Due to the "contextual uniqueness" (Bryman, 2016, p. 392) of my case study, the findings are limited in their relevance to the FE sector in Ireland. Accordingly, the transferability of the results from this research are highly relevant and informative for ETBs across the country, providing guidelines and first hand experiences of FE tutors as to the best practices for TEL and UDL with adult learners. Furthermore, this study is underpinned by the preceding literature and research in this area as discussed in Chapter Two.

The criteria for dependability is for the entire research process to be well documented and every aspect traceable so that it could be replicated (Treharne & Riggs, 2014). Thematic analysis increased this reliability aspect; having a predefined process allows for the methodology to be followed by other researchers (Braun & Clarke, 2006; Nowell et al., 2017). Dependability can also be achieved by adopting an audit trail to document the research process in its entirety as it progresses, including all decisions and reasoning behind them (Creswell & Miller, 2000). However, Bryman (2016) argues that the audit trail can be an unpopular method of assessing dependability because of the sheer amount of time it takes to audit the often vast amounts of data generated from qualitative studies. Rather than conduct a lengthy audit, a reflexive research journal was used in which I reflected on the case study and the process throughout, first and foremost to ensure dependability but secondary to this, it allowed me to reflect on my practice not only as a researcher but as an educator also (Lincoln & Guba, 1985; Olmos-Vega et al., 2023). Samples of this reflexive journal can be found in Appendix 4. According to Lincoln and Guba (1985), confirmability is achieved through the same audit conducted to ensure dependability in the form of the reflexive journal. The main concern when assessing confirmability is any pre-existing biases or motivations that the researcher has influencing the interpretation of the participants' responses (Treharne & Riggs, 2014).

Triangulation, auditing and providing transparent results are the main strategies for ensuring confirmability but the steps involved in thematic analysis also account for this whereby the researcher must cross reference the generated codes and themes with the interview transcripts to ensure that they are supported by participants' answers (Bryman, 2016; Braun & Clarke, 2006). I also included direct quotes from the interviewees to support my interpretations in the findings section to solidify the confirmability criteria. Finally, authenticity was assessed through the auditing procedures listed above particularly member checking to ensure that I have expressed each participants' viewpoints and stories effectively (Lincoln & Guba, 1985). This quality is quite important in this particular case study as it is concerned with UDL and TEL approaches which has the potential to have an impact on how educators embed these concepts and "potentially change their practice based on the findings" (Treharne & Riggs, 2014, p. 58).

3.6. Ethical Considerations

With any research, the researcher should strive to conduct the study in the most ethical manner possible ensuring at all times that the individuals involved are protected and their welfare is paramount during the data collection process (Denzin & Lincoln, 2018). Qualitative research poses more ethical quandaries than quantitative studies overall due to the complex nature of the data that is obtained from participants (Sanjari et al., 2014). This case study was guided by NCI's Ethical Code for Education Programmes Research and the ethical framework complied by the British Educational Research Association (BERA) (2018) to guarantee that the highest ethical and academic standards were followed throughout the research process.

Before this project began, a proposal discussing an overview of the study was submitted to NCI's Ethics Committee for ethical review before I could commence any data collection. When ethical approval was obtained, the research process began by contacting the prospective FE college for permission to interview their staff members for this project. Before, during and after the interviews took place, the tutors were continuously reminded of their rights including their right to withdraw their consent to take part at any time were reassured that this decision would be

respected. The intention of this research was to ensure that "voluntary informed and ongoing consent" (BERA, 2018, p. 9) was maintained throughout the data collection and analysis process. Another assurance provided to the educators was that their anonymity would be safeguarded to the best of my abilities during the course of this case study whereby all associated data was safely stored on NCI's secure cloud storage which is password protected, the original meetings were deleted once the transcripts were created and all names were removed from the transcripts and given a generic label. Overall the ethical risk associated with this research is low as the participants are all adults discussing their professional practice consensually.

3.7. Positionality of the Researcher

In any study, the researcher must consider their own biases, opinions and prior experiences that may shape or influence the research process as whole. It is important to consider that in qualitative research overall, "the researcher is the primary instrument of data collection and analysis" (Merriam, 1998, p. 42) which will have a significant impact on any findings and results that are generated. The positionality of the researcher is intrinsically linked to their prior epistemological and ontological assumptions, thus having an influence on the overall research design, methodology and resulting outputs from the study (Miles & Huberman, 1994). As such, my position as both an educator and a researcher required further examination to identify my biases and influences, which allowed for a clear interpretivist stance to be taken from the outset of the project which of course had implications for the overall meaning attributed to the findings.

Holmes (2020) suggests that positionality should be considered in relation to "the subject under investigation, the research participants, and the research context and process" (p. 2). In relation to the research context of this case study, I am considered an insider as I was working as a learning support member of staff in the FE college this research is based upon (Greene, 2014). It was important that I acknowledged this aspect of my positionality as insider research has the potential to complicate several facets concerning the research process (Greene, 2014). Insider research ensures objectivity is impossible (Atkins & Wallace, 2012). However, a benefit of insider research is the pre-

existing interpersonal relationships with colleagues affords a level of trust possibly not given to an outsider enabling further insights and stories to be volunteered (Fleming, 2018). This supports the creation of a richer narrative and deeper insights into the organisation at the centre of the case study (Atkins & Wallace, 2012).

Furthermore, the topic under investigation is an area of interest to me and as an educator, TEL is a passion of mine which I am always curious to learn more about and engage with. I was a student teacher at the onset of the pandemic in March 2020 and witnessed first-hand how valuable and instrumental technological was to ensure continuity of learning for the students through online platforms, learning activities and assessments. It bothered me immensely that some students who had additional learning needs were essentially left behind in relation to the change in delivery format and assessment method. I implemented the principles of UDL in my practice which helped the learners achieve their learning goals which further demonstrated the importance of ensuring modules and the associated assessment are in an accessible format regardless of the online or in person environment. I recognised the potential that TEL had in regards to utilising the UDL framework thus formed the initial ideas for this research study. Consequently, this position could potentially lead to bias and have an influence on the type of questions asked during the interview stage (Holmes, 2020). However, I feel that this bias on my part is a benefit to this study and provides insight that I wouldn't otherwise have and awareness of a topic that I wouldn't have prior knowledge on if not for my own teaching experiences (Greene, 2014). To account for this level of bias which could have an impact not only on the resulting data but on the quality and trustworthiness of the study overall, reflexivity was engaged throughout the methodology and analysis to negate my prior assumptions and positionality through the use of a reflexive journal (see Appendix 4), member checking and peer debriefing with my supervisor throughout the research process (Wilson et al., 2022; Greene, 2014). By engaging with reflexivity and reflecting on my own biases did not entirely solve this issue or remove the element of subjectivity altogether but by using this reflexive lens throughout, I developed a greater ability to recognise my existing beliefs and the

impact that this had on my research project thus yielding a more complex understanding of the situation studied (Ademolu, 2023).

3.8. Limitations and Challenges

The main limitation associated with this project were the time restraints in place, firstly given the small scale of a Master of Arts dissertation, which does not afford the same amount of time given to, for example, a doctorate degree for the research process. Furthermore, there was also a limited time frame in which data could be collected from the FE staff as the academic year is quite short in these institutions and as such, the tutors are quite busy with assessments and marking before finishing for the summer break which aligned with the data collection phase of this dissertation. This short window for the interviews to take place restricted the number of tutors that I could interview thus creating a smaller data base from which to conduct the analysis. This also shortened the time allocated to the analysis process because the interviews were conducted at the end of April and start of May to accommodate the tutors prior commitments. Overall, I don't believe that this limitation had a detrimental impact on the study and in my opinion, the research question was answered in full through the meaningful and rich data that was produced during the process.

Another challenge to address was the limitation imposed by the mono-method case study approach. In relation to a case study design, this was an unusual approach however it is common to choose a blend of different study designs in order to achieve the best data collection within the constraints of time and resources while avoiding limitations associated with certain methodologies (Fusch et al., 2017). Stake's (1995) approach to case study is less structured than that prescribed by Yin (2003); he uses this as a framework rather than absolute rules to follow exactly while achieving the desired objectives. This case study is supported by Stake's (1995) approach which is a seminal source within this area. When considering Simons (2009) definition of a case study as an "in-depth exploration from multiple perspectives of the complexity and uniqueness of a particular project, policy, institution, programme, or system in real-life context" (p. 21), I do consider this case study to be a success. It has achieved the goal of understanding current TEL and UDL practices within FE with

an insight developed into how this has changed as a result of the pandemic due to the multiple perspectives offered by the seven interviewees, each with a different education based role in the college and therefore a different viewpoint.

3.9. Conclusion

This methodology chapter has provided a detailed outline of the research design, underpinning philosophy and data collection methods. The qualitative case study approach, supported by the interpretivist paradigm and Bronfenbrenner's Ecological Systems Theory, was chosen as the most effective method of achieving the aims and objectives set out for this study. The methodology has been explored and justified, given the unusual design choice as part of the case study approach while elaborating on how this method has resulted in rich and meaningful data. The quality of the results and the rigour of this study has been central to this research combined with ethical considerations to ensure this project was carried out with the highest standards expected of qualitative research within an educational context. This was achieved through a variety of reflexive measures carried out throughout the duration of the study such as peer debriefing, reflexive journaling and member checking. The following chapter will present the findings of this case study paired with a detailed discussion based on this data.

Chapter 4: Findings and Discussion

4.1. Introduction

This chapter presents the findings of this qualitative case study and provides an analysis and exploration of the themes discovered. The data gathered as part of this study sought to answer the overall research question which centred around the teaching experiences of FE tutors with current TEL and UDL practices used in the sector and how this has changed post pandemic. The semi-structured interviews with FE staff were conducted to provide answers to the research questions posed and subsequently provided informative stories illustrating the lived experiences of these educators before, during and after the Covid-19 pandemic. As a result, themes and sub-themes have been identified after a thorough analysis of the interview transcripts. Broad themes have been established based upon thematic analysis of the transcripts with these themes recurring repeatedly throughout all of the participant accounts. The themes will be outlined below, organised thematically with a detailed discussion and exploration of each.

4.2. Thematic Analysis

The semi-structured interviews were analysed using Braun and Clarke's (2006) thematic analysis as discussed in the previous chapter. During this process the following themes were identified:

1. Digitalisation of Further Education
2. Covid-19 accelerated UDL integration
3. The UDL and TEL relationship

These themes also have a number of subthemes associated with them which will be discussed below. The results relating to each theme are presented in the next section with a discussion and analysis contextualising the findings within the existing literature on this topic interweaved throughout. As discussed in the previous chapter, as part of the analysis, I generated a thematic map to illustrate the main themes and subthemes which can be seen below in Figure 5.

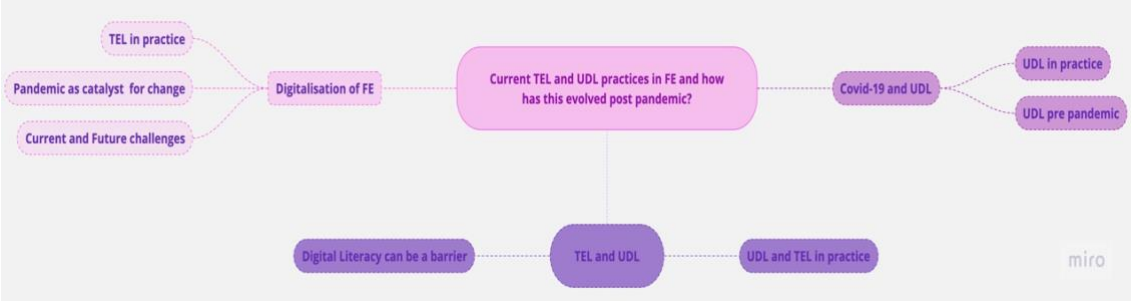

Figure 5: Thematic Map

4.3. Theme 1: Digitalisation of Further Education

During the semi-structured interviews, the participants were asked a variety of open-ended questions relating to teaching, learning and assessment strategies pre and post pandemic. They were also asked a variety of questions surrounding their TEL practices, what this involved before the pandemic and what it looked like after they had returned to in person teaching. All the responses were unanimous with the overall opinion being that there has been a major shift in technology usage among FE tutors post pandemic. This is not surprising given the unprecedented shift to emergency remote learning virtually overnight which required a complete shift in educational content delivery. Technology and digital tools supported educators as they made this transition and ensured the continuation of teaching and learning, despite some hesitation and fear among some staff. Participant 1 offered some insight into what this educational landscape looked like prior to the onset of emergency online learning:

> I can't really even put into words, the change and the seismic shift that has happened here in the institute since Covid hit. The reality was that only about 15% of our teachers were actually using Moodle to any sort of a level that they would have been able to transition to use Moodle during when the pandemic hit and the other 85% of our teachers just you know, really were not at the races with it. (Participant 1)

This impactful statement made by Participant 1 echoes the key sentiments from the literature surrounding TEL use among tutors in the FE sector. Ryan et al. (2020) supports this

revelation based on teaching pre pandemic stating that “the widespread expectation that teachers would embrace educational technologies has failed to materialise” (p. 417). Oriji and Amadi (2016) previously discussed the resistance, reluctance and fear among teachers regarding technology and integrating it in their practice, with some teachers stating “that they are already doing a good job in the classroom and wondered what improvements the technology will further bring” (p. 122). Phipps and Lanclos (2019) also discussed this scepticism and highlighted that many educators were open to technology use, however some were apprehensive about being replaced by technology such as recorded lectures online, reducing the need for in person classes and ultimately making their role redundant. Before the forced uptake of technology in the classroom dictated by the pandemic, some educators had limited digital skills to successfully use technology as part of their teaching strategy which stifled their confidence in this area even further (Hartman et al., 2019). This opinion that the uptake of technology among tutors in their teaching practice was relatively low prior to the pandemic was common across all the interviewees with Participant 3 surmising “your average teacher in FE would have undergone quite a significant change over the course of the pandemic”. Before the Covid-19 pandemic, TEL within the classroom was overall very limited due to a lack of experience with technology and a lack of professional development cited as reasons for teachers not engaging more with TEL in the classroom (Winter et al., 2021). The current National FET Strategy 2020-2024 acknowledges that improvements are needed in the TEL capabilities of staff and more training is required, with the pandemic highlighting the need for a digital transformation of the sector (SOLAS, 2020).

The pandemic as a catalyst

The Covid-19 pandemic acted as a catalyst for change within many areas of FE, the main change being the adoption of technology use in the classroom by all staff. Participant 1 speculated that “technology usage by all of our teachers has probably increased by about 400 to 500% since the pandemic versus what it was before”. Participant 2 shares some insight into how attitudes have changed towards technology among FE tutors since the pandemic:

> I think everybody is much more inclined to use different digital resources and different digital apps to increase classroom engagement even now that we're back in a physical classroom, things like Mentimeter and Kahoot, things like that. And people are much more inclined to use them now that we're back in the classroom where they hadn't necessarily touched them before. (Participant 2)

Ní Fhloinn and Fitzmaurice (2021) describe this reluctance among educators in Further and Higher Education to adopt current digital practices in the classroom and oftentimes "reject the use of technology as unnecessary to their teaching until some powerful new incentive appears" (p. 394). The move to emergency remote learning and teaching overnight forced all teachers to adapt to this new method of delivery and led to many creative and innovative changes in the sector. Participant 6 has described how technology has overall improved education delivery and adapting to the change wasn't difficult stating that "you get so used to technology, so I embraced it full on. It was easy for me to embrace. I'm never going back". Participant 1 also agrees with the positive changes that the pandemic has encouraged in relation to TEL and digital tool uptake in the FE sector:

> If the pandemic hadn't of happened, we would have been going along as we'd always gone and incrementally getting a little bit better. But I would predict that, you know by 2050 we wouldn't be where we are now, had the pandemic not happened. (Participant 1)

Casey (2020) agrees with Participant 1 in that the pandemic offered an opportunity to education providers and teachers to reassess the way things have always been done and instigate a restructure because without the pandemic, "the lessons learned might otherwise have taken another decade to learn", (p. 3). Overall, the general consensus among the tutors interviewed is that "Covid absolutely catapulted people into TEL headfirst" (Participant 3). This was facilitated by the onset of online remote learning which required a complete overhaul of prior teaching, learning and assessment strategies engaged with by FE teachers (Taylor, 2023). One tutor discussed how they had little choice in the matter describing how "there are commonalities I think for all tutors across the institute in their teaching and learning strategy, many of which have been imposed on them, they

had no choice", (Participant 2). However, this imposition is now considered to be a positive as Participant 2 goes on to say, "I don't think any of us could envisage teaching without the use of technology now".

This rapid digital transformation of the FET sector has been embraced by teachers at a rate that wouldn't have been possible if not for the emergency remote learning solution created in response to the lockdown in 2020 (Doherty & McLaughlin, 2021; Casey, 2020). Participant 1 illustrates the impact that this has had on teaching staff with regards to their digital skills and competence:

> There are two or three members of staff who we would have had to consistently support and now those people are navigating MS Teams, are getting their assessments submitted digitally, are able to correct their assessments digitally, are able to provide feedback to learners digitally and all of that evidence is available to EA digitally. So that for me is a big success. (Participant 1)

Another tutor describes this phenomenon as the "legacy" of the pandemic, that teachers are more "comfortable using those apps and digital tools. They know that they work, they've adapted them to face to face learning in the physical classroom" (Participant 2). The complete digital transformation of this FE college appeared to open up a whole new way of operating for staff which would not have been considered pre pandemic (Supple & Fennell, 2020). Based on this, Participant 1 adds that "there was no way that we could continue to operate as we had always operated". Participant 3 also speculates that "your average teacher, if you look at what they were doing pre pandemic and what they do now is very different". One teacher remarked that "there was a paradigm shift really with what happened during COVID. I think TEL is in our DNA now" (Participant 2). This increased digital competence and confidence among educators serves to facilitate further changes to content delivery, assessment, and overall curriculum design which will streamline certain elements of these processes that benefit both teachers and their students (Starkey, 2020; Falloon, 2020). Applying the TPACK model in the FE sector is relevant here and can support this increased integration of technology within the pedagogies utilised by the adoption of this "framework that

guides them to achieve meaningful and authentic integration of technology into the classroom" (Koehler et al., 2016, p. 7).

Technology enhanced teaching, learning and assessment

While the pandemic encouraged overall TEL and technology-based tool use among teaching staff in FE, it also had an unexpected impact on a variety of other aspects within the classroom. Throughout the course of the interviews, all the teachers mentioned that the biggest change that has occurred in their college has been the digitalisation of the assessment process and collection of student evidence. Participant 2 provided a detailed summary of this change to content delivery, assessment processes and the impact that this has had on learners:

> Before Covid, the main thing that sticks out was that there was an awful lot of written work and not even just word processed, but handwritten work in some cases. And the biggest change was that everything has been digitalised because everything had to be assessed digitally during the pandemic. All of the assessments during Covid were either typed and submitted online through Teams or else recorded digitally, so that's huge. And I also think it's an appropriate reflection of the 21st century skills that students need as well. So, it's a very welcome development and students seem very happy with that. (Participant 2)

In some cases, certain modules have had a complete overhaul and redesign in how they are delivered as well as assessed. For example, Participant 5 discusses the QQI Level 5 module Word Processing and how the shift to online learning caused the tutors to restructure how they were delivering the module to students. This teacher explained how "Word Processing was quite paper based. It's gone completely online but it's completely changed now altogether from what it was originally and for the better, there's less paperwork and it's easier for students to follow and submit assignments" (Participant 5). This admission is quite shocking and demonstrates the reality of the comments made by the wider literature surrounding this perceived reluctance among educators and institutions to instigate technologically driven change unless forced to do so through an external circumstance (Ní Fhloinn & Fitzmaurice, 2021; Oriji & Amadi, 2016). However, teachers alone cannot

implement changes to course delivery and require the support of their employer and organisation (Hartman et al., 2019). Educators can also feel constrained by institutional policies that dictate which technologies they can use for teaching and assessment which limits their opportunities to explore new digital tools and technologies independently (Phipps & Lanclos, 2019).

The benefits of this transition to digital content delivery and assessment for the learners in FE was discussed further, with Participant 7 offering a detailed account of how this has impacted mature students:

> One of the benefits I see is particularly with adult learners who wouldn't have been as familiar with technology as the digital natives that are coming up through secondary school. Even though they are a bit uncomfortable with it at the beginning of the year and some of them are very uncomfortable with that at the beginning of the year, by the end of the year, they're flying and they have built up a digital competence that they wouldn't have had, had they not been working in a digitally supported environment and a lot of the time they don't even realize that they have actually developed the skills that they have. And so that's a huge plus of it as well, the confidence of students in their own digital competence. (Participant 7)

Digital competence and the subsequent self-directed learning and motivation involved with learning new skills is particularly important for adult learners and clearly aligns with adult learning theory (Stewart, 2022). Other teachers agreed that the increase in technology usage has had increased benefits for students and teachers, affirming that “the use of technology has really made access to assessments, access to work, an awful lot easier, for tutors and for students” (Participant 5) while Participant 4 elaborates further on the changes to the assessment process:

> It was all very much a learning curve around how we were going to structure collecting all of the work and collecting all the evidence. And then we were just blown away by Teams and the capabilities of it and how that progressed over the last two years. So yeah, it's really shook up and changed, especially the idea of the external examiners and the evidence we've collected. (Participant 4)

These changes are reflective of the findings from a QQI (2020b) study conducted during the remote learning phase whereby the teaching, learning and assessment practices that were put in place in the FE sector during this period were examined and the efficacy was assessed. This research found that many FE teachers preferred the online submission of assessments and the ability to provide feedback digitally added efficiency to the assessment process, which was not there previously, a feature that the educators wished to retain in the future (QQI, 2020b). The responses in this study, highlight how these practices have been implemented into practice within FE, three years on from the pandemic:

> It certainly has streamlined the submission of work, the correction of work, and it's also facilitated more immediate feedback to students. So, in my opinion it has actually facilitated forms of assessment because it's actually made it more efficient from a workflow point of view. (Participant 2)

Another teacher has a similar view on the changes to the assessment process:

> Collecting the work is so much easier on Teams and on OneDrive as opposed to where we used to have it on Moodle. You know, you'd have to download it to view it and then upload it again. So, you know that whole feedback loop and the efficiency of that is absolutely phenomenal. (Participant 4)

Many of the teachers discussed how their ability to give feedback to students has been improved with the increased use of technology with one tutor arguing that “assessment drives learning and with digitally moderated communication, it is possible to give more formative feedback” (Participant 2). Another tutor describes in detail the impact that technology can have in the classroom for students and teachers when it comes to formative assessment and feedback:

> Being able to use the advantages of these new apps to read or record the work, give the feedback, and send it back to them. And I actually found it really effective because they were able to watch back on that video multiple times and they made sure that they had checked all of the errors where sometimes when you’re going around the classroom, they're making little notes but

things can be forgotten and so I actually found it really effective and I still do it now where I'm giving them video feedback of the work that they sent to me and maybe popping it up on One Note or sending them a link to the video. And their response to that has been huge. (Participant 4)

The feedback process is a vital part of assessment with formative feedback playing an important role in the teaching and learning environment to allow students to recognise where they need to improve with regards to their learning (Biggs & Tang, 2011). Formative feedback is especially important for adult learners to receive as part of their learning journey to motivate and encourage autonomy in their learning (Malone, 2014). This is an important finding, demonstrating not only how technology can enhance learning through digital tools incorporated into the teaching and learning process but also how technology can enhance the feedback process overall which ultimately leads to deeper learning and engagement from students (Bloxham & Boyd, 2007).

The streamlining of assessment processes has been achieved through the digital transformation in the sector as learners can now submit their work in a digital format through a VLE or LMS rather than printing out a hardcopy of their work which has had an unanticipated effect of contributing to a more sustainable format for education and a reduced impact on the environment (Al Jaberi et al., 2022). The teachers explained how many of the modules and associated assessment evidence were paper based, with hard copy evidence being a requirement for submission in many cases. Participant 4 explained that they “would have been printing off notes to give to students as opposed to sharing” while Participant 7 said that assignments “were printed out and handed to me, and then I corrected them, obviously with pen”. Participant 1 highlights that the current model in place with regards to assessment allows for “the only evidence that can be submitted in a non-digital format is the end of year exam paper”. This is a significant change to occur in such a short space of time considering that Participant 4 comments on how “it is generally thought that it takes five years to really embed change”.

This has also streamlined the college's Quality Assurance procedures which involves a two stage process consisting firstly of Internal Verification, where the assessments submitted are checked by staff within the institute followed by an end of year External Authentication conducted by External Examiners (QQI, 2020b). This QA process previously involved hard copy evidence of all work submitted and required External Examiners to travel to the FE college to view the assessment evidence in person, often travelling long distances. Now this process has been digitised, resulting in all of the assessment documentation being made available online and shared digitally, reducing the impact on the environment through a reduction in printing and travel by the examiners.

This is quite a significant and unexpected finding of this research; that the pandemic and subsequent reliance on technology in education would lead to reduced environmental impact and improve sustainability in the sector as the "changes adopted during the pandemic can contribute to a sustainable model" (Tsiligkiris & Ilieva, 2022, p. 361). The literature surrounding this subject is limited within the Irish context, but the study conducted by QQI (2020b) does briefly mention the positive impact that the reduction in travel and printing as a result of online remote learning had on the environment. This warrants further investigation but based on the findings from this case study, the digitisation of the FE sector appears to have had the unintended benefit of creating a greener and more sustainable method of education as the pandemic accelerated "the process of going paperless and saving the environment by reducing paper waste (Al Jaberi et al., 2022, p. 3). Participant 2 comments on how the adoption of technology and digital tools in the teaching and assessment process lead to the current practices in place which "actually evolved organically through the different measures we had to put in place during Covid". Bronfenbrenner's (1979) Ecological Systems Theory supported the extraction of this finding from the interview data as the exosystem and chronosystem aspects of the model were considered and used as a lens through which to observe how increased technology use over a significant period time has modified a number of aspects of teaching practice within FE post pandemic (Boison & Dzidonu, 2017; Casey, 2020). When considering the exosystem layer of this model, the measures and policies put into

practice by governance within ETBs and management in FE colleges directly impacted the teaching staff as the teaching strategies that they implemented during this time were dictated by the emerging guidelines surrounding emergency remote learning.

Current challenges and the future of TEL

While there have been many perceived benefits of increased technology use by the staff in the FE institute, they also mention some challenges that they have faced. All the tutors mentioned how the rate of change with regards to technology and new digital educational tools has slowed down in the sector which is a welcome reprieve from the rapid changes that took place during and after the pandemic. One teacher described this change and the impact that it has had on their practice as educators:

> We were catapulted 100 steps forward and then now we really have to take about, you know, 30 steps back and really embed this. We had such change that we really need to offer our teachers the support that's needed because you know we got through the pandemic, in some cases some teachers just got through by the skin of their teeth. We do need to take those steps back and really harness the good that comes out of using technology and the benefits of it. (Participant 4)

Other tutors describe how it required a “huge shift of mindset” (Participant 1) to adapt to the new digitally infused teaching practice while Participant 3 provides a synopsis of the current view that FE teachers have post pandemic:

> We took a lot of steps on with technology. We had such a big acceleration of change so quickly that it's now time to take a pause and that's where I feel everyone is at. It's been a really big adjustment. I feel that the rate of change has slowed down and that's good because it's not possible to keep up with that level of change. I think it's good for people to take a pause and really reflect on what worked, what didn't work and what they'd like to do next. (Participant 3)

Some teachers also mentioned their concerns around Artificial Intelligence (AI) and how they see it as their next challenge as educators in the future. One teacher feels that the onset of AI programmes like Open AI and ChatGPT will raise issues surrounding academic integrity and will

“require a total overhaul of the assessment process” (Participant 3). This finding is a current topic in the educational literature as students are beginning to use ChatGPT leading to questions surrounding the value in what they have learned and how to assess this properly given that the use of this programme renders many continuous assessments as flawed to say the least (Heimans et al., 2023). However, Marino et al. (2023) argue that AI can be a positive addition to the classroom for learners with disabilities or neurodiversity as these programmes can offer these learners further supports and adaptions necessary to improve their learning experience.

The current digital landscape within education has inadvertently paved the way for such technologies to be embedded in the classroom as one tutor describes this situation:

> I think the use of technology has become much more open and it's been more embraced in the classroom which is just as well seeing that we're about to be hit by a tsunami of AI and everything is going to be disrupted forever. So, I suppose it's actually the calm before the storm at the moment. (Participant 2)

Another teacher also commented on the overuse of technology in practice and the reason for using it can be forgotten:

> Technology, some people maybe rely a little bit too heavily on it and you know, forget about what you're really there to do is to get all learners across the line as opposed to maybe the ones that are, you know comfortable with technology. I do think it's important to have that balance and not just overly rely on it. (Participant 5)

The above statement aligns with Bayne (2015) who argues that TEL is actually technology enhanced teaching with digital tools being used to aid educators and the institutions whose “primary concern is oriented to specific teaching and administrative goals (for example, improved assessment and feedback or more flexible course provision) rather than to learning per se”, (p. 14). The focus of using any new technologies or educational apps is indeed to enhance learning for the students but it is important not to forget the reason for using such tools. The educator must have a firm grasp of their practice which should be grounded in the pedagogy and theory underpinning it to justify using

technology otherwise they are “just teaching with electronic tools” (Haggerty, 2015, p. 203). The supporting frameworks provided by TPACK can assist educators in this instance by encouraging the “blending of pedagogical, content and technological knowledge to enhance the learning” (Falloon, 2020, p. 2454). Once again, Bronfenbrenner’s Bioecological Model is relevant here as the external environmental influences that align with the macrosystem, such as the wider societal events and modern developments, directly impact the educator with regards to the tools and accepted practices integrated within teaching. The key finding here based on the insights given from the FE teachers is that technology should support learning rather than being used for the sake of it (Koehler & Mishra, 2005). The pandemic created an opportunity for educators to enhance and reimagine their practice as “pedagogy empowered by digital technology” (Nicolas, 2008, p. 2).

4.4. Theme 2: Covid-19 accelerated UDL integration

UDL in practice pre pandemic

This case study uncovered how UDL practices have changed completely post pandemic, going from being relatively unknown among staff to becoming a more consistent part of the conversation. The insights given by the tutors highlighted how UDL was not a major consideration for many prior to the pandemic with Participant 1 describing how teachers “were putting up content on Moodle maybe a week or two weeks after a lesson had happened. They were sharing their assessment briefs up there but not always and not consistently”. During the semi-structured interviews, it was clear that there was a vast knowledge gap between those teachers who had engaged with the UDL training and those who were only now getting to grips with the principles of UDL and what that means for their learners. Participant 2 openly admitted that:

> I think during Covid was the first time I think I actually heard the term universal design for learning to be honest with you, we were just trying to keep everybody on board then and so I think actually post Covid, that's when it really hit home. (Participant 2)

Participant 1 disclosed a similar statement regarding UDL practice during the pandemic stating that “if I'm being 100% honest, in 2020, no universal design for learning was not considered.

It was simply a case of let's get this done. Let's get as many people across the line as we possibly can". This finding is common among the interviews and many of the teachers explain how UDL is now a core focus of the CPD that they are offered through their employer.

It appears that from 2021 on "there was definitely a marked shift at that stage and much more of a conversation going on about facilitating learners, the conversation was happening here at that point and people were much, much more conscious of it" (Participant 1). This aligns with the literature surrounding UDL at that time where it is indicated that learners with disabilities were impacted more by the transition to remote learning and UDL is rarely mentioned as a strategy in place (Dowdall et al., 2020; QQI, 2020b). One of the teachers alluded to the reasoning behind the lack of consideration given to UDL before the move to emergency remote learning:

> To be honest, I think there was a bit of lip service paid towards UDL pre pandemic and I think that everyone probably had the best of intentions, but I don't know if there was enough CPD and supports to actually support and motivate. We had to resort to anything we could during COVID to just try and keep students engaged. UDL had to apply to everybody for education to happen I suppose during COVID and whereas before I think everyone was kind of sleepwalking a little bit through it. (Participant 2)

This is an interesting finding given that the UDL principles have been around for quite some time now and the benefits for learners is discussed widely in educational literature (Rose & Meyer, 2000; Ryder, 2020b). The implementation of the principles of UDL and fostering inclusion across the FET sector is a strategic priority outlined in the SOLAS (2020) FET strategy for 2020 to 2024 which acknowledges that more support is needed to fully integrate UDL into FE provision. It is clear from the findings and the literature that consistent training and support for staff members are key to the successful application of UDL in education delivery (Fovet, 2021; Kilpatrick et al., 2021; Tobin, 2018). However, many of the teachers discussed how they were using the UDL framework without realising it or labelling it as such. Participant 4 discusses this in the context of the shift to the online classroom during the pandemic:

> If you look at the principles of UDL, I think one of the main things is how we presented information and content. You know, we had to completely move to 100% digital overnight. So, you know there was nothing printed, nothing handed out like that. So content was presented to students in different methods whether it was in OneNote or whether it was in Teams and other digital content. You know it had to be presented differently. So, a lot of the principles were kind of done without us knowing. (Participant 4)

Perhaps the lack of discussion surrounding UDL throughout the pandemic can be explained by the fact that educators are unknowingly engaging with inclusion practices without labelling it as such (Kilpatrick et al., 2021; Bryne, 2023). As Participant 2 and Participant 4 explained above, UDL was applied during the emergency remote learning period as a result of the move to the fully online format and allowed for learning to continue, albeit unintentionally by some tutors. One positive impact of the pandemic is the realisation that change is needed to ensure education is accessible for all and it has offered a chance to redesign how curriculums are designed and delivered (Basham et al., 2020). Participant 3 goes as far to say that:

> I do believe that the pandemic actually helped drive forward the use of UDL. People actually felt like their practice had to change during the pandemic, so it really forced people to get out of their comfort zone and engage with stuff. But change has to start small. It's not something that you can change overnight with embedding UDL principles in such a big organisation. I do feel that it's really up to organisations to continually promote and make sure that TEL and UDL are kept on the agenda. (Participant 3)

This illustrates the challenges that educators and FE colleges face when trying to implement change similar to the embedding of increased technology use discussed in the previous section. Throughout the interviews, the main barriers for teachers when adapting their practice and content to be more inclusive were the time and training needed to fully implement the UDL principles. Participant 7 describes it as “very hard for people to continually change if there's no incentive there for them to engage with training or time more importantly, to actually make those changes”. Heelan

and Tobin (2021) while acknowledging the radical change for some educators required to be a more inclusive practitioner, argue that adapting to the UDL guidelines will save time and energy in the future.

UDL in practice post pandemic

During this investigation into current UDL practices in FE, the teachers highlighted some common methods that are used to incorporate the UDL principles of engagement, representation and action and expression. Many of the staff members discussed their involvement in the UDL training offered by AHEAD in which a digital badge is awarded upon completion of the short course which has led to a rethink and restructure of how content is delivered. Participant 1 also discussed how those who completed this digital badge were more aware of universal design in general not just for application within the education context:

> I do think people are much more conscious of it and it's not even necessarily about the universal design for learning. I'm starting to see also the universal design for living principles starting to come into the college as a result of people having done the UDL course here. They're now looking around the building and going actually, you know, we're not, we're not really being inclusive. It's not just about the learning element. It's also about the, you know, this building functioning as a space for people who need it. (Participant 1)

UDL and inclusion are now a consistent feature of CPD training offered to staff in the FE college which indicates an appetite among those working in the sector to use the momentum of change offered by the pandemic to continue with the overhaul of previous practices and replace these with more inclusive approaches that encompass all learners' needs. Participant 2 indicates that by shaping their practice around the UDL framework "really pretty much everybody is benefiting from it and students who have additional needs aren't getting any special treatment, everyone's getting the same accommodations". These findings indicate the positive impact that incorporating UDL has had on all learners accessing courses through this FE college and not just those with additional needs or learning difficulties (Marcus-Quinn & Clancy, 2022). All the teachers

discussed how they are making changes to their practice, based on the lessons learned during the pandemic with Participant 4 affirming that UDL is “a language that's used now” (Participant 4). Interestingly, some of the tutors were already striving to make their classrooms more inclusive pre pandemic with Participant 3 explaining that their practice:

> Didn’t change too much over the course of the pandemic because I always believed in, you know, giving students a choice of the way that they were able to access materials and engage with content online and trying to provide them with different ways to engage with stuff and of course to offer a little bit of a choice over their method of submission. I would offer a choice over method of submission, I would give set criteria that needs to be met, but that criteria can be met and in whatever way they want either by a video or by text or by an audio recording or whatever method of submission they'd like. (Participant 3)

The principles of UDL, providing multiple means of engagement, representation and action and expression are applied when educators offer their learners a choice in how they engage with the study materials, course content and how to demonstrate their learning (Finn, 2022). However, when discussing choice of assessment format, it was a common finding that when presented with a choice, many learners were apprehensive about veering from the standard format of a written document or report. Participant 4 explained that the students “do need to be guided in the beginning through a change like that” while Participant 1 surmised that with regards to an alternative format being offered in an assessment “the percentage of learners who actually availed of that and the percentage of teachers who encouraged learners to avail of that was probably very low”. Participant 3 explains this further:

> When you start saying to them that they have a choice, they go, oh, I'm just going to write it instead. It's like you have to really hold their hand to do it, it's like alien to them that they're being given a choice and they're like I'm just going to write it because that's easier for me and that's what I understand how to do. We really encourage them to do something that suits their

own approach to learning and that reflects how well they can engage with content. (Participant 3)

Although Participant 4 does go on to say that:

Students respect that they are offered the choice and by engaging with that and just having a conversation with students. If you bring in the UDL principles and say I'm offering you this or I'm going to provide notes in these couple of formats, they respect the fact that you're offered it to them. (Participant 4)

These insights are highly informative and illustrate the challenges that educators face as they implement a more accessible and inclusive approach to their teaching strategy. This is not something that is discussed in the wider literature which mainly focuses on advising educators on what they should be doing and the overall benefits for the learner when UDL is embraced (Ryder, 2020b; Merry, 2021). Is it still considered beneficial if the learners do not choose to avail of the accessible options offered to them? Rather, the onus is on educational providers for not ensuring that courses are inherently designed as flexible, accessible and barrier free from the start as standard practice, so this is not a novelty to the learners (Flanagan & Goldthwait-Fowles, 2023; Ryder, 2021). This was also acknowledged by Participant 1 when discussing the future integration of UDL in new programmes which will be:

Designed very much with UDL principles to the forefront in terms of teaching, learning and assessment and that's, I suppose from, going forward, where we're involved in the writing or in development of new programs or the revalidation of existing programs. That is a core principle which will be embedded into any new or revalidated program. (Participant 1)

This is a reassuring finding, proof that UDL is firmly cemented in the future of FE provision. Post pandemic, learner expectations surrounding educational delivery have changed and FE providers should capitalise on this opportunity created to reshape and reimagine the current model to facilitate a more diverse population of adult learners (Byrne, 2023; Ryder, 2022; Basham et al., 2020).

4.5. Theme 3: The UDL and TEL relationship

TEL supporting UDL implementation

The final theme that was determined based on the findings is the relationship that technology has and can have with the UDL framework. All of the teachers discussed their TEL habits and UDL strategies individually but when the two are considered together, it is clear there is a beneficial relationship for learners in FE. Technology and digital tools can support the integration of UDL principles with many of the tutors exploring this concept throughout the course of the interviews. Participant 2 explains how technology can enhance the learning experience for those students who do not speak the same language as the teacher and discusses this in relation to Ukrainian students who have moved here due to the Russian invasion:

> Actually, one of the things that has made it kind of hit home certainly in my classroom is actually the influx of Ukrainians students. Students with either a hearing difficulty or the language difficulties were able to use the immersive reader and I was able to use PowerPoint live and generate QR codes so students could actually bring up my notes in their own particular languages on their phones and it's really worked. (Participant 2)

This is an excellent example of how technology can work together with UDL. This finding demonstrates how the application of UDL principles to education delivery benefits all learners, not just those with disabilities while technology adds an element of flexibility and offers accessibility features that were not previously possible for those with additional needs (Finn, 2022; Edyburn, 2021). Judy Heumann, the Assistant Secretary for the American Department of Education, succinctly described this relationship between technology and education for a learner who has a disability or learning difficulties when she stated “for most of us, technology makes things easier. For a person with a disability, it makes things possible” (Edyburn et al., 2005). The pandemic forced educators to be innovative with how they delivered content and ensure continuity of learning for the students which was facilitated by the technology and digital tools available. The crisis demonstrated how many processes could be improved and new practices have been adopted consequently, but this

forced innovation also highlighted where education could be using said technologies to improve accessibility for learners (Healy, 2023; Ryder, 2020a). Participant 1 even argues that technology is necessary for the successful implementation of inclusive education from the educators' point of view:

> Unless you have those digital tools and that functionality available to you, then it becomes really difficult for teachers to manage that whole process of offering choice. And if you have a platform that supports you to do that, then I think that that makes life easier. And at the end of the day, anything that makes life more difficult for teachers is guaranteed to fail because, you know, the assessment period is so short, the window in which to get work up from students is so short. They don't have the time to be, operating in multiple different ways and multiple different platforms; if the technology can support the application of that, then you're much more likely to get a win win for the learner there. (Participant 1)

Digital Literacy as a barrier to UDL

However, Kilpatrick et al. (2021) warns that the use of these digital tools should always be used carefully and competently by staff to increase engagement, representation and action and expression with the focus on "technology as the tool and not the driver of UDL" (p. 156). The TPACK framework is useful to consider in this context so that all forms of knowledge are considered when applying technology to this equation (Koehler et al., 2016). It is of course possible to engage with UDL without the use of technology (Heelan & Tobin, 2021). Some of the teachers acknowledged that they have had issues with technology since the digitalisation of education delivery in their college. Participant 6 discusses how there are times when technological tools can hinder accessibility and inclusion:

> The balance is in favour of it supporting technology. But I think you have to be careful about the assumptions we make and just I suppose that contingency for those situations when it doesn't work and that can be difficult because when all your resources are digitised and you're in a classroom and the Internet is down. (Participant 6)

Participant 5 agreed with this, sharing how technology is not always the answer:

> I think technology is a little bit overused. I think a lot of it can be done you know very simply in a classroom without technology. I think just going technology based does put people off. The real important thing is do the learners actually learn. Inclusion is important for everybody; you know you can't just throw a blanket over everything and hope it catches everybody. You're going to have to go a little bit further with some people and in different directions. (Participant 5)

It is also important that staff do not make prior assumptions that the learners already know how to use the educational technologies effectively or at all and provide appropriate supports to account for this (Edyburn, 2020). Participant 1 described a problem they experienced whereby "we discovered that actually while we had trained the teachers, we hadn't necessarily provided huge amount of training to the students". Digital and technological literacy can be a barrier for learners especially adult learners and educators alike (Staddon, 2020; Bell & Barr, 2023). Student difficulties with using technology as part of a TEL based teaching strategy are not widely discussed in the literature and this is an important finding to be cognisant of if TEL and UDL are to have a symbiotic relationship and not cause further barriers for learners. Training and support mechanisms therefore must be in place for both teachers and students to build digital competence and confidence, allowing for the strengthening of the relationship between UDL and TEL (Scully et al., 2021; McMahon & Walker, 2014). There are tools and guidelines to help educators to support their learners with technology integration such as the European Framework for the Digital Competence of Educators (DigCompEdu) (Redecker, 2017). This framework offers educators a basis from which to not only facilitate learners in their digital competency but to reflect upon their own technological skill set (Redecker, 2017). Considering the findings surrounding learner supports with digital learning, the FE sector might benefit from this framework. A graphic of this model is presented in Figure 6 below.

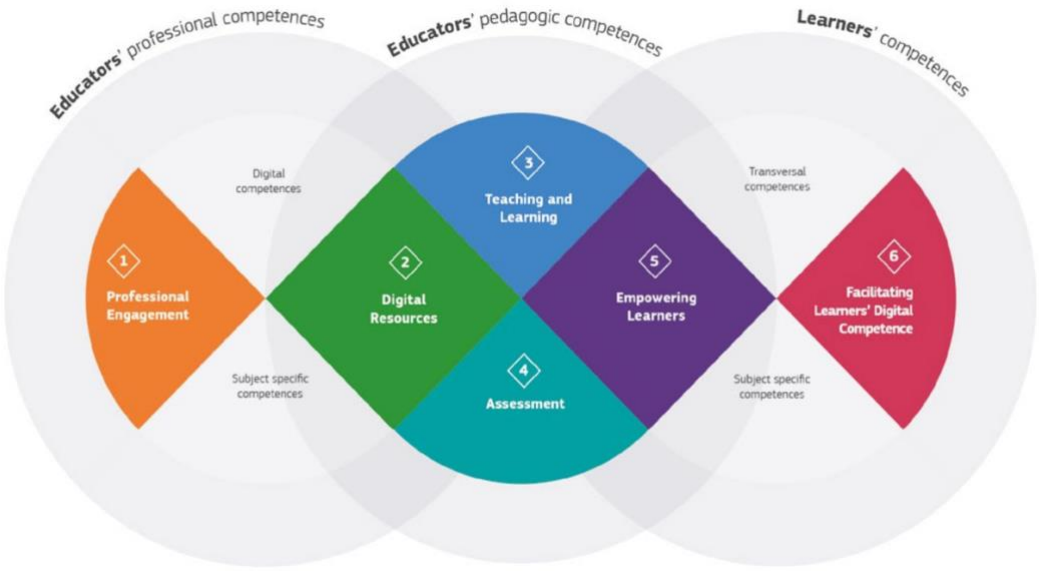

Figure 6: DIGCOMPEDU areas and scope (Redecker, 2017)

4.6. Conclusion

This chapter has presented the findings of this case study and provided a discussion of the themes that were discovered from the semi-structured interviews carried out with members of staff at an FE college. The insights given by FE tutors were analysed using thematic analysis and themes were developed based on these rich and detailed descriptions. The main themes that emerged were centred around answering the research question and meeting the aims and objectives set out at the beginning of this project. The focal points of discussion in this chapter explored how TEL and UDL practices have undergone significant changes post pandemic while the interplay between the two is also examined. The commentary provided by these educators offers their perspective into current TEL and UDL standards in place for adult learners while they navigate the challenges appearing as they strive to deliver a high standard of education in the FE sector. The following chapter brings this dissertation to a close, providing a detailed conclusion based on what was discovered throughout the course of this research study.

Chapter 5: Conclusion

5.1. Introduction

This final chapter of the dissertation presents an overall summary of this case study, its findings and how they answer the research questions while also discussing the implications of this study for further research in the area and teaching practice within the FET sector. This research explored the current teaching and assessment strategies of FE teachers with particular focus on how TEL and UDL practices have changed post pandemic. While the value of the findings drawn from this research alongside the strengths of this study and its contribution to the educational field are discussed at length, the limitations are also considered to explore the impact this may have had on the data gathered and offer a balanced synopsis of the results. The implications of this case study regarding policy and practice in FE are highlighted while the significance of this research in relation to my own professional practice is reflected upon. Finally, an overall conclusion presents some final thoughts and reflections on my own learning throughout the research process, with the aim of bringing the chapter and the dissertation to an end.

5.2. Answering the Research Question

The overarching aim of this case study was to investigate how teaching and assessment practices in FE incorporate UDL and TEL and to explore any changes to this practice that may have occurred as a direct response to the Covid-19 pandemic. To obtain a clear insight into technological and inclusion practices in place in the FE sector, it was necessary to explore the lived experiences of educators working before, during and after the pandemic. The multiple perspectives captured during this interpretivist study created a rich tapestry from which to assimilate themes and establish a narrative based upon the detailed descriptions provided by the FE teachers. The benefit of qualitative research is the ability to generate expansive and informative answers to the research questions posed rather than definitive answers or numerical figures. The thematic analysis of the semi-structured interviews resulted in the uncovering of key themes and points of discussion

surrounding the topic, yielding informative and insightful findings which offered the opportunity for this case study to delve deeper into the experiences and strategies of FE tutors, thus contributing substantial answers to the questions driving this research.

The research questions are as follows:

What are the current TEL and UDL practices being implemented in the FE sector and how has this evolved post pandemic?

The following sub questions focus on other important elements that were considered throughout this research in order to achieve a deeper understanding of this subject:

What are the challenges faced by staff in FE when implementing UDL principles and integrating TEL into their practice?

How do TEL and UDL relate to one another in practice?

With regards to the main question based on current usage of TEL and UDL in the FE classroom, the teachers acknowledged the unprecedented impact that the pandemic has had on both technology and inclusion practices in the sector. Pre pandemic, it was established from the anecdotes and insights given by the tutors during the interviews that teaching practice in FE looked very different to how it is now. The teachers that used technology in any substantial way in their classrooms were in the minority despite the gradual increase of learning technology usage in recent years (Hyland & O'Shea, 2021). However, the shift to emergency remote learning and subsequent effect that this had on educational delivery served as the impetus for change in technology enhanced teaching and learning in the sector (Scully et al., 2021).

Currently, all assessments with the exception of any end of year written examinations in the FE college at the centre of this case study, are all submitted in a digital format through a VLE such as MS Teams. Within these assignments, students can choose the medium through which they complete the required learning outcomes to demonstrate their learning in the best way possible, with this choice facilitated by the sudden increase in the range of technologies and applications available for educational purposes. The choice element offered to learners also serves to incorporate

the UDL principles of action and expression into these assessments. These digital tools are also used by educators currently to create more interactive content and multiple ways of presenting learning material to not only increase student engagement in the classroom but to offer a choice for learners in how they engage with the module, thus integrating the other UDL principles, providing multiple means of representation and engagement. These changes to teaching, learning and assessment strategies have improved the learning experience for adult learners and tutors in the FE college with many of the teachers acknowledging that these monumental changes to practice would certainly not have happened as abruptly if not for the Covid-19 pandemic. The narratives obtained during this study revealed that UDL and TEL are incorporated in educational delivery through a variety of ways while these practices have undergone significant developments since the pandemic which have ensured that the future of FE provision is driven by the modern needs of the adult learner (Healy, 2023).

While the findings chapter explored the many benefits of the digitalisation of resources, assessments, and content delivery overall, the tutors highlighted the challenges both present and future that have the potential to negatively impact TEL use in their classrooms and teaching strategies. The area of most concern that was mentioned by all the participants is the influx of AI and the surge in popularity of the ChatGPT programme. The use of these technologies by students poses a significant threat to academic integrity as the content produced by these programmes is quite sophisticated and sometimes impossible to tell that it was written or generated by AI (Ryder, 2022). This creates a problem for the assessment process as it brings into question the validity of student work as many plagiarism detection tools and software utilised by the Further and Higher Education sector are unable to distinguish AI generated content from human written text (Rahman & Watanobe, 2023). These challenges require changes to be made regarding digital submission and plagiarism policy which can only be addressed when tools are developed to combat this problem in the education sector. Professional development and training will also need to be provided for educators to remain up to date with the latest advances in this technology with guidance advising

how to capitalise on the potential benefits of AI as well as combating the contentious issues surrounding the technology.

The main challenge that educators face when integrating UDL into their practice appeared to be lack of time to restructure current resources and create new educational material based on the inclusive framework and training preparing them with the skills and knowledge to make these changes. The successful integration of UDL into an education setting requires an institution wide approach setting the precedent for inclusion to be a priority in all aspects of education delivery while ensuring relevant CPD and training is provided regularly for all staff (Kilpatrick et al., 2021). Finally, when discussing the relationship that exists between UDL and TEL in teaching practice, it became clear based on the interviews that technology can facilitate and enhance inclusion within FE. It was discussed how a curriculum designed around digital tools and educational technology offers all learners choice in how they engage with content and demonstrate their learning in way that suits their own specific learning style regardless of additional needs (Edyburn, 2021). However, an interesting finding was uncovered where the teachers highlighted that technological skills are not inherent with all learners and they too sometimes struggle with navigating new and existing technologies to access the full potential of these tools to support their learning. The assumption is that students are familiar with and fully competent when it comes to technology of all descriptions, and this is simply not the case. When integrating TEL and UDL together in a way that is beneficial for the learners it is important to ensure that the technology in place is supporting their learning and supporting them in achieving their full potential not creating another barrier.

5.3. Contribution to the field

This case study is situated in the unique context of the FET sector in Ireland and generates original research in an area that is widely unrepresented within the educational literature. The value of this study is centred around the insightful findings and rich narratives that were captured during the semi-structured interviews with FE tutors which contributes important information for the sector to draw from while exploring TEL and UDL in practice. The methodological aspect of this

research is also of interest as it is a mono method exploratory case study which is unusual and may be considered a limitation of this data (Yin, 2003). However, when combined with thematic analysis of the interview transcripts, valuable themes and insights from the multiple different perspectives obtained during the interviews contributed to the development of rich qualitative data (Braun & Clarke, 2006). This underpinned by interpretivism and Bronfenbrenner's Bioecological Model, allowed for the lived experiences of these educators to be captured and yielded data that is unique and invaluable which would have otherwise been impossible to be obtain through other methodologies (Scotland, 2012). Another aspect of this study which increases its worth is the insider research element (Greene, 2014). My positionality as an insider is a benefit to this research as the existing relationships with the staff in the FE college enabled a wealth of honest opinions and stories to be disclosed because of the level of trust that was built beforehand (Fleming, 2018). This further adds value to the findings and ensures that they are a distinctive and original offering to the wider literature.

Discussion surrounding TEL and UDL, both as individual topics and with respect to each other is sparce in the context of education in Ireland but is even more limited in the FET setting. Thus, the findings produced by this case study are novel and provide examples of how TEL and the principles of UDL can be used in tandem to support adult learners in their learning which may act as guidance for educators working in the sector. This case study is a useful addition to the continually emerging research centred around the pandemic and its impact on various aspects of educational delivery (Healy, 2023; Ryder, 2022; Judge, 2021; Finnegan, 2021; Kilpatrick et al., 2021). The research conducted as part of this study documents teaching practice in FE at three different stages; pre pandemic, during and post pandemic now that in person teaching has resumed. The originality of the findings presented in this case study is a valuable contribution to the FE sector in Ireland and offers educators in the field the opportunity to reflect on their own UDL practice and how this can be shaped by TEL for the learner's benefit.

5.4. Limitations of the research

As with any research, there are limitations associated with this study which have been considered alongside the valid contribution it has made to the educational field as outlined above. This case study was completed to fulfil the requirements of a Master of Arts in Educational Practice and as such the time frame allocated for a dissertation of this nature is quite limited. The time constraints placed on this research restricted the length of time that could be spent on the data collection stage thus the number of participants that could be involved in this study was dictated by this limitation. However, seven semi-structured interviews were carried out with FE teachers with the narrative and subsequent analysis created from this data offering a rich insight into the experiences of these teachers with UDL and TEL which wholly supported the aims of this research project.

Another limitation that was a factor in reducing the overall data collected was the mono method case study methodology implemented in the final study design due to issues surrounding GDPR and policy document analysis as discussed in Chapter 3. While this was disappointing and perhaps leaves this study vulnerable to criticism, the informative stories gathered as part of this mono method case study entirely compensate for the lack of multiple data sources utilised as would be expected of the traditional case study design (Yin, 2003). Other limitations considered included my own status as a novice researcher having an impact on the overall process, but this was alleviated via regular meetings with my supervisor and the quality assurance measures implemented such as reflexive journaling and the audit trail which can be viewed in Appendix 4 and 5. All of the above issues and limitations were acknowledged and accounted for throughout the research project resulting in minimal influence on the findings of this study.

5.5. Implications and Recommendations for practice, policy and future research

The findings of this case study as presented in Chapter Four of this dissertation have a number of possible implications for teaching practice in the FE sector which subsequently may influence changes to policy in the sector while paving the way for future research in this area. The FE

college in question does not have an individual institution policy surrounding UDL practice however, they do follow overarching policies put in place by SOLAS and ETBI which is intended for use by all ETB and FE colleges across the country (SOLAS, 2020). Many of the teaching staff confirmed that UDL is now a core focus of their CPD provided by their employer while many teachers have chosen to engage with the AHEAD UDL training outside of their working hours. This is encouraging and demonstrates that there is a willingness among staff to continually improve their practice for the benefit of their students and to remain relevant with current standards in their profession. Participant 1 also discussed how many of the modules and courses that are delivered by the FE college do need to be redesigned and revalidated to ensure that they adhere to the UDL guidelines while this restructure will allow for the UDL framework to be included as standard practice in the future. This case study has highlighted the importance of UDL and inclusion for all learners which became even more apparent to educators during the pandemic with many of the teachers interviewed choosing to avail of the AHEAD UDL digital badge during and post pandemic (Ryder, 2022; Flanagan & Goldthwait-Fowles, 2023). This is a clear indication that the FE sector is now striving to become and more importantly, remain inclusive for all adult learners that access its services (Healy, 2023). A key finding here is that staff are more than happy to engage with training and upskill to improve the educational experience for the learner but they do need to be continually supported by their employer and FE college to be able to implement new strategies and changes to course delivery (Tobin, 2018).

This is also true for TEL and digitalisation of teaching, learning and assessment within FE. The interviews revealed that since the pandemic, all staff have adapted to a digitally enhanced teaching environment and are enjoying the many benefits of previously laborious tasks being streamlined as a result. Technology actively facilitated the pivot to online and blended learning while the immediacy of this shift to the online classroom accelerated immense change within the FET sector which has overall, been positively accepted and adopted by FE educators (Mottiar et al., 2022). Participants 2 and 3 discussed how these new skills were only possible because of an extensive training

programme provided by their FE college, once again highlighting the importance of appropriate CPD for teaching staff to grow their skills as educators and maintain their relevance in the sector. This case study, while exploring the current TEL and UDL practices in place in this institute of Further Education discovered the monumental shift that has taken place in course delivery and assessment strategies since the pandemic, which is not unexpected, but this indicates the deep connection between technology, inclusion and all aspects of education which was not previously explored pre pandemic. These findings demonstrate how digital tools can actively support the integration of UDL into teaching, learning and assessment but the teachers stressed the importance of not overwhelming learners with new technologies that they may be unfamiliar with and ensuring training is provided for students so that they are utilising the learning technologies appropriately and in a way that is enhancing their learning, not creating an additional barrier. This finding is not discussed within the wider literature and is quite significant when educators are considering using technology to offer a choice of assessment or alternative format for students to engage with course material. The DigCompEdu framework as discussed in Chapter Four could provide a solution to this issue and may provide support for teachers as their learners acclimatise to a digitally enhanced classroom (Redecker, 2017). Digital literacy is an area that is of concern among students and teaching staff which was discussed in this study and within the literature surrounding changes to further and higher education since the pandemic (Bell & Barr, 2023; MacEochagáin, 2021; Cloonan, 2022).

The significance of this research for policy and practice in the FET sector will not be seen immediately for changes such as these normally take quite some time to be enacted. The questions asked and the conversations that took place during the interview stage of this project offered the educators the opportunity to reflect upon their teaching and perhaps highlighted areas of their practice in which they could be more inclusive or integrate technology into their classrooms to benefit both the learners and themselves. Many were grateful for the reminder of how far they had come with regards to their teaching practice in the short time since the pandemic and when put into

words the enormity of these changes was more apparent. This case study had an impact on my own teaching practice also as I was afforded a glimpse into the current accepted TEL and UDL practices in FE and the challenges that are arising for educators in the technology driven climate we find ourselves in. The rise in AI as mentioned by many of the teachers is a worry in one sense but its power has the potential to be harnessed for the benefit of learners, in particular those with additional needs or learning difficulties as generative AI can ensure content is always accessible through its ability to alter media formats to suit the learner (Marino et al., 2023). The current research on AI is limited and as such, warrants further investigation which could form the basis of future research within this area. This case study provides a valuable snapshot between two pivotal times in the tertiary education landscape in Ireland. It has successfully captured the current experiences of educators in FE as they reflect on the rapid changes that have occurred in the last three years while also illustrating the direction in which this profession is moving towards in the near future. The findings of this research have been instrumental in shaping my future teaching practice and will influence the TEL and UDL strategies that I integrate which will improve the educational experience for the adult learners that I teach.

5.6. Conclusion

This mono method case study has explored the experiences of FE teachers with TEL and UDL and the changes to their practice that have occurred since the Covid-19 pandemic in 2020. Interpretivism coupled with qualitative semi-structured interviews and underpinned by Bronfenbrenner's (1979) Bioecological Model was chosen as the methodological approach, to gather the data required to answer the research questions and fulfil the aims of this study. The interpretivist paradigm was chosen as it aligned with the objectives of the research and the philosophical underpinnings of my own practice. This study design allowed for rich insights to be captured during the semi-structured interviews with educators working in the FE sector, illustrating clearly the lived experiences of these teachers before, during and after the pandemic. The major changes, challenges and current practices surrounding UDL and TEL were discussed throughout the

course of the data gathering phase while thematic analysis revealed further insights into the illuminating narratives presented by these teachers. Many of the current studies conducted mention TEL and UDL separately but not in relation to each other while the research within FE in Ireland is limited. The findings of this case study offer a unique perspective of the current landscape in the FET sector while also documenting inclusive practice and technology use which addresses this knowledge gap in the wider literature. The research process has also had an impact on myself as an educator within FE as it has encouraged me to be a more reflective practitioner and improve my inclusion strategy and technology use for the learners I teach. I hope that this research will have a positive effect on policy and practice within the FE sector in Ireland as we strive for a more inclusive educational environment for all adult learners.

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Appendices

Appendix 1: Interview Schedule

Questions for Tutors and Head of School

General Introduction Questions

1) How long have you been teaching in FE?

2) What subjects do you teach?

Pre-Pandemic Practices

3) Tell me about your teaching, learning and assessment strategy before the pandemic?

4) Was UDL considered during this time?

5) Did technology play a role during this time?

6) How did the pandemic and the move to online learning impact teaching and assessment for your subject area?

7) Talk to me about how technology/digital tools were used during this period?

8) How did your assessments change during emergency remote learning?

9) Was UDL/inclusivity considered when changing assessment techniques and teaching strategies during this time?

Post-Pandemic Practices

10) Now that in person learning has resumed, has your teaching, learning and assessment strategy reverted back to pre-covid times or have you made changes based on what was learned during the remote learning period?

11) Do you think technology plays a bigger role now in teaching and assessment since the pandemic?

12) Tell me about how technology plays a role in your practice/subject area?

13) Is technology use a problem with students? I.e. are they technology/digitally literate?

14) What are the current (if any) challenges for you as an educator when utilising a new technological tool in your practice?

15) Tell me about how you incorporate inclusivity/UDL in your teaching, learning and assessment?

16) In your experience, is UDL considered when designing assessment, lesson plan etc?

17) Do you think that UDL has become more important in FE since the pandemic?

18) Do you think that educational technology and digital tools can support inclusive practices/incorporate the principles of UDL?

19) What are the current (if any) challenges for you as an educator when applying the principles of UDL in your practice?

20) In your FE college, are you offered CPD opportunities in relation to UDL and TEL?

21) If so, is this CPD useful to improving your teaching practice?

22) Any further comments or points to make?

Questions for Deputy Director

General Introduction Questions

1) How long have you been working in FE?

2) What does your role as deputy director involve?

Pre-Pandemic Practices

3) Tell me what teaching, learning and assessment looked like in CI before the pandemic?

4) How did the pandemic and the move to online learning impact teaching and assessment?

5) Talk to me about how technology was used during this period?

6) How did assessments change during emergency remote learning?

7) Were UDL and inclusivity considered when changing assessment techniques and teaching strategies?

Post-Pandemic Practices

8) Now that in person learning has resumed, has teaching, learning and assessment reverted back to pre-covid times or have some changes been made based on what was learned during the remote learning period?

9) Do you think technology plays a bigger role now in teaching and learning since the pandemic?

10) What is the current policy within CI surrounding inclusion and UDL?

11) What is the current policy within CI surrounding TEL and technology use?

12) Are CPD opportunities offered to staff in relation to UDL and TEL?

13) Do you think that educational technology and digital tools can support inclusive practices/incorporate the principles of UDL?

14) In your opinion, what are the main challenges faced by educators when implementing the principles of UDL in their teaching practice?

15) In your opinion, what are the main challenges faced by educators when using new technology/digital tools in their teaching practice?

Appendix 2: Project Information Sheet for Participants

Information Sheet

I. Introduction to the Research Study

The working title of the research study that you are being asked to participate in is: Technology Enhanced Learning and Universal Design for Learning in practice in Further Education. It is being undertaken at the Centre for Education and Lifelong Learning at National College of Ireland by Laura Fitzpatrick.

II. Details of what involvement in the Research Study will require

Semi-structured interviews will take place with staff members who agree to participate in the study. The interviews will involve a discussion around TEL and UDL in practice within your further education setting. The interview will take approximately 30-45 minutes and will take place online via MS Teams. With your consent, this meeting will be recorded and the transcription will be stored securely.

III. Potential risks to participants from involvement in the Research Study

It is not envisaged that you will encounter any risk arising from involvement in this research study.

IV. Potential benefits to participants from involvement in the research study

You may benefit from the opportunity to reflect on your practice and how you implement UDL and TEL into your teaching; this may offer further insights into your current teaching, learning and assessment methods. The study aims to explore and create new knowledge and understanding of UDL and TEL usage in further education and as such, further education institutes and ETBs may benefit from the insights here. Key findings from this study will be communicated to you via email.

V. Arrangements to be made in order to protect confidentiality of data

Your privacy is of utmost importance in this study and as such, every effort will be made to respect your anonymity. The data collected will be viewed and analysed by the researcher only. Participants will be labelled Participant A, B, C etc., on audio recordings and written transcripts. Interview recordings will be stored separately from the associated transcripts on NCI secure cloud storage and will be password protected. Original interview recording will be deleted once the transcripts have been generated and securely stored. All data is collected and stored in compliance with GDPR regulations.

VI. Advice that data is to be destroyed after a minimum period

As per NCI policy, data collected during interviews will be securely stored for five years and then securely destroyed.

VII. Statement that involvement in the Research Study is voluntary

Involvement in the Research Study is entirely voluntary, and you may withdraw from it at any point as is your right to do so.

VIII. Any other relevant information

All participants in the study will be further education staff.

If you have concerns about this study and wish to contact an independent person, please contact:

National College of Ireland Research Ethics Committee EthicsSubCommittee@ncirl.ie

Appendix 3: Informed Consent Form

Participant Informed Consent Form

I. Research Study Title

The working title of the research study that you are being asked to participate in is: Technology Enhanced Learning and Universal Design for Learning in practice in Further Education. It is being undertaken at the Centre for Education and Lifelong Learning at National College of Ireland by Laura Fitzpatrick.

II. Purpose of the research

The purpose of this study is to gain an insight into TEL and UDL practices implemented in teaching, learning and assessment by FE tutors within their subject areas. The overarching aim of the study is to contribute to the existing knowledge on UDL and TEL in FE in Ireland and generate new data that has potential to shape teaching practice regarding inclusivity in adult education.

III. Confirmation of requirements (as highlighted in the Information sheet below)

As stated in the information sheet, participants (FE staff) are asked to take part in semi-structured interviews which the researcher will request to record (audio only).

IV. Participant – please complete the following (Circle Yes or No for each question)

- Have you read the Information Sheet? **Yes/No**
- Do you understand the information provided? **Yes/No**
- Have you had an opportunity to ask questions and discuss this study? **Yes/No**
- Have you received satisfactory answers to all your questions? **Yes/No**
- Do you agree to have your interview recorded? **Yes/No**

- Do you agree to having anonymised quotations from your interview being used in the study report? **Yes/No**

V. Voluntary Participation

Your involvement in this study is completely voluntary. You may withdraw from the research study at any point as is your right to do so. Early withdrawal from the research study before all stages have been completed will **not** incur any penalties of any kind.

VI. Data Protection arrangements

Every effort will be made to respect your anonymity and privacy. The data collected will be accessed and analysed by the researcher alone. Interview recordings and transcripts will be held by the researcher and stored in secure online storage that is password protected. Interview recordings will be destroyed once the transcripts have been generated. The anonymised transcripts will be stored in secure online storage that is password protected.

VII. Signature

I have read and understood the information in this form.

My questions and concerns have been answered by the researchers, and I have a copy of this consent form.

I consent to take part in this research project.

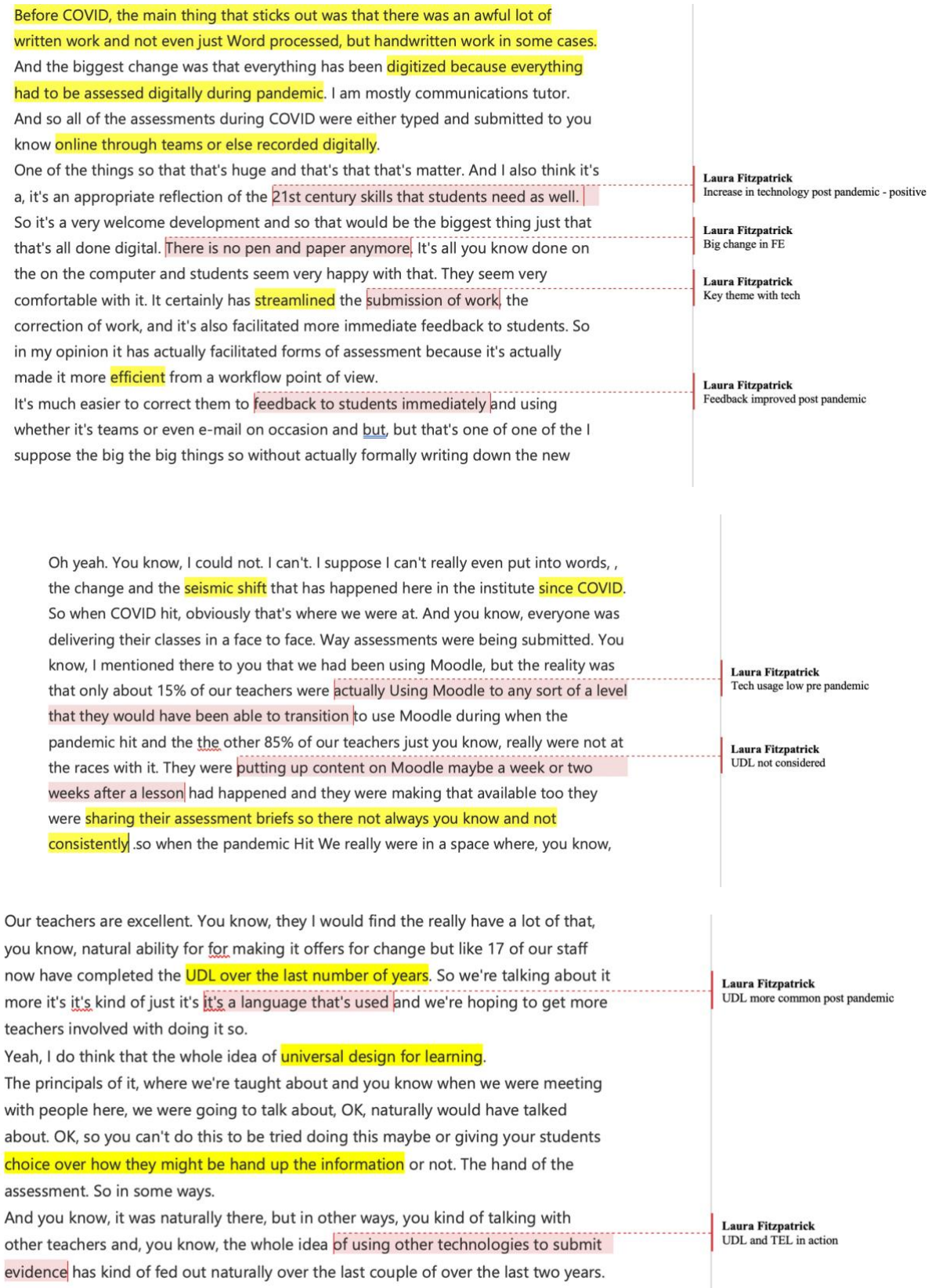
Participant's Signature:

Name in Block Capitals:

Date:

Appendix 4: Qualitative Research Audit Trail Documents

A: Sample of Thematic Analysis in MS Word

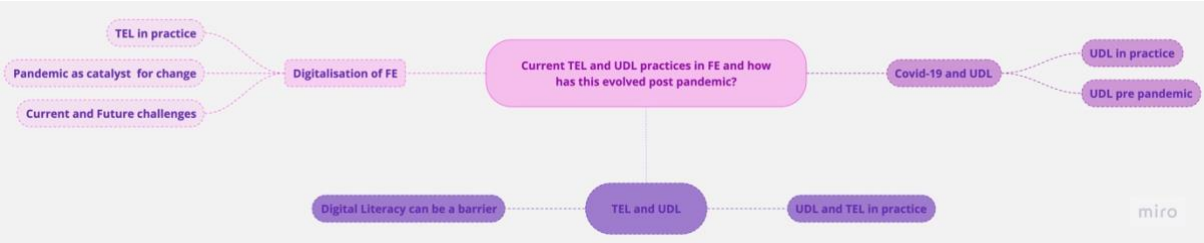


B: Sample of Selected Quotes

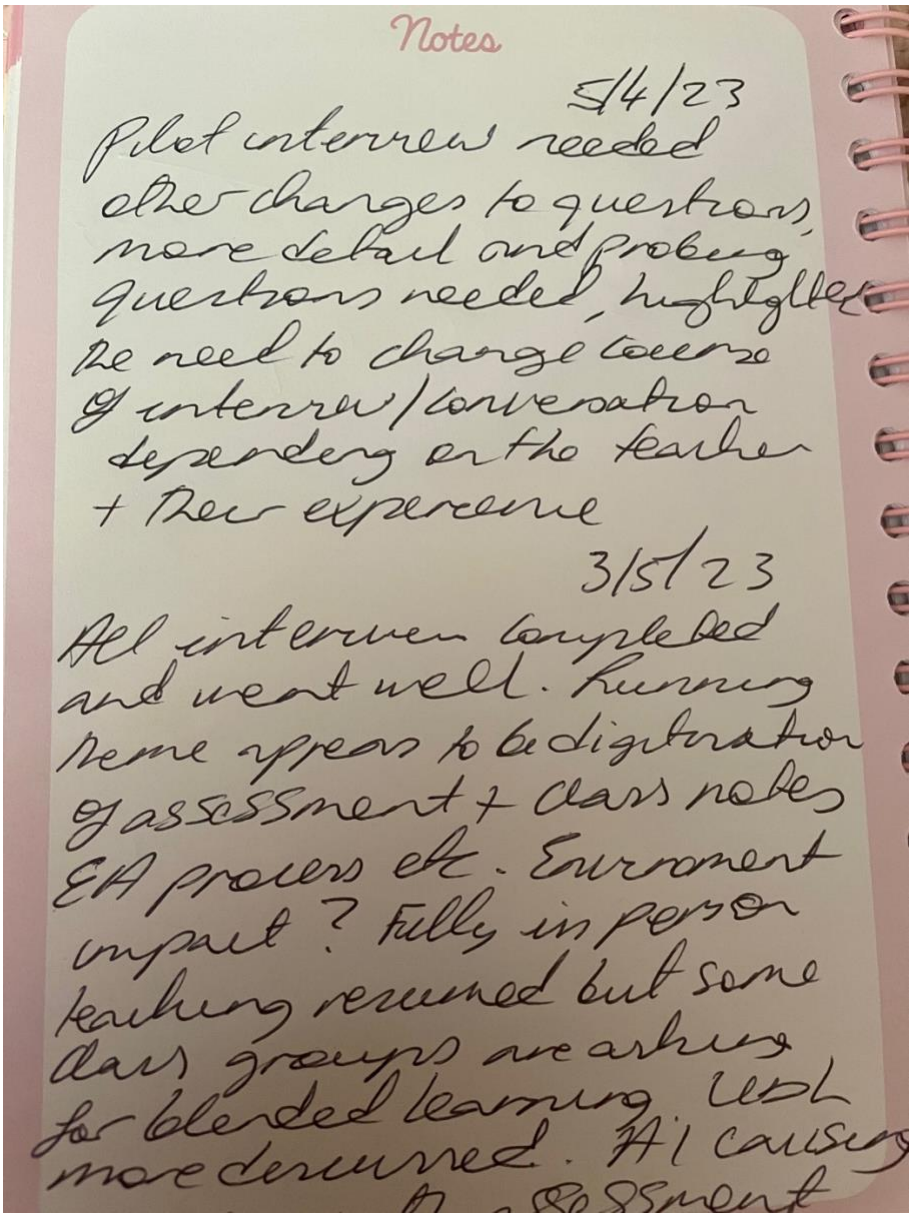
Participant 1 quotes:
"I can't really even put into words, the change and the seismic shift that has happened here in the institute since COVID hit"
"the reality was that only about 15% of our teachers were actually using Moodle to any sort of a level that they would have been able to transition to use Moodle during when the pandemic hit and the other 85% of our teachers just you know, really were not at the races with it"
"It was a very limited engagement"
"there was no way that we could continue to operate as we had always operated"
"huge shift of mindset that was required (from teachers)
"that's something that has remained since COVID began where all of our evidence has stayed in that digital format where even though we've now moved back to I suppose face to face teaching and learning Microsoft Teams is still very, very much a feature of everything that we're doing"
"there's sort of an inbuilt level of familiarity with teachers if you're familiar with one you can transition to another quite easily" (with technology)
"the only evidence that can be submitted in a non-digital format is your end of your exam paper"
"technology usage by all of our teachers has probably increased by about 4 to 500% since the pandemic versus what it was before"
"there are two or three members of staff who we would have had to consistently had to support to and now those people are navigating Teams, are getting their assessments submitted digitally, are able to correct their assessments digitally, are able to provide feedback to learners digitally and all of that evidence is available to EA digitally. So that for me is a big success."

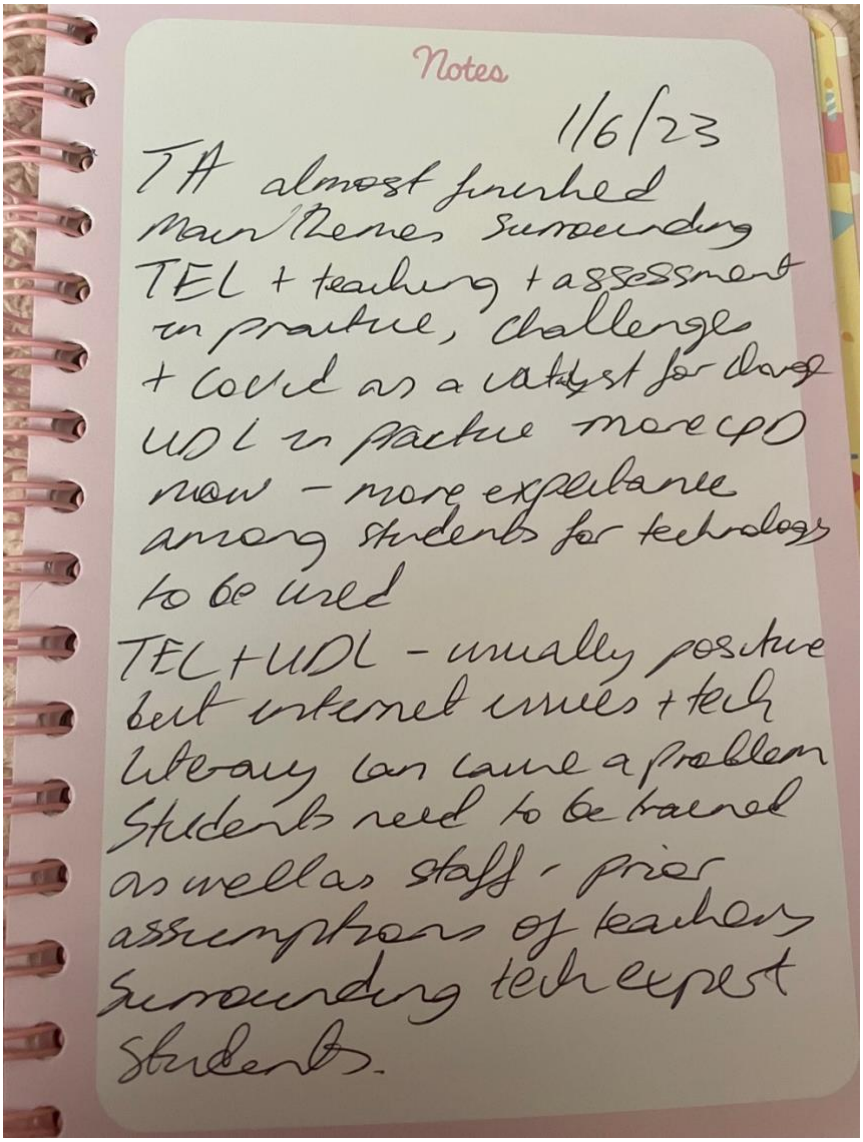
Participant 2:
"Before COVID, the main thing that sticks out was that there was an awful lot of written work and not even just Word processed, but handwritten work in some cases. And the biggest change was that everything has been digitized because everything had to be assessed digitally during the pandemic.
All of the assessments during COVID were either typed and submitted to you know online through teams or else recorded digitally, so that's huge. And I also think it's an appropriate reflection of the 21st century skills that students need as well. So, it's a very welcome development"
"and students seem very happy with that"
"It certainly has streamlined the submission of work, the correction of work, and it's also facilitated more immediate feedback to students. So in my opinion it has actually facilitated forms of assessment because it's actually made it more efficient from a workflow point of view."
"This has actually evolved organically through the different measures we had to put in place during COVID"
"I think, but there are commonalities there I think for all tutors across the Institute in their teaching and learning strategy, many of which have been imposed on them, that they had no choice"
"I think everybody is much more inclined to use and you know different digital resources, different digital apps and even things to increase classroom engagement even now that we're in a physical classroom, things like Mentimeter and Kahoot and things like that. And people are much more inclined to use them now that we're back in the classroom where they hadn't necessarily touched them before"
"But we had to resort to anything we could during COVID should just try and keep students engaged so that that's a bit of a legacy that people are more comfortable using those apps. They know that they work, they've adapted them to face to face learning in the classroom"

C: Thematic Map



D: Reflexive Journal




Notes
1/6/23
TA almost finished
Main themes surrounding
TEL + teaching + assessment
in practice, challenges
+ covid as a catalyst for change
UDL in practice more CPD
now - more expectance
among students for technology
to be used
TEL + UDL - usually positive
but internet issues + tech
literacy can cause a problem
Students need to be trained
as well as staff - prior
assumptions of teachers
surrounding tech expert
students.