The Contribution of Lifelong Learning Ecologies in Online Higher Education: Graduate Student Learning Across Contexts

Doctoral Thesis

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ABSTRACT

Far-reaching technological, socio-economic and organizational shifts have taken place in higher education (HE). Learners today face the challenge of rapidly changing and increasingly complex study and work environments. In this regard, both universities and students have had to navigate increasingly digital, collaborative and globally networked learning scenarios. Moreover, HE institutions have had to adapt to a broad global demographic of students re-entering formal education at different stages of their career as lifelong learners, often in combination with parallel professional responsibilities. The purpose of this exploratory and interpretive study, therefore, is to understand student experiences and conceptions of learning across contexts—from a learning ecologies perspective--in the context of online HE.

Many online learners are motivated to advance their career trajectories and employability through professional development. The rise of fully online graduate programs has attracted students who need or desire to update their skills and competencies as lifelong learners, often choosing to combine online graduate work with professional commitments. There is a growing sentiment, however, that a dearth of research exists on how learners navigate, experience, select and participate in learning experiences across a range of contexts to support learning in online HE. Although online education has an impressive, robust and global research agenda, substantive findings and rigorous research which critically examines how students integrate and connect opportunities for learning across a continuum of contexts and practices has been limited. In response to this identified gap in the literature, the research is guided by the following question: how do students experience learning across contexts —from a Learning Ecologies (LE) perspective—to support academic learning in online HE?

The primarily qualitative mixed methods multiple case study was developed across three sites of fully online graduate level programs (masters or 1st year doctoral students) at the UOC, UIUC and U of E in the interdisciplinary field of educational technology and digital education. Twelve students were selected through purposive and convenience sampling with a broad variability of professional and academic trajectories. The case study participants were the 'bounded' case and reflected an emerging profile of online learners unrestricted by age and geographic boundaries. The study used a sequential exploratory research design collecting qualitative data through program documentation, interviews and online observations. Thematic network analysis was used to analysis qualitative data which was complemented by an online (quantitative) survey developed sequentially from the qualitative thematic

findings. Through a mixed methods integration, findings were interpreted through visual joint displays, narrative accounts, and data transformation.

The results obtained using a LE analytical framework have demonstrated the effectiveness of the construct for analyzing the complexity of learning across multiple contexts. The findings highlight the centrality of learner activity as a key component which drives an individual's LE in combination with peer support and digital learning resources within open, dynamic and fluid systems spanning multiple contexts. In particular, the interaction between learner activity and the requirements of the academic curriculum (i.e. academic tasks) are fundamental in linking and stretching learning across contexts. In the context of online HE, learning strategies and practices have been identified as taking place across four conceptual zones of learning according to formality and collaboration. These zones combine to form a LE matrix in the context of online HE, and results indicate that students move across these zones based on the demands of the curriculum in combination with the idiosyncratic attributes and profiles of each individual learner (i.e. academic and professional trajectories, intentions, motivations, learner agency). In this regard, fluid transitions across the four detected conceptual zones of learning contribute to innovative and connected forms of boundary crossing and lifewide learning across a continuum of learning experiences. The findings confirm that learning is a situated and personal process, and that building an awareness of the mechanisms of one's own LE can enable and empower forms of boundary crossing and connected learning. The profile of an online learner is varied and heterogeneous, reflecting lifelong learners re-entering educational processes at various phases of their professional lives (i.e. early career, mid-career, or late career), motivated by career advancement opportunities afforded by developing new disciplinary skills and competencies in digital education and educational technology. The findings indicate that online HE programs have an essential role in supporting forms of boundary crossing & lifewide learning which can be enabled through program development and a connected curriculum design.

Keywords: Lifelong Learning Ecologies, Student Experiences of Learning, Continuum of Formal and Informal Learning, Online Higher Education.

RESUMEN

Se han producido cambios tecnológicos, socioeconómicos y organizativos de gran alcance en la educación superior (ES). Los estudiantes de hoy en día se enfrentan al desafío de unos cada vez más complejos entornos de estudio y trabajo que cambian rápidamente. A este respecto, tanto las universidades como los estudiantes han tenido que navegar por unos escenarios de aprendizaje cada vez más digitales, colaborativos y conectados en red a nivel mundial. Además, las instituciones de ES han tenido que adaptarse a una amplia demografía mundial de estudiantes que vuelven a incorporarse a la educación formal en diferentes etapas de su carrera como aprendices a lo largo de la vida, a menudo en combinación con responsabilidades profesionales paralelas. El propósito de este estudio exploratorio e interpretativo, por lo tanto, es comprender las experiencias y las concepciones de los estudiantes a través de los contextos—desde una perspectiva de ecologías de aprendizaje—en el contexto de la ES en línea.

Muchos estudiantes en línea están motivados por avanzar en sus trayectorias profesionales y su empleabilidad a través del desarrollo profesional. El auge de los programas de posgrado completamente en línea ha atraído a los estudiantes que necesitan o desean actualizar sus habilidades y competencias como aprendices a lo largo de la vida, los cuales a menudo optan por combinar el trabajo de posgrado en línea con compromisos profesionales. No obstante, existe un creciente sentimiento acerca de la escasez de investigación sobre cómo los alumnos navegan, experimentan, seleccionan y participan en experiencias de aprendizaje en una variedad de contextos para apoyar el aprendizaje en la ES en línea. Aunque la educación en línea tiene una tradición de investigación impresionante, sólida y global, los resultados sustantivos y la investigación rigurosa que examina críticamente cómo los estudiantes integran y conectan las oportunidades de aprendizaje en un continuo de contextos y prácticas ha sido más bien limitado. En respuesta a esta brecha identificada en la literatura, la investigación se guía por la siguiente pregunta: ¿cómo experimentan los estudiantes el aprendizaje a través de los contextos—desde una perspectiva de Ecologías de Aprendizaje (EA)—para apoyar el aprendizaje académico en la ES en línea?

El estudio de caso múltiple, en el marco de un diseño de métodos mixtos principalmente cualitativo, se llevó a cabo a través de tres programas de posgrado completamente en línea (másters o estudiantes de doctorado de primer año) de la UOC, la UIUC y la U of E en el campo interdisciplinario de la tecnología educativa y la educación digital. Doce estudiantes con una amplia variabilidad de

trayectorias profesionales y académicas fueron seleccionados mediante muestreo intencional y de conveniencia. Los participantes del estudio de caso fueron el caso "delimitado" y reflejaron un perfil emergente de estudiantes en línea sin restricciones de edad y límites geográficos. El estudio utilizó un diseño de investigación exploratoria secuencial con una recopilación de datos cualitativos a través de la documentación del programa, entrevistas y observaciones en línea. El análisis de redes temáticas se utilizó para analizar datos cualitativos la cual se complementó con una encuesta en línea (cuantitativa) desarrollada secuencialmente a partir de los resultados temáticos cualitativos. A través de una integración de métodos mixtos, los resultados se interpretaron a través de exhibiciones conjuntas visuales, relatos narrativos y transformación de datos.

Los resultados obtenidos utilizando un marco analítico de las EA han demostrado la efectividad del constructo para analizar la complejidad del aprendizaje en múltiples contextos. Los hallazgos resaltan la centralidad de la actividad del alumno como un componente clave que impulsa la EA de un individuo en combinación con apoyo de los compañeros y los recursos de aprendizaje digital dentro de sistemas abiertos, dinámicos y fluidos que abarcan múltiples contextos. En particular, la interacción entre la actividad del alumno y los requisitos del plan de estudios académico (es decir, las tareas académicas) son fundamentales para vincular y ampliar el aprendizaje en todos los contextos. En el contexto de la ES en línea, se han identificado estrategias y prácticas de aprendizaje que tienen lugar en cuatro zonas conceptuales de aprendizaje de acuerdo con la formalidad y la colaboración. Estas zonas se combinan para formar una matriz EA en el contexto de la ES en línea, y los resultados indican que los estudiantes se mueven a través de estas zonas según las demandas del plan de estudios en combinación con los atributos y perfiles idiosincrásicos de cada alumno individual (es decir, trayectorias académicas y profesionales, intenciones, motivaciones, capacidades y voluntad del aprendiz). En este sentido, las transiciones fluidas a través de las cuatro zonas conceptuales de aprendizaje detectadas contribuyen a formas innovadoras y conectadas de cruce de límites y aprendizaje a lo ancho de la vida a través de un continuo de experiencias de aprendizaje. Los hallazgos confirman que el aprendizaje es un proceso situado y personal, y que crear una conciencia de los mecanismos de la propia EA puede habilitar y potenciar formas de aprendizaje que cruce de fronteras y aprendizaje conectado. El perfil de un alumno en línea es variado y heterogéneo, lo que refleja que los alumnos de por vida vuelven a incorporarse en los procesos educativos en varias fases de su vida profesional (es decir, inicios de su carrera, mitad de su carrera o carrera tardía), motivados por las oportunidades de avance profesional que ofrece el desarrollo de nuevas habilidades y competencias disciplinares a través de la educación digital y la tecnología educativa. Los hallazgos indican que los programas de ES en línea tienen un papel esencial en

el apoyo a las formas de aprendizaje que cruce fronteras y aprendizaje a lo ancho de la vida que se pueden habilitar a través del desarrollo del programa y un diseño curricular conectado.
Palabras clave: Ecologías de aprendizaje a lo largo de la vida, Experiencias de aprendizaje de los estudiantes, Continuo de aprendizaje formal e informal, Educación superior en línea.

RESUM

S'han produït canvis tecnològics, socioeconòmics i organitzatius de gran abast en l'educació superior (ES). Els estudiants d'avui dia s'enfronten a el desafiament d'uns entorns d'estudi i treball cada vegada més complexos i que canvien ràpidament. En aquest sentit, tant les universitats com els estudiants han hagut de navegar per uns escenaris d'aprenentatge cada vegada més digitals, col·laboratiu i connectats en xarxa a nivell mundial. A més, les institucions d'ES han hagut d'adaptar-se a una àmplia demografia mundial d'estudiants que tornen a incorporar-se a la formació acadèmica en diferents etapes de la seva carrera com a aprenents al llarg de la vida, sovint en combinació amb responsabilitats professionals paral·leles. El propòsit d'aquest estudi exploratori i interpretatiu, per tant, és comprendre les experiències i les concepcions dels estudiants a través dels contextos-des d'una perspectiva de les ecologies d'aprenentatge-en el context de l'ES en línia.

Molts estudiants en línia estan motivats per avançar en les seves trajectòries professionals i la seva ocupabilitat a través del desenvolupament professional. L'auge dels programes de postgrau completament en línia ha atret als estudiants que necessiten o volen actualitzar les seves habilitats i competències com a aprenents al llarg de la vida, els quals sovint opten per combinar el treball de postgrau en línia amb compromisos professionals. No obstant això, hi ha un creixent sentiment sobre l'escassetat d'investigació que abordi com naveguen, experimenten, seleccionen i participen els alumnes en experiències d'aprenentatge en una varietat de contextos per donar suport a l'aprenentatge en l'ES en línia. Encara que l'educació en línia té una tradició d'investigació impressionant, sòlida i global, els resultats substantius i la investigació rigorosa que examina críticament com els estudiants integren i connecten les oportunitats d'aprenentatge en un continu de contextos i pràctiques ha estat més aviat limitat. En resposta a aquesta bretxa identificada en la literatura, la investigació es guia per la següent pregunta: com experimenten els estudiants l'aprenentatge a través dels contextos-des d'una perspectiva de les Ecologies d'Aprenentatge (EA) -per donar suport a l'aprenentatge acadèmic en la ES en línia?

L'estudi de cas múltiple, en el marc d'un disseny de mètodes mixtos principalment qualitatiu, es va dur a terme a través de tres programes de postgrau completament en línia (màsters o estudiants de doctorat de primer any) de la UOC, la UIUC i la U of E en el camp interdisciplinari de la tecnologia educativa i l'educació digital. Dotze estudiants amb una àmplia variabilitat de trajectòries professionals i acadèmiques van ser seleccionats mitjançant mostreig intencional i de conveniència. Els participants de l'estudi de cas van ser el cas "delimitat" i van reflectir un perfil emergent d'estudiants en línia sense restriccions d'edat i límits geogràfics. L'estudi va utilitzar un disseny d'investigació exploratòria

seqüencial amb un recull de dades qualitatives a través de la documentació de el programa, entrevistes i observacions en línia. L'anàlisi de xarxes temàtiques es va utilitzar per analitzar dades qualitatives, la qual es va complementar amb una enquesta en línia (quantitativa) desenvolupada seqüencialment a partir dels resultats temàtics qualitatius. A través d'una integració de mètodes mixtos, els resultats es van interpretar a través d'exhibicions visuals conjuntes, relats narratius i transformació de dades.

Els resultats obtinguts, utilitzant un marc analític de les EA, han demostrat l'efectivitat d'el constructe per analitzar la complexitat de l'aprenentatge en múltiples contextos. Les troballes ressalten la centralitat de l'activitat de l'alumne com un component clau que impulsa l'EA d'un individu en combinació amb suport dels companys i els recursos d'aprenentatge digital dins de sistemes oberts, dinàmics i fluids que abasten múltiples contextos. En particular, la interacció entre l'activitat de l'alumne i els requisits de el pla d'estudis acadèmic (és a dir, les tasques acadèmiques) són fonamentals per vincular i ampliar l'aprenentatge en tots els contextos. En el context de l'ES en línia, s'han identificat estratègies i pràctiques d'aprenentatge que tenen lloc en quatre zones conceptuals d'aprenentatge d'acord amb la formalitat i la col·laboració. Aquestes zones es combinen per formar una matriu de les EA en el context de l'ES en línia, i els resultats indiquen que els estudiants es mouen a través d'aquestes zones segons les demandes de el pla d'estudis en combinació amb els atributs i perfils idiosincràtics de cada alumne individual (és a dir, trajectòries acadèmiques i professionals, intencions, motivacions, capacitades y voluntat de l'aprenent). En aquest sentit, les transicions fluides a través de les quatre zones conceptuals d'aprenentatge detectades contribueixen a formes innovadores i connectades de aprenentatge al llarg de la vida a través d'un continu d'experiències d'aprenentatge. Les troballes confirmen que l'aprenentatge és un procés situat i personal, i que crear una consciència dels mecanismes de la pròpia EA pot habilitar i potenciar formes d'encreuament de límits i aprenentatge connectat. El perfil d'un alumne en línia és variat i heterogeni, el que reflecteix que els alumnes de per vida tornen a incorporar-se en els processos educatius en diverses fases de la seva vida professional (és a dir, inicis de la seva carrera, meitat de la seva carrera o carrera tardía), motivats per les oportunitats d'avanç professional que ofereix el desenvolupament de noves habilitats i competències disciplinaris a través de l'educació digital i la tecnologia educativa. Les troballes indiquen que els programes de l'ES en línia tenen un paper essencial en el suport a les formes aprenentatge al llarg de la vida que es poden habilitar a través del desenvolupament del programa i un disseny curricular connectat.

Clau Paraules: Ecologies de aprenentatge a lo largo de la vida, Experiències de aprenentatge de los estudiantes, Continuo de aprenentatge formal e informal, Educació superior en línia.

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CHAPTER 1
INTRODUCTION

1.1 Background of Study

Learners today face the challenge of rapidly changing and increasingly complex study and work environments. Far-reaching technological, economic and structural shifts have taken place in higher education (HE). Such transformations have been accelerated by digital media and new technologies which simultaneously have transformed work and study practices across all sectors of society. In this regard, not only has the system of higher education had to prepare for the transformation toward the digital university (Wilcox et al. 2016; Siemens et al. 2015; Salmon, 2019), but so to have students had to navigate increasingly digital, collaborative and globally networked learning scenarios (Bates, 2015). Universities have likewise had to navigate a wide range of students re-entering higher education at different stages of their life as lifelong learners (Cendon, 2018), often in combination with parallel professional responsibilities.

Recent academic and technological changes that have manifested in higher education, as authors such as Altbach et al. (2010) argue, have "fundamentally redesigned the nature of the university worldwide" (p.30). This fundamental redesign in HE, exemplified in many ways by the emergence of online HE as a mainstream practice and phenomenon, offers possibilities for new forms of emergent and connected learning. Increasingly, a wide range of learners are choosing online HE as a pathway toward career advancement and professional development. In this regard, understanding students' experiences of learning in emergent HE scenarios can be a method to harness the full potential of online education. The current study, therefore, investigates the following guiding research question: How do students experience learning across contexts —from a Learning Ecologies (LE) perspective—to support academic learning in online HE?

In this context, authors such as Castells (2010) agree on the fundamental role that the university plays as an institution in the network society. There is some concern, however, that formal education has not kept pace with the digital transformations in society (European Commission, 2013; Krull, 2018). As such, a range of challenges have emerged which threaten the efficacy and mission of HE, including improving digital literacy and digital competence among both students and faculty, integrating formal and informal learning, shifting toward student-centered designs and rethinking the roles of both educators and students (Adams Becker et al., 2017; Siemens et al. 2015). Accordingly, blending informal and formal methods of learning has been identified as a pertinent challenge facing higher education (Adams-Becker, 2017), and recent studies have demonstrated that both students and faculty use formal

and informal networks to optimize learning, yet "online course design is usually not designed to consider informal experiences of the students" (Czerkawski, 2016 p.1). Given that connecting academic learning to the wider world has been a longstanding challenge in HE (Fung, 2017) the background of the current study is situated in this well established challenge.

The fundamental redesign of the modern university has also provoked an open debate about the new academic skills and communicative, technological and cultural competencies necessary to study and work in the digital age. The rise of the network society has been defined by Castells (2001) as "a society where the key social structures and activities are organized around electronically processed information networks. It's about social networks which process and manage information and are using micro-electronic based technologies" (p.4). The social, cultural, economic and cultural impact of the 'network society' has forced higher education to rethink the educational experience for students, including designing clearly aligned learning processes and outcomes based on competency and skill development frameworks with a focus on future oriented skills (Ehlers & Kellerman, 2019).

Future oriented commentators describe HE in 2019 as Education 4.0, linked to the fourth industrial revolution (Salmon, 2019). HE 4.0 is characterized by a 'symbiotic-web' between human intelligence and artificial intelligence and focuses on ensuring employability in uncertain times defined by a new Industry 4.0. In this regard, universities must accommodate the future, aiming to tackle societies biggest challenges (i.e. energy, climate, education, health) while ensuring individual employability and productivity. Yet to achieve HE 4.0, Salmon (2019) articulates that we should focus on; i.) curricula, most notably developing digital/online curricula, scaling enrollment and 'future proofing' the process/content of curricula; ii.) modes of learning, optimising online learning through a symbiosis of human teaching and the strengths of new technology as well as by enabling students to understand how they are learning and what they are learning for; iii.) rethinking ways of achieving by moving toward understanding universities as hybrid organizations that need to be less insular and isolated, and more open and adaptable to the wider world.

Of course, we know that major changes in education take a very long time. In this regard, much education discourse still characterizes the networked society and modern university in terms of a rapidly evolving Web 2.0 (collaborative and interactive) and Web 3.0 (semantic and mobile) (Salmon, 2019). In particular, the term Web 2.0 has been the most common construct to discuss new technologies in education discourse, research and practice. It is characterized by emerging networked technologies

empowered by social software, yielding fully immersed digital lives and digital mobilities. In 2019, 5.1 billion unique mobile users account for 66% of internet use (Kemp, 2019) and the majority of digital content is visual and mobile, competing for the attention of users in a digital economy where 'attention' itself is seen as a scarce commodity to be exploited. Social networks, online communities, blogs and other collaborative authoring tools, wikis and open educational resources, characterize Web 2.0 offering expanded opportunities for networked learning (Dron & Anderson, 2014) and digital mobilities. Web 2.0 has also yielded a range of learning technologies, and although there is a broad range of tools and possibilities, the literature suggests that "educators typically have a narrow conception of Web 2.0 technologies, and that there is a wide array of Web 2.0 tools as yet to be fully harnessed by learning designers and educational researchers" (Bower, 2016 p.763). As such, understanding how students harness a range of digital learning tools, resources and technologies to support their experiences in online HE has become an urgent task in educational research.

Although open to multiple interpretations and in constant evolution, Web 2.0 is broadly understood as the more interactive, personalized, and communicative form of the World Wide Web that "emphasizes active participation, connectivity, collaboration and sharing of knowledge and ideas among users" (McLoughlin et al. 2007 p.665). Web 2.0 facilitates 'participatory', 'collaborative' and 'distributed' practices across spheres of everyday informal activities through a range of connected mobile devices (Lanksheare & Knobel, 2006 p. 38). As such, emerging Web 2.0 practices have been broadly adapted into HE learning offering a range of affordances within what Cope & Kalantzis (2017) refer to as 'e-learning ecologies', including multimodal representations, collaborative intelligence, active knowledge making, ubiquitous learning and recursive feedback. The current research, therefore, is situated in the context of online learning ecologies, aiming to understand the lived experience of learners through emergent practices and technologies in online HE.

As higher education adapts to the continuous evolution of the Internet (Web 1.0/2.0/3.0/4.0) emerging pedagogies materialize that challenge the traditional models of transmission-based learning informed by the logic of the industrial age. In the current study, reconceptualising the modes and forms of learning in online HE across a continuum of contexts and practices has been identified as an urgent challenge for faculty and students who prepare for living in complex and uncertain times. In this way, and departing from a socio-constructivist perspective that views learning as socially and culturally constructed, this study contributes to reconceptualising student learning across contexts—from formal to informal. This view aims to understand the processes of learning across contexts reflecting the

shifting requirements modern knowledge-driven societies pose for learning and education as lifelong and life-wide processes (Banks et al 2007; Ito et al, 2013; Kumpulainen & Sefton-Green, 2012).

The paradigm of lifelong learning in online HE has shifted the balance of agency from the institution to the learner, provoking student centred designs which promote inquiry driven, problem based and active learning. As Cendon (2018) articulates, the all-encompassing concept of lifelong learning "shifts the focus from an institutional view to the learner and his or her learning, which includes life-long, life-wide, and non-formal and informal learning processes" (p.81). In a European context, emerging discourses in HE policy center on preparing students for lifelong learning and competency development as well as the ability to adapt and succeed amidst changing and uncertain economic and social conditions. Focus has not only been placed on how to meet the needs of students in uncertain and complex times, but how to meet the needs of students who are re-entering university as lifelong learners with varying learning trajectories, professional backgrounds and levels of readiness. It is clear, that processes of teaching and learning need to respond to the evolving needs and challenges of lifelong learners in step with the changing forms of work and study in a digital economy and networked 'knowledge society'. Supporting and empowering student lifelong and lifewide learning, therefore should be a principle mission of HE institutions.

Research on student learning experiences over the last 30 years has routinely explored the relational nature of the key aspects of the learning experience (Prosser & Trigwell, 1999; Laurillard, 2002; Biggs and Tang, 2007; Ellis & Goodyear, 2013), in line with the social nature of learning. As a through-line in research on student learning in HE, the 3P model of student learning has been used to map different studies examining this phenomenon in higher education, and only recently has been explored in online contexts (Ellis & Goodyear, 2013). Broad aspects of this model that can serve to frame and inform research on student learning experiences in online HE are detailed by Ellis & Goodyear (2013):

- **student perceptions of the learning context;** including how they view the clarity of learning goals and requirements of the academic curriculum, as well as the quality of teaching;

- **students' conceptions of their learning** – what they think they have learned i.e. the impact or outcome of their learning experiences;

- **students' approaches to learning –** what they do to learn, encompassing both strategies and intentions i.e. how they translate learning tasks into learning 'outcomes' or 'products' through learning activity;

- **student attributes** – including academic and professional trajectories, level of readiness, current understanding and capabilities and knowledge of prior experiences that they bring to their current learning experience;

- **the course, program and departmental context** – including course design, underlying pedagogical frameworks, teaching methods, assessment and associated learning activities.

Online learners, particularly in graduate education, are regularly combining full-time work with part-time study and often have a broad range of learning and professional trajectories to draw from. Online learners, therefore, have a unique opportunity to engage with lifelong learning across contexts and practices by leveraging digital technologies, resources, and social networks while employing a range of strategies in support of emergent forms of learning. Educational discourse is likewise beginning to emerge which supports connecting academic learning through research and inquiry into the wider society with ecological and connected perspectives (Ellis & Goodyear, 2013; Jackson, 2016; Barnett, 2017; Fung, 2017). For example, Fung (2017) articulates, that such connected forms of curriculum can contribute to "breaking down longstanding divisions between research and education" as a way to "build stronger bridges between research, education, professional practice and society" (p.156).

To support research on student learning, the current study has identified the construct of learning ecologies (LE) as an appropriate analytical framework. A LE perspective has itself emerged in recent decades in social science research in the context educational transformation. A LE framework has been established as productive in analyzing the complex and multifaceted phenomenon of human learning across multiple contexts, however with an as yet unrealized potential (Sangra et al. 2019). A LE perspective is ontologically supported by a socio-constructivist view, in line with a range of previous studies that have examined online or digitally mediated learning with an integrated and connected view to learning (Barron, 2006; Ito et al., 2013; Kumpulainen et al., 2014). In this sense, the current thesis connects and extends research on student experiences of learning in online HE (Ellis & Goodyear, 2013) with the literature on adult lifelong learning (Colley et al., 2003; Van Noy et al., 2016).

Although there has been a great deal of attention given to linking formal and informal student learning through social media and participatory digital cultures (Jenkins et al. 2009; Ito et al, 2013) this work is commonly under theorized (Greenhow et al. 2016). Some scholars (Colley et al. 2003; Van Noy et al., 2016; Greenhow et al. 2016) have proposed frameworks for analyzing learning across a continuum of formality, moving away from traditional notions of formal, non-formal and informal learning that has dominated the literature on lifelong learning. The current study is therefore influenced by a continuum of formality framework, identified as a novel way to conceptualize research on student experiences of

learning in online HE across contexts. For example, Colley et al. (2003) suggest that it is impossible and unproductive to separate informal, non-formal, and formal learning. Rather they posit that "it is more sensible to see attributes of formality and informality as present in all learning situations' (2003: executive summary). Even as students engage in a formal learning scenario within online HE, learners may participate in a range of activities and processes that support their learning across both formal and informal boundaries and contexts, reflecting the notion that there are numerous influences on student learning that may be outside of a formal scenario and those tasks set within the academic curriculum.

1.2 Justification for the Study

The current research problem has been identified in light of evidence that among the most significant challenges facing higher education is integrating formal and informal learning (Adams-Becker et al., 2017). A longstanding challenge for universities, as Fung (2017) articulates, has been connecting academic learning with workplace learning. Several authors have noted an urgent need to critically examine how students integrate and connect opportunities for learning across a continuum of contexts and practices (Barron, 2006; Jackson, 2016; Sangra et al, 2019). In this line, understanding how emerging professional learning scenarios in online HE can promote connected and integrated lifelong learning becomes an imperative in current educational research. Likewise, as little research exists on strategies and practices students use to connect and integrate learning across contexts in this educational scenario, there is a genuine need to generate new insights through empirical research.

In parallel with significant educational change, recent transformations in society has influenced the rise of expanded professional development opportunities, particularly through online learning. Today, lifelong learning opportunities are readily accessible through the hybridization of digital learning experiences—from formal to informal— across a continuum of contexts and practices. As such, online higher education (HE) has evolved to become an important educational and training solution for lifelong learners. However, several researchers have identified a need to research connected learning experiences of students through a life-wide and lifelong perspective (Kumpulainen et al., 2014; Jackson, 2016; Fung, 2017; Sangra et al., 2019), particularly those mediated through digital technologies (Selwyn, 2016) and with a focused attention on "analyzing the continuum between formal and informal learning in higher education" (Sangra et al., 2019 p.15).

In the context of professionally focused programs in higher education, some have argued a particular emphasis should include engaging the complex interplay between the academic practices valued in formal university scenarios and the workplace learning that can happen outside of such contexts (González-Sanmamed et al., 2018). A growing literature (Ito et al. 2008, 2013; Kumpulainen et al., 2014; Sefton Green et al., 2017) has likewise argued a need to understand the 'learning lives' of individuals, from a socio-cultural and connected learning perspective (Oddone, 2019). This approach emphasizes understanding how students are interacting through interest-driven, peer-supported and academically oriented informal activities in digital contexts and the contributions these interactions may have in supporting learning opportunities in formal contexts. According to Kumpulainen et al. (2014),

there is little known about how students see themselves as learners, about how they conceive of their learner identity and experiences as they grow, change and bring together different trajectories across a range of learning scenarios. It is therefore important to understand the 'learning lives' of lifelong learners in online HE as they engage across contexts and practices. Insights into student's experience of learning in online HE can lead to better informed decisions about program and learning design to support more connected forms of learning, linking academic learning to the 'wider world'.

Recognizing and connecting formal and informal education across 'learner lives' has been highlighted as an important educational challenge by many authors (Sefton-Green, 2013; Barron, 2004, 2006; Gros et al. 2015). A learning ecologies perspective, in this sense, seeks to understand what types of practices, resources and social support make digitally connected forms of learning happen and effective, as well as how these self-directed mechanisms can be integrated and sustained across contexts to support academic learning. Similarly, there appears to be a lack of evidence in the scientific literature about what support learners receive or strategies they use in connecting formal and informal learning opportunities across a variety of scenarios. Research is therefore needed on how students connect learning opportunities across multiple contexts, using a variety of self-regulated and self-directed learning activities and strategies, resources, and relationship support.

Although online education has a robust research agenda, there is a dearth of research on student learning across contexts—from formal to informal—in online HE. Generating insights and knowledge on this phenomenon could be considered as a process toward harnessing the full potential of online education. A fundamental rational for the current research, therefore, is linked with understanding how to harness the full potential of student learning in online HE by generating new insights on student learning across contexts. This is particularly pertinent in light of the challenge of the continuous emergence of new digital technologies, resources and environments, influencing new forms of emergent learning across a range of contexts.

The rationale for this study, therefore, lies in exploring student experiences of learning across multiple contexts. The study also aims to contribute to new understandings of how students experience learning in online HE in contexts of educational, technological and social change through a learning ecologies perspective. Moreover, the study centres on how students conceive of their experiences of learning across these contexts and practices, contributing to a broader tradition of research on student learning in HE (Biggs & Tang, 2007; Ellis & Goodyear, 2013). In this regard, the research outputs can contribute to faculty recommendations for connected program designs at the graduate level and

beyond. In this regard, the substantive results and interpretations of the study may be able to act as a roadmap for graduate programs in how to generate boundary crossing and connected learning experiences that contribute to professional development and career advancement for student participants. Such contributions, particularly in the context of inquiry driven knowledge work and social learning, aim to support and empower student learning across a continuum of contexts and practices. In this regard, new insights generated from the study may shed light on how students connect learning to the wider world, based on the in-depth and nuanced lived experiences of learners in online HE.

Apart from the substantive results and their contributions to the field of online HE, a further rational for the current research is to make methodological contributions which can advance integration techniques in the field of mixed methods educational research. Specifically, the current research contributes to mixed methods innovation through the use of a LE sensitizing model which guided the primarily qualitative mixed methods multiple case study. Such a design was identified as appropriate for the case study purpose of exploring emergent and complex social phenomenon in digital contexts, namely learning across multiple contexts in online HE. Through mixed methods integration at the design, methodology and data integration and interpretation levels the study was able to construct a novel visual joint display, in line with the ecological and connected perspective of the thesis. Integrating mixed methods results in a discussion is a well-established practice, however using a visual joint-display to link to theoretical models, has received relatively little attention in the literature and is "increasingly seen as an area of innovation for advancing integration" (Guetterman, Fetters, & Creswell, 2015, p. 555).

Finally, the research is also influenced by personal and professional motivations. The researcher has been studying and working in the field of online HE for over a decade, completing an online M.Ed. in Educational Policy studies in Global contexts in 2010, and continuing to teach and research in blended in online modalities in HE throughout Europe. After obtaining a doctoral grant at the Open University of Catalonia, the researcher had an opportunity to work with an established research group (Edul@b) and with supervisors who specialize in research in open education and emerging learning scenarios with an emphasis on teacher training, digital competence, lifelong learning, and professional development. Collectively, the central working concept of the group has been the learning ecologies construct as "a means to provide an integrated conceptualization of learning as a complex phenomenon bridging formal, non-formal and informal learning experiences" (Sangra et al., 2019 p.1615). The current research, thus, has been a synergy between the collective knowledge and experience of the Edul@b

research group and the background and research interests of a Canadian researcher with a global profile and passion for online learning.

1.3 Structure of the Thesis

The current thesis is organized around 8 chapters which are briefly summarized below:

Chapter 1 introduces and provides a general overview of the study, including the background to the research, the research context of student experiences of learning in online higher education across contexts. A justification for the study is presented, as well as the structure of the thesis.

Chapter 2 presents the first half of a literature review relevant for researching student learning in online higher education. Specifically, this chapter introduces the conceptual and empirical literature on higher education in the digital age, including emerging technologies and emerging pedagogies as well as the conceptual origins and research trends in online higher education.

Chapter 3 features the second half of the literature review with a focus on reviewing research on student learning in online HE. This section introduces a learning ecologies analytical framework that is used to theoretically support the study. Learning paradigms in online higher education are reviewed and the concepts of formal and informal learning as well as lifelong and lifewide learning are likewise presented.

Chapter 4 presents the primarily qualitative mixed methods research design, including the methodological approach, sequential exploratory design, context and sampling techniques. Here, research questions and objectives are introduced. Responding to the core research questions, the qualitative component is presented including data collection and analysis procedures. The quantitative component is then presented, likewise introducing the data collection and analysis procedures. Mixed methods integration procedures are then presented, including integration techniques at different phases and levels of the research. Finally, quality issues in mixed methods research (MMR) are discussed, including legitimation procedures, ethical considerations and research design limitations.

Chapter 5 presents the qualitative results of the multi-case study by first discussing the case study context and participants, followed by a presentation of the learning ecology components of online HE

students. Salient factors which impact student LE are then presented. Finally, student conceptions of their experiences of learning across contexts, practices and trajectories are presented. The qualitative findings presented in this chapter are related to the research questions.

Chapter 6 presents the quantitative results from the survey of students' experience studying online HE at three distinct graduate programs in digital education. The demographic profile is reviewed, including the digital activities, peer collaboration and social support and digital tools and technologies used to support academic learning. Later, multivariate statistical procedures are presented, including PCA and cluster analysis, which lead to the definition of 4 differentiated learner profiles.

Chapter 7 presents the findings through an analysis and interpretation of the main qualitative and quantitative results in an integrative and complementary manner. Results are integrated through visual joint displays, narrative accounts, and data transformation. Considerations are made for the implication of the study for online HE pedagogy and practice. As such, this chapter will interpret the central findings from the mixed methods study in relation to the existing literature of student learning in online higher education, with a particular emphasis on both formal and informal lifelong learning.

Chapter 8 concludes the thesis by offering a summary of the research context and findings. It likewise discusses implications for educational practice and theory, including the contribution and conceptual potential of a Learning Ecologies Conceptual Framework in online HE. It offers recommendations for supporting and empowering student learning from an LE perspective in online HE across formal and informal contexts along a continuum of learning. Research contributions are presented, including filling a gap in the research about how students experience learning across contexts and practices in online HE. Limitations are likewise presented as are future lines of research.

CHAPTER 2
LITERATURE REVIEW:
ONLINE HIGHER EDUCATION

2.1 Introduction: Higher education in the Digital Age

"It's not the strongest of the species that survives, not the most intelligent, but the one most responsive to change."

—Charles Darwin, Origin of Species, 1859

The aim of this literature review is to define the current state of the empirical literature, including reviewing the major developments, research trends and conceptual definitions that have supported the growth of online higher education as a mainstream phenomenon in 2019. In this sense, the intent is to establish the immediate areas of the research field, presenting the key arguments, concepts, trends and theories. The current chapter will contextualize the rise of online learning from its origins to its current position as a mainstream practice in HE. The chapter will likewise situate the current study of online HE within a trend toward emerging pedagogies that favour openness and the development of new competencies and skills essential for engaging lifelong learners in academic and professional practice. This emphasis will also consider the modes of learning that enable employability in uncertain times for graduates regardless of discipline or profession. As such, the review will highlight models and approaches of emerging pedagogies in online and open education that respond to the demands and opportunities of a globally networked knowledge society, including the shifting requirements that contemporary society poses for learning and education to be seen as lifelong and lifewide processes.

In 2019, far-reaching technological, socio-cultural and economic shifts continue to transform higher education (HE) around the world. Globalization and technological developments are radically reshaping the higher education landscape. Such shifts have been accelerated by the adoption of new media and emerging digital technologies across all sectors of society. In this regard, not only have higher education systems had to prepare for the transformation toward the digital university (Wilcox et al. 2016; Siemens et al. 2015), but so to have students had to navigate increasingly digital, collaborative and globally networked learning scenarios (Dron & Anderson, 2014; Bates, 2015; Adams-Becker, 2017). Moreover, students must also prepare to participate in uncertain and unpredictable futures (Salmon, 2019). The academic changes that have manifested in higher education in the 21st century, as authors such as Altbach et al. (2010) argue, have "fundamentally redesigned the nature of the university worldwide" (p. 30). Such transformations lead to questions about the purpose and role of online HE in supporting student learning with a focus toward employment prospects and contributions to the future.

The fundamental redesign and academic revolution in networked higher education is intimately tied to powerful processes of globalization, increasing student diversity and learner mobilities enabled through advances in information and communication technology. As a result, the complex study of online higher education has emerged as an important and notable field of research, studied from a variety of disciplinary foci as well as from socio-cultural, political and economic dimensions.

In this context, several authors (Castells, 2001; Guitert, 2014) agree on the fundamental role that the university plays as an institution in the network society. There is a growing view of HE "as a complex adaptive system of which time and the interaction with other systems is a major driver" (Salmon, 2019 p.110). Given such rapid social and technological changes, the rate of immense transformation can be unsettling for teachers, students and institutions. It is clear, however, that university education and the processes of teaching and learning need to respond to the changing needs and demands of learners as well as the changing forms of work in a global 'knowledge society'.

The fundamental redesign of the modern university has also provoked an open debate about the new academic skills and communicative, technological and cultural competencies necessary to work and learn in the digital age. The Institute for the Future (2019) sums up succinctly some of the major forces and trends that are affecting HE delivery and development in the following quote:

> *"We're shifting to a new kind of workforce focused less on predefined job categories and skill requirements and more on tapping the unique potential of billions of worker-learners for a rapidly evolving labor landscape. The next decade will not only challenge us to reinvent learning for this new kind of distributed, dynamic, and ultimately more creative workforce. It will also inspire us to re-envision the tools, practices, and standards of assessment for the infinity of pathways that tomorrow's learners and workers will pioneer to create their uniquely meaningful lives" (p. 1).*

The fundamental question then arises, how can HE institutions support and enable worker-learners to prepare for rapidly evolving labor landscapes through increasingly distributed, dynamic and networked academic and professional contexts? It is clear that online HE institutions need to engage with questions of how to support lifelong learners as they engage in professional development while re-entering educational institutions at different phases of their career. In this regard, the European Commission (2014) high level group on the modernisation of HE has offered several key recommendations, most notably that; (i.) HE institutions need to facilitate, collect and take into account student feedback as a process to identify and anticipate quality issues in teaching and learning and as a process to improve educational quality, and (ii.) HE institutions, with support from public

administrations and the EU, should support teacher professional development through online learning and the opportunities that are afforded through digital technology to improve the quality of teaching and learning. It is in this context that the current study aims to address some of these pressing issues where changes and innovation arrive quickly and generate lasting transformations.

2.1.1 Emerging technologies and emerging pedagogies

Increasingly, we are no longer in a world where digital technology and media are separate from our everyday social and professional life. As Dron & Anderson (2014) point out, it is not unreasonable to presume that in a very near future, nearly every human on the planet may "be able to connect with nearly every other in order to share information, knowledge, and ideas in a myriad of ways, virtually instantaneously" (p. 3-4). Such transformations have indeed inspired post-digital perspectives in science and education (Jandric et al. 2018). In this regard, unprecedented changes have inspired new concepts directly linked to the practice of online higher education, including emerging technologies and emerging pedagogies.

As Gros & Maina (2016) articulate emerging technologies play a mediating role in supporting emerging pedagogies. Veletsianos (2010) defines emerging technologies as "tools, concepts, innovations, and advancements utilized in diverse educational settings to serve varied education related purposes" (2010, 33). Here, Veletsianos (2016) argues that:

> *"what makes technologies and practices emerging are not specific technologies or practices, but the environments in which particular technologies or practices operate. This definition recognizes that learning, teaching, and scholarship are sociocultural phenomena situated in specific contexts and influenced by the cultures in which they take place" (p.6).*

Gros & Maina (2016) further articulate that emerging pedagogies and technologies are in constant dialogue and mutual influence, and as technologies become more invisible, pedagogies need to make their "practices visible offering practices that take into account the fundamental needs of modern society" (p.1). Table 2.1 summarizes several key features of emerging pedagogies drawn from the work of Cobo et al. (2011); Gurung (2013); Dron & Anderson (2014); Gros & Maina (2016); Velatsianos (2016); Cope & Kalantzis (2017); Guitert & Romeu, 2019).

Table 2.1 Key Features of Emerging Pedagogies

Knowledge is…	• co-constructed in knowledge communities • used in different forms • transferred and applied in real-world contexts • represented through multimodality • accessed through collaborative intelligence
Learning is….	• continuous and collaborative • supported by ecologies of learning • transparent • lifelong and lifewide • differentiated according to student interest and need
The role of social software and social technologies is..	• integrated through "high level" use in synergy with pedagogy • enabling the creation of spaces where interaction, support, content creation and sharing might occur • a key driver that enables lifelong learning • to support and encourage individuals to learn together while retaining individual control over their time
The learner….	• integrates self-regulation, co-regulation and social shared regulation • actively participates in the learning process
The Pedagogical design…	• is based on socio-constructivist + connectivist pedagogies • is based on a transformative praxis • supports lifelong learning • embraces and fosters change • changes the traditional roles of teachers and learners.
Teaching involves…	• designing and promoting deep learning tasks • rethinking and applying new forms of assessment and recursive feedback • -rethinking of pedagogies within evolving pedagogical contexts; • emerging new roles including teacher as designer, evaluator, collaborator, researcher, facilitator, administrator and guide

The role of emerging technologies across all aspects of our social lives in amplifying learning opportunities across both formal and informal contexts cannot be underplayed, nor can we overlook the character of emerging pedagogies in shaping the expansion and future of online learning (Gros & Maina, 2016). Velatsianos (2016) for example, discusses the characteristics of emerging technologies and emerging practices, arguing they are not always defined by newness as they may or may not be recent

developments (i.e. newer: 3D printing; older: open source LMS. Further Velatsianos (2016) argues that emerging technologies and practices are evolving organisms that exist in a state of "coming into being", that is to say, as platform and software refinements continuously change the way technology can be used, practices may evolve and depart from those originally anticipated, as in the case of Academic Twitter, for example. Further, Velatsianos (2016) elaborates that a further characteristic of emerging technologies and practices are their promise for significant impact, which is often mostly unfulfilled. Institutions may, for example, recognize that an emerging technology or practice such as the use of Professional Learning Networks (Oddone, 2019) or social media in formal learning has significant potential for enabling change, but such potential has often not yet been fully realized. Understanding the implications of emerging technologies and practices for online education is difficult as emerging pedagogies are not fully understood and under-researched, giving an impetus for the current study to examine emergent phenomenon that is both under-theorized and under-researched.

In the context of emerging practices, Cobo et al. (2011) argue that learning occurs on a continuum across our lives, referring to such a new paradigm of learning as 'invisible learning'. An 'invisible learning' paradigm focuses on how (strategies and practices) to learn, and not what (content) to learn. Taking a critical stance against EdTech discourses, the authors articulate that digital learning should not focus on technology or infrastructure, but rather should focus on practices such as active knowledge making, knowledge acquisition, and knowledge transfer and application outside of formal classrooms and into the wider society. This is precisely the context in which emerging technologies and emerging pedagogies are situated in this study.

2.1.2 Social Software and Emerging Pedagogies

Social software equally plays a critical and substantial role in emerging pedagogies and new forms of learning. Social software has existed for several decades however the term is attributed to Shirkey (2003), who defined it as "software that supports group interaction". Clearly, this is a broad definition, and can serve to explain most web technologies or tools, however a useful clarification to the various definitions of social software has been added by Mejias (2006), who defined social software along three dimensions as "as a tool (for augmenting human social and collaborative abilities), as a medium (for facilitating social connection and information interchange), and as an ecology (for enabling a 'system of people, practices" (p.5). As Dron & Anderson (2014) claim, the benefits to learners from the aggregation of the ideas, behaviours, practices, expressions and attitudes of other users are the defining features of many of the forms of collective social software that is impacting both formal and

informal online learning. Anderson has further clarified the term in an educational context by defining educational social software as "networked tools that support and encourage individuals to learn together while retaining individual control over their time, space, presence, activity, identity and relationship" (Anderson, 2008 p.225). As emerging technologies continue to influence the emergence of new pedagogies, online HE has become a fertile landscape for experimenting with socially driven, network-oriented and knowledge-centred educational experiences, supported and empowered through social software.

2.2. Online Higher Education

The literature on online education is vast and global in nature (Bates, 2015; Siemens et al. 2015; Zawacki-Richter et al., 2016). Research on online HE is accelerating as education systems around the world aggressively adopt a blended or fully online model. In the US, a pioneer and global leader in online higher education, 15% of higher education students were enrolled exclusively online in 2017, representing 3.1 million students (Lederman, 2018). The presence of computers and technology in the learning process, correspondingly, has been researched more in the past 14 years than in the previous 40 years combined (Aparicio, 2016). Current research has provided an expansive output across qualitative and quantitative methods from which to both analyze and inform the design and practice of online education as well as to shape future lines of research on emerging practices in HE. As Wilcox et al. (2016) establish, the study of online learning in HE is an interdisciplinary field, integrating disciplinary knowledge from fields that use a diversity of methodological approaches, disciplinary perspectives and research paradigms.

The concepts of online learning, digital learning and e-learning[1] are often used synonymously and interchangeably, and are among the most common constructs for conceptualizing computer and internet mediated learning. E-learning was coined by White (1983 p.13) and defined as "learning via electronic sources, such as television, computer, videodisk, teletext, videotext". What has become explicitly clear is that digitally mediated learning has emerged as the new dominant paradigm of modern HE. Correspondingly, Sangra et al, (2011) have established an updated and inclusive definition of e-learning noting that the wide range of definitions and conceptualizations stem from diverging profiles in the field of educational technology, specifically noting differences between those with a more

[1] For the purposes and scope of this research, the term **online learning** will be used to refer to internet and ICT mediated learning, unless specifically referring to another construct or phenomenon with historical importance to the research.

technological profile (engineers and computer scientists) and those with a more pedagogical profile (educators, psychologists and social scientists). Sangra et al. (2011) define e-learning as:

> *"a form of teaching and learning - which may represent a part or the whole of the education model in which it is used - that makes use of electronic media and devices to facilitate access, promote evolution and improve the quality of education and training" (p.36).*

Although the concept of e-learning does seem linguistically out of step with our digital times, it remains one of the dominant nomenclatures and conceptual frameworks for higher education, and still commonly found in the literature, however used with variability across different socio-cultural contexts.

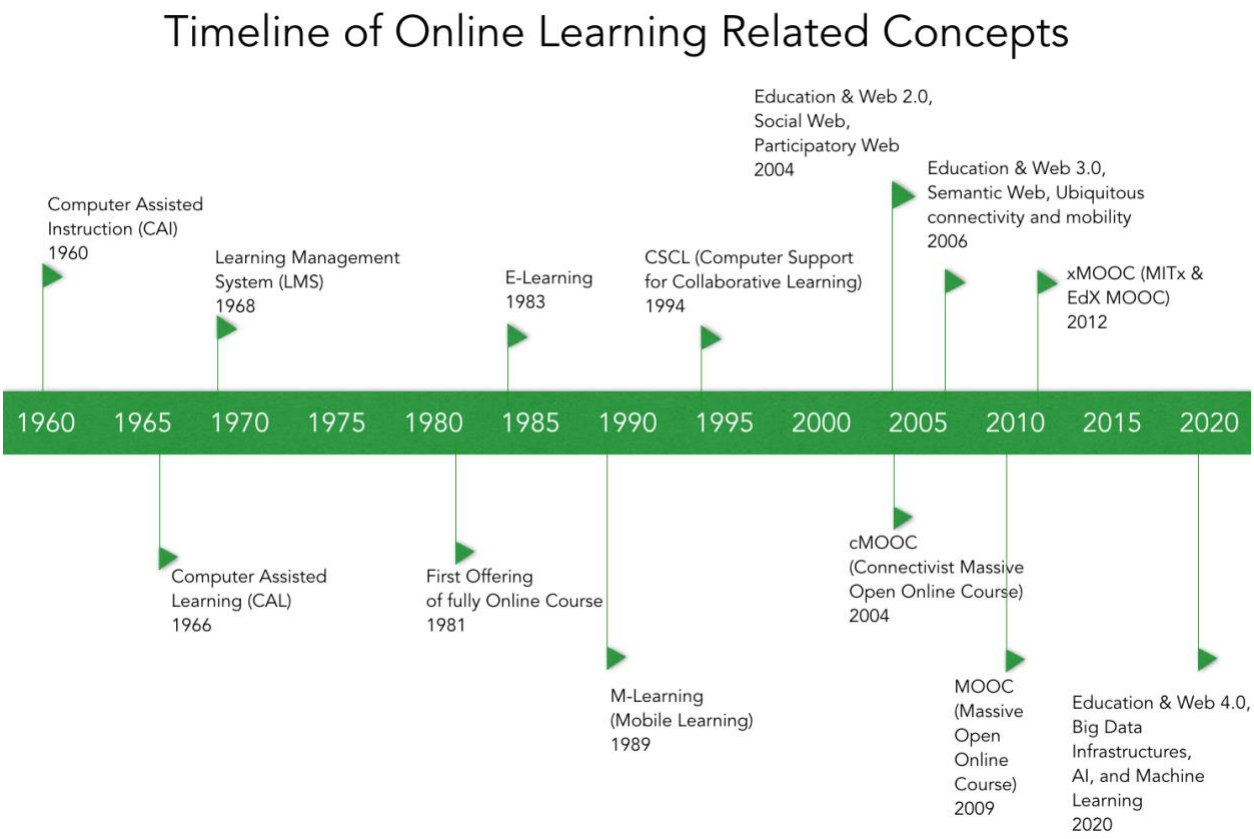
The operational definition of online learning, understood as the most recent generation of distance education, is where technology mediates the learning process mediated through the internet, making information and or knowledge available to learners over distances of time and space (Sun, Tsai, Finger, Chen, & Yeh, 2008). Online learning experiences are typically asynchronous, although there may be synchronous elements such as weekly video meetings. The majority of HE institutions who offer online learning rely on a Learning Management System (LMS) as a platform for both the administration and organization of course content, as well as the central learning environment for online courses. Similarly, a variety of associated phenomenon such as machine learning, learning analytics, artificial intelligence, the Internet of Things and mobile and virtual reality technology are also continuing to disrupt and transform higher education, offering new opportunities and challenges for designing student learning (Velatsianos, 2016; Salmon, 2019).

2.2.1 Conceptual Origins of Online Education

The potential of online learning as a new educational model was clear with the first offering of a fully online course in 1981 (Harasim, 2000; Siemens et al, 2015), radically changing the field of distance education and online learning and ushering in new pedagogical models through the affordances of networked technology. The origin of many of the transformations that preceded modern online learning began in the middle of the 20th century when networked computer technology emerged. Correspondingly, Computer assisted instruction (CAI) was conceived in 1955 as a method for teaching problem-solving techniques (Aparicio et al. 2016). Over the following 5 decades an abundance of online learning concepts and trends have emerged, including Computer Assisted Learning (CAL), Learning Management Systems (LMS), e-Learning (Electronic Learning), m-Learning (mobile learning), as well as more recent concepts such as cMOOC and xMOOC (Massive Open Online Course) (Aparicio et al. 2016) as well as Web 2.0, Web 3.0 and what some observers refer to as Education 4.0 (Salmon, 2019). The

below timeline highlights the development of major concepts related to online learning, according to the first publication date, adapted from Aparicio et al. (2016) and Salmon (2019).

Figure 2.1 Timeline of Online Learning Related Concepts (Adopted from Aparicio (2016) and Salmon (2019)



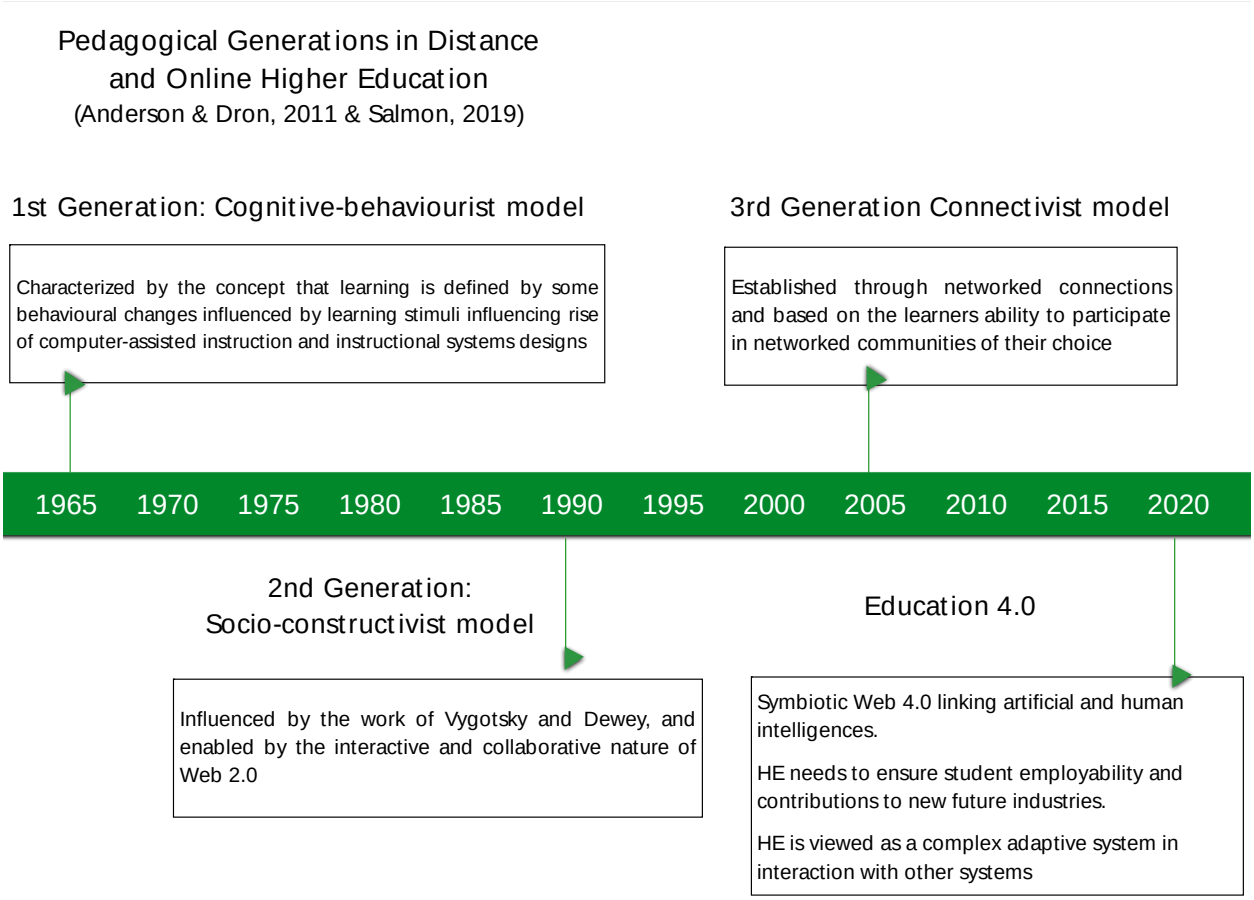
In the literature, there is an extensive range of terminology, concepts and different approaches for learning in digital environments, developed chronologically over several decades. Correspondingly, one of the most significant challenges for researching online learning identified in the literature is the lack of authoritative definitions of what constitutes online learning as well as the diversity of terms used to conceptualize similar phenomena (Siemens et al., 2015). For example, designing systematic literature reviews becomes problematic when researchers define different technologically mediated learning phenomena (such as blended, connected, online and distance learning) in multiple ways. Rudestam et al. (2010 p.2) likewise argue that determining a clear understanding of best practices and an in depth understanding of the literature in online learning is complicated by the "multiplicity of terms used to describe a phenomenon". As such, Tallent-Runnels et al. (2006) recommend some standardization of terms to avoid the inconsistency of terminology, for example, suggesting courses taught fully online be called online courses. In the current study, characterizing and describing emergent phenomenon by

using precise and appropriate language is recognized as a significant challenge which needs to be addressed through rigorous and critical thinking.

2.2.2 Generations of Pedagogy in Distance & Online Higher Education

In accordance with Anderson & Dron (2011) a broad overview of three of the most significant pedagogical generations of online and distance education are reviewed and updated with what contemporary observers refer to as Education 4.0 (Salmon, 2019). Reviewing pedagogical generations is used as a method for understanding and approaching the phenomenon of student learning in online HE today. In direct response to classifications of generations based on the use of adopted technology (Anderson, 2008; Taylor, 2001), Anderson and Dron (2011) suggest three generations of distance education pedagogy that define the online and distance learning experience, outlined in the below Figure 2.2.

Figure 2.2 Pedagogical Generations in Distance and Online Higher Education (Adapted from Anderson & Dron, 2011 & Salmon, 2019)



The following sections will briefly review the most relevant generations for the current study of student experiences of learning across contexts in online HE as well as the concept of Education 4.0 in HE.

2.2.2.1 The Social Constructivist Generation

The second generation of online and distance education pedagogy is rooted in the constructivist approach influenced by the work of Vygotsky and Dewey, generally referred to as social constructivism. The rise of social constructivism views learning as an inherently social process of meaning making, integrating new information, and creating knowledge (Dron & Anderson, 2014). Social constructivism in distance education pedagogy developed in parallel with the rise of ICT and two-way communication technology allowing for robust interaction and communication in asynchronous and synchronous form between and among learners and teachers. Within this perspective, learning is understood, on an

individual level, as meaning making through active discovery, while in social contexts is understood as achieving understanding through dialogue and collaboration (Mayes and de Freitas, 2004).

The evolution of online education moved from individually based instruction to more socially oriented, constructive, and collaborative as the cohort organizational model emerged. As Greenhow, Robelia, and Hughes (2009) argue, this approach views learning as located in contexts and relationships rather than solely in the mind of individuals and this was reflected in the models of online learning that emerged with Web 2.0 and social software in the first decade of the 2000's. Indeed, online distance education began to see the emergence of social constructivist perspectives linked with networked digital culture and many-to-many horizontal communication tools (Marino et al.,, 2012). Unlike the cognitive-behaviorist generation of distance education, social constructivist approaches shift the locus of control away from the teacher and is oriented toward more student-centered approaches, seeing the teacher as more of a guide or facilitator than as the purveyor of knowledge and expertise. Social Constructivist models were, therefore, heralded as part of the "post-industrial age" of distance education (Garrison, 1997) that moved beyond teacher centered, independent study and mass production based on an industrial model of teaching and learning toward a model centered on rich student-student and teacher-student interaction (Anderson & Dron, 2011). Many current online graduate programs are still heavily influenced from this generation of online learning (Bates, 2015).

Additionally, the theory of Communities of Practice is a derivative social theory of learning related to socio constructivism and was established in the seminal work of Lave & Wegner 1991. Lave and Wegner (1991) sought to re-conceptualize the notion of learning by "treating it as an emergent property of whole persons' legitimate peripheral participation in communities of practice" (p.63). The theory accounts for primarily informal community formation and development, conceptualized as the basis for a social theory of learning drawn from studies in anthropology. Wegner's (1998) definition claims that communities of practice are groups of people who share a concern or a passion for something they do and learn how to do it better as they interact regularly. Further, a community of practice has three key features (Wenger, 1998, p. 73); first, the community as a form of mutual engagement with shared forms and methods of collaboration; second, a domain, also known as a joint enterprise including shared goals, intentions and purposes; and third, a practice, or shared repertoire, understood as a set of resources, both physical and conceptual, that the community shares. Dron & Anderson (2014) identify community of practice as a concept that shares notional features such as distributed cognition between human and non-human actors, as a distinctively networked learning theory, and an essential conceptual heuristic for analyzing adult learning across professional, academic,

and socialized contexts. As a common social form in professional contexts in education, the communities of practice construct will be useful as an approach for how learners use social support in their experiences of online learning in HE.

2.2.2.2 The Connectivist Generation

The most relevant and influential epistemological position to impact online HE in recent years is undoubtedly connectivism, presented as a learning theory for the digital age (Siemens, 2004; Downes, 2007). Anderson et al. (2011) characterize connectivism as the third generation of distance education pedagogy. The central focus of connectivist approaches, entrenched in a network society (Castells, 2000), rely on ubiquitous access to networked technologies, where learners build and maintain networked connections that are current and flexible enough to be applied to existing and emergent problems. Within this perspective, knowledge is not to be memorized by the learner, in contrast, the capacity to find, evaluate, and apply knowledge when and where it is needed is more important than what is currently known by the learner.

As Bates claims (2015) ""connectivism is really the first theoretical attempt to radically re-examine the implications for learning of the Internet and the explosion of new communications technologies" (p.192). In response to the dominate learning theories that underlie modern learning environments today, Behaviourism, Cognitivism, and Constructivism, Siemens argues that these epistemologies fail to explain learning when technology has completely transformed and disrupted the way we communicate, interact, and live in contemporary life.

As a theory that is still in its infancy, connectivism has many critics and has provoked much controversy for being under conceptualized, unrefined, and in need of further development. For example, Clarà et al, (2014) identify three problems with the current conceptualization, mostly from a Vygostky inspired socio-constructivist critique. They argue connectivism fails to address Socrates' 'learning paradox', the explanation for 'how somebody comes to know something', that the theory fails to properly conceptualize interaction as well as concept development among learners. Anderson (2016) further highlights several critiques of the theory, including that connectivism appears to offer nothing new that hasn't been accounted for in earlier works in complexity theory and constructivism, the lack of an extensive or clear role for teachers and the substantive requirements placed on the learner who would need significant motivation and directed-ness to engage in self-regulated learning. Although connectivism does represent a paradigm shift in both research and practice in online HE, for

example in the rise of connectivist informed massive open online courses which have emerged over the last decade, it is unlikely to be the unique model of online learning and will likely be used as part of a spectrum of epistemological choices by university instructors. For individual learners in online HE, connectivist approaches will likely be more apart of self-directed, informal and boundary crossing approaches to networked learning.

Connectivism has lobbied for the need to bring formal institutionalized learning, especially in higher education contexts, outside of the classroom and has been applied in relation to the rise of MOOC's as a model of open, networked and distributed learning. The role of teacher's in connectivist MOOC's has often been to structure the initial learning environment and offer strategies for students to create their own personal learning environments (PLE's) and 'connect' into successful networks and flows of information that will result in learning and individual meaning-making for the student (Bates, 2015). Recent research on connectivism in online HE has analyzed participation behaviour through interaction traces in MOOC's to reveal 4 common participation profiles (Wang et al. 2018) and posited for the design of MOOC's as personal learning environments for digital language skills development as a connectivist pedagogy (Fondo et al. 2018). In the current research, **connectivist perspectives can serve to analyze and characterize students' experiences of learning in online HE across contexts**. In particular, **connectivist perspectives can help understand student approaches to learning which link formal and informal learning networks** enabled through horizontal interactions based on the students' needs and interests.

2.2.2.3 Education 4.0

Education 4.0 refers to the most current trends and state of HE in relation to Industry 4.0 characterized by the fourth industrial revolution influenced by big data, artificial intelligence, robotics and globally distributed labor markets (Davies, 2019). It must be recognized however, that universities as an institution are "cautious of disruption, suspicious of transformation, and risk-averse" (Salmon, 2019 p.109). Education 4.0 is characterized by learning processes which are fully integrated with digital technology through both on-site and online modes of learning. Education 4.0 has evolved from a transmission model of learning which characterized Education 1.0, to social learning which characterized Education 2.0, to fully immersed, ubiquitous digital lives and mobilities which characterize Education 3.0 (Salmon, 2019). Education 4.0 in HE is about continuing the core mission of universities in a globally networked knowledge society while aiming to tackle some of societies biggest challenges (i.e. education, climate, health, global terror etc.) with an emphasis on ensuring employability of students. In this

regard, learners need to acquire skills and competencies to ensure lifelong learning responsive to students needs which enable participation in a rapidly transforming and uncertain society (Feldman, 2018). As Salmon (2019) argues, there are three clear foci of attention in achieving Education 4.0 in HE, and they include:

(1.) a focus on curricula: student learning shaped by the curriculum should be future oriented and digitally enhanced increasing the scale and scope of delivery. The curriculum. One essential focus is on 'future-proofing' the curriculum by ensuring relevant and sustainable educational programming that develops students' multiple careers and contributes positively to global civil society. Curriculum should be focused on developing design and systems thinking.

(2.) a focus on modes of learning: it is clear that student learning should focus on processes of self-directed and self-regulated learning, enabling students to understand how they are learning, and to prepare them for future learning. Digital modes need to be optimized, recognizing the ever-shifting and situated nature of learning. Although technology is a major element of Education 4.0, the most important elements include fostering essential human skills: creativity, critical thinking, effective communication, and productive collaboration.

(3.) a focus on re-conceptualizing achievement and assessment: instead of focusing on transmission models and exam driven methods based on memorization and repetition, achievement needs to be re-imagined toward real-wrold problem solving and inquiry driven assessment models where students become creators and communicators of knowledge through active learning approaches (Davies, 2019).

2.2.3 Debates & Research Trends in Online Education

A common maxim in the literature on online education has been the claim of 'pedagogy before technology', where, in theory, technological application is precipitated by pedagogical approaches to teaching and learning. As such, pedagogy 2.0 (McLoughlin & Lee, 2007) has been coined to refer to emerging pedagogies that as Bryant (2012) claims:

> *"embeds the new skills of learners in collaboration, content making, remixing and repurposing, interaction, identity and sharing into a curriculum that encourages social interaction, supports the development of networks through social media, broadens the community of practice to include a wider community of practice and promotes and generates inter and trans-disciplinary thought and ideas" (p.2).*

Current debates in online HE, therefore, argue over the role of the university and how learning should unfold in networked contexts. Authors such as McLoughlin & Lee (2007) and Bryant (2012) argue that the university in the digital age will be built on the learning affordances of social software and emerging technologies founded on social interaction, connectivity, social knowledge construction and collaboration. Similarly, Adams Becker et al. (2017) argues that advancing innovative pedagogical

approaches requires cultural transformations focused on student-centered models and lifelong learning as the essential constituent of higher education. Consequently, the convergence of the modern university, the social web 2.0, the semantic web 3.0, digital media and participatory culture is redefining higher education in the digital age toward student-centered models that focus on collaborative, active and deeper learning approaches. Key trends that are accelerating technology adoption and teaching innovation include pedagogies focused on active learning approaches that follow inquiry-based learning strategies such as problem-based and project-based learning where students solve real-world challenges as well as actively produce new knowledge and learning artefacts (Ellis & Goodyear, 2013; Adams Becker et al., 2017).

In the context of online HE, prominent research trends have been examined by various authors (Zawacki-Richter, 2009; Zawacki-Richter et al. 2016), who have identified three broad research perspectives. These broad categories have been classified as i.) Macro level examining Distance Education systems and theories at a global system level, ii.) Meso level interested in management, organization and technology at an institutional level, and iii.) Micro level interested in teaching and learning in digitally mediated education, representing the individual level. The most glaring result is that research in this field is dominated by micro-level studies that focus on interaction and communication patterns in networked communication, issues in instructional design, learner attributes, and educational technology. Likewise, there has been a modest upward trend for qualitative research, perhaps as an attempt to attain a deeper, more nuanced understanding of the phenomena (Zawacki-Richter et al. 2009). In line with this trend, the current study identifies as micro-level research in online HE, however will fill a gap in the literature by examining student learning across contexts and practices—from formal to informal—to support academic learning.

In a comparable study, Zawacki-Richter et al. (2016) mapped research trends across 35 years of publications in the Australian Journal Distance Education. Using a textual content analysis technique concept maps were produced and 3 broad waves of research from 1980-2015 emerged. The first research wave includes a focus on the consolidation of DE institutions and instructional design as a new and potentially revolutionary mode of educational practice. The second research wave was identified by the importance of quality assurance and student support and the third research wave is constituted by the emergence of the Virtual university characterized by online interaction and online learning.

Significant in relation to the current study, the third wave of developments in online and distance education research is particularly notable. This can be seen through the evolution of three research

perspectives including i.) the emergence of the virtual university from 2000-2004, ii.) the importance of collaborative learning and online interaction patterns from 2005-2009, and iii.) the emergence of interactive learning, MOOC's and OER's from 2010-2014 (Zawacki-Richter et al. 2016). Bond et al. (2019) have published a meta-analysis of educational technology research in the influential British Journal of Educational Technology and their results reveal that from 2010-2018 there has been an expanded focus on learning processes of students, including an 'increased sensitivity' toward the learner (Bond et al., 2019). In this regard, the current research is contextualized in this recent trend in research with an emphasis on a data-led approaches in trying to understand student experiences of learning in technology mediated environments with an emphasis on collaboration in online HE and mobile learning and the development of new tools for academic knowledge work.

These types of meta-analytic studies offer key trends, research perspectives as well as gaps in the literature that can provide insight and justification for future research. Room for critique exists, as these trends may also represent the views, power and conceptions of editors, an editorial board and reviewers from one journal acting as gatekeepers while validating what constitutes knowledge in a given field. Regardless, various researchers (Zawacki-Richter et al. 2016; Bond et al. 2019) have revealed a range of developing and alternating research perspectives over time and as such offer insight into research trends that help situate the current research within broader historical developments as well as giving insight into future research trajectories.

2.2.4 Openness in Higher Education

The proliferation of open educational resources (OER) and open educational practices (OEP) has become a significant trend and key development in online learning, particularly in higher education. OER's and OEP's have likewise shaped the current research on open education, parcticulary in HE (Kalz et al., 2017). The Internet has been central to the principles of this movement, with the rise of social software and Web 2.0. Openness, as Peters (2009) articulates, represents a variety of digital transformations and developments that has emerged as an alternative form of 'social production' founded on the development and interconnected complexities of open source, open access, open archiving, open publishing and open science. As Wiley (2017 MOOC) claims, the essential imperative for openness in education lies in the copyright restricted character of traditional or closed education, that limits or prohibits us from learning in some ways. In essence, as openness begins to remove some of the barriers in education, we can begin to learn in new ways that we haven't had access to before.

At the same time, as Bayne et al. (2015) argue, openness has become a "highly charged and politicized term" (p. 247) that operates equally outside many areas of education including open government, open data and open culture, and that it has acquired an often unquestioned conception, consensus and legitimacy. Proponents of the Open education movement often make democratizing and transformational claims while others point to a need for a critical approach (Bayne et al. 2015), questioning the assumptions that "students fall into a universal category of rational, self-directing, and highly motivated individuals" (p.248). The often undisputed nature of open education, they argue, makes the movement problematic for its lack of critical perspectives. It seems imperative, therefore, that research on openness in higher education should engage with the existing debates and unquestioned assumptions about the openness movement in the context of online HE, representing an important yet under researched area.

Authors such as Veletsianos (2016) have convincingly claimed higher education faces growing tension along several 'fault' lines, including tension between open and closed resources, practices and models of learning. The 'closed' model of education, represented by learning management systems, journal articles, educational resources and data bases which lay behind restrictive pay walls, stands in sharp contrast to the openness represented by journals such as the IRRODL and Open Praxis, courses offered through MOOC's and the variety of personal learning environments that characterize the social web, including YouTube, Khan Academy, MIT OpenCourseWare, TED Talks and iTunes University. As Veletsianos (2016) articulates, Emerging practices of open education, although complex and elusive to fully understand, have been:

> *"heralded as providing opportunities to transform education, learning, and teaching. Such discussions often postulate that new ideas—whether technologies or practices— will address educational problems or provide opportunities to rethink the ways that education is organized and enacted" (p.ix)*

Despite the rise of open education as a global movement, some observers (Murphy, 2013) view a deficiency of an open learning model in higher education, where resources are most concentrated and accessible. From a constructivist perspective, authors such as Smyth et al. (2016), offer models of learner-centered open pedagogy in HE. The focus of this model centers on the interaction between learners, knowledge and network connectivity that promotes collaboration and knowledge production rather than a teacher-to-student transmission model of knowledge production. Smyth et al. (2016) therefore propose that OER's should be developed and implemented in combination with pedagogies "that stimulate learner generated content produced by learners acting autonomously, exploring,

collaborating and generating knowledge" (p. 208). Within such a nascent educational movement, there is an abundance of resources and learning opportunities which is contrasted with little empirical evidence about how learners, teachers, and higher education stakeholders generally engage with OER and OEP (Smyth et al. 2016; Panke, 2011). A dearth in the research literature on openness in higher education is a call to contribute to the field through empirical study, particularly in understanding how students use OER and OEP's as they engage in online HE, as is the case in the current research.

2.2.5 Open Education Research

Research on Open Education has placed a strong emphasis on the Massive Open Online Course (MOOC) phenomenon. A recent study by Toven-Lindsey et al. (2015) analyzing 24 university level MOOC's across a range of disciplines reveals that the majority of pedagogical practices tend toward an objectivist-individual approach (1st gen. online pedagogy), with some efforts being made to introduce more socio-constructivist and group-oriented approaches (2nd gen. online pedagogy). The study raises concern about how to improve quality in HE, and the challenge for universities and faculty in providing innovative and transformative pedagogies. Despite a range of critiques, the open education movement has offered some of the most significant interventions and innovations for online learning in the last decade. As such, it is an important educational phenomenon to consider within educational research in online HE, particularly when researching online graduate programs that support and develop their own open educational practices and resources, as is the case in the current study, in order to understand the lived experiences of students within these contexts.

It is likewise important to consider critiques of the open education movement. Knox (2013), for example, argues that much research attention has been narrowly placed on case studies in open education, strategies for implementation, and approaches to institutional change, neglecting critical studies that examine the pedagogical and educational rationales that underpin the Open Educational movement. He contends that the field remains significantly under-theorized. Another critique identified in the literature is that much of the discourses of the OER movement presupposes the abilities of participants as self-determined, self-directed and autonomous learners, often already highly educated, working toward pre-defined goals of established HE institutions (Knox, 2013). His characterization, for example, is highly accurate for the population under study in the current research.

Finally, when researchers examine open education they often focus on things such as engagement and course retention in OER's (de Freitas et al., 2015), the use of MOOC's for professional development of employees (Castano-Munez et al., 2017), frameworks for integrating MOOC's into

existing curriculum (Perez-Sanagustın et al., 2017) or the role of social media (twitter) communication channels alongside MOOC communication tools (Veletsianos, 2017) while ignoring students experiences of learning across a continuum of contexts and practices. Rarely do scholars focus on the open educational resources and practices that students engage with across a range of contexts in support of formal academic learning in online HE. Open education practices, activities and resources will thus be an important analytical dimension of the current study.

2.3. Digital Competence in Higher Education Research

An essential attribute of online HE is the understanding that the conventional competencies required of traditional models of higher education no longer capture the range of skills, dispositions and knowledge required to learn and participate in a digitally networked model of learning. As such, the concept of digital competence will be reviewed given the increasing attention the construct receives in public discourse and educational research, particularly in higher education research in Europe (Spante, 2018) as well as in public policy recommendations on developing key competencies for lifelong learning (European Commission, 2018).

The climate of educational discourse in European Higher Education settings has recently given prominence to the construct of Digital Competence, particularly in continental Europe. There is a growing use of 'digital competence' as a synonym for digital literacy, especially within a European Union context and with the publication of recent European Commission policy-documents (Vuorikari et al., 2016; Carrotero, S. et al. 2017). A digital competence approach moves away from talking about digital literacy as more than a set of defined skills or practices, rather moving towards offering frameworks about what digital literacy does and the essential competencies that will allow citizens to fully participate in economic, social, and cultural life. The scope of digital competence moves across a variety of areas, including media and communication, technology and computing, literacy, information science, as well as health and well-being, across personal and professional spheres. The European Commission (Ferrari et al., 2012) gave central importance to digital competence, identified in its recommendation as one of eight key competencies for lifelong learning essential for citizens in the knowledge society. Ferrari et al. (2012) define digital competence as:

> *"the set of knowledge, skills, attitudes (thus including abilities, strategies, values and awareness) that are required when using ICT and digital media to perform tasks; solve problems; communicate; manage information; collaborate; create and share content; and build knowledge effectively, efficiently, appropriately, critically, creatively, autonomously, flexibly, ethically, reflectively for work, leisure, participation, learning, socializing, consuming, and empowerment."(p. 30)*

Digital competence is a relatively recent and emerging concept and has been the latest terminology used to describe technology-related skills. A review by Spante et al. (2018) concludes that "publications on digital competence are strategic and politically underpinned by means of definitions used from policy reports, and oriented towards use of technology in professionally purposeful ways in various contexts"(p.14). Digital competence can be understood as a highly policy-related concept, as frameworks often come from economic and political institutions such as the E.U., the O.E.C.D. and the U.N, who see the concept linked to the core skill of Lifelong Learning. In this sense, digital competence is a concept explicitly linked to both communicative and technological development and the political and economic aims for citizenship in a knowledge society (Ilomäki et al. 2011). Further, in higher education research, the predominant focus of research on digital competence is to develop and support both student and faculty competence, particularly in the area of teacher education (Spante et al., 2018). Linked with the new skills for working and learning in digitally networked contexts, as exemplified by the MOOC offered by the Edul@b research group which builds digital competence to live and work together in the network society (Romero, 2017), the concept of digital competence has been used as a construct in this study in order to frame professional development and teacher education in the context of online HE.

Although studies in digital competence in higher education have examined how online teacher education programs have supported innovative ways of teaching and learning with ICT (Tømte, 2015); digital competence for developing and managing digital libraries (Khan, 2017); the influence of digital competence and occupational setting in participating in MOOC's (Castano-Munoz, 2017) and the determining factors in acceptance of and use of ICT among university faculty in their teaching practice (Gutiérrez, 2011; Cazco et al., 2016), there has not been an analytic focus in current reseearch on the role of digital competence in supporting student learning across a continuum of contexts and practices in online higher education. As such, this study aims to provide additional insight into the role of digital competence in supporting and enabling student learning across contexts in online HE.

It is clear from the literature that this arena of research, policy and practice is still in its inception, and lacks significant and critical empirical work that can demonstrate the integration of a digital competence framework into higher education scenarios and practices. With recent European Commission policy development, the conceptualization of digital competence has become increasingly standardized and normative, however is not yet a stable concept (Ilomäki et al. 2011; Spante et al. 2018). There is still a clear dearth in the research literature, particularly in higher education contexts, signifying that further research could address this issue by interrogating student's experiences and

approaches to learning in online HE and the role digital competence plays for enabling innovative and transformative forms of learning. More research based on critical perspectives is however needed, including critical research into the legitimacy of policy frameworks over empirical research. In this way, the current research agrees with the conclusion offered by Gallardo-Echenique et al., (2015) who claim that "institutions and policymakers should set out their current educational priorities for an effective response to the changing needs of 21st-century learners. Proper acquisition of digital competence or digital literacy, understood from the holistic and emancipatory perspective, is key to active and functional participation in contemporary society" (p.12).

Within a nascent stage of conceptual and empirical development, there is a noticeable lack of large-scale studies on digital competence in HE, particularly in regard to the lived experiences of students. Significant policy development, particularly in an EU context, offers a considerable literature from which to design empirical studies. Several studies and conceptual developments relate to one another, particularly across other areas of online HE research, including linking emerging pedagogies and epistemologies of online learning, who often share similar socio-constructivist perspectives. From the literature review on digital competence in HE (Spante, 2018), it is evident that further empirical work is needed to contribute to the body of knowledge in this field, particularly linking the role of digital competence development to innovative and novel approaches to learning across contexts and practices, where currently little research or knowledge exists.

As the research field of online HE becomes more established, it is hoped that greater links between emerging pedagogies, open education, and digital competence can be made in relation to student's experiences of learning across contexts, so that researchers will be able to locate their work within a broader and emergent research movement in online higher education. It is certain that the field of digital competence will continue to evolve and develop, playing a fundamental role in both lifelong learning and educational processes in online HE.

CHAPTER 3
LITERATURE REVIEW: STUDENT LEARNING ECOLOGIES IN ONLINE HE

3.1 Introduction

"Most learning is not the result of instruction. It is rather the result of unhampered participation in a meaningful setting. Most people learn best by being "with it," yet school makes them identify their personal, cognitive growth with elaborate planning and manipulation". Ivan Illich, Deschooling Society

This chapter will highlight and review the literature most relevant in researching student experiences of learning in online HE, underpinned by a learning ecologies (LE) perspective. Throughout the various sections in this chapter, an overview of the significant learning paradigms in online HE will be presented. Developments in the study of formal and informal learning as applied to HE will also be considered, followed by a review of the literature on lifelong and lifewide learning. A review of the Learning Ecologies (LE) construct in relation to HE will be presented as the underlying analytical framework for the study. The LE construct has been used as a guiding "conceptual heuristic" which offers a theoretical lens and analytical framework through which to examine learning which draws together multiple contexts, spanning the boundaries of formal and informal learning practices and trajectories.

3.2 Learning Approaches in Online Higher Education

Significant developments in the sciences of learning, particularly in the last 30 years, offers evidence based principles for how people learn, grounded in socio-constructivist theories and a learner-centered approach (National Academies of Sciences, Engineering, and Medicine, 2018). In this regard, research on learning today must acknowledge that learning does not only take place in institutionalized classrooms in HE, but is connected across all aspects of community, family, and personal life at home, in the workplace and in community spaces, and increasingly in contexts amplified through digital media and new technologies. Accordingly, the current research takes into considerations learning paradigms and frameworks across a diverse literature on adult learning in online HE to address the complexity and connectedness of students' experiences of online learning across multiple contexts.

The literature on lifelong learning (Colley et al., 2003; Van Noy et al., 2016; Greenhow et al. 2016) argues that attributes of formal and informal learning are present in any circumstance of learning, across a continuum of experiences, increasingly mediated by digital technology and social networks. At the same time, advances in big-data infrastructures, A.I., machine learning and hyper-connectivity are reshaping

many aspects of modern life, including economies, job markets and university systems leading to what some observers term Education 4.0 (Feldman, 2018; Davies, 2019; Salmon, 2019). In this setting, traditional models of transmission based learning in HE need to be re-conceptualized in relation to emerging understandings of how students learn mediated through digital technology, with a particular emphasis on learning across contexts.

In this line, Cobo Romani and Moravec (2011) argue that "education demands an ecological, systemic, inclusive and long-term improvement" (p.20), bringing new focus to life-long learning that acknowledges the nature of learning across a continuum of contexts, relationships, activities, intentions, and purposes. The digitalization of HE has led to a unique and unprecedented moment in history where **new digital tools and** technologies have fundamentally reshaped student agency, transforming pedagogical interactions between knowledge, teacher and learner, disrupting traditional methods of instruction, modes of learning as well as pedagogical practices.

Reviewing the dominant paradigms of online learning may offer insight into resolving some of the fundamental challenges online HE faces in providing effective and relevant educational experiences for learners. In the midst of transformation in HE, there is near universal agreement (Siemens, 2004; Anderson & Dron, 2011; Bates, 2015) that the most dominant epistemological paradigms that underlie online higher education are Behaviourist, Cognitivist and Socio-Constructivist theories of learning. All three have often been combined and have contributed in various ways to the design of formal online learning programs in higher education, as discussed in more detail in Chapter 2. Likewise, whereas the 3 dominant paradigms of learning have fully matured in the 20th century, a 21st century digital age paradigm, Connectivism, has also emerged in recent years with considerable traction, yet with unsubstantial empirical support (Bates, 2015). Although learning theory can offer robust frameworks for designing learning tasks, theoretical concepts can also fail to offer tangible concrete prescriptions for classroom application, particularly in bridging academic learning to wider world contexts. Regardless of what learning paradigm programs are working from, it is clear that what has the most impact on learning outcomes is the activities students' engage in (i.e. what students do to learn) as they navigate the academic curriculum.

3.2.1 Social Configurations for Online Learning

In online spaces, individuals cluster together in various configurations in relation to their socio-cultural context, interests and needs (Dron & Anderson, 2014). In this regard, the current study is

influenced by the social learning literature, particularly as related to online learning in HE. As such, the current study proposes that social learning is the active construction of meaning which occurs through negotiation and interaction between people, and between people and their environment, including those interactions that emerge from them (Vygotsky, 1978; Dron & Anderson, 2014). The construct of social learning is informed in particular by the perspective of social constructivism, which suggests that knowledge is actively co-constructed in a social environment, and through the processes of social interaction (Dewey, 1938; Vygotsky, 1978). Dialogue and interaction with one's environments are opportunities to negotiate and construct meaning in this regard. As Dron & Anderson (2014) elaborate, social constructivist paradigms of learning require opportunities to discuss, debate and co-construct knowledge with a focus on authentic contexts for active problem solving.

In the context of online higher education, there are a variety of social configurations that can be used to support learning across contexts, particularly in digital scenarios, including traditional forms of dyadic and peer learning. For example, one-to-one tutoring is an ideal learning scenario and as Dron & Anderson claim "the gold standard for effective instruction" (2014, p.74). Many online programs incorporate tutoring support, such as in the case in all 3 programs sampled within this study. However, it is costly and difficult to scale, and in this sense, dyadic learning, often in a tutor and learner format, is not the most effective form of institutional learning.

In the social learning literature, there are two social configurations that receive particular attention, communities and networks. Of course, communities and networks exist in online and offline contexts, however, for the purposes of the current research, a focus will be placed on how these configurations support learning in digital contexts. Group relations are also familiar formations for learners, being the most common social configuration in an educational context. Common group forms include classes, tutorial groups, cohorts, collaborative work groups and academic faculties (Dron & Anderson, 2014). Online learning groups or communities are well represented in the literature, influenced by the work of Wenger (1999) who conceptualized the concept of communities of practice. A learning community, or community of practice, aligns with the social learning typology of 'group' outlined by Dron and Anderson (2014). As Wenger et al. (2002) articulate, a community of practice is a type of learning community defined as "a group of people who share a concern, set of problems or a passion about a topic, and who deepen their knowledge and expertise in this area by interacting on an ongoing basis" (p.4). Communities of practice are common in workplace contexts and involves the notion of legitimate peripheral participation as articulated by Lave and Wenger (1991). A core feature

of the community of practice are their network-like characteristics and three definable attributes of the domain, the practice and the community. The cohesiveness of many communities of practice, particularly in educational contexts where locations are often shared, make them feel group-like as well. They are also noted for their lack of explicit hierarchies, although there are often leaders, and exclusions that often define groups (Dron & Anderson, 2014).

Networked learning is based on an understanding of learning as a social and relational experience. In this regard, research on online networked learning align with a social network perspective (Downes, 2010). The rapid growth of online social networks, supported by social software and emerging technologies (Velatsianos, 2016), has created new and emerging ways to collaborate and interact to support learning, often blurring typical boundaries of formal and informal (Cope & Kalantzis, 2017; Greenhow et al. 2016).

Each learners network is unique, individual and in constant evolution through the interactions, mediating objects and connections individuals make through the situated physical and virtual environments they inhabit. Dron & Anderson (2014) describe entry and exit into our personal networks as a relatively basic task relying on whether a connection has been made or not. In this sense, individual learners may enter in and out of *"network activity and participation based on relevance, time availability, context, needs and other personal constraints"* (Dron & Anderson, 2014 p. 76). In the age of social software, network relations are enabled through social networking technologies typified by Facebook, Twitter, LinkedIn or Pinterest. Although networks can be related to non-living things, such as tools and technologies as well as conceptual heuristics such as ideas and theories, the current study is most interested in networked social relations and it's role as an essential dimension of student experience across contexts and practices. Understanding the defining features of online communities and networks as they relate to online higher education, detailed in the Table 3.1 below, will support the conceptualization, data collection and analysis phases of the current research, as well as contribute to an understanding of social learning in a networked society.

Table 3. 1 Comparison of Features of Online Learning Communities and Networks adapted from Dron & Anderson (2014)

	Online Learning Communities/Groups	**Online Learning Networks**
Metaphor	virtual classroom	virtual communities of practice

Common Activities	collaborative group projects	discussion, inquiry, exploration
Typical Tools	threaded discussion, LMS (VLEs); multimodal conferencing (Blackboard, Moodle, Hangout)	mailing lists, blog syndication, social networks (Facebook, LinkedIn, etc.)
Goals	accreditation, formal learning, task completion	knowledge generation, expanding social capital
Learning Approaches	social constructivist	connectivist
Time frame	usually bound by semester, synchronous or asynchronous	short to long term—as beneficial to individual synchronous or asynchronous
Membership	known	flexible, changing

3.2.2 Learning Activities and Strategies in Online Higher Education

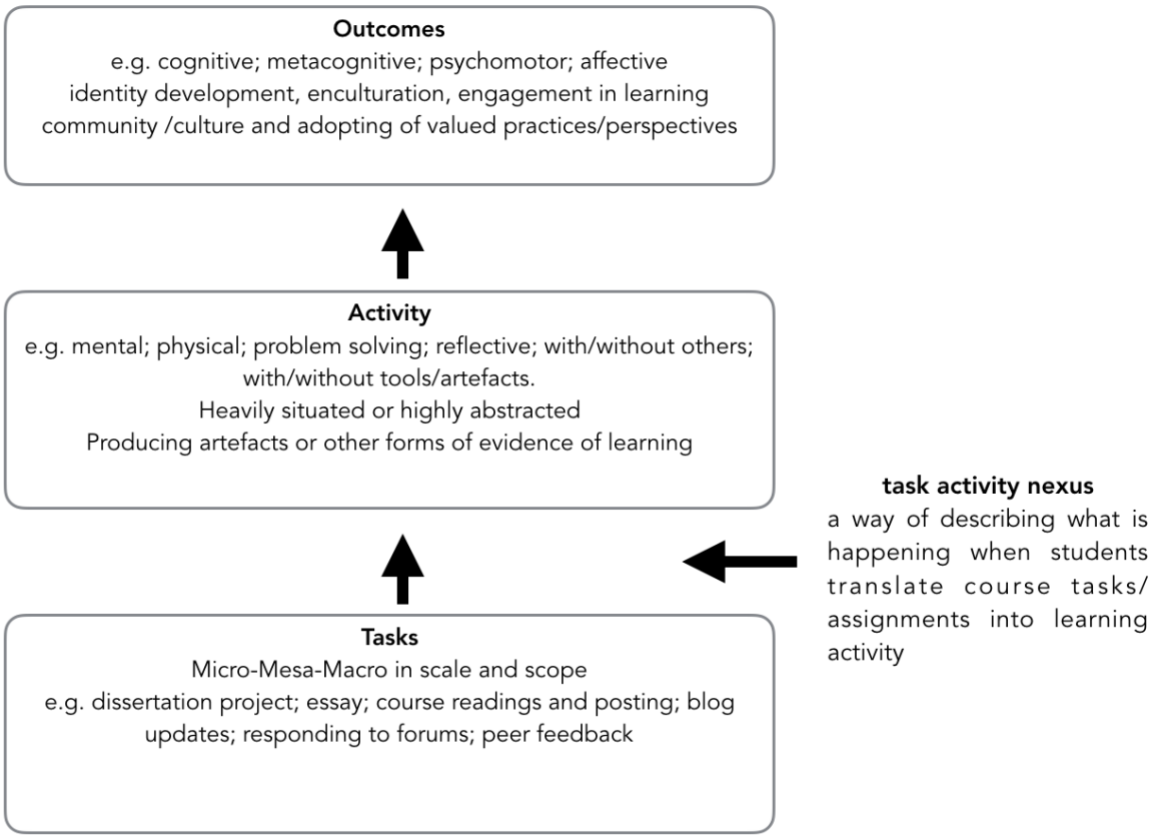
In a social sciences context, graduate study is largely characterized as knowledge work. In online HE, two broad activity categories have guided learning design, which can be placed into inquiry-driven activities and discussion/dialogue driven activities (Ellis & Goodyear, 2013). Although these broad learning approaches have come under critique, most notably from a cognitive load theory perspective (i.e. Kirschner, Sweller, and Clark, 2006), they are still widely used in the social sciences, particularly at the graduate level. Kirchner et al. (2006) have argued in favor of designs they term guided instruction. In their critique, Kirschner et al. (2006) attack the limitations, or failure, of what they term "constructivist, discovery, problem-based, experiential, and inquiry-based teaching" (p. 75). Despite such critique, deeper learning approaches through inquiry-based learning, collaboration and interactive discussions have been central activity design features within HE (Adams-Becker et al, 2017), particularly suitable for online learning. Ellis & Goodyear (2013) note that learning through discussion can be effective in connecting learners together in communities of practice (Wegner, 1999) as well as connecting learners through another prominent model of online learning, communities of inquiry (Garrison et al. 1999). Learning through inquiry can likewise engage learners in discovering, exploring and benchmarking a range of learning resources to guide problem-based, project-based, and research-based activities. Hmelo-Silver, Duncan, and Chinn (2007), for example, argue that problem-based and inquiry-driven learning activities "provide students with opportunities to engage in the scientific practices of questioning, investigation, and argumentation as well as learning content in a relevant and motivating context" (p.105). However, they continue that students are not only learning "but also learning 'softer skills' such as epistemic practices, self-directed learning, and collaboration that are not

measured on achievement tests but are important for being lifelong learners and citizens in a knowledge society" (p.105).

Contributing to the literature on foundational activities for online contexts, Sharpe & Beetham (2010) have proposed a developmental model for effective e-learning. They have suggested that students develop their technology-based learning practices over time. The first level of their model is based on functional access to digital technologies, resources, and environments overcoming issues of accessibility, privacy, mobility and ownership. The second level is based on skill development including technical skills, information & knowledge management, communication and organizational skills. The third level are digital practices, including making informed choices about how to use technologies autonomously and collaboratively in response to individual and situational needs. Lastly, the final level in their developmental model is based on creative appropriation of digital practices by making use of their skills and competencies in order to create and support their own learning processes and environments. They argue that through these developmental stages students develop the practices and attributes required to be a successful learner in the digital age. In this regard, their work is linked from a practitioner perspective, to the digital competency framework reviewed in Chapter 2 (Vuorikari et al., 2016; Carrotero, S. et al. 2017). In the context of the current study, this framework can serve to understand forms of digital practices accounted for through empirical field work.

Offering a more integrated or ecological perspective, Ellis & Goodyear (2013) conceptualize what they call the *'Ecology of University Learning'* by focusing on the relationship between academic tasks designed by the instructor (i.e. a required piece of work to be undertaken by the student), learner activity completed by the student (i.e. what the learner does to complete a task), and learning outcomes (i.e. the result of learner activity) in any given study situation. In relation to student experiences of online learning, understanding the nexus between task design, learner activity (through strategies and practices), and the outcomes of such activities can offer rich insight into how students experience learning in online HE. Goodyear & Ellis (2013) define the task-activity nexus as "a way of describing what is happening when students translate tasks they are set into actual learning activity" (p.122). How students approach learning, they argue, is through a mixture of **learner strategies** (what they did to learn) and intentions (what they hoped to achieve by acting in certain ways). The below Figure 3.1 offers a view of the relationship and alignment between task design and learning outcomes, in line with both the 3P model of Student Learning (Trigger & Proswell, 1997) as well as Biggs and Tang's 'constructive alignment' (2007). How students achieve learning outcomes are based on their intentions and strategies (Goodyear & Ellis, 2013).

Figure 3.1 Ecology of University Learning visualizing the relationship between Academic Tasks, Learner Activity and Learning Outcomes (Adapted from Ellis & Goodyear, 2013)



Moving to online learning strategies, the current study uses the work of Ellis & Goodyear (2013) to define a strategy as what the student does to learn through activity. Significant attention has been given to self-regulated learning (SRL) strategies in online HE, attracting meta-analytic attention (i.e. Broadbent & Poon, 2015). Research has shown links between self-regulated learning strategies and academic achievement in online HE, particularly through strategies of time management, metacognition, effort regulation, and critical thinking (Broadbent & Poon, 2015). Those strategies with the weakest support include rehearsal, elaboration and organization, while peer learning only had a moderate effect on academic outcomes. As research in this area is relatively recent, Broadbent & Poon (2015) conclude the following:

> *"Although the (SRL) contributors to achievement in traditional face-to-face settings appear to generalize to online context, these effects appear weaker and suggest that*

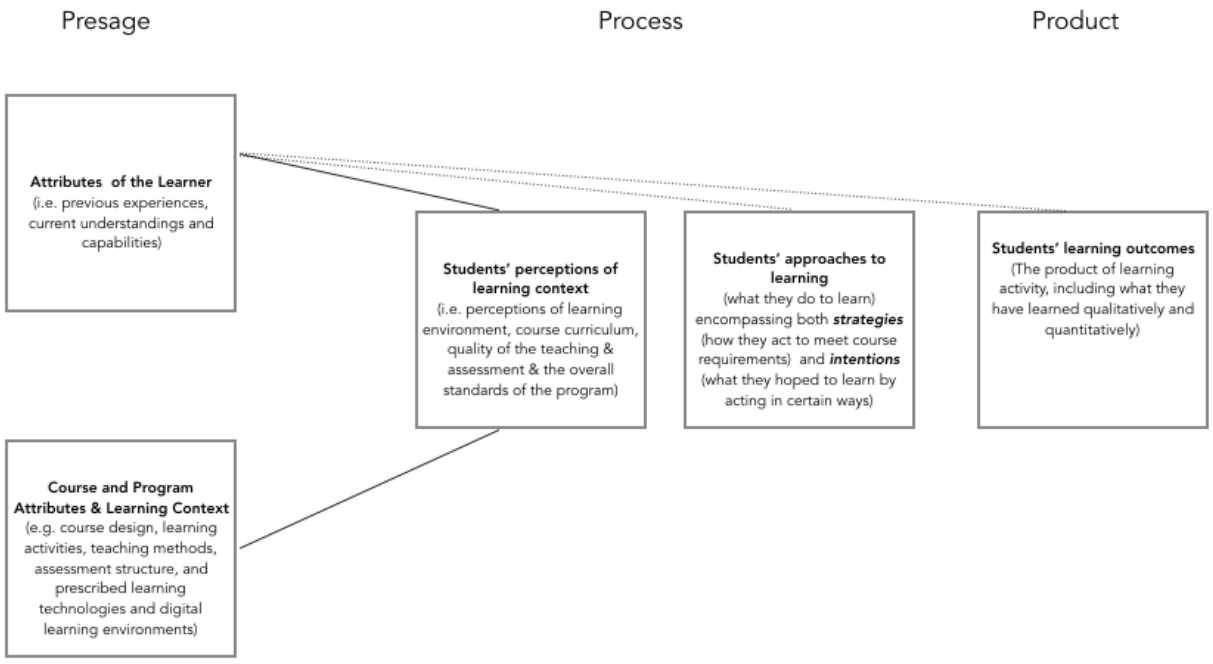
(1) they may be less effective, and (2) that other, currently unexplored factors may be more important in on-line contexts." (p.1)

As the above quote indicates, there is still a need for exploring learning strategies that students use to support formal learning across a range of formal contexts. As research has supported a link between the use of self-regulated learning strategies and academic achievement, authors such as Jackson (2016) have argued that *"the theory of self-regulation can provide an overarching framework for explaining self-directed learning and development in many different contexts" (p.261)*. In this line, a range of models have been developed, however Zimmerman's (2000) model of self-regulated learning has influenced online HE research on MOOCs (see Tang, 2018), and can be viewed as an appropriate framework for supporting research on learning in online HE. Zimmerman's model includes a cycle of 1. Forethought, 2. Performance, and 3. Self-reflection, in combination with a range of practices and strategies that students may use to impact learning and achievement, including i.) goal setting, ii.) strategic planning, iii.) intrinsic interest, iv. Goal orientation, v.) self-instruction, vi.) time management, vii.) help seeking, viii.) cognitive monitoring, ix.) self-evaluation and x.) self-satisfaction.

3.2.3 Student Learning in Online Higher Education

Research on student learning in HE has often been undertaken through the perspective of educational psychology (see Trigwell & Prosser, 1999; Biggs and Tang, 2007; Laurillard, 2013; Fryer & Gijbels, 2017). However, these perspectives, especially the 3P model of student learning have also been used to understand student experience of learning in online higher education (Ellis & Goodyear, 2013). Importantly, the 3P model lends itself nicely to an ecological perspective on learning, yet can be extended beyond a formal scenario to account for lifewide learning. The below Figure 3.2 outlines the 3P model, adapted from Trigwell & Prosser (1999) and Ellis & Goodyear (2013).

Figure 3.2 3P Model of Student Learning in HE (adapted from Trigwell & Prosser (1999) & Ellis & Goodyear (2013)



An advantage of using this model, according to Ellis & Goodyear (2013), is that it can be used by researchers to represent the experience of learning who may hold different ontological and epistemological beliefs. As such, research does not need to align with the educational psychology origins of the model. Accordingly, the model can be adapted to incorporate ecological epistemologies and ontologies, taking into account learners' experiences across a continuum of contexts and trajectories, as is the case in the current research. The presage, process, and product components of the model are likewise highly adaptable and malleable, able to account for the specific contexts and trajectories of lifelong learners in online HE, many of whom are unrestricted by age or geographic boundaries with a broad range of career and academic trajectories. The model is also activity centered, and is able to account for how students translate the tasks designed within the academic curriculum into learning activity which in turn yields learning outcomes (i.e. the product of learning).

Another useful model which has been used to support research on student learning is Constructive Alignment (Biggs & Tang, 2007). It has greatly influenced research on student learning in HE and likewise lends itself well to an ecological and interconnected perspective on learning. Biggs (2014) defines constructive alignment as:

> *"a design for teaching in which what it is intended students should learn and how they should express their learning is clearly stated before teaching takes place. Teaching is then designed to engage students in learning activities that optimize their chances of achieving those outcomes, and assessment tasks are designed to enable clear judgments as to how well those outcomes have been attained" (p. 5-6)*

Biggs's commonly accepted concept of 'constructive alignment' (Biggs & Tang 2007), whereby every component of student learning must be explicitly aligned to predetermined learning outcomes, has its own internal logic but likewise has its limitations as a goal-directed form of learning. 'Constructive alignment' serves educational program design from an institutional perspective, yet doesn't account for emergent forms of boundary crossing learning across contexts. For example, as Ellis and Goodyear (2013) point out, there must be an acknowledgement that:

> *"The connections between tasks as set and learning outcomes are sometimes tenuous. Moreover, it is likely that only a subset of what the student has learnt will be visible to the teacher in the artefact submitted by the student" (p.122).*

In this regard, the current research on student learning acknowledges that how students interpret tasks through learner activity can likewise produce unexpected outcomes and results that may never be viewed or assessed by the instructor. This phenomenon is particularly aligned with networked and connectivist approaches to learning and education that may lead to rhizomatic experiences where learning is not considered as such a lineal and rational process (Cormier, 2008).

A range of theories and constructs, dominated by educational psychology perspectives, have been used to research student learning in HE (Fryer & Gijbels, 2017). Although most have their origins in campus and classroom based teaching and learning, some have been adapted to research learning in online HE. Those most relevant to the current research include Student Approaches to Learning (Marton and Säljö 1984), linked with the 3P model noted above, which has in particular influenced research in Europe and Australia. This theory posits that learners approach their studies differently, including acting in certain ways, depending upon the perceived objectives of the course they are studying (Marton and Säljö 1984). Similarly, self-directed learning (Garrison, 1997, 2011) has been a particularly useful framework for research in online HE as learner success relies heavily on one's ability to autonomously and actively engage in the learning process (Wang, Shannon, & Ross, 2013).

Another prominent line of research related to student learning in HE has been how teacher and student roles have evolved in emerging online learning scenarios, including student and instructor perspectives on the process of learning as well as the role of motivation and students' experiences (Siemens et al. 2015; Ellis & Goodyear, 2013; Peterson, 2008; Styer, 2007). In this line, self-directedness

has also been identified as a critical variable highlighted in the research that characterizes the successful online learner (Peterson, 2008). An additional principle concern is the role of motivation in online environments, where Styer (2007) concluded in a meta-analysis of student motivation that adult learners are often "intrinsically motivated, possess the ability to employ the cognitive strategies necessary to succeed online, value online learning, have high self-efficacy and set goals, but still may not be successful" (p.116). These broad lines of research underline the active and self-directed role of the student in online environments.

In relation to changing student and teacher roles, an important pedagogical feature of online learning environments that has been amplified from traditional face-to-face settings is the opportunity for recursive, formative feedback (Cope & Kalantzis, 2017). Seimens et al. (2015) emphasize that continuous instructor involvement characterized by personalized, timely, and formative feedback are foundational approaches for supporting student learning in online environments. Likewise, Hattie & Timperly's (2007) review of the literature confirmed that feedback is "one of the most powerful influences on learning and achievement, but this impact can be either positive or negative" (p.81). There is compelling evidence to support the role of feedback in student achievement, however, the type of feedback and the way it is given can vary considerably in its effect on student learning, especially in online environments. It is clear that both formative feedback and peer feedback can be a useful analytical dimension when researching student's experience of online learning. In the current study, recursive feedback, help seeking, peer collaboration and social support have been used as elements to support an analytic framework for understanding student learning across contexts.

Finally, the most recent literature suggests that much interest on student learning in online HE has focused on MOOC experiences, likely due for a variety of reasons, including; an abundance of available data; an interest and opportunity to perform learning analytics; the scale of student participation; the mainstream attention MOOC's have received; and the disruption that MOOC's have caused to traditional models of HE delivery. A prominent pattern of research into learners' experiences in MOOC's has been Identifying learner profiles based on behavior and participation patterns (Kahan et al., 2017; Khalil & Ebner, 2017; Tang, 2018; Wang et al., 2018 Poellhuber & Bouchoucha, 2019). Researchers have focused on how learners have participated in connectivist learning through social network and content analysis (Wang et al., 2018). This study concluded that students rely on a wide range of technologies to support their learning and revealed four participation profiles, including (1) unconnected floaters, (2) connected lurkers, (3) connected participants, and (4) active contributors. Their findings generally support the connectivist view of learning as network creation. Kahan et al.

2017, using a data mining methodology, analyzed participant behavior based on their use of activity resources in course, identifying patterns of behaviors, from Tasters, Downloaders, to online engagers and Social engagers. Limitations clearly emerge through mono-method quantitative approaches, where the nuanced personalized experiences of learners are difficult to identify.

When examining student experiences of learning in online HE, rarely do researchers focus on a mixed methods approach examining practices across a range of contexts—from formal to informal. When researchers focus on quantitative analysis to understand learner experiences in online HE, concerns can be seen about how nuanced, in-depth and deep understandings of the student experience can be neglected, as exemplified in the current literature.

3.3 Formal and Informal Learning in Online Higher Education

This section will review the current literature on formal and informal learning as it applies to online HE. The review will focus particular attention on conceptualizing formal and informal learning in this context while also presenting research which addresses ways it has been blended in online HE contexts.

3.3.1 Conceptualizing Formal and Informal Learning

The current thesis argues that it is increasingly important to conceptualize learning with varying attributes of formality and informality, particularly as "pedagogical practices drawing on informal learning become more commonplace" (Greenhow and Lewin, 2016 p.12). This phenomenon is directly linked to the blurring of boundaries as digital practices increase within educational institutions and digital cultures grow in importance outside of these institutions. Research on participatory media cultures, for instance, has demonstrated that individuals (young and old) can engage in participatory digital cultures, and potentially benefit from collaborative learning, the development of new skills and competencies and the shift in the balance of agency toward individual learners (Jenkins et al., 2009; Jenkins et al., 2015). In the context of online HE, blurring boundaries can be enabled through pedagogical approaches that emphasize self-directed learning through inquiry and research, as is the case in many online graduate education programs. These approaches, as Ebner et al., (2010) articulate, "offer particular potential for informal learning because of the low influence of teachers and the fact that learning is not primarily aligned to teaching" (p.93). In this setting, conceptualizing and understanding the boundaries and mobilities between formal and informal learning practices is a complex yet solvable problem in online HE and an essential dimension of the current research.

Within this context of blurred boundaries between formal and informal learning, it is generally accepted that informal learning is the truly lifelong and interest-driven, unscheduled, and impromptu process whereby individuals acquire knowledge, value and skills from daily experience and interactions undertaken at the learner's own speed (Van Noy et al., 2016). In contrast, formal learning is most often defined as learning that occurs in school and leads to an educational credential. In this regard, Van Noy (2016) explains formal adult learning as "intentionally sought by learners, includes a formalized curriculum, with an instructor, and occurs in traditional, classroom-based, accredited educational institutions that issue credentials; examples include postsecondary education programs that lead to degrees" (p.i).

The literature on formal and informal learning, however, is controversial, open to disagreement, and has often provoked debate among researchers (Colley et al. 2003; Czerkawski, 2016; Van Noy et al., 2016). Therefore, some disambiguation is necessary. It is universally accepted that formal learning in schools is not the only education that students experience throughout one's life. As such, it is important to consider the conceptual and empirical work that has contributed to the study of learning across a variety of practices and contexts outside of academic settings, in order to understand how these experiences may support formal learning.

Authors Colley et al. (2003) articulate an important claim that the conceptualization of discrete categories of learning from formal to informal is misleading and actually demonstrates a misunderstanding of the nature of learning. As they argue (2003 p.1), it is more sensible and accurate "to conceive 'formality' and 'informality' as attributes present in all circumstances of learning". This research will thus take influence from the learning formality framework as an appropriate perspective for researching student learning across contexts. In this regard, through empirical field, a central purpose of the study is to disentangle formal and informal strategies and practices in online HE, attempting to gain insight into what the boundaries between them might be.

Several authors have contributed to the study of learning across contexts, including Resnick (1987), whose influential study highlighted differences across settings, articulating that formalized school learning is centered on individual performance, symbolic thinking, and general skills and knowledge. In contrast, out-of-school learning is characterized as highly socially collaborative, aided by tools, and embedded in mediating objects, resources and situations that result in highly contextualized competencies, skills, and knowledge practices. Marsick & Watkins (2001) have similarly concluded that

informal learning is integrated into daily routines, not highly conscious, haphazard and influenced by chance, and often linked to the learning of others. Formal learning, on the other hand, is understood as a hierarchically structured 'education system' running from primary school to university and professional training that often leads to credentialing, while non-formal learning is any structured educational activity that is organized outside an established formal system, usually not leading to credentials (Van Noy et al., 2016).

Colley et al.'s (2003) '*continuum of formality'* has been developed to conceptualize learning across contexts--from '*formal learning'*, to '*organized informal learning'*, to different varieties of '*informal learning*' (self-directed, incidental and tacit learning). The continuum of formality incorporates a broad spectrum of learning theories while recognizing that the categories are not absolute and fixed, and that overlapping inevitably occurs. For example, Van Noy et al. (2016) claim that "informal learning can and does occur within the context of formal learning" (p.6). Conceptual ambiguity arises as the construct of 'organized informal learning' begins to replace 'non-formal' learning from the original typology of formal, non-formal and informal from Coombs (1973) in modern discourses, particularly in the workplace and adult learning literature (Van Noy et al. 2016). Non-formal[2] learning is also commonly associated with adult education in international development and education contexts. Moreover, when the authors Colley et al. (2003) examined a range of learning contexts in their literature review, they discovered that attributes of formality and informality were present in all circumstances of learning. They therefore concluded that: .

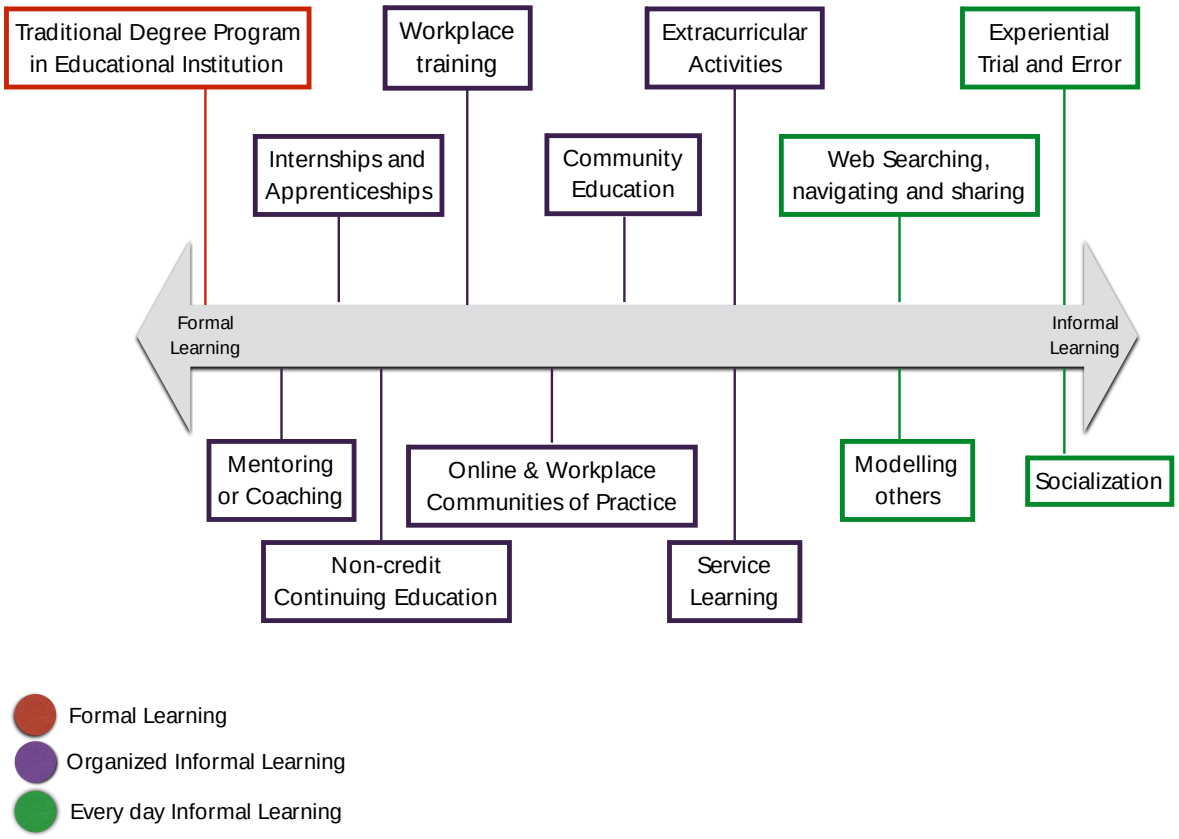
> *"It is important not to see informal and formal attributes as somehow separate, waiting to be integrated. This is the dominant view in the literature, and it is mistaken. Thus, the challenge is not to, somehow, combine informal and formal learning, for informal and formal attributes are present and inter-related, whether we will it so or not. The challenge is to recognize and identify them, and understand the implications. For this reason, the concept of non-formal learning, at least when seen as a middle state between formal and informal, is redundant" (p.314).*

Organized informal learning includes a broad spectrum of purposes including learning new skills such as photography or new media production, to workplace and professional development contexts that may include semi-structured workshops, or on the job training

[2] For the purposes of this study, the current study will use Colley et al.'s (2003) learning formality continuum categorization, referring to 'formal', 'organized informal' and 'informal learning' (itself having three subcategories of self-directed, incidental and tacit learning). Non-formal learning, therefore, will not be used as a middle state between formal and informal, as it is redundant, unless to highlight a specific case or practice.

through mentoring, coaching, peer observation or communities of practice (Van Noy et al. 2016). Figure 3.3 below represents a range of learning examples along a continuum of formality, adapted from Van Noy et al. (2016).

Figure 3.3 Visualization of a Continuum of Formality with range of Learning Examples (adapted from Van Noy et al., 2016)



3.3.2 Blending Formal and Informal Learning in Online HE

Although research on formal and informal learning is not new, it is relatively new in the context of online HE (Czerkawski, 2016). Research on how people learn has long been a pressing question in educational research. Increasingly, however, research has focused on where people are learning through place, mobilities, trajectories and networks, provoking serious interest in the blurred boundaries between school and non-school, digital and physical spaces, and formal and informal

educational opportunities (e.g. Leander et al. 2010; Sefton-Green, 2012; Ito et al. 2013). Historically, research on informal learning has been linked to a conceptualization of place (Sefton-Green, 2012). However, today research on how, where and why people learn seem irreversibly interconnected.

Recently, Adams Becker et al. (2017) have articulated that integrating formal and informal learning is a significant yet solvable challenge in the context of technology integration in HE. This claim is particularly notable as Czerkawski (2016) concludes that HE students regularly use both formal and informal learning networks in online courses to support their learning, however, "online course design is usually not designed to consider informal experiences of the students" (p. 138). Similarly, other studies have concluded that there is little evidence about the interrelationship between the formal and informal uses of ICT in online learning and that more studies are needed to "investigate the extent and impact of informal uses of IT on formal e-learning" (Cox, 2013 p.17). Further studies have argued that social media has the potential to bridge formal and informal learning through participatory digital cultures (Greenhow & Lewin, 2016).

Another trend identified in the research has been characterized as both the formalization of the informal, as well as the informalization of the formal. Sangra et al. (2013) highlight this trend, particularly with the movement toward Open Educational Resources, MOOC's and a growing interest in connectivism as a learning paradigm. Sangra et al. (2013) argue for a need for evidence based research capable of establishing what actual learning can be attained informally, while also claiming that "informal learning has found a perfect ally in ICT in general, and in online learning in particular" (p.291). As such, the current learning aims to contribute to evidence based research which can establish how learning can unfold across a range of contexts.

The constructs of formal and informal along a continuum of learning will therefore be critical to the current research, as a gap has been identified in the literature on understanding the role of informal processes in supporting academic learning in online HE. Although studies have examined the role of social media in re-conceptualizing the boundaries between formal and informal learning (Greenhow & Lewin, 2016) and blending formal and informal learning networks for online Learning (Czerkawski, 2016), there has not been sufficient attention placed on connecting learning—from formal to informal—across contexts and practices in online higher education (Sangra et al, 2019).

The rise of online HE as a mainstream phenomenon appears to be a fertile ground for linking formal academic learning with informal practices and experiences across students' lives. This is particularly true as the profile of online graduate student is often combining full time professional work with part-time study. In this context, informal learning in digital contexts has been increasingly associated with the concept of communities of practice, or online communities of learning (Downes, 2017), where interaction, participation, and sharing of content defines many affinity groups. Linked with communities of practice is the rise of informal professional learning networks which has been, for example, examined in recent doctoral thesis that trace the identity of student researchers in the digital age using the LE construct (Esposito, 2014; Oliveira, 2015). In this regard, the rise of open education, as discussed in Chapter 2, has had compelling influence on opportunities for learning across a range of formal and informal networked learning scenarios.

Professional development has been greatly influenced by globally distributed networked practices. As Evans (2015) articulates, the pervasiveness of digitally networked technologies has "contributed to the growth of distributed work practices alongside a privileging of individualized learning. Individual professionals are increasingly expected to take responsibility for their own professional development and learning activities" (p.31). In this context, professionals engaged in online higher education often experience a continuous mixing of formal and informal networked learning practices (Cope & Kalantzis, 2017). Moreover, some authors argue for academic programs in higher education, particularly graduate education, to be seen as a form professional practice (Boud & Brew, 2013). It is clear that as online degrees continue to expand, many students are able to combine full time professional work with part time academic studies. At the same time, student experiences of learning have significantly changed through ever-present social technologies continuously blending formal and informal contexts (Cope & Kalantzis, 2017) as participants often engage across integrated and boundary-less professional, socialized and academic practices.

Another significant trend in online HE has been the role of mobile technologies in blending formal and informal learning environments (Lai et al., 2013). Krull & Duart (2017) identify mobile technologies in higher education as a growing field where the most common research theme is related to enabling m-learning applications and systems. In relation to online HE and professional development, the rise of PLE's or Personal Learning Networks, defined by Visser, Evering, & Barrett (2014) as simply "a

system of interpersonal connections and resources" (p. 396)— has likewise been given significant attention as a form of professional practice which blurs the lines between formal and informal learning in higher education (Czerkawski, 2016; Oddone, 2019). One clear example of this is found in the valued academic practice of using social media for professional development (Bruguera, 2018), particularly Academic Twitter for teacher professional development, becoming a focus of PLN research in recent years (Oddone, 2019). With enough sustained practice, relationships akin to mentor and mentee may begin to develop (Rodesiler, 2015), and thus support forms of social learning through digital technology.

3.4 Lifelong and Lifewide Learning

3.4.1 Conceptualizing Lifelong & Lifewide Learning

The concept of lifelong learning has become a salient feature of contemporary educational discourse, redefining the critical skills and abilities needed for citizens and learners today. For higher education institutions, as Cendon (2018) argues, "this means a shift from the traditional role of educating young students coming directly from (high) school to navigating a wide range of students re-entering higher education at different phases of their lives" (p.81). The premise of lifelong learning shifts the focus of agency from institutions and teachers toward learners, and claims that individuals need to update and develop skills and capabilities throughout their working lives (Cendon, 2018). Today, lifelong learning opportunities are readily accessible through the hybridization of digital learning contexts—from formal to informal— across a continuum of contexts and practices. As such, online higher education (HE) has evolved to become an important educational and training solution for lifelong learners.

In a European context, public policy and higher education leadership have intentionally adopted discourses that engages higher education institutions to develop lifelong learning as central to their organizational mission, established as one of the ten priorities for 2010-2020 within the bologna process (de Viron et al. 2015). The concept of lifelong learning first appeared in a seminal 1973 UNESCO report entitled "Learning to Be", that advocates for 'lifelong learning' to be considered as the 'master' concept for educational policy and practice in the coming years (Elfert, 2015). Lifelong learning has been defined by the European Commission's (1995) white paper 'Teaching and Learning: Towards the Learning Society', as "the on-going access to the renewing of skills and the acquisition of knowledge" (p.24). Similarly, the Commission of European Communities (2001) defines lifelong learning as "all learning activity undertaken throughout one's life with the aim of improving knowledge, skills, and

competencies, within a personal, civic, social and/or employment related perspective" (p.9). The later definition in particular emphasizes the interconnected and integrated characteristic of learning which naturally moves across contexts and practices.

The scale of far-reaching technological change and the significant shift from a traditional 'industrial-economy' toward a 'knowledge-economy' has created a critical need for self-directed, lifelong learners within a learning society. A significant force behind such changes can be linked to what many observers term the fourth industrial revolution (Industry 4.0) influenced by big data infrastructures, artificial intelligence and robotics (Feldman, 2018; Davies, 2019; Salmon, 2019). Other forces that have contributed to the paradigm shift toward lifelong learning in higher education include demographic transformations and the impact of economic globalization. Moreover, the role of 'life transitions' is also cited as a significant factor that contributes to lifelong learning in the context of higher education (de Viron et al., 2015), explaining that for a variety of reasons "new patterns of career and working life have emerged for both men and women whereby the traditional sequence of education – work – retirement has been replaced by several entries to and exits from the labour market" (p. 42).

Lifelong learning has been considered an 'extra-ordinarily elastic term' (Smith, 2000). A range of interpretations and can be viewed as a concept with broad semantic space for characterizing learning throughout the lifespan. Kehm (2015) presents a synthetic view of the core characteristics of lifelong learning, which include;

(i.) a focus on the intrinsic value of education and learning over the instrumental value

(ii.) open and universal access to learning opportunities for citizens; an acknowledgement of learning in a variety of settings beyond institutionalized formal education

(iii.) learning throughout the lifespan

(iv.) a diversity of approaches to teaching and learning as well as modes of education that often diverge from traditional models;

(v.) a shift from learning content or substance to learning process or strategies;

(vi.) a shift from teacher-centered to student-centered learning

Online learning, the open education movement, personal learning networks, and the rise of MOOC's and participatory digital cultures have all been significantly associated with lifelong learning policy, discourse and practice. A range of studies have contributed to an important educational and public

discourse about the centrality of lifelong learning for societies and for individuals (Elfert, 2015; Kehm, 2015; de Viron et al., 2015; Cendon, 2018). These studies have contributed to a clear paradigm shift that establishes definitive conceptual, theoretical and practical applications for lifelong learning in the 21st century, particularly in the context of online higher education as a site for learners who are re-entering educational processes at different phases and transitions in life, reflecting a broad spectrum of academic and professional trajectories. It is clear that the construct of lifelong learning will serve a clear analytic and conceptual purpose in the current study.

Although less commonly found in education discourse, the concept of lifewide learning has emerged to become an important construct in the 21st century. Lifewide learning is a complementary concept to lifelong learning, yet more ambiguous and less commonly applied in educational discourse and practice. Whereas lifelong learning may be interpreted as learning in time, lifewide learning is defined as learning across the multiple contexts of everyday life (Banks et al., 2007). As such, lifewide learning will contribute to the analytical focus of the current study by understanding how students experience learning across a variety of contemporaneous contexts. Lifewide learning has its socio-constructivist roots in the work of progressive and democratic educators such as John Dewey (1938), arguing that education must be linked across the different dimensions of ones' life. As Banks et al. (2007) articulate, the majority of learning outside of educational institutions is through informal experiential learning and personal development. As Jackson (2014) argues:

> *"It is ironic that one of the most important things higher education can do to prepare adult learners for learning in the rest of their lives is to pay greater attention to the informal dimension of their learning lives while they are involved in formal study in higher education" (p.2).*

Accordingly, the current study will emphasize the lifewide dimension of learning as students engage with formal study in online higher education in combination with a range of contexts of everyday life.

3.4.2 Lifelong and Lifewide learning in Higher Education

Slowly, HE institutions are recognizing, encouraging, and valuing experiences of learning that are acquired beyond academic contexts (Jackson, 2014). As authors such as Barnett (2011) argue, we have entered the age of the liquid, ecological university, influenced by the marketization and globalization of HE. In this regard, institutions are no longer isolated to the world through the traditional 'ivory tower'

model. In contrast, Barnett (2011) argues universities are "in the world, and the world is in universities" (p.2). Recognizing the concept of lifewide education means an acknowledgement that formal university learning is taking place alongside other learning spaces that students inhabit. The concept of a lifewide curriculum has been conceptualized and articulated in the case of HE systems in the U.K. For example, Barnett and Coate (2005) articulate that the key challenges include "how to design a curriculum that enables learners to integrate their life experiences into their learning and developmental process to prepare themselves for the complexity and uncertainty of their future lives. Such a curriculum shifts the focus from a skills, standards and outcomes model of curriculum [to] a reflexive, collective, developmental and process oriented model" (p.18).

Advocates of lifewide education (Banks et al., 2007; Barnett, 2011, 2017; Jackson, 2011, 2014; Fung, 2017) argue that universities must recognize a need to respond to the opening and integrating of universities in the modern, digital age, and of acknowledging the complex interrelations between learning inside and outside of formal university classrooms. For example, Barnett (2011) argues that a lifewide education response strategy should include;

(i.) enabling and promoting students in gaining valuable learning experiences beyond their program of study;

(ii.) accrediting the variety of learning experiences across different settings that learners bring to university life;

(iii.) enhancing lifewide learning experiences by offering opportunities for systemic reflection on those experiences; and

(iv.) designing lifewide curriculum that maximizes the potential of learning opportunities across a variety of learning spaces in one's life.

Lifelong and lifewide learning is part of a greater paradigm shift in the transformation of higher education in the 21st century, however it requires greater empirical attention. A gap in the literature with a focus on lifelong and lifewide learning in higher education using rigorous research methods has been detected. In this regard, the particular research problem of understanding how students experience learning across contexts is justified. Accordingly, the study aims to contribute to the knowledge base in this field by exploring lifelong and lifewide learning trajectories in the context of online HE.

3.5 Learning Ecologies as a Sensitizing Analytical Framework

3.5.1 Defining Learning Ecologies as an Analytical Framework

The current research is theoretically supported through a Learning Ecologies (LE) perspective, used as a 'sensitizing' conceptual framework (Van Den Hoonaard, 2012). The LE framework offers a general sense of reference and guidance in approaching empirical research through a conceptual lens, suggesting helpful directions along which to look and as guidance in the data collection and analysis. The construct of a LE analytical framework can be described as a 'conceptual heuristic' which offers an analytical model through which to explore learning that draws together multiple contexts, spanning the boundaries of formal and informal experiences and practices. The research explores a complex human phenomenon; learning across multiple contexts. Complex social realities require complex research frameworks. In this regard, the LE construct has been as an appropriate framework as it is capable of accounting for a more comprehensive and holistic view of student learning from a lifewide perspective. The strength of a LE perspective, therefore, lies in its ability to account for the multiple contexts and variables that support individual learning across contexts driven by learner activity.

The LE construct has arisen in educational research and theory to advance new conceptualizations of learning environments, processes of personalized and self-initiated learning, the appropriation of available resources and engagement across different contexts (González-Sanmamed et al, 2018; Luckin 2010; Maina & Garcia, 2016). The impetus for a learning ecologies perspective is also influenced by the hybridization of learning mediated by digital technologies (Sangra et al., 2019), as well as by those continuum experiences that individuals navigate in an increasingly post-digital world (Jandrić et al., 2018). These include experiences along a continuum of analog and digital as well as physically and virtually situated learning, open and closed sourced learning, self-directed and other-directed learning. The social dimension of learning along a continuum also needs to be considered within an LE perspective, from autonomous/individual learning to collaborative/group learning influenced by social learning theories such as socio-constructivism and communities of practices (Dron & Anderson, 2014). The LE construct has been defined, adopted and applied in highly diversified and fragmented ways for close to 20 years as a concept to support the phenomena of learning in and with the digital (Peters & Romero, 2019).

The concept of LE is an emerging, yet diffuse concept that has been used by different researchers in fragmented and inconsistent ways, appearing as though there is no one unified conceptualization. At times, the construct has been problematically used in research with no clear link to a theoretical definition (Raffaghelli & Fernandez, 2018). Yet, despite the fragmented nature of the concept, there are basic agreed upon assumptions that consider learners as part of a living and dynamic system located in particular cultural, social and historic contexts (Maina & Garcia, 2016). For instance, an early definition by Brown (2001, p.19) defines a learning ecology as "an open, complex, adaptive system comprising elements that are dynamic and interdependent - a collection of overlapping communities of interest (virtual), cross-pollinating with each other, constantly evolving and largely self-organizing". Later, Barron's (2004) ontological view of LE develops the notion that individuals are the central organizing node in the system. Following Barron (2004, 2006), the current study will emphasize the role of the individual as the central organizing node within their respective learning ecologies. Recently, through a systematic review, Sangra et al. (2019) articulate, the central potential of the LE construct lies "in the possibility of supporting learners by raising their awareness of their own learning ecologies, thereby empowering them and encouraging them to engage in agentic practices" (p.2). This is precisely the potential the current research aims to exploit guided by the LE construct; understanding learner agentic practices across contexts in online HE.

Despite the contributions of various researchers, a limitation of a learning ecologies framework lies in the diversified and disjointed ways that it has been used as an ontological and methodological construct in education research. Ontological definitions of LE include being applied as a metaphor or a set of elements (Barron, 2006), as available resources for learning (Luckin, 2010), as networks of emergent forms of learning (Williams et al., 2011; Díez-Gutiérrez, 2018), or as contexts for learning (Esposito et al., 2015) as well as an environment where learning unfolds (Hamilton, 2015). For example, Esposito et al., (2015) used the LE construct "to interpret digitally-mediated educational contexts to account for e-learning in higher education" (p.331) in the context of doctoral student research. The current research builds our analytical focus and ontological definition from a widely cited definition by Barron (2006) defining a learning ecology "as the set of contexts found in physical or virtual spaces that provide opportunities for learning. Each context is comprised of a unique configuration of activities, material resources, relationships, and the interactions that emerge from them" (p. 195). As such, the current research hopes to extend and build upon this ontological definition by grounding it in empirical research within a mixed methods case-study.

The below Table 3.2 outlines the varying ways ontological definitions have been associated in the literature, with the most common ontological category being used to define an LE as 'contexts for learning' or LE as an 'environment' (Sangra et al. 2019).

Table 3.2 LE Ontological Definitions in the Literature

LE Ontological Definition	Examples in the literature	Quote
A metaphor	Barron (2004, 2006)	"While the metaphor of a learning ecology is useful for conceptualizing how new technologies make a variety of learning opportunities possible, it is also a useful as a way to organize an empirical research agenda" (Barron, 2004 p. 7-8)
A network/networks	Williams et al. (2011), Díez-Gutiérrez (2018)	"The current cybersociety has widened the learning sphere generating "ubiquitous learning ecologies, namely, environments that foster and support the creation of expanded learning networks and communities through the use of digital means in which knowledge is exchanged in both the virtual and face-to-face spaces" (Gutiérrez, 2018 p.50)
A set of elements (resources, relationships, activities)	Barron (2004, 2006), Zuiker (2012), Esposito (2015)	"learning ecologies are defined as the processes co-created by the individual's agency in a defined learning situation and for a particular purpose, by engaging with the opportunities for learning (i.e. people, resources and relationships) provided by physical and virtual, formal and informal spaces and contexts." (Esposito, 2015 p.133)
An environment	Macleod (2015)	"This paper provides an account of analysis aimed at understanding who Edinburgh MOOC learners are, who elects to participate and the aspirations of that population, and the place that the MOOC will occupy in the University's online learning ecology" (Macleod, 2015 p.56)
An expanded system	Steffens (2015), Spires et al. (2012)	"We visualize a new learning ecology in which learning is multidirectional and multimodal. Learning, idea exchanges, and inquiry all take place within a dynamic system among students, teachers, and a global community. The system becomes open and dynamic as a direct result of 1:1 computing and access to the Internet" (Spires et al. 2012 p.234).
Available resources	Luckin (2010), Tabuenca (2013)	"The Ecology of Resources model….is concerned with learning and considers the resources with which an individual interacts as potential forms of assistance that can help that individual to learn. These forms of assistance are categorized as being to do with Knowledge and Skills, Tools and People and the Environment" (Luckin, 2010 p. 162).
Contexts for learning	Cabot (2016), Lai (2015), Hernandez-Selles (2015)	"Learning takes place across different social contexts, and understanding how learners perceive and traverse different learning contexts enables educators to gain a more comprehensive view of their learning processes and to support their learning better" (Lai, 2015 p.265)

As has been presented above, a growing yet diffuse literature on LE has emerged with an interest in the possibilities of new technologies in facilitating self-sustaining, interest-driven, boundary crossing, as well as lifelong and lifewide learning. Learning ecologies have been studied from a variety of perspectives, however most theoretical underpinnings are supported by sociocultural and situated approaches to learning (Barron, 2006; Lave and Wenger, 1991; Maina & Garcia, 2016). This perspective emphasizes the interacting role of culture, interactions, practices and resources in individual learning and development mediated through technology (Barron, 2004, 2006; Sefton-Green, 2013; Ito 2008; Ito et al. 2013). Associated or derivative learning theories such as communities of practice (Wenger 1998), activity theory (Engestrom, 2000) situated cognition and situated learning (Brown, Collins, & Duguid, 1989; Lave and Wengner, 1991) as well as emerging theories such as connectivism (Siemens, 2004) have all been linked to the conceptualization of learning ecologies. The current research will, however, draw from sociocultural and situated approaches to learning in the construction of a LE analytical framework.

Ecological perspectives appear particularly relevant and applicable in a networked knowledge society, however, such perspectives have been adopted in the social sciences since the 1980's. In particular, the work of Bronfenbrenner (1994) can be historically linked to current conceptualizations through his work on the ecology of human development (1994). Bronfenbrenner's characterization of human development and learning based on interactions at multiple social and societal levels, across the micro to macro levels through his development of "eco-social systems model" (Peters et al., 2018) has had particular influence on developmental perspectives on learning.

A LE approach conceptualizes learning throughout time (across the lifespan) and across the multiple settings that offer contemporaneous opportunities for learning, and thus aligned with a broad range of literature discussed throughout this chapter (i.e. formal/informal, lifelong/lifewide, social configurations of learning). Indeed, one of the central concerns of this perspective on learning is the critical need to build and support connections and awareness across a continuum of contexts and practices—from formal to informal. As Barron (2006) articulates, a particular emphasis in the literature is about researching the "synergies between participation in technologically mediated informal learning activities and more formal educational environments" (p. 198). In this regard, a recognition of 'lifewide-learning' demands reappraising and acknowledging important issues which academic institutions should be raising about the nature of student learning and the value of recognizing learning across contexts. In

this sense, educational experiences should not only be assessed on the efficiency of preparing students for solving narrow and isolated forms of problems linked to a pre-defined assessment structure, but also in their potential for preparing students for recognizing and generating learning opportunities across a range of contexts—from formal to informal.

A further critical feature of a LE analytical framework is examining the complex interrelations between contemporaneous contexts of lifewide learning (Barnett, 2011). For example, reflecting about how students experience learning across contexts from formal institutions to everyday learning in professionalize or socialized contexts. In this line, as some authors suggest (Buckingham, 2007; Cope & Kalantzis, 2017) formal education often overlooks new forms of ubiquitous educational interaction that is now generated through digital contexts that support expansive learning networks and communities, where knowledge is exchanged and co-constructed through digital technology in both virtual and face-to-face scenarios (Díez-Gutiérrez et al. 2018). This is particularly notable as formal curriculum boundaries begin to disappear and become blurred (Cope & Kalantzis, 2010; Díez-Gutiérrez et al. 2018) through more connectivist and networked approaches to learning, presenting a series of both challenges and opportunities for HE in the digital age.

A learning ecologies perspective has thus been taken up by researchers to meet these challenges across a variety of fields, although predominantly at the intersection of education, developmental psychology and educational technologies. There is also particular interest in the role of learning ecologies in HE (Ellis & Goodyear 2013: Jackson, 2014; Peters et al. 2018; Gonzalez-Summand et al, 2018). A common theme has been to apply the LE construct to research learning across formal and informal settings, although there is a dearth of literature in this regard in HE (Sangra et al., 2019). Despite the contributions of various researchers, a learning ecologies framework is not yet a standardized or stable concept. As Sangra et al. (2019) argue "clearer definitions of LE may encompass new models and tools for analyzing Technology Enhanced Learning processes, supporting learning visibility and learners' awareness of the connections between the formal and the informal and vice versa" (p.4). This research, therefore, aims to contribute to clearer alignment across ontological, methodological and applicative dimensions when using a LE framework. The goal is to contribute to the knowledge base on student experiences of learning by understanding learner agency and learner awareness of the connections between formal and informal contexts and practices in digitally mediated learning.

3.5.2 Conceptualizing Learning Ecologies in Higher Education

There has been a small but important current of research and conceptual thinking that links the functioning of the modern university to broader ecosystems within the wider world, bringing ecological perspectives to HE (Barnett, 2011, 2017; Ellis & Goodyear, 2013; Jackson, 2014, 2016; Fung, 2017; Salmon, 2019). Many are questioning the configuration of universities within wider ecosystems, including the economic, political, knowledge, and socio-cultural systems. Capturing these sentiments, Barnett (2011) expresses that:

> *"In an age of liquid learning, students are as much as if not more in the world than they are in universities; and many of their extra-curricula experiences are yielding experiences of significant learning and personal development" (p. 12).*

To support ecological views on learning in HE, **an emerging approach to education referred to as "connected learning"** has gained increased attention with a particular emphasis on linking formal and informal learning mediated through digital technology and participatory cultures (Ito et al., 2013; Kumpulainen & Sefton-Green, 2014; Greenhow & Lewin, 2016; Odonne, 2019). Such a view offers a theoretical lens, influenced by ecological perspectives including socio-constructivism and connectivism, which allows researchers to explore learning by drawing together multiple contexts. Ito et al., (2013) define 'connected learning' as "learning that is socially-embedded, interest-driven, and oriented towards educational, economic or political opportunity" (p.6). Although their case-study research emphasizes youth development, other researchers have adapted a connected learning approach to professional learning in the context of teacher professional development (Odonne, 2019).

A connected learning approach views learning situated in social and cultural contexts where learners and resources can interact in processes of knowledge co-creation (Ito et al., 2013). In this regard, a connected learning framework is understood as a pedagogical approach to examine and understand how learning occurs in networked contexts mediated by digital technology. A recent update of the connected learning framework has proposed three central design principles for research and practice which include (i.) interests, (ii.) relationships and (iii.) and opportunities (Connected Learning Alliance, 2018). Within this framework, Ito et al. articulate that connected learning occurs when students are able to "pursue a personal interest or passion with the support of friends and caring adults, and is in turn able to link this learning and interest to academic achievement, career success or civic engagement" (Ito et al., 2013, p. 4). Through learner agency and autonomy, individuals develop their own connected learning environment by making connections which link together individual

interests, peers, and academic intentions (Oddone, 2019). In this sense, synergies can be created which offer opportunities for learning across contexts, drawing on range of learning resources. It is within a social learning context where authentic personalized learning occurs, enabled through learner agency and a diversity of connections where individual learners seek those with shared purpose to learn from and with (Downes, 2012; Ito et al., 2013).

An increasing number of researchers across a range of disciplines (education, learning research, literacy and media studies) are developing approaches to investigating learning as a series of boundary-crossing activities (Kumpulainen & Sefton Green, 2014). Researching learning from this perspective is a complex challenge as it requires "understanding the nature of learning not only within a setting but within a matrix and continuum of several communities and contexts" (Kumpulainen & Sefton Green, 2014 p.8). Consequently, a key area for research is what has been termed 'boundary crossing', understood as a theoretical term that "captures the activities and dynamics of reapplying and reframing learning from one context to another" (Kumpulainen & Sefton Green, 2014 p.13). In the context of this study, an objective is to understand boundary crossing activities and experiences where knowledge from one domain (i.e. professional, personal or academic) is applied in another. In this sense, the current study, following guidelines by Kumpulainen & Sefton Green (2014) is interested in understanding and explaining the "complexities, barriers, and enablers involved in the process" (p.13).

In recognition of ecological perspectives in HE, institutions such as University College London have proposed new frameworks for guiding educational practice, including the 'Connected Curriculum' framework (Fung, 2017). Such a framework acts as a way to open up the university by paying attention to the many ecosystems within which it interacts through a pedagogical model founded on inquiry and research. In this framework, a research-driven curriculum engages with the cutting edge of what is known in a given field, with a particular emphasis on interdisciplinary and trans-disciplinary approaches (Fung, 2017). In this regard, inquiry should move beyond conventional disciplinary boundaries to build new analyzes and connections across disciplines. The basis for such an ecologically oriented curriculum is founded on six dimensions of academic practice in higher education, worth noting here as it is directly in line with an ecological and connected view of student learning in HE, detailed in the Table 3.3 below.

Table 3.3 Connected Curriculum Framework in HE (Fung, 2017)

Connected Curriculum Framework in HE	Description	Learning Activity Examples common in Online HE	Recommendations
1. Connect with researchers and with the institution's research	-Explicitly inviting students to connect with researchers and research relevant to their study as an integral part of their learning experience.	• Dyadic supervision meetings and work review (dissertation project) • Supervisor/student progress guidance and review • Webinars with research groups/teams	-Students should be encouraged to start to formulate their own research questions, and empowered to explore and critique (through inquiry and discussion) emerging research in their field or discipline.
2. A throughline of research activity is built into each program	-Connecting sequence of learning activities that support students, step by step, to apply the skills and dispositions needed to undertake inquiry, project and research-based learning.	• Capstone projects and dissertations • Micro-scale tasks (i.e. weekly updates/posts) connected to macro course tasks • Online Portfolio development	-Assessment and feedback activities should encourage students to link different aspects and phases of their learning, for example by requiring them to draw on different themes and skills within a final course module, dissertation, e-portfolio or capstone project.
3. Make connections across subjects and out to the world	-Students making conceptual connections between their own subjects and other disciplines, having opportunities for interdisciplinary and trans-disciplinary approaches to learning in the field of digital education and e-learning.	• -Engaging in Twitter tutorials and chats • Reflective writing in open networked spaces • Participating in MOOC's linked across disciplines and subjects	-Engaging with international and cross cultural perspectives in their disciplines, building global perspectives and an awareness of disciplinary perspectives and knowledge traditions from cultures or societies that differ from their own
4. Connect academic learning with workplace learning	-Connecting academic learning explicitly with the areas of knowledge, skills and approaches needed both for professional work and for lifelong learning	• Writing Open reflections about integrating course concepts/knowledge into professional practice • Developing Case-Studies linked with professional practice	-Learner activities should be designed to build student awareness of a broad range of perspectives, competencies, skills, values and attributes to take with them into their professional lives, including the ability to be able to articulate these effectively.
5. Learn to produce outputs – assessments directed at an audience	-Explicitly linking learning activity and student outputs with external audiences	• Publishing Works on Class Blogs, Wikis and Open Platforms • Disseminating Academic	-Assessments should link learner activities to 'outputs', 'works', or 'products' from student research activity and inquiry, similar to those of researchers in their program/field,

		Projects through Social Networks • Using Open Collaborative authoring/writing spaces (PB wiki, google docs, blogs)	and directed at wider audiences beyond the classroom or program.
6. Connect with each other, across phases and with alumni	-Supporting learner activity to connect diverse students to one another, both in their co-hort and across phases of study, including connecting alumni with newer students entering the program.	• Peer review and Peer feedback exercises & activities • Receiving Tutor/Teacher formative feedback • Collaborative learning activities and Communicating through Social Software	-Peer mentoring should be supported and encouraged, particularly among alumni who could be invited to get involved as mentors, tutors or advisers.

The use of an ecological metaphor in the context of HE requires further exploration beyond its intuitive appeal. As Barron (2004 p.8) suggests, the metaphor serves several useful functions in analyzing learning in technology-mediated environments, understanding how digital media and new technologies make a diversity of learning opportunities possible. She also argues, that it is a "useful way to organize an empirical research agenda". Moreover, Jackson (2013) elaborates on the well-suited nature of the "ecological" metaphor as a method to analyze human interactions as ecologies are living systems with a range of variables, attributes and components that interact with each other, characterized by their self-organizing, adaptive, and fragile qualities, appropriate for conceptualizing learning in the modern globally interconnected university. The use of ecology is indeed a rich and valuable concept, as Barnett (2017) argues:

> *"At once, it alerts us to certain features of the world: it intimates not just interconnectedness but also a complex system of interactions. It alerts us, too, to a fragility in a system: the connections between the elements that constitute an ecology might become impaired in some way. An ecology may be 'disrupted' (as we see here) and it might even fall apart. And the idea of ecology alerts us, also, to an interconnected setting having worthwhile properties, that it requires continual maintenance, and that human beings collectively have a responsibility in that direction" (p.vii).*

Here, the idea of maintenance and collective responsibility is essential in linking ecological perspectives to the practical, everyday experiences of students as they engage in academic practice and navigate the academic curriculum. The perspective of lifewide learning (Banks et al., 2007) is closely

linked to the LE construct (Barnett, 2011), with important implications for graduate program teams when building the academic curriculum. Barnett (2011) offers some general points regarding lifewide learning activities in HE, relevant to the current review of LE in online HE.

- Student learning often takes place in a number of sites
- A student's formal course of study may constitute a minority of the learning experiences undergone by a student while they are registered for that course of study.
- That much of the learning that a student achieves while at university is currently unaccredited, and involves unaccredited learning that is both within the course of study and unaccredited learning that is outside the course of study;
- That much of the student's learning is personally stretching, and may involve situations quite different from anything hitherto experienced

The above guidelines reflect the dynamics between learning within the formal curriculum, and the wide experiences learning which fall outside of it. In this regard, student experiences in navigating the academic curriculum have traditionally been oriented toward theory-rich knowledge through transmission models of learning, through both independent work and group or collaborative projects (Aparici, 2012; Laurillard 2013). However, the idea of curriculum as an ecology has likewise been developed in the literature, and is helpful in conceptualizing ecological perspectives, particularly in online HE with it's complex organizational and globally networked structure. In conceptualizing the academic curriculum as an ecology for learning, Jackson (2016) explains:

> *"The idea that a curriculum is inhabited by people and brought to life through the interpretations and actions of the teacher and the responses of her students to those actions, in an environment that is structured and culturally attuned to encouraging and supporting learning is an ecological concept. It suggests also that learning itself is an emergent phenomenon: something that is only brought into being as a result of people participating and interacting in particular disciplinary and pedagogic contexts, working with the resources, tools and technologies that are available within the space it affords for learning, on the problems and inquiries that are relevant to the situation" (p.244)*

The above quote contributes to ecological perspectives in HE, relating the university as a complex and adaptive ecosystem intimately connected to wider and broader systems as well as conceptualizing the curriculum as an ecology that requires maintenance in order to achieve equilibrium as well as collective responsibility. These conceptualizations are contributing to a growing discourse in HE, with a particular resonance to online HE with its networked, connected, and socially collaborative character, where students work with a range of tools, resources and technologies across a multitude of contexts and spaces.

3.5.3 Learning Ecologies Research in Higher education

There has been steady, although limited use of an LE perspective in higher education research for close to 20 years as a way to focus on both student learning and faculty development (Peters & Romero, 2019). A gap in the literature on the LE construct in HE research reveals a need to examine continuum experiences of learning across contexts and practices, emphasized by Sangra et al. (2019) who conclude that "it is evident that studies analyzing the continuum between formal and informal learning in higher education and adult education, as well as vocational educational training are still needed" (p.15). A systematic review of research in HE using the LE construct has been analyzed and published as an open data set (here) by Raffaghelli & Fernandez (2018). The data set reveals certain patterns and themes worth noting in the literature, including how research has been conducted in HE but likewise identifying educational levels closely linked to and often overlapping with HE, including at the levels of Teacher Education and Professional Learning. This open data set indicates that the LE construct has been approached from a variety of methodological designs (i.e. qual, quan, mixed methods, conceptual paper). However, the majority of LE research has been developed as conceptual papers and therefore discuss the construct and it's potential, without applying it to empirical work. This adds further support to the need for substantive and coherent research designs applying the construct to collect and analyze empirical data. The second most common methodological design has been qualitative observational (i.e. Van den Beemt & Diepstraten, 2016), followed by a mixed interventionist approach (i.e. Díez-Gutiérrez, 2018) as well as a quantitative observational approach (i.e. Scott et al. 2016). A fully integrated mixed methods multiple case-study design, as revealed through a systematic literature review, has not been a common approach in LE research, and therefore the current design could fulfill an existing gap in the literature.

One thing that remains clear, in agreement with the findings of Sangra et al. (2019), in order to reach the full potential of the LE construct in HE research, there needs to be an explicit alignment between the ontological, methodological and applicative elements within the research design. One of the weaknesses of the LE construct has been a the disjointed alignment across these dimensions, leading to its use in highly fragmented and diversified ways (Peters & Romero, 2019). In relation to LE research in HE, a range of ontological definitions have been used, however the most common has been both as an 'environment for learning' (Hamilton, 2015; Folkestad & Banning, 2010) or as 'contexts for learning' (Lai, 2015; Scott et al., 2016), which extends the notion of an LE as available resources for learning, or as a set of elements or contexts. In order to meet the research objectives and purposes of the current study, the ontological definition of a LE most appropriate for researching multiple contexts for learning, will use the definition of LE as 'contexts for learning', including the definition of LE as a set of elements or components that support learning which include activities, relationships and resources in line with previous conceptualizations (Barron, 2004, 2006; Jackson, 2016).

Conceptual advances in research on HE have been fragmented and diversified in how they support the LE construct through underlying theories ranging from unclear theoretical positions, to communities of practices, connectivism, situated and self-directed learning (Maina & Gonzalez, 2016). Underlying theories used in research on LE in HE are overwhelmingly dominated by connectivist and socio-constructivist approaches, given the high level of integration with digital technologies present in both campus-based and online HE. Other theories range from communities of practice, sociolinguistics, activity theory, as well as theories related to lifelong learning such as self-determined & self directed learning (Sangra et al. 2019). A troubling pattern in the literature is that a considerable number of studies lack a clear theoretical position (Raffaghelli & Fernandez, 2018), and thus weaken the validity of the construct by failing to provide a conceptual foundation from which research can be coherently built. In this regard, this trend needs to be recognized and rectified in the literature if the LE construct is to reach its full potential.

In relation to the focus on pedagogical granularity, the research in HE has been roughly divided by two lines. The first, particularly given the formal character of learning in HE, has been focused on pedagogical methods and activities (i.e. Diez-Guiterrez, 2018; Scott et al., 2016). As such, the current research is in line with this focus, with a particular interest in learner activity across contexts and practices to support formal learning in HE. The second major pedagogical focus has been on learning architectures (i.e. Van den Beemt & Diepstraten, 2016). This focus likewise aligns with broader trends in

online HE. However, there is a clear lack of the use of the construct in the context of online HE, related to the micro level of research interested in processes of teaching and learning in digitally mediated environments (Zawacki-Richter, 2009; Zawacki-Richter et al., 2016).

The most common pattern of research application in HE has been as a framework to develop and analyze learning resources, digital tools and environments for learning. Through an LE perspective, studies have explored and described new digital environments and tools for collaborative e-learning (Okamoto, 2005), the design of learning ecologies through technologically mediated learning environments and successful personalized learning communities (Hamilton, 2015), using a community of inquiry model through an enterprise social network to build a learning environment that contributed to a course learning ecology (Scott et al., 2016). The next most common application has been used as a framework to observe learning processes, in line with the current research. In HE research, Díez-Gutiérrez (2018) has observed learning processes in blended education settings for the training of trainers, over-claiming that through supported training processes, innovative learning resources and collaborative and cooperative learning there is a "potential to pave the way for the empowerment of peoples, communities and social movements" (p.49). Similarly, Hernández-Sells et al., (2015) examine processes of learning in a collaborative and blended environment and the role of teachers in supporting and developing student learning ecologies. Although these studies explore certain elements of the LE construct, there is still a considerable gap in in the literature on exploring how students experience learning across contexts—from formal to informal—in online HE, which the current research aims to fill.

The current state of the literature suggests that much of the recent research on LE in the context of HE neglects the productive and generative engagement of student learning across a continuum of contexts, practices and trajectories. When researchers examine student learning practices and engagement in online higher education they often focus on specific blended learning environments (Diez-Guiterrez, 2018), conceptualizing the self-organized, emergent, and disruptive nature of learning engagement in open and networked environments (Saadatmand et al., 2012) or the teachers role in supporting learning ecologies (Scott et al., 2016), while ignoring lifewide and boundary crossing engagement across a continuum of contexts, trajectories and practices. Rarely do scholars focus on the learning trajectories and continuum of digital practices across a range of contexts—from formal to informal—that students develop to support and engage with academic learning, particularly in online contexts. Concerns can be seen about how the construct of LE has been used to examine students' experiences of learning which neglects the lived experiences of students as they engage in online

learning across multiple contexts. This current research aims to fill this gap in HE research through the use of a LE analytical framework. When the ontological, methodological, and applicative dimensions of the LE construct are coherently aligned, there appears to be great potential for accounting for the complexity of human learning across contexts by using a LE analytical framework.

3.6. Summary: Gaps in the Research

The literature review in Chapters 2 and 3 has demonstrated that there is limited research about student experiences of learning across a continuum of contexts and practices in online HE. Although there is a long and broad history of research in Online & Distance Education, including a recent emphasis on the phenomena of MOOC's, learning analytics and big data in HE, less attention has been given to the strategies and practices students use to support academic learning across a continuum of contexts—from formal to informal. The field of online HE is expanding and growing exponentially, and a rich and varied research agenda continues to develop with a broad range of theoretical and conceptual frameworks. As online HE becomes a mainstream phenomenon around the world, little is known about how students conceive of their experiences of learning across increasingly complex and networked learning scenarios, often in combination with full-time professional commitments and socialized practices in a digital society. It has become clear that there is an emerging need to examine the complex interconnections and interrelatedness between what is learned in formal academic programs, and the complementary learning that co-exits outside of these contexts. Online HE increasingly caters to working professionals characterized as lifelong learners unrestricted by age who are re-entering educational processes at different phases of their professional lives. In this regard, a particular need exists in understanding boundary crossing and connected forms of learning that takes place across the contexts of online learners lives. It is evident that studies analyzing learning strategies and practices across contexts in online HE are still needed. There is likewise a growing concern and need to ground theoretical and conceptual development of the LE construct through empirical research to authentic educational contexts. This process may support construct validity through coherent research designs, particularly in aligning the ontological, methodological, and applicative dimensions of LE in educational research.

CHAPTER 4

RESEARCH METHODOLOGY

4.1 Introduction:

The current chapter will elaborate the mixed methods research design which frames the current study. By previously identifying gaps in the recent literature and a need for research on student experiences of emergent learning across contexts in online HE, the current study has been designed to explore and interpret how students experience learning across contexts and practices in online HE, from a LE perspective. This chapter aims to demonstrate methodological transparency by clearly outlining the range of procedures of the mixed methods research design. First the mixed methods research design is presented, demonstrating the coherence and alignment between the ontological, epistemological and methodological positions that have been adopted in the study. Secondly, the procedures, analysis and legitimation process for the qualitative component is presented. Thirdly, the procedures, analysis and legitimation process for the quantitative strand is presented. Next, the integration procedures are discussed at the variety of levels in which they exist. Finally, quality criteria procedures are detailed including legitimation procedures, ethical considerations and design limitations.

4.1.1 Mixed Methods Research Design

This section details the research design followed in the study. As Trochim (2006, Website) articulates, research design "provides the glue that holds the research project together". In other words, it is the blueprint that refers to the overall strategy to be followed, integrating all of the components of a research project in a coherent and logical way, including explicitly clarifying the underlying philosophical (ontological, epistemological, methodological) assumptions. The current research will follow a primarily qualitative mixed methods multiple case study design.

There is strong consensus that a range of quality criteria in mixed methods research (MMR) need to be adhered to (Creamer, 2018). These include the expectations of clearly identifying the priority of the methods, the sequence of the methods (sequential), the purpose of the mixing, and the stage of integration of both types of data. Such criteria will be discussed throughout the different sections of this chapter.

Although there is still debate about what constitutes mixed methods, including conceptual definitions in the field, this study aligns itself with authors such as Tashakkori & Teddlie (2009) and Creamer (2018) who adopt the terminology of 'fully integrated mixed methods' which refers "to

research studies where the qualitative and quantitative strands are engaged in a dialectical manner at all stages of the study" (Creamer, 2018 p.xxiii). Common qualitative data collection methods such as interviews, documentation, and observation will be used, complemented by a quantitative online survey that is designed to best meet the needs and objectives of the study (Creswell, 2009) in an attempt to offset potential limitations or bias introduced within each respective paradigm. At its most basic level, the use of mixed methods here is predicated on the insight that different methods have different strengths. The mixed methods approach used in this thesis is understand as a logic of inquiry founded upon ontological, epistemological and methodological assumptions which will be subsequently detailed.

For close to 40 years there has been an established interest in mixed methods (MM) designs in social inquiry as researchers try to mix and integrate the strengths of qualitative and quantitative methods to tackle both challenging research problems and complex questions. The overall rational for using a MM approach is to provide a better understanding of the phenomenon under study (Tashakkori & Teddlie, 2009) Researchers are increasingly turning to mixed methods approaches, particularly for emerging and networked digital phenomenon, because it "has the potential to advance theory and enhance the usefulness of research findings" (McCrudden et al. 2019 p.1) as well as the capacity to "increase the interpretability, meaningfulness, and validity of constructs and inquiry results by both capitalizing on inherent method strengths and counteracting inherent biases in methods and other sources" (Greene et al. 1989 p.259). The influence of mixed methods research is 'accelerating considerably' across many disciplines in the social sciences, as researchers tackle complex questions about "how knowledge is built, what we can know, and how knowledge building ought to proceed" (Hesse-Biber, 2010 p.1). This study examining emergent practices in online HE will use the strengths of a quantitative survey research as a method to complement the rich, in-depth, and contextualized data that is collected using a qualitative approach with the aim to understand and build knowledge and insight into student experiences of learning across contexts. Although there are methodological purists who argue that qualitative and quantitative approaches are so different that "intermingling the two is impossible" (Creamer, 2018 p.8), the current research takes the position of conceptualizing qualitative and quantitative approaches along a continuum (Tashakori & Teddlie, 2009). This conceptualization approach understands that the boundaries between the two methodological strands are not impervious.

4.1.1.1 Paradigmatic Assumptions: Ontology, Epistemology, and Methodology

Under an **interpretivist paradigm**, the current research is striving "to understand and interpret the world in terms of its actors" (Cohen et al., 2007 p.26). An interpretive lens has been used in the exploratory mixed methods multiple case study design examining student experiences of learning across contexts in online HE. In an interpretive research, theory is emergent and must arise from particular situations; it should be 'grounded' in data generated by the research act (Strauss and Corbin, 1997). The interpretive paradigm is underpinned by observation and interpretation, thus to observe is to collect information about events, while to interpret is to make meaning of that information by drawing inferences.

The research design will follow a **socio-constructivist and interpretivist paradigm** using a qualitative multi case-study approach. An interpretivist paradigm is an epistemological orientation within qualitative research that assumes that "reality as we know it is constructed inter-subjectively through the meanings and understandings developed socially and experientially" (Cohen, 2006 webpage). A socio-constructivist paradigm implies that reality is constructed through human interaction and knowledge is a human product and is socially and culturally constructed. In this regard, individuals create meaning through their interactions with each other and with the environment in which they live (Kim, 2001). Central features of primarily qualitative inquiry include that the research unfolds in a natural setting, the reliance on the researcher as the key instrument for data collection that relies on multiple methods, the use of inductive reasoning for interpretation, founded on the meanings expressed by the participants in the study, the use of interpretive and emergent designs as well as a well-founded theoretical framework (Cohen, 2007).

The **position of the researcher** in the current study is participant as observer with an aim to generate meaning through inquiry from the data collected through empirical fieldwork (Cohen et al. 2007). This approach has a common core assumption that reality is socially constructed and that subjective meaning is a critical component of knowledge building (Charmaz, 2000). In the current study, the researcher has made explicit their theoretical assumptions and recognize that they are working from culturally and socially situated contexts as they are the "co-producer of meanings and data" (Charmaz, 2000 p.82).

4.1.1.2 Exploratory Sequential Design

There are several important dimensions to consider in mixed methods design, however the primary design dimensions to account for include; (1.) the independence or interaction of the methods, (2.) the status or parity of the methods, and (3.) the timing of the methods (Greene, 2008). Accordingly, **the primarily qualitative multiple case study approach** will follow a common sequential exploratory design (Creswell, 2009; Hesse-Biber, 2010; Morgan, 2014; Creamer, 2018; McCrudden et al. 2019). The first sequence of data collection and analysis will be qualitative followed by a second sequence of quantitative data (Creswell, 2009; Hesse-Biber, 2010). The exploratory sequential design can be divided into 6 clear phases, with each phase containing a variety of procedures and outcomes outlined in Figure 4.1 below.

Figure 4.1 Procedural Diagram for the Mixed Method Sequential Exploratory Design

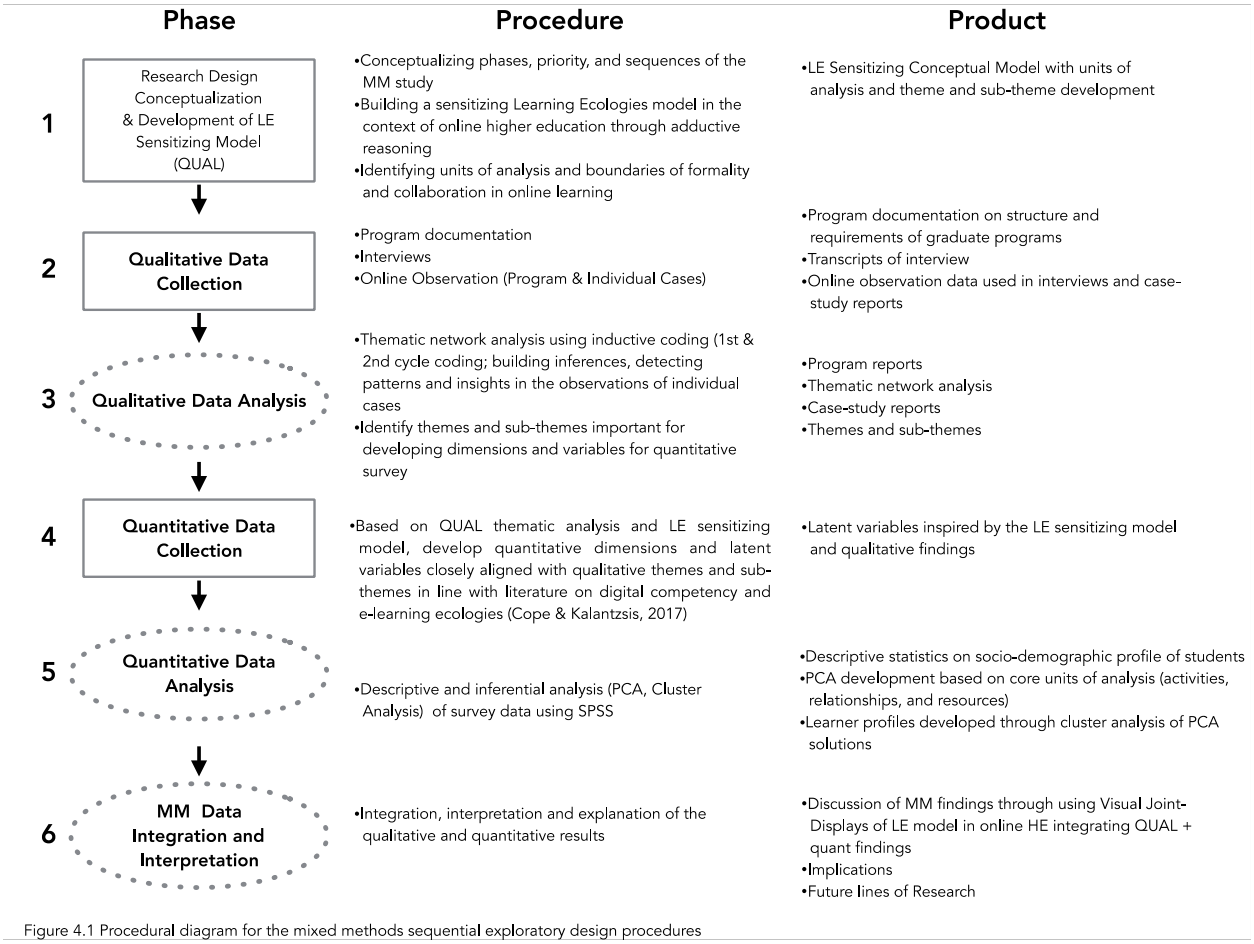


Figure 4.1 Procedural diagram for the mixed methods sequential exploratory design procedures

As is detailed in the figure, findings from both strands will be integrated and interpreted as a process for deepening and assessing the results and for generating new insights, inferences and meta-inferences. The weight will be placed on the qualitative phase, whose results will be used developmentally to build the quantitative phase of the study (i.e. online survey). As Miles and Huberman (2014) establish, the most common reasons for mixing qualitative and quantitative components are "(a) to provide analytic texture to your work, (b) to compensate for the deficiencies of one genre with the strengths of another, and to (c) modify or strengthen the analytic findings when the results of each genre support, corroborate, or contradict each other" (p.43).

Additionally, the motivation for using a sequential exploratory design is in line with Morgan (2014) who follows a pragmatist view for integrating mixed methods research. Following this view in mixed methods research the division of labor between qualitative and quantitative strands are clear-cut, the relationship between the methods is linked through data collection, the point of integration is at

various points throughout the study (including both collection and interpretation of results), and the ease of integration is relatively straightforward (Morgan, 2014).

4.1.1.3 Primarily Qualitative Design

As has been stated, the current study uses a primarily qualitative approach. Claiming priority of one method over another is important in demonstrating methodological transparency (Creamer, 2018) as well as in defining the purpose and rationale of the study. Although there are a range of forms of research under the mixed methods movement, as Teddlie & Tashakkori (2009) characterize, the current research can be described as qualitatively oriented social science working primarily within a constructivist worldview and principally interested in data and analyses related to narrative accounts of lived experience of a phenomenon under study, in this case, student learning in online contexts. Leaders in the field, such as Johnson et al. (2007) have defined a primarily qualitative approach by claiming that:

> *"Qualitative dominant mixed methods research is the type of mixed research in which one relies on a qualitative, constructivist- poststructuralist-critical view of the research process, while concurrently recognizing that the addition of quantitative data and approaches are likely to benefit most research projects" (p. 124).*

Morgan (2014) advocates for defining the logic of mixed methods inquiry through priority and sequencing. In line with this pragmatic view, defining a primarily qualitative study by default establishes a clear division of labor, identifying a *core method (qual)* and a *supplementary method (quant)*. The core method offers the key strength to the study, which in this case is conceptual and empirical development of themes, dimensions and units of analysis relevant to understanding student experiences of learning in online HE across contexts. The core qualitative method typically focuses on research goals and outcomes that are generally *inductive*, *subjective* and *contextual* and is more suitable to developing theory and conceptual models. In contrast, quantitative research often serves *deductive*, *objective* and *general* purposes, and is appropriate for generalizing results to other populations (Morgan, 2014).

4.1.2 Research Questions and Objectives

The **current research problem recognizes** an urgent need to actively examine the interconnections and complex relations between process (i.e. strategies, actions, activities) of learning in formal university scenarios and the everyday learning that happens outside of the classroom, particularly the informal learning that is afforded through expanded and emerging digital contexts in the

workplace or in socialized practices. The current research problem responds to a lack of understanding of how students experience, integrate, navigate and connect learning across contexts and out into the wider world, especially into professional practice. The central research question addressed in the current study, therefore, is: *How do students experience learning across a continuum of contexts —from a Learning Ecologies (LE) perspective—to support academic learning in online HE?*

The central question is supported by the following sub-questions:

RQ1: What **digital learning practices and strategies** do students use to support academic learning across a continuum of contexts—from formal to informal?
RQ2: What **components configure** the LE of online higher education students?
RQ3: What learner profiles can be detected among online HE students, based on their experiences of learning across contexts?
RQ4: How do students conceive of their experiences of learning across a continuum of contexts—from formal to informal—to support academic learning in online HE??

In this study, RQ 1-2-3 will be supported by integrating qualitative and quantitative findings in equal measure, while RQ 4 is primarily a qualitative question supported with some complementary quantitative findings.

The central purpose of the current research is **to understand student experiences of learning in online higher education, examining how students approach learning across contexts and practices—from formal to informal—in order to better support and empower connected forms of lifelong and lifewide learning.**

The central purpose of the current study is supported by the following research objectives:

RO1: To identity successful digital learning strategies and practices that HE students use to support learning in online HE across a continuum of contexts.
RO2.1: To adapt and construct a Learning Ecologies conceptual model as a guiding heuristic for empirical data collection and analysis in the context of online HE.
RO2.2: To propose a Learning Ecologies model in the context online HE through a fully integrated mixed methods research design.
RO3: To identify a range of learner profiles and attributes based on student experiences of learning across contexts in online HE.

RO4.1: To identify student conceptions of learning across a continuum of contexts—from formal to informal—to support academic learning in online HE

RO4.2: To detect and systematize the affordances and barriers of learning across contexts and practices in online HE.

4.1.3 Purpose, Rationale and Added Value

In alignment with the objectives of the research, and in line with several authors in mixed methods research (MMR) in the social sciences (Greene et al., 1989; Morgan, 2014; Creamer; 2018), the current study uses mixed methods (MM) for the purposes of **development, complementarity, and integration**. Selecting a primarily qualitative exploratory sequential design connects two distinct approaches so that one method enhances the effectiveness of another. This is particularly important when exploring emergent phenomenon where there has been little or no prior research. For example, no previous quantitative instrument existed that was suitable for this particular study, and therefore an exploratory sequential design was suitable for this purpose. As such, the results of the qualitative strand were used to inform the quantitative strand, aiming to enhance the process of data collection.

The **developmental** rationale has been used here in supporting the development of both a sensitizing model to design data collection across both components, as well as the substantive qualitative phase used to build the quantitative instrument in the form of an online survey capable of measuring students views on their experiences studying online across contexts. Here, both phases of the study are examining the same constructs and phenomenon and thus, the qualitative strand has been designed for instrument development useful in the quantitative strand. In this sequential phase, the quantitative strand is explicitly linked and informed by the qualitative strand, understood as integration through methods where one database informs the data collection of the other (Fetters et al., 2013).

Further, as a qualitative approach is suitable for building theory, the current research coincides with Teddlie & Tashakkori (2009) who articulate that an essential step in a MM study is when findings (i.e. results and conclusions) from the qualitative & quantitative strands "are incorporated into a coherent conceptual framework that provides an effective answer to the research question" (p.249). This process of conceptual framework development is in line with the rationale of the mixed methods research questions and objectives, aiming to understand the central components of a LE construct in online HE through conceptual framework development. Using a primarily qualitative MM approach, in

this sense, can provide a better understanding of the lived experiences of student learning across contexts.

Integration has been used in this study to explore emergent phenomenon such as online learning across contexts and practices. A fully integrated mixed methods approach is used here to support innovative and novel research techniques such as building a visual joint display at the integration and interpretation phases of the study, a primary rationale for using a mixed methods approach. This rationale is in line with a previous study by Bustamente (2019) who used a theory driven mixed methods research case study with a theoretical framework as the starting point. This study used a mixed methods design to integrate findings in a joint-display using a pre-existing theoretical model, concluding that such an integrated design provides a methodological innovation which can enhance understanding of the particular cases.

Although mixed methods research has become increasingly popular, especially in exploring emergent digital phenomena, authors Guetterman et al., (2015) argue that "the meaningful integration of qualitative and quantitative data remains elusive and needs further development" (p.554). This challenge is explained by the practical, theoretical and methodological complexity associated with collecting, comparing and integrating data from mixed methods. A fully integrated mixed methods design offers a new framework for thinking about social science research and although the field of MMR is dominated by health and behavioral science (Fetters et al. 2013), there is great potential for bringing the benefits of this field into educational research. Indeed, using mixed methods offers substantial potential to generate unique and innovative insights into the multifaceted and complex phenomenon of human learning across formal and informal contexts.

A **complementarity** rationale allows for exploring different facets of the same complex phenomenon through different methods. The principal purpose for this, in line with Greene's typology (1989) is to gain deeper and wider understanding of the phenomenon under study. Complementarity is also useful for generating theoretical expressions and conceptual models through exploratory and confirmatory phases and by asking how or what questions, as is reflected in the current study. In this sense, each data strand may be able to elaborate, enhance, help clarify or illustrate the phenomenon under study (Creamer, 2018).

As an element of methodological transparency, authors such as Creamer (2018) suggest explicitly detailing **the added value of using a mixed methods design**. In the case of the current

research, the added value has been the development of an innovative visual joint-display which builds upon and expands an initial sensitizing LE model toward the development of a current LE model in the context of online HE, something that has rarely been done in the literature on mixed methods educational research. Such a process has allowed the development of meta-inferences capable of bringing new insight, interpretation and theory construction to the phenomenon under study. From a theory construction standpoint, Jaccard & Jacoby (2009) argue that mixed methods offers the best opportunities for developing and generating innovative and creative insights. As mixed methods is becoming a more common approach to investigate complex education-related problems, promising innovations such as the joint-display continue to emerge which can facilitate novel forms of data integration and interpretation based on mixed methods findings, particularly appropriate given the affordances and potentialities of digital age research (Quinton & Reynolds, 2018). Given that leaders in the field describe connecting theoretical models to the development of joint displays as "innovative" (Fetters et al. 2013; Bustamente, 2019), an added value of the current design is the ability to advance methodological integration and contribute to the literature on mixed methods approaches when researching emergent social phenomena.

4.2 Qualitative Component

4.2.1 Multiple Case-Study

A case-study is a method that is used to deeply observe the characteristics of a person, group, or community in real-life contexts. Case studies are a common strategy of educational and social research through inquiry into a specific social phenomenon in its real-life, 'bounded' context. Case studies focus on the exploration of processes, activities, and practices, where social phenomena are both constructed and are dependent on interactional accomplishments (Cohen et al, 2007; Stake, 1995; Yin, 2003; Baxter & Jack, 2008). Merriam (2009), for example, concludes that the single most defining characteristic of a case study approach is in the delimiting of the object of study, what is known as the case. In this line, Miles and Huberman (1994) consider the case "a phenomenon of some sort occurring in a bounded context"(p.25) while Stake (2005 p. 443) argues that choosing a case study approach primarily concerns "a choice of what is to be studied", that is to say, a single unit, an entity, around which boundaries can be defined. A comprehensive definition of a case study is offered by Creswell (2009) as "a qualitative approach in which the investigator explores a bounded system (a case) or multiple bounded systems (cases) over time, through detailed, in-depth data collection involving multiple sources of information

(e.g., observations, interviews, audiovisual material, and documents and reports), and reports a case description and case-based themes"(p.73).

In order to attain a more compelling interpretation as well as strengthen external validity, precision, and generalizability of the phenomena under study, a multiple case study design was employed (Miles & Huberman, 1994; Stake, 2006; Merriam, 2009). As Stake (2006) explains, "in multi-case study research, the single case is of interest because it belongs to a particular collection of cases. The individual cases share a common characteristic or condition. The cases in the collection are somehow categorically bound together. They may be members of a group or examples of a phenomenon"(p. 5-6). A multiple case approach is therefore used to understand a collection of cases more deeply, noting the similarities and differences across cases, trying to find patterns and relations for the social phenomenon under study while providing a more reliable and robust study (Stake, 2006).

Accordingly, in the context of the current research**, 12 individual online graduate students comprised the multi-case study.** Individual participants and their experiences of learning across contexts were considered as the 'bounded' case. Each student was considered as a unique and separate case and their idiosyncratic experiences of online learning were analyzed and observed individually as they shared their experiences of studying across contexts in online HE. Case study data analysis procedures were completed individually case by case, and then findings were compared across all cases. Cross-case comparison of the individual participants has allowed for an exploration into the interconnectedness of the elements within each case (Thomas & Myers, 2015).

4.2.2 Participants & Context

The current study is situated in global and intercultural educational contexts, selecting three study sites across geographic and cultural regions in the field of online higher education (HE). The scope of the current study, therefore, is students' experiences of online learning in these academic contexts linked with the contemporaneous online learning contexts across their lives, analyzed through a learning ecologies perspective. Three distinct case sites have been selected at **(1.)** the **Open University of Catalonia, Spain, M.Ed. Program in Education and ICT** (https://estudios.uoc.edu/es/masters-universitarios/educacion-tic/presentacion), **(2.) the University of Edinburgh's MSc. in Digital Education** (https://online.education.ed.ac.uk/about), and **(3.) the University of Illinois Urbana Champagne M.Ed. in Learning Design and Leadership** (https://education.illinois.edu/epol/programs-degrees/ldl). Each site has a focus on online/digital education and the integration of educational technology into pedagogical scenarios (i.e. e-learning, and online learning) across a range of contexts including k-12, higher & further

education as well as professional development & training. All three programs have an emphasis on building practical skills and critical insight into the field of online/digital education and online/digital learning. Each program aims to understand and critically reflect on the phenomenon of digitally mediated learning while creating effective and engaging learning environments for students through the integration of emerging technologies and emerging pedagogies.

Each participant, including their personal trajectories as well as their experiences of learning in online HE during the 2017-18 academic year make up the 'bounded' case, and collectively comprise the multiple-case study. The selection of participants has followed a non-probability purposive sampling (Babbie, 2013) using techniques of both convenience and criterion sampling (Cohen, 2007; Creswell, 2009). Purposeful sampling involved selecting a variety of information-rich cases with direct experiences of learning across contexts and practices in online HE.

Participant selection was aided with the direct help of professors working with the entire program population, who sought participants with a willingness to participate in multiple interviews as well as a minimum of 1-year completed in the program. Once participants were identified by professors as appropriate for the study (as was the case at the UOC & U of E) or once students responded positively to the researchers request for participation through email (as was the case at the UIUC) an informed consent and research information sheet was sent to participants in order to receive their consent for participation in the study, in line with the ethical considerations detailed in Section 4.5. The informed consent form and research information sheet can likewise be found in the Appendix B.

The study aimed to gain greater insight by selecting participants particularly experienced in online learning across contexts and practices allowing a more in-depth look at the phenomenon from a variety of trajectories and perspectives, ultimately helping to identify common themes and patterns evident across the population. The case-study sought participants who were available and accessible to participate in the study as well as selecting cases that are able to meet some predetermined criterion of importance. Following criterion sampling (Creswell, 2009), a range of factors have been considered, represented in Table 4.1, in order to offer as wide a range of student learning experiences in online HE as possible.

Table 4.1 Case Study Criterion of Importance

Selection Criterion	Selection Criterion Description
1. Stage of Program	Case participants should have completed at least one year of the program, however have yet to finish and still be involved in active coursework until the end of 2018. When possible, students should be in the same cohort or year.
2. Age	Age range should be equitably distributed.
3. Gender	Gender should be as equitably distributed as possible
4. Labour position	Participants should have a varied profile (from teachers, instructional designers to education program management to academic administration) however, they should be working, in a broad sense, in the educational field.
5. Digital Competency	Study participants, where possible, should be highly digitally competent, understood as a combination of the knowledge, skills and attitudes required while using ICT and digital media to perform tasks, solve problems, communicate, manage information collaborate and build knowledge.
6. Academic achievement/engagement	Where possible, participants should be students with a good academic record and visibly proactive in the program. For example, they intervene in the classroom and they take full advantage of the learning activities proposed.

Site Selection

Following Creswell (2009), the multi case-study will be set in temporal, geographical, organizational and institutional boundaries. The 3 university sites have been selected using defined criteria and selected as exceptional cases of best practice in distinct cultural and geographic contexts that may be able to offer clear insight into the phenomenon under study. The three sites of Online Masters of Education sites have been chosen because of their intensive use of digital technologies and emerging pedagogical designs, characterized by innovative learning practices. As such, they may be able to offer new knowledge and insight into the full potential of online learning, and in particular, newer understandings of how to empower and support connected student learning across a range of contexts.

The master's level is also important because it represents students as they continue their professional trajectories as lifelong learners, bringing a wide range of academic and professional experiences to their learning. Thus each individual case will be able to offer rich data and observation

opportunities on emerging lifelong and lifewide learning practices and trajectories, and in particular in identifying emergent learning strategies in supporting academic learning. The 3 sites likewise have three culturally and linguistically distinct origins, histories as well as orientations and approaches to teaching online. Two sites represent traditional universities offering fully online graduate programs (UIUC, U of E), while one follows a fully online, open education model (UOC).

Despite the three program sites being in distinct cultural and geographic regions, there were consistent and similar operational structures and designs of each program including instructional strategies that emphasize i. independent study and collaborative group work, ii. creation of open knowledge artifacts through inquiry, problem and project-based processes iii. individual and group web publishing and blogging, iv. creation and presentation of visual and multimodal assignments, v. peer-based assessment structures, vi. in-depth forum discussions and debates and vii. the use of a variety of rich digital learning environments (LMS's such as Moodle, Blackboard, or institutional LMS's, Blogs, Wikis, and collaborative authoring platforms and workspaces). These sites were chosen as forward-looking universities among a wide population of fully online graduate programs in the field of educational technology and digital education (e-learning) for a variety of reasons, detailed in the below Table 4.2.

Table 4.2 Attributes of Graduate programs

•Accessible and open program documentation, course curriculum, and course guidebooks
•Focus on criticality in online learning
•Open educational practices (i.e. use of MOOC's, open web publishing and blogging);
•Emphasis on part-time study in combination with and reflection on professional practice
•Innovative program design and established faculty that have published research in the field of digital learning

In order to begin the case-study field work, and in accordance with Yin (2009) **a case-study protocol and research agreement was developed.** Each participating program signed the protocol and research agreement. As Yin (2009) articulates, a protocol is "essential" if you are doing a multiple case study, a desirable way of increasing reliability, and "intended to guide the investigator in carrying out the data collection from a single case" (p. 132). The case study protocol and research agreement can likewise be **found in the Appendix A.**

The case study took place throughout the 2017-2018 academic school year, and the population, course context and academic curriculum of each graduate program is represented in Table 4.3 below, including those course documents collected and analyzed in building the case study.

Table 4.3 Population Sample

Graduate Programs	Students Registered	Courses Visited
UOC Master of Education and ICT	906 students registered in different phases of the program	4 core courses observed/documented
UIUC Master of Education in Learning Design and Leadership	200+ registered in the 2017-2018 academic year	4 courses observed and documented
U of E M.Sc in Digital Education	172 students registered across 32 Countries	4 courses observed and documented

4.2.3 Procedures

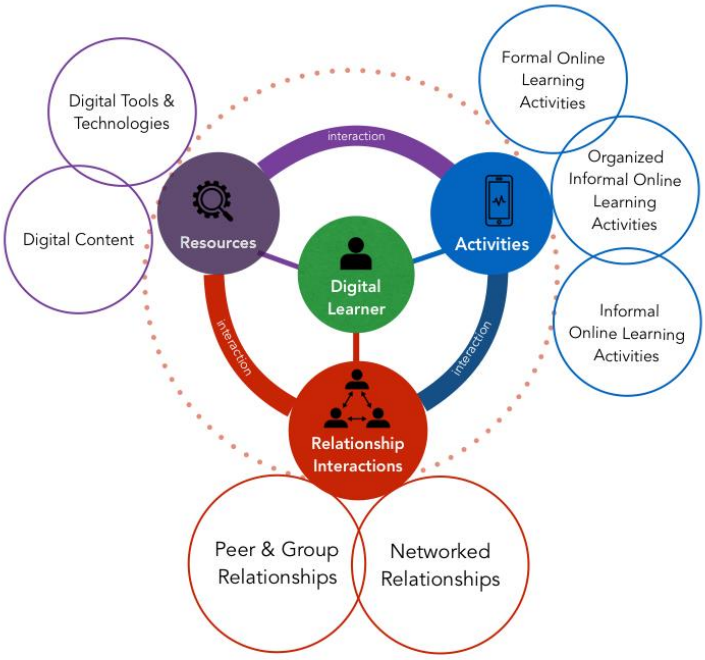
This section will detail the data collection procedures used within the qualitative strand of the mixed methods design.

4.2.3.1 LLE Sensitizing Conceptual Model

An initial Learning Ecology model has been constructed as a sensitizing concept (van den Hoonaard, 2012), "derived from the research participants' perspective, using their language or expressions, and that sensitize the researcher to possible lines of inquiry"(p.1). The use of a sensitizing concept is helpful in guiding and offering a general sense of reference in approaching empirical instances, offering useful directions along which to observe and analyze, and helping to support the units of analysis, boundaries, and parameters of the study. The LE sensitizing model was designed in the first phase of the research as a guiding heuristic and organizing scheme in order to support data collection in the field of online learning from an ecological perspective (Peters et al. 2018). A sensitizing LE component model has been designed as an integrated conceptualization of a complex and multi-layered phenomenon, human learning that spans multiple contexts. It has been developed as a clear way to characterize the units of analysis for the study. In this sense, the conceptual model was also built to respond to one of the research sub-questions by inquiring **what components configure the learning ecologies of online higher education students.**

The below LE sensitizing model (Figure 4.2) was derived from the researcher's perspective in consideration of the literature and previous research which has used the LE construct. The current model has used the language and expressions of the researcher as a means to sensitize and focus the possible lines of inquiry for student learning in online HE. Sensitizing concepts give the researcher a general sense of reference and guidance in approaching empirical research, suggesting helpful directions along which to look (Van Den Hoonaard, 2012). As such, sensitizing constructs can be considered starting points when thinking about data collection and analysis, particularly about social phenomena which the researcher has no definite idea. In this process, a concept can often become provisional (i.e. digital learning ecology) and may be discarded as a more viable and definite concept emerges throughout the course of research.

Figure 4.2 Learning Ecologies Sensitizing Model



The development of a LE sensitizing model was constructed through adductive reasoning (Lipscomb, 2012). As the least familiar mode of reasoning, abductive reasoning is used to make logical inferences about the world and "offers great promise as a potential primary mode of reasoning for qualitative research" (Shank, 2008 p.29). An abductive approach has been used in previous LE research in HE (Esposito, 2014) and has been argued to aid the researcher "remain open to all kinds of theoretical possibilities and gather more data to check the most plausible explanation" (Charmaz, 2008, p. 467). In

this line, a LE sensitizing model has been used as a guiding heuristic to structure the qualitative procedures in the current mixed methods study.

The LE model represented in Figure 4.1 extends and builds upon definitions and conceptualizations from Barron (2004, 2006) and Jackson (2016), defining the central components of an individual's learning ecology as **learner activities, relationships and resources and the interactions that emerge from them across a range of contexts that lead to opportunities for learning.** A particular emphasis was placed on the attributes or qualities of learning across a continuum—from formal to informal—elaborated by Colley et al. (2003) and extended by Van Noy et al. (2016) and Greenhow et al. (2016). This continuum of formality allows an understanding that in any circumstance of learning there are attributes of both formality and informality operating along a continuum.

As part of the LE sensitizing model, typologies (i.e. thematic categories) of learner activities, relationships and resources across formal and informal contexts and practices were developed and validated by a group of 4 experts through iterative email communication, using content validity (Creswell, 2009) in order to assess the appropriateness of the content and organization of the model. The model is not meant to be exhaustive, yet tries to define the most plausible component typologies across a range of formal and informal activities, resources and relationship interactions mediated by digital technology that may support academic learning in online HE. Through an iterative process, the model was revised based on expert feedback. The model which included central components (learner activities, relationships and tools/technologies) with associated typologies were sent to 5 experts in educational technology who provided critical commentary through face and content validity. Revisions were made based on their critical feedback. Component typologies (i.e. activities, relationships, and resources across contexts) formed the core units of analysis and the basis of data collection, including the development of the interview protocol, program document analysis as well as informing the design of the quantitative survey, as is detailed in section 4.3.1. Below we present the category typologies of the components of a LE sensitizing model in online HE developed through abductive reasoning.

Table 4.4 presents a typology of learner activities according to formality, influence by Van Noy et al.'s (2016) typology. Formal online learning activities were adapted from the Digital Competency framework developed by the European Commission (Vuorikari et al., 2016; Redecker, 2017).

Table 4.4 Typology of Learning Activities according to formality

Formal Online Learning Activities	Organized Informal & Informal Online Activities
• Browsing, searching and evaluating data, information and digital content.	• Browsing, searching and filtering information and digital content.

• Managing information and digital content. • Communicating and sharing resources and content • Collaborating in the co-creation of resources, information and knowledge. • Creating and Developing your own digital content. • Integrating and elaborating digital content that others have created. • Identifying technological needs and solving technical problems. • Creatively using digital technologies by applying a variety of tools and technologies • Protecting devices, personal data, and privacy	• Browsing and viewing digital entertainment (i.e. netflix, hbo, social media). • Interacting informally across my Personal Social Networks • Sharing Content • Browsing and playing video games. • Communicating with peers and peer groups (whatsapp, groupme, messenger, discord etc.) • Interacting more formally across my Professional Development Networks (linkedin, researchgate or academia.ed. etc). • Engaging in Mentoring and/or Coaching and/or Volunteering. • Interacting with Online Interest Groups and Online Communities (i.e. Facebook groups, Meetup groups). • Participating in Online Courses outside of my academic program.

Table 4.5 presents a typology of digitally mediated learner resources according to formality. Specifically, the typology of digital tools & technologies was adapted from a typology of Web 2.0 technologies developed by Bower (2016). Digital content was developed abductively through logical inferences in order to come across the best plausible explanation (Shank, 2008) for a range of digital content which may support academic learning across a range of digital contexts.

Table 4.5 A Typology of Digital Tools/Technologies & Digital Content

Digital Tools/Technologies	Digital Content
• Search Engines (i.e. google, bing etc.) • Communication tools (i.e. whatsapp, skype, google hangout etc.) • Multimodal and Multimedia Editing and Sharing tools (Youtube, Movie Maker, Prezi, Slideshare, Padlet, etc.) • Text Editing and/or Sharing tools (Word, Google Docs, Pages etc.) • Collaboration (synchronous & asynchronous) tools (Email, google drive, forums, messaging apps)	• Content facilitated by the academic program. • Content accessed in Scientific Knowledge Databases and Repositories (digital libraries etc.) • Open Educational Resources (MOOC's, Webinars, Presentations /audio/video) • Content accessed on Social Media • Content accessed on Institutional Websites (Research Institutes, government agencies)

- Social Networking Systems (Facebook, LinkedIn, Twitter etc.)
- Data Gathering and Analysis tools (surveymonkey, spreadsheets, google forms etc.)
- Knowledge Organization and Sharing tools (dropbox, google drive, mendeley, zotero, etc.)
- Personal websites, Personal Blogs, and Wikis
- Online Games & Virtual Worlds
- Mass-media (i.e. Digital Newspapers, Radio, T.V. & Movies)

Table 4.6 presents a typology of digitally mediated relationship interactions that could support formal learning. Again, it is not exhaustive, yet attempts to "reason to the best explanation"(Shank, 2008 p. 29) a range of social support interaction categories that students may use as they engage in academic learning in networked and digital environments, largely influenced by social learning theories and the work of Dron & Anderson (2014).

Table 4.6 A typology of Relationship Interactions

Relationship Interactions (Peer and Group Relationships & Networked Relationships
• Interactions with Teacher(s)
• One -to- one interactions with university peers.
• Small group interactions with university peers (i.e. study/research/class/project groups)
• Interactions with Work Colleagues
• Interactions with peers outside of school and work
• Interactions with Mentors
• Interactions across Personal Social Networks (friends, contacts, family)
• Interactions across Professional Social Networks (professional associations, contacts, acquaintances)
• Interactions within Online Interest groups and communities of practice (i.e. Facebook groups, meetups, interest group forums)

4.2.3.2 Program Documentation

This section details the role documentation played in the qualitative phase of the research. Documentation often constitutes the basis for most qualitative research (Schensul, 2008) and is a common form of qualitative data in case-studies (Stake, 2006; Yin, 2009). Because of the digital nature of the three case sites, access was easily and openly facilitated, including explicit documentation about the program objectives and aims in general, and about the academic curriculum and program pathways as well as general course program guides and handbooks more specifically. Online document collection

can indeed be an important element of an 'expanded' or online ethnographic method for helping researchers shape a valid exploration of a studied virtual phenomena (Skågeby, 2016). Several authors (Creswell, 2009; Merriam, 2009; Flick, 2018) establish that documents are an important form of qualitative data allowing the research to obtain the language, words and meanings of the case site or participants in an unobtrusive manner.

Program documentation collection began in Phase 1 of the study. It became an important process in the conceptualization of the LE sensitizing model, in understanding how students' experience of learning is shaped through the academic curriculum. Through thematic analysis of collected documents, it offered important insight into the structural, organizational and curricular requirements of each program and course, including the central learner activities, learning resources and environments, and social configurations required or necessary to successfully participate in the program. As the major sources for understanding the academic curriculum, program documentation was likewise used in triangulation with other sources of data in the qualitative phase of the study, visible in Chapter 5 through thematic network analysis aiming to answer the central research questions of how students experience learning across contexts in online HE.

4.2.3.3 Interviews

This section details the use of online interviews as the principle qualitative method of data collection in the current study, representing a common and effective technique to explore the meanings of participants in their real-life settings (Babbie, 2013; Flick, 2018) becoming more widespread as a digital age research method (Quinton & Reynolds, 2018). Participant interviews were semi-structured (Creswell, 2009) so as to allow the interviewer the ability to reorder, omit, or add questions based on the interviewer's perception of what seemed most appropriate to gain relevant, in-depth, and highly contextualized information related to the phenomenon under study.

During Phase 2 of the study, the qualitative interviews consisted of two cycles across all 12 case participants, all the interviews began with an introduction to the purpose of the study and the objective of the interview, as well as outlining the rights of participants in the case-study. All the interviews were carried out online and audio-recorded for later transcription with informed consent received from the participants in advance. The interviews were broken down into 10 broad questions, informed by the LE sensitizing model as a guiding organizational scheme for the interviews, as well as guided by central purpose of the research. The interview followed the below structure:

- Background as Online Student: Trajectory of Education and Training experience leading up to beginning the online program
- General Impressions of the online learning experience so far
- Experiences of Learning in the Program through activities, resources and relationship interactions students would use to complete a typical learning requirement
- Frequency of Learning activities (i.e. how often on a typical week did they engage in formal study)
- Relationship between formal academic learning and other contexts in their life
- Affordances of Online Learning Vs. other forms of learning (i.e. face-to-face)
- Views on preparedness for future learning experiences

A second cycle follow-up interview was completed after a period of online observation (detailed in the next section 4.2.3.4). A follow-up interview was conducted to corroborate the results from the first interview along with descriptive results from the online observations. Before the second interview, the first interview was transcribed and thematically analyzed, and used to inform and develop the second interview protocol. The second interview protocol included the following structure:

- Online learning strategies: Frequency of engagement with learning activities
- Connecting academic learning with other contexts (professional and personal) and the role of the university in supporting this.
- Changes in approaches to learning after participating in the online program (skill & competency development)
- Peer collaboration and social support in supporting learning
- Advice to give for those studying online
- Learning Strategies developed throughout the program
- View of online learning (and how they may have changed since beginning program)
- Impact of online learning experience

Both the first and second interview protocols can be found in the Appendix C**.**

4.2.3.4 Online Observations

As a complementary data source, the study has used both limited online participant and program observations, following a researcher as bystander role (no participation, complete observer). This technique relied on online or 'expanded' ethnography techniques including structured and bounded observations of individual cases across as well as program environments within digital scenarios (Standlee, 2017). Participant observation of online higher education students has been used to obtain a better understanding of the cases. Observation has been conducted openly, and there was no interaction or participation with the research participants. The online observation followed a cross-sectional study method, analyzing data from the case-study participants at a specific point in time (Creswell, 2009). The principle objective of the online observation was to identify online activities and patterns of digital practices and behavior that could be corroborated and verified within the 2nd participant interview, as well as support the development of individual case reports. In this sense, unlike other sources of qualitative data, online observation data was not analyzed systematically on its own. It was used to complement and triangulate with other sources of qualitative data, namely interviews and program documentation. Specifically, the online observation occurred during Phase 2 of the study between the 1st and 2nd interviews in order to corroborate and triangulate information collected in the first interview related to student experiences of online learning. Data collected during observation, including field notes were corroborated during the 2nd interview, and thus integrated into the thematic analysis through the interview data.

Consent was negotiated and received by all students for the online observation data collection through an informed consent process (detailed earlier) and found in Appendix B. The online observation protocol used the following parameters for the individual students, shown in Table 4.7. For each student, observations occurred in two primary social network sites related across formal and informal contexts of learning and professional development (twitter, linkedin) as well as with either (1) personal blog or work-related site, and (1) site of formal academic learning (if available) related to the program and ideally openly networked, during the 2017-2018 school year.

Table 4.7 Online Observation Parameters

Table 4.7 Online Observation Parameters

Individual Student Cases (12)	2 Primary Social Networks (Twitter, Linkedin)	1 Personal Blog or Professional site	1 Site of Formal Academic Learning linked to the Program (if available)
Program Sites (UOC, UIUC, U of E)	Program Social Media Accounts (Twitter etc.)	Formal Institutional Program Sites	1 prominent example of a course that follows an open learning and OER format.

4.2.4 **Thematic Network Analysis: Individual Case Reports and Cross Case Analysis**

Qualitative thematic network analysis (Attride-Stirling, 2001; Nowell et al., 2017) has been used as a set of foundational qualitative procedures for the rigorous processing, analysis and thematic development of the qualitative data, primarily through program documentation and interviews. In general, thematic analysis is considered a "method for identifying, analyzing and reporting patterns (themes) within data. It minimally organizes and describes your data set in (rich) detail." (Braun & Clarke, 2006 p. 79). Thematic analysis has been a poorly demarcated, yet widely used qualitative research method, and through its theoretical freedom has been able to provide a versatile and highly flexible analytic approach that yields a rich, detailed and nuanced account of data (Braun and Clarke, 2006; Nowell et al. 2017). Nowell et al. (2017) articulate that "a theme is an abstract entity that brings meaning and identity to a recurrent experience and its variant manifestations. As such, a theme captures and unifies the nature or basis of the experience into a meaningful whole" (p. 362). A network approach to thematic analysis aims to reach deeper levels of meaning, analyses, interpretation and inference by identifying patterns and relationships that underlie themes, augmenting qualitative analysis through networked interpretations and presentations of the identified themes (Attride-Stirling, 2001; Nowell et al., 2017), particularly aligned with an LE perspective.

The first step in the analytic process is organizing and accounting for the data. Interviews were therefore transcribed (24 in total) from audio recordings and a first cycle inductive approach to cross-case coding was completed across all 12 cases. Interview transcription itself was also considered as an important part of the data analysis procedure, viewing it as a central part of the analytical process in interpretive research (Braun & Clarke, 2006). Atlas.ti was used as a form of Computer-assisted

Qualitative Data Analysis Software, following the work of Friese (2012) who has written extensively on qualitative analysis using Atlas.ti. Initial inductive coding has used elemental methods outlined by Saldaña (2013). In particular, structural and In-Vivo codes have been used for program documentation and process coding and In-Vivo coding have been used for interview data. Process coding has been used to connote action in the data (Charmaz, 2000) appropriate in understanding students' experiences of learning through learner activity. A hybrid inductive-deductive analytic approach (Fereday et al., 2006) was used, providing a flexible framework for allowing themes to 'emerge' from the data inductively through first-cycle open coding, yet allowing for emerging thematic networks to be linked to previous conceptual models (LE conceptual model) through deductive interpretation and reasoning.

After initial open coding using Atlas.ti, a robust systematization and presentation of the thematic network analyses of the interview data was completed as an attempt to systematize the extraction of lowest order premises evident in the text (basic themes), to categories of basic themes grouped together to form "organizing themes," in order to construct superordinate themes that encapsulate the principle meanings and richness of the data into "global themes". This method allowed for network representations to emerge capable of signaling the most salient themes and patterns in relation to the phenomena under study. During this phase, analytic memos were created by the researcher in order to develop conceptualizations about the dimensions and categories of learners experience in online HE. In order to establish trustworthiness and credibility of the qualitative data analysis, established thematic analysis phases were followed and adapted from Braun & Clarke (2006), Nowell et al., (2017) with a thematic network emphasis adapted from Attride-Stirling (2001). These phases are outlined in the below Table 4.8, adapted from the previously mentioned authors.

Table 4.8 Phases of Thematic Network Analysis (adapted from Braun & Clarke (2006) & Attride Stirling (2001)

Phases of Thematic Network Analysis	Analytical Procedures & Means of Establishing Trustworthiness & Credibility
1. Organizing & Familiarizing yourself with your data:	• Prolonged engagement with data: data analysis took place over several months • Triangulate different data collection modes: interview data was triangulated with program documentation • Analytic memos were used to document and develop theoretical, analytical and reflective thoughts • Detailed Organization and Storing of Data collected within Atlas.ti

Table 4.8 Phases of Thematic Network Analysis (adapted from Braun & Clarke (2006) & Attride Stirling (2001)

2. Generating initial codes:	• First cycle open & inductive coding produced a range of basic themes across the interview data collected related to students' experiences of studying online • Supervisor debriefing & Researcher triangulation: through supervisor meetings and feedback, researchers debriefed the first coding cycle, and the generation of initial codes through process and in-vivo coding.
3. Searching for, reviewing, and defining themes:	• Second cycle coding involved refining first cycle themes, arranging & selecting basic themes, and rearranging basic themes into organizing themes in Atlas.ti • Researcher triangulation was used to agree on and establish organizing themes • Analytical memos and detailed notes were developed during second cycle coding
4. Construct Thematic Network	• Thematic Networks were developed by developing Basic themes into code groups using Atlas.ti. Basic themes (code groups) were then clustered and rearranged based on larger shared issues and themes, related to the phenomenon of online student learning and in response to the central research problem and associated research questions, using an LE perspective. • Researcher Triangulation & Peer Debriefing was used to identify and name the issues and elements underlying the larger organizing themes in light of the basic themes
5. Describe, Explore and Summarize Thematic Network	• Through analytical reasoning, a summary of the basic themes, including their claims, meanings and assumptions was developed, representing the organizing themes. This process led to the development of the 'Global' themes of the network. Because the scope of student experiences of online learning is so broad, a range of global themes were developed, constructing distinct global themes related to a variety of related elements of student learning (i.e. past trajectories, learning strategies, engagement between academic learning and professional practice etc.). • Peer debriefing and Researcher triangulation was used to research consensus and revise Global themes. • Thematic network development was documented using a variety of tools, including Atlas.ti, PPT, and Excel.
6. Interpret Patterns into Results	• Thematic Networks were visualized using PPT to understand the relationships and patterns found in the data. These visualizations were used to explore the significant themes, concepts, patterns and structures that arose in the visualized data • Analytic memos were developed to guide interpretation as a form of documentation of theme development and network construction • Thematic Networks were presented at various Supervisor meetings and in Research Seminars, summarizing the principal themes and patterns which characterize student learning in online HE. • Thematic Networks were interpreted using a hybrid inductive and deductive approach through summarizing all of the identified and constructed networks in direct relation to the original research questions and the conceptual framework which underpins the study.

Table 4.8 Phases of Thematic Network Analysis (adapted from Braun & Clarke (2006) & Attride Stirling (2001)

7. Produce Individual Case Reports & Cross-Case Thematic Network Report	• Individual case reports were constructed, presented in Chapter 5 Section 5.1.2., using the global themes developed from the Thematic Network Analysis as the guiding structure of each report, and directly linked to the individual experiences of learning in online HE collected through interviews and participant observation. • A cross case report was developed through reasoning and argumentation based on the salient patterns and themes that emerged in the exploration of the identified thematic networks across all case participants, found in Chapter 5, Section 5.1.3 and 5.2 & 5.3. • Participant checking was used, giving participants the opportunity to comment on the individual case reports and emerging findings, in order to enhance credibility and trustworthiness of results.

Throughout the qualitative strand of the study, data triangulation has occurred across a range of phases, given the interpretive multi-site, multi-case nature of the study. For instance, data collected through program documentation was triangulated to compare and analyze the academic curriculum and program structure of each site, finding commonalities and distinctions across a range of sources from program guides, to MOOC's to class blogs. During Qualitative collection in Phase 2 of the study, data was collected from each case participant through interview and observation, and thus triangulated from each source. A cross case analysis was conducted to enhance generalizability and transferability to other contexts, and data sources across all cases were triangulated trying to analyze whether findings apply beyond a specific case (MIles and Huberman, 2014). In this sense, data triangulation has helped to deepen understanding and explanation of students' experience of learning in online HE, particularly useful in interpretative research accounting for the different viewpoints and experiences of research participants (Cohen et al., 2007).

4.2.5 Credibility & Trustworthiness

Credibility and trustworthiness in qualitative research has long been a challenge, leading to an imbalance of qualitative research being published in highly ranked scientific journals (Twining et al., 2017). In order to mitigate issue of legitimation, the current research has used variety of procedures to ensure credibility, authenticity and trustworthiness of the qualitative data related to the goal of accurately accounting for and representing the experiences of learners in online HE.

A central procedure within the current study to build internal reliability and credibility has been the development of a case-study protocol and research agreement with each case-site (Yin, 2009) as a way to clearly outline the data collection and analytical procedures before entering into the field, and

making these openly available to participating graduate programs. Likewise, the use of both multiple sites, and multiple cases fundamentally increases the reliability of the results, as triangulation can be used across sites and across cases in order to corroborate and build patterns found within the data.

Another important procedure to improve reliability of the case-study research as been detailed organization of the data collected, including data archiving for easy retrieval and analysis. Analytic memos were also used throughout the research period, in order to maintain alignment and coherence of analytical procedures and lines of inquiry throughout the study timeline.

As interviews were an essential source of qualitative data, they were aligned with an expert validated LE conceptual model, and were likewise piloted on 10 students to ensure consistency and clarity in the interview protocol, linked with the research questions and objectives. In analyzing the transcripts of the interviews, they were triangulated with participant observation in order to ensure credibility of the data (Creswell, 2009; Cohen et al., 2007).

Further, to ensure credibility, trustworthiness and internal validity of data, triangulation occurred on a variety of combined levels (Elliott et al., 1999; Cohen et al., 2007; Twinning et al. 2017), detailed below:

Data triangulation through the use of 12 different participants across three distinct case sites, a wider range of viewpoints and insights could be drawn, as well as through program documentation and participant observation

Method triangulation - using multiple methods to collect qualitative data as outlined previously, as well as triangulating qualitative and quantitative methods.

Participant checking - case study participants had the opportunity to comment on both the interview transcripts as well as the produced individual case reports (presented in Chapter 5).

Researcher triangulation: the doctoral researcher was directly involved with two research supervisors in both the analysis, interpretation and validation of the qualitative results across all stages of the research process, from conceptualization to final validation. Further researcher triangulation was also carried out, as has previously been mentioned.

Across a range of opportunities, the research design and initial findings have been presented in a variety of academic venues, including international conferences such as EDEN, 2018, The Learner Conference 2018 organized by the program team from the UIUC case site, and the EDEN Research Workshop 2018. A three-month research stay at the University of Edinburgh Centre for Research in Digital Education was likewise completed as part of the study, whose research team leads the M.Sc. in Digital Education Program. Initial results were able to be presented in a seminar for feedback through dialogical engagement. Finally, the study was completed within the work of the Edul@b research group, whose central working concept connecting major lines of research is Learning Ecologies. As such, the research design, instruments and conceptualization was able to be presented at various research meetings over the 3 year course of the project, receiving feedback and continuous dialogue concerning the development of the project with a variety of researchers.

4.3 Quantitative Component

4.3.1 Online Survey Design

This section details the development of an online survey as part of quantitative collection phase (4) of the research design. As has been explained, the mixed method design used a sequential exploratory approach, aligned with the interpretive and exploratory nature of the case-study research. The survey was designed for students at all three sites (UOC, UIUC & U of E), and was therefore developed in English and Spanish. Survey methods are common in social research as they represent an efficient and systematic method for collecting data from a broad spectrum of individuals and settings (Check & Schutt 2012). The current survey was sequentially designed and distributed after the qualitative phase of the study, where both the LE sensitizing model and results from the thematic qualitative analysis of interviews, observations, and program documentation were used to inform the development of the different sections of the questionnaire, based on an LE perspective, with a particular emphasis on learning along a continuum—from formal to informal. The purpose of the quantitative survey is to integrate survey results in a complementary, developmental and integrative form with the qualitative results in order to answer the central research questions and objectives. In this sense, survey research attempts to build generalizations into the study which will be contrasted with cross-case analysis which primarily focuses on in-depth, nuanced and contextualized qualitative inquiry. The survey will be able to aggregate responses across a broader population within the study sample of graduate programs, but also compare for similar patterns and profiles identified within the qualitative

case-study data collection, for instance, previous professional and academic trajectories, learning activities, learning resources and social support.

Because the research is exploring emerging digital phenomenon, no prior survey was found to be adequate for this study. Accordingly, the survey was informed by a literature review of appropriate conceptual frameworks (Barron, 2006; Jackson, 2016 Cope & Kalantzis, 2017; Vuorikari et al., 2016) as well as from previous surveys designs around digital media use and online higher education, such as the Pew Research Centre (Anderson & Jiang, 2018), presented in Table 4.11. Likewise, themes, typologies and categories that have emerged in the LE conceptual model phase (Phase 1), as well as the qualitative thematic analysis phase have also been used in the development and design of the survey. Detailed survey design influences, and the survey itself, can be found in Appendix D & E.

Limesurvey was selected as a popular choice of open source survey software, with advanced analytic and robust design options, with results easily exportable to SPSS for analytical testing and generalizing. In total, 22 questions were developed across five broad sections including 1. Demographics (Personal, Academic and Professional Backgrounds), 2. Engagement with Digital Activities 3. Digital Relationships Interactions 4. Digital Resource Use 5. Impact of Digital Learning Experiences.

The development of the survey instrument culminated through a survey validation process using both content and face validation from 4 experts in the field of online higher education and educational technology, including two international experts from Canada. Content validation (Salkind, 2010) was used to ensure that the items on the survey were representative of the domain the survey seeks to measure, namely student experiences of learning in online HE from an LE perspective. Face validity refers to "the degree to which a measure is clearly and unambiguously tapping the construct it purports to assess" (Lewis-Beck et al., 2003 p.1) and was also conducted through expert validation. A pilot survey was likewise distributed to 20 students at the UOC doctoral school with experience of online study. Their feedback also contributed to content and face validity of the survey, as many pilot survey participants had previous experience in survey design. An initial analysis of the data, including testing for internal consistency and reliability of each scale used in the survey was completed.

4.3.2 Sampling

The quantitative sampling method involved sending the online survey through email to participants of the graduate program at each site. The inclusion criteria for the survey were those students currently taking online courses in the graduate program at the graduate level (i.e. masters course, which included

doctoral students taking masters level courses) during the 2017-18 academic year. Across the three case sites, the digital survey was distributed among the population of the graduate programs at each site that were active in course work during the 2017-18 academic year. As each site used a slightly different sampling approach, they will be detailed below.

- At the UOC, in coordination with the E-Learn Centre, and approved by the UOC Research Ethics committee, a sample of 904 students were sent an email invitation to the digital survey.
- At U of E, the academic directors of the graduate program sent emails to the entire program population (132 students) inviting them to participate in the survey in June 2018, and a follow email was sent in Sept. of the same year.
- At the UIUC, the researcher was given access to course email lists of all graduate students participating in courses throughout the 2017-18 academic year. Participants (200) were sent an invitation to participate in the survey.

At a confidence level of 95%, this population sample enables the research to obtain statistically significant information for the student population across the three Masters program at a maximum error margin of 7% (Field, 2013). Table 4.9 below shows the response rate across the 3 case-sites.

Table 4.9 Response rate across the 3 case-sites

	Full Responses	Response Rate	Population Sampled (by digital survey)
UOC	89	9.9%	904
UIUC	57	28.5%	200
U of E	32	24.2%	132
Total	178	14.3%	1236

4.3.3 Procedures

4.3.3.1. Data Analysis Plan: Descriptive and Multivariate Statistics

Quantitative data collected through the survey instrument has been used for both descriptive statistical analysis, in line with the exploratory nature of the research design as well as multivariate procedures, including PCA and Cluster analysis. Descriptive analysis allows for clear descriptions of a large range of quantitative data, while multivariate analysis allows the researcher to reduce data complexity, draw inferences and yield conclusions from the collected data (Babie, 2013), which has been

particularly useful when integrating the mixed methods data. Data has been organized and analyzed using the statistical analysis tool SPSS version 23. Descriptive analysis allows the researcher to provide a succinct view of the quantitative data efficiently, augmenting the account of the phenomenon under study by providing a clear line of evidence without overwhelming the reader (Given, 2008). The quantitative analysis began with the simplest form of testing, univariate analysis, where a single variable was analyzed in relation to the means and standard deviations, summarized in Chapter 6 Section 6.1.

The sequence of data analysis procedures was influenced by following previous studies, including Guitert et al. (2018), Krull (2018), and Poellhuber et al. (2019). The survey aimed to understand how students experience online learning from an LE perspective, and therefore was interested in patterns of learner activity, digital resource use and relationship interactions used to support online HE in digital contexts. PCA and clustering techniques were used to identify emerging profiles and patterns of behaviour across contexts in online HE.

4.3.3.2 Principal Components Analysis:

In relation to each LE component dimension outlined in the survey (detailed in section 4.4.1.1), survey respondents had to select from a range of categorical options to indicate which activities, resources, and relationship interactions across contexts they relied on most to support academic learning. Across the central dimensions of the survey (i.e. activities, resources, relationships) Principal Components Analysis (PCA) has been used to explore whether there was an underlying structure to the set of variables presented in the survey as well as a way to "reduce a data set to a more manageable size while retaining as much of the original information as possible" (Field, 2013 p.628). PCA's are linear combinations of variables which help reduce data complexity and support the analytical process (Guitert & al., 2018). A PCA statistical procedure uses an orthogonal transformation to transform observations of possibly correlated variables into values of linearly uncorrelated (not directly observed) variables called principal components (Jolliffe, 2011). This procedure was used in order to understand patterns in student experiences of online learning in higher education. For each PCA solution, a Cronbach Alpha technique was used for construct validity to test internal consistency by measuring how closely related a set of items are as a group (Field, 2013).

4.3.3.3 Cluster Analysis

Following the PCA procedures, a cluster analysis (Garson, 2014) was used to identify and create learner profiles based on a clustering (segmentation) technique. This process uses the underlying

structure of the variables present in the PCA solutions, in relation to students' experiences of studying online and is thus carried out using the standardized principal component scores resulting from the previously mentioned PCA and the k-means partition method (Aldenderfer & Blashfield, 1984). The strength of this method lies in its ability to classify "a data set into groups that are relatively homogeneous within themselves and heterogeneous between each other" (Xing et al., 2015, p.118). K-means clustering analysis has been widely applied to reveal learner profiles in MOOC research (e.g., Khalil & Ebner, 2016; Kahan et al. 2017; Poellhuber et al. 2019), particularly related to learning analytics and big data in education. It has been less used in the context of mixed methods case-study research or research on student experiences of learning in online HE, and as such, the K-means clustering algorithm aligns with the purpose of this research in identifying learner profiles from an LE perspective using an innovative mixed methods technique. Likewise, using a cluster analysis is also a method to qualitize numeric data through data transformation into qualitative learner profiles based on a narrative account (Fetters et al., 2013).

Five component variables have been chosen (detailed in Chapter 6 Table 6.12) that represent a wide variety of connected learner activity across contexts and practices, in order to represent a connected, collaborative and life-wide view of learning in the clustering profiles created. These component variables have likewise been chosen as they represent many of the valued academic and disciplinary practices which are encouraged through networked and inquiry driven online HE, included creative and collaborative knowledge work. To determine the optimal solution, a range of categories were tested, including four, five, six, and seven categories, comparing the quality of the different models and the meanings of the profiles produced. A classification model was sought in which the profiles would be qualitatively and meaningfully different, underpinned by a LE analytical framework, while preserving the quality of the profiling solution. As such, the meaningfulness criterion in Garson's (2014) three ways to assess cluster validity has been followed, including: criterion (or variable) validity, distance (or proximities), and meaningfulness.

4.3.4 Validity

Validity is an essential dimension of any research, as research processes that are invalid bring no value in their conclusions or contributions (Cohen et al., 2007). This section details the steps taken to ensure validity and reliability of the quantitative component.

Within a mixed methods approach, quantitative data must be considered in relation to internal and external validity. Given the exploratory and interpretive nature of the current research, threats to internal validity are low (Cohen et al., 2007). The selection procedures and population of the study are reported clearly, distributing the survey to the entire student population of each online graduate program during the 2017-18 academic year. The quantitative instrument was designed specifically for this study, based on an expert validated sensitizing conceptual model and informed from the literature, including previous studies which examined students' experiences of learning with digital media. Validity was likewise established through both content validity (whether or not the test covers a representative sample of the variable to be measured) and face validity (whether the test appears to measure what it is designed to measure) (Lopez et al. 2015; Cohen et al., 2007) with a group of experts (4) in educational technology in higher education. The survey was piloted with a group of 12 doctoral and post-doctoral students at the UOC to likewise ensure content and face validity, from a respondent's perspective. Through this process, not only the linguistic structure and organization was improved, including clarity of items across the central dimensions of the survey, but also issues of relevance, univocity, and importance of the scales. This process was also enhanced as those students who piloted the survey also had, in many cases, significant experiences studying and working in online contexts.

Iterative consultation with two faculty members specialized in educational research using statistical analysis and 4 post-doctoral researchers working on survey design who are published in the field of psychometrics at the UOC was used in both the instrument design and data analysis plan and procedures to likewise enhance the reliability and validity of the quantitative data. Following Creswell, (2009), the survey instrument has been included in the appendix, and will likewise be done in future publications. Finally, researcher triangulation with post-doctoral members of the Edul@b research group was used in the interpretation of the multivariate analysis for both the component solutions of the PCA as well as in the interpretation of the Cluster analysis, including the reviewing, defining and naming of both the component solutions and the cluster profiles (Elliott et al., 1999).

4.4 Mixed Methods Integration Procedures

4.4.1 Integration at the Research Design and Methods Level

Mixed methods integration procedures occurred at various phases throughout the research. Integration procedures are considered by many to be the 'hallmark' of mixed methods research (Fetters et al., 2013; Moseholm & Fetters, 2017). The first level of integration in the current study occurs at the

research design level through an exploratory sequential design. This particular design was identified as the most suitable method for the purposes of the current research. The study was designed to develop a LE sensitizing model which could be expanded developmentally through substantive findings within the qualitative phase, to build toward the quantitative phase.

The next level of integration would be methodological, which occurred through development. The study was designed in such a way so the LE sensitizing model in combination with the qualitative data analysis (i.e. program documentation, interviews and online observations) could be used to thematically develop and build the dimensions and latent variables used within the quantitative survey as a way to explore the same construct and variables throughout both strands of the study. Thematic categories and variables which were yielded from the qualitative strand (i.e. activities, resources, relationships, interests/motivations in studying, academic and professional trajectory, impact of learning) were built specifically into the quantitative survey.

4.4.2 Integration at the Interpretation and Reporting Level

The third level of integration occurs at the interpretation and reporting level (Fetters et al., 2013). Although mixed methods research has become a significant methodology in a range of disciplines across the social sciences, including in education research, some authors argue that ‘‘meaningful integration of qualitative and quantitative data remains elusive and needs further development’’ (Guetterman, Fetters, & Creswell, 2015, p. 554). In fact, integration has been considered one of the most challenging procedures to execute in mixed methods research (Guetterman, Creswell, & Kuckartz, 2015). Accordingly, there is a responsibility on researchers to practice methodological transparency by clearly detailing how data is integrated in order to achieve legitimation in the mixed methods findings.

Throughout the reporting phase of the current research, in line with Fetters et al., (2013) the current study uses the three principle forms of data integration in the recent literature including; **(1)** a **narrative account** integrating the mixed findings through a *weaving* approach writing the qualitative and quantitative findings together on a theme-by-theme basis; **(2)** integration through **data transformation** where firstly, one type of data has been converted to another type of data, and secondly, the transformed data are then integrated with data that has not been transformed; **(3)** integration through **joint-displays**, which involves *“bringing data together through visual means to draw*

out new insights beyond the information gained from the separate quantitative and qualitative results" (Fetters et al., 2013 p.2143).

A **visual joint-display** has been identified as an approach highly suitable for the purposes and objectives of the study. Although integrating mixed methods results in a discussion is a well-established research practice, using joint displays, and in particular those which link to theoretical models, has received relatively little attention in the literature and are "increasingly seen as an area of innovation for advancing integration" (Guetterman, Fetters, & Creswell, 2015, p. 555). A joint display not only assists readers in considering inferences, but also in understanding how quantitative and qualitative data interfaced. For instance, recent research has demonstrated innovation by using joint displays, advancing the field of MMR by connecting results to an established theoretical model (Bustamente, 2019), in line with the objective and purpose of the current research.

When integrating data through a **visual joint-display** one challenge that may emerge is considering the coherence of the qualitative and quantitative results, referred to as "fit" of data integration (Fetters et al., 2013). Authors Fetters et al. (2013) offer three possibilities for data coherence; **(1)** if the results from each strand confirms the results of the other, confirmation occurs and therefore credibility is enhanced; **(2)** if the results from each strand diverge and expand understanding of the phenomenon, expansion occurs; and **(3)** if the results from each strand are inconsistent or contradict each other, discordance occurs. In the case of discordant results, the authors suggest ''gathering additional data, re-analyzing existing databases to resolve differences, seeking explanations from theory, or challenging the validity of constructs'' (p. 2144). Similarly, Guetterman et al., 2015 offer a series of 'best practices' that were followed in the current study when using joint-displays, including; **(1)** label quantitative and qualitative results, **(2)** be consistent with the design, **(3)** be consistent with the integration approach, and **(4)** identify inferences or insights generated.

A **narrative account** involves integrating qualitative and quantitative findings by weaving results together by building a coherent story with the data (Fetters et al, 2013), which has been done in the current research throughout the reporting phase in the discussion section. This particular approach has been useful in particular to respond to the mixed methods questions and objectives of the study on a theme-by-theme basis and concept-by-concept basis. For example, in integrating the academic and professional trajectories of the case-study participants with those of the general population through the quantitative survey.

Another technique for data integration used in the current research has been **data transformation by qualitizing numeric data into narrative accounts.** Specifically, the current research has developed learner profiles which used statistical data to build 4 distinct profiles which are then qualitatively analyzed and integrated with data from the qualitative strand, a popular technique in mixed methods research (Onwuegbuzie & Johnson (2011). Here, quantitative data is transformed into a qualitative form through a narrative profile account, used for integration with qualitatively assessed findings (Fetters et al., 2013).

4.5 Quality of Mixed Methods Research

4.5.1 Legitimation Procedures

Onwuegbuzie & Johnson (2011) use the term legitimation to refer to all aspects of quality in MM research, recommending that legitimation be considered more of a continuous, iterative and dynamic process than an outcome. Their framework (2011) for assessing legitimation is widely cited in the field and will be used in this discussion. They likewise argue that the challenge of ensuring legitimation in mixed methods research is greater than in mono-method research due to the multiplicity of validities required at different levels (i.e. qualitative, quantitative, and mixed). The challenge of legitimation lies in the complexity of developing inferences and meta-inferences from mixed methods findings that are "credible, trustworthy, dependable, transferable, and/or confirmable" (Teddlie & Tashakkori, 2009 p.310). Below, Table 4.10 presents Onwuegbuzie & Johnson's (2011) mixed methods legitimation framework linked with legitimation procedures from the current study.

Table 4.10 Legitimation Procedures in Current Study

Legitimation Type	Description	Example in Current Research
Sample integration	• The extent to which the relationship between the quantitative and qualitative sampling designs yields quality meta-inferences	• Combining a small purposive sample (12) with a larger general sample in terms of analytic and statistical generalizability is a complex and challenging task. In the current study, the same population for both strands was used, and results demonstrated that there was integration between analytic and statistical generalizability in relation to the socio-demographic profiles of both samples used in the study.

Inside–outside	• The extent to which the researcher accurately presents and appropriately utilizes the insider's view and the observer's views for purposes such as description and explanation	• Although researcher's position has been participant as observer, the researcher has also been a participant himself in online HE as a student, teacher, and researcher for over 10 years, shaping the qualitative component. In this regard, the researcher aimed to use an outsider, impartial and unbiased approach during description and explanation.
Weakness minimization	• The extent to which the weakness from one approach is compensated by the strengths from the other approach	• The design was such that each strand was used to emphasis strengths on the one hand, and minimize weaknesses on the other. For example, statistically significant relationships and categories developed through quantitative analysis (i.e. PCA) were explained more broadly and expanded upon in the qualitative phase through more descriptive precision and nuance. The qualitative phase brought more depth and nuance to student experiences of learning, in contrast to the generalizing and objective character of the survey.
Sequential	• The extent to which one has minimized the potential problem wherein the meta-inferences could be affected by reversing the sequence of the quantitative and qualitative phases	• The sensitizing LE model in combination with the qualitative thematic analysis was an explicit method to develop clear units of analysis, study dimensions and variables which developed the quantitative survey measuring an emergent phenomenon of student learning across contexts. The qualitative strand directly informed the quantitative strand, in order to combine the strengths of both approaches.
Conversion	• The extent to which the quantitizing or qualitizing yields quality meta-inferences	• Qualitizing in this research offered 4 profiles, which were interpreted through a qualitative lens in the form of narrative profile formation, in relation to qualitative themes developed in the study and in light of the literature on online learning in HE. This interpretive and narrative process was iterative and researcher triangulation ensured that quality meta-inferences could be made.
Paradigmatic mixing	• The extent to which the researcher's epistemological, ontological, axiological, methodological, and rhetorical beliefs that underlie the mixed approaches are successfully (a) combined or (b) blended into a usable package	• From the beginning of the study, the underlying philosophical position has been declared, and consistency and coherence was maintained throughout all phases of the research design in relation to the ontological (socio-constructivist), epistemological (interpretivist) and methodological (primarily qualitative MMR) assumptions.

Commensurability	• The extent to which the meta-inferences made reflect a mixed worldview based on the cognitive process of Gestalt switching and integration	• Through iterative processes, the researcher and collaborators made multiple switches between qualitative and quantitative lenses, offering a more mixed worldview incorporating both qualitative and quantitative stances, including in the qualitative coding and analysis phase and in the inferential statistics phase.
Multiple validities	• The extent to which addressing legitimation of the mixed components of the study result from the use of quantitative, qualitative, and mixed validity types, yielding high quality meta-inferences	• Legitimation has been carried out at many levels in this study, including at the qualitative, quantitative and mixed levels of interpretation and reporting. Attention has been paid to, and accounted for both the qualitative strand (credibility & trustworthiness) and in the quantitative strands (validity and reliability) through a variety of techniques and procedures. Multiple validities requires a meta-awareness of the entire research design legitimation process.
Political	• The extent to which the consumers of mixed methods research value the meta-inferences stemming from both the quantitative and qualitative components of a study	• The current research considers online HE as an emergent and significant field in educational practice, policy, and research. The stakeholders whose needs and interests are served are clearly articulated in the discussion and conclusion section (program teams, faculty/professors, academic institutions, university policy-makers, educational researchers etc.) and in particular the added value of using a mixed methods approach is highlighted as way to combine the strengths of both strands of research in order to account for as comprehensive an account as possible of the phenomenon under study.

4.5.2 Ethical Considerations

The current study has received ethical approval from the Research Ethics Committee at the UOC (comite_etica@uoc.edu). A case study protocol, research agreement and informed consent form were elaborated (see appendix) that clearly establishes an ethical protocol for guaranteeing the integrity and dignity of participants taking part in the research, including fully informing their rights as research participants and their ability to withdraw from the research at any point, including their right to contact the research director (Montse Guitert) or the UOC Research Ethics Review committee at any point if they have experienced any inconvenience or ethical concerns. Ethical principles and legal regulations governing research activities were abided by throughout all phases of the study. In addition, the research team was aware of the legislation on data protection and have undertaken steps to preserve confidentiality of the study's personal data, and have stated this undertaking to all participants taking part in the case-study.

Likewise, participants were encouraged to ask questions, raise concerns or contact the principal researcher at any time about the nature of the study or the methods that were used. Students were also encouraged, if they had concerns, to contact the Research Ethics Committee (comite_etica@uoc.edu) at the Open University of Catalonia. Because of the nature of the study, examining student experiences in online higher education, there were no expected negative outcomes for participating in the study. There may have been minor discomfort or inconvenience from responding to questions during an interview, however, the nature of the study was not of a sensitive or emotional nature.

Participation has been anonymous and there would be no risk of being identified by others for participation in the study. Student's participation and their identity remained anonymous and confidential, and no one apart from the researcher and his supervisors, as well as coordinating faculty at the host institution, has known about their involvement in the research. Records that identify individual participants will be available only to people working on the study, unless participants give permission for other people to see the records. When research reports are made or publications are submitted of the study, such as a journal article or conference proceedings, individual participants will not be identifiable in such reports.

Data Protection

Data collected in this study, primarily in digital form, will be stored by the researcher for a period of 5 years after the study is completed on a password protected computer. Future use of the collected data will be subject to further Ethics committee review and approval if applicable. The information will be destroyed and digital data will be permanently deleted after a period of 7 years.

Dissemination of the Results

Study results (including publications) will be disseminated to those taking part, particularly because the objectives of the study involve making recommendations to higher education stakeholders involved in the research process. At any point in the research participants were encouraged to contact the researcher, Mitchell Peters (mjosephp@uoc.edu) for information regarding research outputs, however, all direct participants and faculty will have received an email link to access the final copy of the thesis.

4.5.3 Mixed Methods Research Design Limitations

This section details the research design limitations of a mixed methods multiple case-study. As the research falls under an interpretive and exploratory paradigm, research results should not be considered as exhaustive or universally applicable. The multi-site multi-case research design will provide a glimpse of the emergent and under-explored phenomena under study, during a specific point in time, however will not provide data or empirical evidence that can track variables over time. Although research findings do provide insightful evidence and productive theoretical, conceptual and experiential insights into emerging phenomenon of online learning across contexts, it should be recognized that the case study has limitations, including limitations related to the selection of cases and whether results can be generalized (Yin, 2009). Despite using a mixed methods approach as an attempt to compensate for the deficiencies of one genre with the strengths of another, there may be issues of transferability and replicability given the socially and culturally situated and idiosyncratic attributes of individual learners, as well as those case sites selected who are situated in distinct international, historical and intercultural contexts.

Several authors have noted limitations of case study research (Yin, 2009; Creswell, 2009; Merriam, 2009) such as its lack of representativeness which may influence issues of reliability, validity and generalizability. Yin (2009) cautions that limitations of case-study research should be openly acknowledged, such as the inability or difficulty in replicating due to time and resource intensiveness, the possibility of errors in judgment or memory when constructing the case study and researcher bias. In this line, the integrity, sensitivity and disposition of the researcher, as a principle instrument of case-study research, can be considered a further limitation (Merriam, 2009). For instance, the researcher is often left to follow his/her own instincts and capacities throughout much of the research process. Resource constraints mean that research will take place over a relatively limited time scale; this will restrict the amount of data that can be collected, the capacity for processing large and complex data sets and will limit the overall scope of the project. A clear case-study protocol, including ethical concerns, has been used to overcome some of the ethical challenges when building case-study research, another limitation of this form of research (Merriam, 2009). Understanding how biases can affect the final results and implications of the study through researcher triangulation and peer debriefing, as well as participant checking, has been one approach to overcoming such a limitation.

The theoretical and methodological complexity of using a LE analytical framework, including the development of an exploratory sequential design based on a LE sensitizing model, is likewise another challenge and potential limitation of the current research, requiring conceptual coherence and clarity

throughout all phases of the study. The need to ensure a consistent alignment between the ontological definition, methodological approach and research application has been another challenge which may limit the current research design. This is particularly relevant when using an emerging construct (LE) linked with an emergent research design in order to explore an emerging phenomenon in online education (i.e. research formal and informal learning).

CHAPTER 5

QUALITATIVE RESULTS

5.1 Case Study Context & Participants

In order to understand student experiences of learning in online HE across contexts, it is first essential to have an in-depth understanding of both the program context as well as the profile of individual case study participants before completing further cross-case and thematic analyzes. Accordingly, the first section of this chapter (5.1) will present the graduate program attributes and context, followed by individual case profiles and will conclude with a cross case analysis and profile summary of study participants.

5.1.1 Graduate Program Attributes & Context

In the context of online higher education, there is little question that the design, context and online environments of the educational program itself has a significant, yet not exclusive, impact on how students experience academic learning. Accordingly, each graduate program creates a particular context of learning with boundaries and parameters, yet connected to the wider world through digital and networked technology. Curriculum and course design linked with the associated learning activities and assessment structure are the some of the primary influences on student experiences of learning in online HE. As will be demonstrated throughout this chapter, **the particular characteristics of each program can be broadly characterized as inquiry, collaborative, project and problem-based approaches**. In this particular context, learners are encouraged to define and explore (educational) problems, seek and evaluate necessary resources (knowledge, peer support, tools and technologies, or other artefacts), and build or construct academic task solutions for themselves independently or in groups.

Despite the three program sites being in distinct cultural and geographic regions, there were consistent and similar designs in the operational structures of each program including instructional strategies that emphasize (1.) independent study and collaborative group work, (2.) the creation of open knowledge artifacts through inquiry, problem and project-based processes (3.) individual and group web publishing and blogging, (4.) creation and presentation of visual and multimodal assignments, (5.) peer-based assessment structures, (6.) in-depth forum discussions and debates and (7.) the use of a variety of rich digital learning environments (LMS's such as Moodle, Blackboard, or institutional LMS's, Blogs, Wikis, and collaborative authoring platforms and workspaces). These sites were chosen as forward-looking universities among a wide population of fully online graduate programs in the field of

educational technology and digital education (e-learning) for a variety of reasons, detailed in the below Table 5.1.

Table 5.1 Attributes of Graduate programs

Accessible and open course contents and program documentation
Focus on criticality in online learning
Open educational practices (i.e. use of MOOC's, open web publishing and blogging);
Emphasis on part-time study in combination with and reflection on professional practice
Innovative program design and established faculty that have published research in the field of online education and digital learning

The **Open University of Catalonia (UOC)** is a fully online university that was created in 1996 under an open educational model to meet the distance education needs of the region of Catalonia as well as other regions in the Catalan and Spanish speaking world. The UOC identifies itself as an innovative university that is rooted in Catalonia and open to the world, aiming to help society and individuals advance through lifelong learning. The educational model of the university, which is explicitly internet-centred, has been based on a model of distance education through e-learning since its founding. The UOC model is oriented towards active knowledge making and collective participation and embraces the student's learning, social and working experiences. As the UOC website explains, the educational model:

> *"was created with the goal of offering an effective solution for the educational needs of people engaged in lifelong learning and to optimally leverage the potential offered by the internet to learn in a flexible environment" (UOC, 2018a).*

At the **University of Edinburgh (U of E),** online distance learning (ODL) is offered primarily through post-graduate study under a fully online model. The MSc. in Digital Education is advertised as a "world-class masters programme that will challenge your thinking about education and technological change" (U of E website, 2018). The program is designed to tackle the challenges of teaching and learning in the digital age, navigating with critical insight through key debates and perspectives in the field of digital learning in a rapidly transforming society. The online program is built around several pillars that include; a fully online model of learning; a breadth of scope adequate for examining a broad and diverse field of

study; innovative approaches to digital pedagogy that employ a variety of media and teaching modes; empirically based and research informed teaching by professors who are active researchers through the Centre for Research in Digital Education; and a high level of learning support through the creation of a collaborative learning environments with the support of experienced tutors with backgrounds in teaching, research and course design.

Although the **University of Illinois Urbana Champagne (UIUC)** is a traditional campus based institution, the fully online MEd. is an innovative and forward looking program that aims to prepare "participants to tackle challenging questions about how to create more effective, innovative, indeed transformative learning environments" (UIUC 2018). The program is oriented toward progressive, transformative and innovative education, taking a broad view of the discipline of education in both traditional educational organizations but also in wider informal scenarios of learning. The Learning Design and Leadership program has grown out of two previous programs; New Learning as well as Curriculum, Technology, and Education Reform. The latter program was formed in 1998, and as such was among the first fully online education programs in the world (UIUC 2018).

The below Table (5.2) presents the core attributes of each program. As each program is designed specifically for professionals across a range of specialized domains which intersect with online learning and digital education, each site can be characterized as graduate level knowledge work. Most teaching methods and learner activities, and indeed most learning experiences, are completed through what can be characterized into two broad learning activity categories: inquiry and discussion (Ellis & Goddard, 2013). Graduate level knowledge work through inquiry and discussion will become clearer as the below table highlights the most important program attributes that influence students experience of learning.

Table 5.2 Cross Case Program Attributes

	UOC	UIUC	U of E
Program Aims & Overview	-Aims to train teachers, designers, managers and administrators of the educational and business world, driven by the need for improvement and the desire to make the most of information and communication	-Provides educators and training/learning development professionals the opportunity to learn how to create more engaging learning environments by integrating new media technologies.	-Gives professionals in higher and further education and training and development the practical skills and critical insight they need in the fast-moving and richly diverse field of digital education.

	technologies (ICT) for education and training. -Offering innovative and quality training in an emerging field of the knowledge society: Education and ICT	-The Learning Design and Leadership program prepares participants to tackle challenging questions about how to create more effective, innovative, and transformative learning environments.	-Program designed to have students work with current research and theory in the field in order to apply it to their professional practice. Courses are academically driven and critically focused.
Who should apply?	-**Aimed at professionals** who wish to optimize the processes involved in the demand, design, configuration and integration of all the elements of an online learning project, both in the management and management field and in design. instructional and technological, and also to professionals who want to do the doctoral thesis in the field of educational technology	-**Aimed at training/learning development professionals** across a broad range of industries and organizations throughout the world: advance their credentials, knowledge, skills, and competencies in creating efficient, effective, and engaging learning systems and environments	-**Aimed at professionals in higher and further education and training and development**: representing an international collection of students including university professors and lecturers, online education developers in the public and private sector, educational trainers and developers, researchers, and public and private school teachers.
Model of Teaching & Learning	- Fully Online, Asynchronous & Collaborative Teaching & Learning Model -A learning model that supports student interaction with the learning environment combining a range of learning resources and working dynamics with support from the teaching team and interaction with fellow students. -Encourages students to build professional and digital competencies through learner activities, teamwork and virtual collaboration that aims to enrich the learning process through the knowledge, contributions, and opinions of their fellow students. -Rooted in competency-based assessment model that focuses on the set of skills, knowledge	-Fully online model of learning focused on transformative pedagogies using Socio-constructivist teaching methods based influenced by a pedagogy of multiliteracies (Cope & Kalantzis, 2017). -Learning model interrogates the impact of educational media on learning environments including traditional as well as new and emerging learning scenarios and literacies. -The model of learning is based on a peer-assessment model within an E-learning ecologies conceptual framework. --Program includes weekly synchronous meetings with asynchronous peer-feedback and online interaction, including review of individual student works & updates.	- Fully online model of learning following a cohort model where students engage in a structured, designed and supported learning experience based on inquiry and discussion/dialog alongside their peers. -Core features of the program include a combination of independent study and group activities and tasks through an active and constructive student-centered framework. - Uses a wide range of technologies to deliver the program, using a rich variety of media and teaching modes. - A model that encourages self-exploration and interest driven research, discussion and inquiry. -Irregular synchronous seminars along with asynchronous discussion and debate -Active and constructive student

	and attitudes learners are capable of demonstrating proficiency in within a given learning objective or activity.		participation is encouraged and expected.
Assessment Structure	-Formative + continuous assessment based on 4-6 course learning activities based on student inquiry and discussion. -competency & skill based evaluation of the core learning activities, often using Learner Rubrics (as expressed in course objectives and competencies)	-Collaborative & Continuous Peer Assessment of Major course projects based on Assessment Rubrics and recursive feedback based on student inquiry and discussion	-Formative and continuous assessment of 2-4 major works per course, based on Rubric Criteria and evaluated by a team of program tutors and lecturers
Learning Environments	-The Central Virtual Learning Environment is part of the UOC institutional digital learning platform, with course calendar, debate forms, course tools and access to all course learning resources. -Collaborative writing spaces are also used (Blogs, PB Wiki, and Google Docs etc.). -A variety of tools and technologies are prescribed for use in the program, particularly involving digital presentations, knowledge sharing and communication technologies. (Complementary program observation was made here)	-Using the institutional collaborative authoring and workspace learning environment CG Scholar for most course work. (Complementary program observation was made here) -Program also uses Learn@Illinois, an institutional Digital Learning Environment -Weekly synchronous meetings held through Blackboard collaborate ultra for weekly class meetings. -A MOOC learning environment is also used.	-A combination of digital learning environments are used including: Moodle as the central VLE (for discussion space, course reading, and resources) and additional Collaborative writing spaces are used (Blogs, PB Wiki, and Google Docs etc.) -A central program hub to connect alumni, faculty and current students for relevant information sharing and activities of interest -A MOOC learning environment is also used. (Complementary program observation was made here)
Learning Activities	-Required courses are designed around a 12-week activity structure with, on average, 4 Continuous Assessment Activities (CAA) in each course. -CAA's are a combination of individual study and	-Each required course module explores core concepts on a given theme/subject (i.e. Learning Technologies) across a 12-week activity structure. -Each course requires weekly readings or viewings learning resources (video tutorials, web	-Courses designed around a 12-week activity structure, often broken down into 3 major blocks exploring a variety of different course themes and topics. -Course Activities are a combination of individual study and collaborative group work.

	collaborative group work. -For each learning activity, there are associated learning resources (theoretical/practical/technical) -Example learning activities include: • Literature reviews • Active and in-depth Forum discussion boards and debates • SWAT analysis • Digital Presentations • Online course building in Moodle • Individual and Group Research Projects • Developing Case-Studies in E-learning • Open & Collaborative Wiki Writing Activity • Developing a range of digital presentations: i.e. Conceptual Maps, Pecha Kucha, Infographic etc. using digital tools • Publishing Works on Class Blogs • Disseminating Academic Projects through Social Networks • Developing E-Learning Project Proposals • Writing Open reflections about integrating course concepts/knowledge into professional practice • Producing Digital Essays • Collaborative authoring/writing spaces (PB wiki, google docs, blogs)	sites etc.) and further individual research combined with active posting on the Scholar LMS platform. Each course has roughly 7 required updates or posts per student. Each course also contains two major works: Work 1: Theory based assignment: Students must define the concept, describe how the concept translates into practice, and provide examples in a theory driven multimodal written assignment. Work 2: Practice-based Analysis Students must analyze an educational practice. This could be a description of a practice in which they have been involved, or plans that they have to implement an assessment practice, or a case study of an interesting assessment practice someone else has applied and that students would find beneficial to research and analyze. Learning Activities often require: • Inquiry Driven Literature review • Active knowledge making • Multimodal representations • Joint Knowledge curation and building through a Wiki/Blog/Course site • Peer-review • Digital resource development • Reflective exercises/activities on current and potential professional practice • Independent study/research • Viewing Video tutorials	-Weekly readings and additional learning resources are linked with each course activity -Example Learner activities in the program include: • Moderated small and large group, in-depth discussion, both synchronous and asynchronous as well as through video and text. (tutorials, seminars, group discussion etc.) • Collaborative authoring/writing spaces (PB wiki, google docs, blogs) • Video tutorials • Social Software such as Skype, Google Chat, and Collaborate • Weekly Audio & Video introductions to readings, activities, and new themes/blocks • Joint Knowledge curation through a Wiki/Blog/Course site • Group exercises/activities • Reflective exercises/activities on current and potential professional practice • Planning, running and experiencing learning activities/events • Assigned weekly readings • Individual and Group blogging: blog Discussion Leaders (posting relevant content) and ensuing blog discussion on current course topics/themes • Active Forum discussions • Several classes taught in an Open Access Format through WordPress. • Digital resource development (OER's, Online courses etc.) • Exploration of a range of digital learning environments (debate/discuss/critique) • Reflective writing • Dyadic supervision meetings and work review (dissertation project) • Twitter tutorials and chats • Peer review and Peer feedback exercises & activities

5.1.2 Individual Case Profiles

After viewing the context for each graduate program, the individual profiles of the 12 case study participants will now be presented in the below tables (5.3-5.14), synthesized and thematically analyzed primarily from interview data and complemented through and triangulated with online participant observation. In accordance with the ethical protocol followed in the current research, **detailed in Appendix B**, individual contributions have been and will remain anonymous. As such, names of been anonymized by using pseudonyms and any identifying information has been removed. Each profile highlights salient themes that emerged across two distinct interviews. Each profile presents key demographic information, professional and academic trajectories, learner attributes, digital learning activities and strategies (including frequency of engagement), views on peer collaboration and social support, engagement with learning resources, conceptions of digital learning experiences as well as well as impact of online learning across contexts and in their professional life. In particular, individual case profiles reflect the variety of strategies and practices students engage with as they experience online learning in higher education across contexts.

Table 5.3. Case #1

Matt (UIUC)	
Age:42	
Gender: Male	
Study Status: Full-Time 1st year Online Doctoral Student (coursework)	
Employment Status: Full Time Work in University leadership position	
Previous Experience Studying Online: no prior experience	
Professional and Academic Trajectories	-mid-career professional working in university contexts as a professor and in academic leadership roles since 2006 -progressively moving from adjunct professor into academic leadership roles including Acting Vice-President of Academic Affairs. -requires an online doctoral degree in order to continue to advance in academic leadership positions, -background as a professional writer, having published fiction and non-fiction in various publications since 2001 -Undergraduate degree in literature (1994-1998) -Master of Fine Arts in Creative Writing (2001-2005)
Learner Attributes	-approaches the world as “a fiction writer”. -considers himself an introvert, more of an online observer or voyeur in networked spaces than an active participator. -very disciplined worker and deeply motivated with his course work, comes from both internal (inner-discipline) and external (career trajectory) motivation -motivated by mid-career trajectory in academic contexts, needing doctoral degree to achieve career goals/aspirations

Digital Learning Activities and Strategies	-developed clear goal setting and planning strategies for meeting the learning requirements of each course. -operates using checklists -organizes each course around the major works or projects that must be completed. -gathering articles trying to find themes and trends across the course topic by different researchers. -deliberating linking each weekly activity toward the final major project for each course -engaging with both course and further readings (often working on reading multiple articles at a time) -interact and give rubric-based peer-feedback on three other peers major works. -follows an interest driven research approach. -setting weekly and course goals
Frequency of engagement:	-spending the majority of his time researching, -"30-40 hours a week (online learning) and then I probably put in another 60 hours a week at work, so, yeah, I probably work about 100 hours a week". -engaging in online learning everyday (7 days a week), reading posts, reflecting, researching and writing updates and major works
Engagement with Learning Resources	-researches on his phone and home devices to organize, manage, and filter information while heavily using Instapaper as a note taking and organization app -heavily using google search to find a variety of resources, including video resources, scientific papers, and research communities (e.g. social learning analytics research community). -Very active on CG Scholar (UIUC Digital Learning Environment) -Active on Twitter & YouTube and somewhat active on Moodle/Blackboard & Facebook
Peer Collaboration and Social Support:	-follows a peer-to-peer social learning model with a good deal of peer interaction through forums -feeling motivated when others comment on his work, and discouraged when people do not respond to his work. -motivated by receiving peer feedback -has felt lonely or socially isolated, wishing at times he had more connections with like-minded researchers with similar interests. -organized informal meet-ups with colleagues in the same cohort, to informally chat about research topics. -has not often used openly networked interactions in order to support his formal academic learning. -gets a lot of motivation and support from his professional community in his academic learning
Conceptions of Digital Learning Experiences	-likes "how the course has created activities that activate his metacognition". -considers that the pedagogical design of the program should "intentionally" facilitate student participation in the program -strongly believes in "this idea about ubiquitous learning, is absolutely true, it's absolutely true for me". -online learning allows him to strategically use his time (i.e. reading articles in the grocery line) to balance his work demands across his professional life, academic life, and family life -feels that having smaller group meetings in order to discuss, rather informally, the content and process of learning would be a valuable way to bridge learning and engage students throughout a formal course.
Engagement between Academic and Professional Practice	-professional and academic practices are intimately integrated, claiming "my professional experience is informed by my doctoral work and vice-versa, and I think that makes it fantastic" -has brought some of his academic practices and perspectives into his professional context -strategically connects/links academic work to his own professional context. -research interests in his academic work are driven by his professional practice
Barriers in Engaging with Online Learning	-feels there is an important piece of informal and socialized learning missing from his online experience. -wishes the functionality and design of Scholar (Digital Learning Environment) were more like Facebook and other social media in terms of user experience and user interaction

practices:	-peer-feedback is missing a level of richness and analysis that an expert may be able to offer (more than a peer).
Conceptions of Impact of Online Learning across contexts	-considers that learning across different contexts is a very important part of his experience in formal education. -experience in online learning has impacted how he plans and organizes his learning, including note taking, organizing his thoughts, and creating outlines for works and assignments, including developing information literacy skills.
Impact in his professional life	-recognizes that his doctoral studies "feels like an extension of my job" and that "it's very easy to see that the payoff for this would be to continue that trajectory to get myself another job promotion". -considers that his participation in the program will directly impact the advancement of his professional trajectory.

Table 5.4. Case #2

Rebecca (UIUC)

Age:52
Gender: Female
Study Status: Full-Time 1st year Online Doctoral Student (coursework)
Employment Status: Full Time Work as a Language Professor at Public College
Previous Experience Studying Online: Previous Blended Master in Business Administration.

Professional and Academic Trajectories	-has been working at the same Public Institute of Languages for close to 10 years, with extensive experience teaching foreign languages. -working full time while taking a full academic course load -has had online blended learning experience in past Masters -acknowledges that her goal in completing a doctoral degree is based on career advancement -Undergraduate degree in literature (1994-1998) -Master of Arts in ESL teaching (1998-2000) -Master of BA (Blended program) 2006-2008
Learner Attributes	-somewhat hesitant and reluctant to study online at first -identifies as a "nerd type student" and as "extremely excited" and "extremely motivated" to be in the program. -balancing full-time professional duties with full time academic work -motivated by mid-career trajectory in academic contexts, needs doctoral degree to achieve career goals/aspirations
Digital Learning Activities and Strategies	-reading and analyzing content of each week's work, posting commentary online and responding to peer-comments, using peer-feedback to improve her own work. -watching videos and reading materials, completing complementary research in order to produce weekly update (works) to be posted online -responding to peer-feedback in the forums -using weekly updates to build toward the two major works for each course, reviewing work based on

	peer-feedback in order to submit final revised version.
Frequency of engagement:	-works most evenings on her doctoral work organizing, planning and writing works. -reports being plugged in “pretty much, seven days a week.”
Engagement with Learning Resources	-uses both online and offline resources (books). -uses online library resource (from previous university, not current) -Very active on Moodle and Facebook to support academic learning and also active using WhatsApp (messaging apps), Youtube, Blogging platforms
Peer Collaboration and Social Support:	-design of the program strongly impacts peer interaction based on a peer-feedback learning model. -recognizes some peers are more engaged than others in providing rich analytical feedback. -aside from synchronous meetings and required peer feedback, she has “not had a lot of interaction aside from the commenting on on each other's works. I don't have a lot of interaction with the other classmates” -participated in an informal, student-led initiative for students in the doctoral program “to share questions and share ideas and discuss issues that we might encounter”. -has two colleagues in her professional context also doing the post-graduate program
Conceptions of Digital Learning Experiences	-admits that she is “so far, very satisfied. I'm very happy with the program” -feels “to some degree, that the online program is not that different in that it involves reading, researching and writing, and then interacting or answering probes and questions. -notes that the biggest action possibility is unlimited access to digital learning resources -appreciates the notion and use of peer-feedback as a pedagogical model -enjoys the structure and self-directed and interest driven nature of the program -feels more “in-charge of her own learning” in this program
Engagement between Academic and Professional Practice	-works in a field with direct practical application to her graduate program, explaining that “ most of these concepts are eventually applied and embedded into what I do (at work).” -explains that “it helps a lot that I'm studying something that I'm actually practicing (professionally)”. -has a very high level of relatedness between her professional practice and academic course work, mixed with the freedom and liberty to research based on her own needs and interests,
Conceptions of Impact of Online Learning across contexts	-explains that “the number one most obvious and most significant change would be rank advancement” -further explains that the program’s impact is more significant “in terms of just really shaping my thoughts and my philosophy of teaching, and then eventually my practice.”

Table 5.5 Case # 3

John (UIUC)

Age:55
Gender: Male
Study Status: Part-Time 1st year Online Doctoral Student (coursework)
Employment Status: Full-time work as an Online Instructor at Arts College
Previous Experience Studying Online: Previous online Master in Business Administration

Professional and Academic Trajectories	-experienced educator with over 13 years of teaching in a variety of settings, including high school and college in both traditional classrooms and in online environments. -has always been interested in media and technology in relation to professional practice -developed an interest and passion in teacher professional development and classroom management skills -begun a doctoral degree in educational leadership as a way to further his career trajectory with an objective to work in online higher education administration leadership. -has significant experience working in digital contexts as both an instructor and a student. -B.A. Journalism (1995-98) -M.A. BA & Marketing (2011-12)
Learner Attributes	-passionate about lifelong learning across different areas of his life, -strong desire to move on and get a doctorate as a way to prove to himself and his family that he is capable of reaching the highest levels of the education system -an active and expert user of the institutional digital learning platform Scholar, yet more introverted on more public platforms -motivated by mid-career trajectory in academic contexts, needs doctoral degree to achieve career goals/aspirations
Digital Learning Activities and Strategies	-first major strategy is “planning…keeping track of the dates” and that “you've got to go in the calendar system -attend weekly lecture, read, plan, organize and write update, and respond to peer-feedback -highlights the importance of developing planning and organization skills as well as core academic skills such as information literacy -does a lot of cross-referencing and paying attention to the works and authors cited by the works of his peers when reviewing the scientific literature - reviewing the literature and organizing information in order to create works is a large part of his academic activity
Frequency of engagement:	-“I’m logged in to the class room somewhere around 4-6 hours per day” and that he is “still teaching online, so that is where I will switch. But it is, a 12 hour day on the computer.”
Engagement with Learning Resources	-“will work through google scholar, I will work through the online library at the UIUC, and sometimes I will even check local libraries, I will hit youtube for videos.” -works from home in an online environment and also enjoys the cutting-edge of new technology - Very active using Moodle, Youtube, Lynda.com - (learning software for curriculum and content design), active using Meetup, and somewhat active using Whatsapp, Pinterest, Blogger/Wordpress, Google +, Research Gate

Peer Collaboration and Social Support:	-reports having high levels of peer collaboration and social support, particularly having “found a couple of people along the way who have similar interests.” -has also developed a niche support group among “a group of doctoral students that I'm engaged with that really crave a social aspect” -feels that including peer-review into the pedagogical design of the program “can make you a better student, and certainly a better colleague”. -has a strong interest in building and supporting peer collaboration and social networks in his program as a strategy to support formal academic learning.
Conceptions of Digital Learning Experiences	-finds “the transparency of the online program to be so much better than (traditional face-to-face learning)” in terms of curriculum design. -identifies the role of teachers in the program more as “facilitators at this point.” - notes that he is “excited to be engaged”.
Engagement between Academic and Professional Practice	-spending close to 12 hours a day working in online contexts in his professional practice and in academic activities. - in his professional practice, working as a subject matter expert, he has developed full college courses, and was able to include many of the concepts from his graduate program
Conceptions of Impact of Online Learning across contexts	-a piece of advice he might offer relates to the core academic competencies of research organization and academic writing, including specifically “teaching those basic organization skills that keep you from getting overwhelmed by the scope of what you're doing”. -future goals is to advance his career trajectory into a educational leadership position, particularly in online education -an impact of the program is on his professional identity development as an academic researchers -feels that “the student is no longer just the student, the student is also the creator, the student is the curator, the student is the teacher. Yeah, this is a major change in education.”

Table 5.6 Case #4

Olivia (UIUC)
Age:40
Gender: Female
Study Status: Full-Time 1st year Online Doctoral Student (coursework)
Employment Status: Part-time consulting work
Previous Experience Studying Online: Previous online master in Human Resource Education

Professional and Academic Trajectories	-a mid-career professional who has developed a career as a social learning consultant working on social collaboration platforms. -had two previous experiences studying graduate degrees, studying an online masters for the first time in 2002-03, when she "fell in love with the concept of E-learning" -moved into the field of workplace training and development leveraged by digital technology - had experience beginning a Phd, combing full time work with part-time study for 2 years, in 2007 - Because of both family and work life, she needed the flexibility (both time/space and geographic), in order to return to full-time doctoral work - M.Ed in Curriculum & Instruction 2003-04 - M.Ed in Human Resource Education 2001-03 - Began other Phd program (2 years)
Learner Attributes	-In the 2017-2018 academic year, she studied full-time, taking 10 classes (roughly two each semester. -academic research and professional interests in social collaboration are her "passion" and is very interested in the social collaboration dimension of online learning. -very active contributing in professional and academic online communities, not active contributing in personal social networks (Facebook, twitter, etc.) -motivated by mid-career trajectory and as training to support her consulting company
Digital Learning Activities and Strategies	-connecting micro-activities each week with larger course works and her final dissertation. -"regularly provides feedback" to the program, on some of the usability features and user experience of the in-house LMS. -multitasking family life with academic research activities - identifies "as a planner" who meticulously "looks ahead at the entire course", - -researching for the weekly updates so that I'm kind of getting that research element completed early on" - -much of her weekly updates are directly related from her professional experience and perspective, engaging constantly with her professional practice - is motivated by deadlines, and appreciates the structure of 12 week courses
Frequency of engagement:	-reports working 6 days a week, taking Sundays off, working more heavily and on Saturdays when bigger assignments are due. She puts roughly 3-5 hours into her weekly updates. She reports dedicating another 20 hours to complete a major course assignment.
Engagement with Learning Resources	-uses her phone as a reading and information management tool. - using "Word Excel, and the folders on my computer" in order to produce her work and manage information. -Very active with Moodle/Blackboard/Scholar, LinkedIn, Jive Software, Igloo Software and active with Researchgate
Peer Collaboration and Social Support:	-admits that "the advisor contact for me is really important". -reported "yes and no" to feeling a part of a learning community - feels that "having an online community separate from classes is something that's lacking" - -feels that informal community building is an important part of the online learning experience. - -has felt the most support "through our more informal community", and that she doesn't feel that she has been able to establish the same sort of peer support within a particular course, feeling that it is difficult to build real dialogue because "we're all fulfilling requirements".

Conceptions of Digital Learning Experiences	-feels that the peer collaboration has been special, “learning from my peers, their expertise, their experiences, and backgrounds”. - feels that the current learning platform of the program could improve “usability, but also on longevity of the content” - recognizes that the “ubiquitous nature” of online learning helps her progress, mixing family life with academic activities
Engagement between Academic and Professional Practice	-has been clear and applicable impact between her academic activities and professional practice, explaining that it has “helped me to strengthen even my consulting practice, as I have been researching a given subject, you know, been able to enhance the materials that I create for my clients or even for business development purposes to try to get a client” -her academic activities and professional interests are intimately interconnected - has developed explicit strategies to connect her academic activities with her professional practice,
Barriers of engaging	- one of the barriers for engaging in academic activities is directly related to her research interest which is “how do we make online communities, not a post and checkmark situation?”. - one of the challenges is accessing academic support available to campus based students, - needs more support and proactive assistance with research and publishing opportunities. - feels that “there's some support mechanisms that need to be put in place in our program to help us be more successful”
Conceptions of Impact of Online Learning across contexts	-being exposed to a variety of learning technologies has been a big impact in the past year -one impact is discovering herself more, what she’s interested in, this includes a focused interest in online communities and social collaboration. -feels that her learning has broadened her perspective and vision and is helping her enter into different industries (k-12 etc.) -is now “more disciplined being in the program, I've always been kind of a community based that hasn’t necessarily changed. I think just being a better researcher, you know, digging deeper into more academic resources, using the library search database to access more things that wouldn't be able to get to university resources, learning from my peers and seeing how they're writing and researching, it gives me ideas on how I can improve my review process” - hopes through her academic work “to be able to publish in a scholarly journal”

Table 5.7 Case #5

Jose (UOC)
Age:29 Gender: Male Study Status: Part-time Online Masters Student Employment Status: Full-time employment in E-Learning Consultancy Previous Experience Studying Online: Previous online Master in Education and Innovation. More than 1500 hours complementary online professional training

Professional and Academic Trajectories	-is an early career professional in the e-learning sector. -has previous experience studying an online/distance master in innovation and education research -current study was proposed to him by his current e-learning teacher training consultancy -currently works full time as Director of Studies for an e-learning company -has more than 1500 hours of complementary online training -Previous Master in Education Innovation and Research (distance mode) -Study abroad (English)in the U.K.
Learner Attributes	-is "passionate about innovation" and is attracted to online learning and education for this reason. -is a critical consumer of online training and exhibits strong characteristics of a self-directed learner -motivated by passion and interest in e-learning and professional development. -recommended by current employment.
Digital Learning Activities and Strategies	-first task of the week is to complete course readings, as well as an advanced bibliographic search in order to complete the weekly course activities. -completes course activity by reading activity outline, -After completing course readings, he would begin to communicate with peers, which he explained was at times a very demanding task. -creating digital presentations using PPT or Prezi, mixing 50-50% between traditional academic works such as group projects and essays, and other more innovative and progressive, such as building an online course in Moodle.
Frequency of engagement:	-working roughly 4 days a week and between 2-3 hours each work session
Engagement with Learning Resources	-using journal articles and video tutorials and heavily using google scholar as well as a paper agenda where he writes down all important planning and scheduling information related to the master. -Very active using Facebook, WhatsApp, and Instagram to support learning, and active on Moodle, Twitter and YouTube.
Peer Collaboration and Social Support:	-most of the interactions are informal in nature, and are mediated through WhatsApp -a positive point of the program was meeting and connecting with some course mates (low number) that he got to work directly with in the masters. -engaged in both individual and collaborative group work (sometimes, however, he feels that the work was not truly collaborative) -peer collaboration was an important dimension of his experience and an opportunity to build competencies in online collaborative group work. -through peer collaboration he was able to gain new understandings of the course material. -he relied on both current work peers (exceptionally) as well as peers in other academic contexts outside of the UOC in supporting his formal academic learning
Conceptions of Digital Learning Experiences	-felt that the program was heavily theoretical, and could have been more productive through a more pragmatic approach. -notices a difference in the support of the teacher in online environments in comparison to traditional university.

Engagement between Academic and Professional Practice	-identifies as a self-directed learner who is passionate about innovation in education and the e-learning industry -regularly reads articles, newspapers, television programs and reports related to the world of education. He has also regularly used MOOC's and other open educational resources to support his professional development. -His interest in leadership and management in e-learning in his academic study has sparked interests in themes he has not explored yet, for example e-learning policy, project management, and instructional design. -has found ways to connect his academic learning with his professional practice, particularly as his studies focus on management and leadership in E-Learning and his current role is director of studies in an e-learning consultancy.
Barriers in Engaging with Online Learning practices:	-feels that many students in the program need to have a better understanding of the roles of both teacher and students when studying fully online.
Conceptions of Impact of Online Learning across contexts	-In 5 years time, sees himself "as a civil servant, as an educational guidance counsellor, in which ICT, learning and knowledge form an important part of my professional practice" -his academic experience in his master, particularly learning about educational projects in K-12 related to e-learning, as well as teacher training which will help him as he becomes an educational counsellor.
Impact in his professional life	-greatly feels that his experience in this program will have impact on his future professional trajectory and practice.

Table 5.8 Case #6

Lydia (UOC)

Gender: Female

Study Status: Part-time Online Masters Student and Part time Blended Diploma degree student

Employment Status: Both part time and full time work in primary education during academic year

Previous Experience Studying Online: 660 hours of online training for Public Education exam

Professional and Academic Trajectories	-has a background studying chemistry as well as professional studies to become a public primary school teacher. -had previous (negative) experience taking a 660 credit hour online course to prepare for the government exam in education ("I didn't learn anything") -combined both full time and part time work during academic study

	-primary objective is to gain points in order to place well on the government exams to become a public teacher. -Undergrad in Chemistry (no date available) -Post-graduate certificate in elementary education (2018)
Learner Attributes	-is an active and engaged learner, explaining that "everything interests me in this world, I've always like to experiment with everything" -is intrinsically motivated to learn and "very demanding on myself, so once I commit myself to something, I will try to get the most out of it." -motivated by early career trajectory of finding a full-time job in public education, and preparing for public teacher exams. -potentially interested in PhD
Digital Learning Activities and Strategies	-"if it's a week with an assigned activity, the first thing I will do is read the document, download it and have it in my computer, to know when it begins and ends, and all the tasks that are required." -using the assignment rubrics and "from the rubric, after completing the activity, review the rubric to evaluate whether each objective had been completed." -organizing her learning tasks more digitally, explaining that "I am a person who is very much of paper and pen, however I have now changed to organize and plan more digitally".
Frequency of engagement:	-roughly working from 1530h to 2130 each week day. -admits that she is "very obsessive, so every morning I would connect before going to school, to respond to students, and after school".
Engagement with Learning Resources	-used "google scholar, which brought me to sites such as dial.net, sites I am not used to visiting, in order to search for more information that interests me." -engaged a lot with Moodle, in order to design and build a course from the perspective of a teacher -sought social support and peer collaboration through WhatsApp, these interactions were "very much supportive in both the learning and for moral support". -Very active on Facebook and WhatsApp and active Moodle to support academic learning
Peer Collaboration and Social Support:	-impressed and satisfied with her experience in peer collaboration -"I had the good fortune of having positive experiences in all of my group projects; identifying goals, defining clear objectives, and moving projects forward to completion." -used peer social support in her final individual capstone project, -studied in the same cohort as two colleagues she knew from other educational experiences receiving

	social support from them
	-had a great deal of support in her husband,
	-found relationships in online learning were more open and inclusive than in traditional learning
	-learned "through the reflections of peers, from what others showed me, sharing articles, ideas, opinions, and tools."
Conceptions of Digital Learning Experiences	-originally unsure whether to pursue an online degree and was "initially reticent, with low confidence in the program"
	-afforded her to connect her learning across courses as well as support future learning, building toward her major work in the capstone project
	-feels that online study may take as much effort, if not more than a traditional degree explaining that "I have certainly learned, and I have changed".
Engagement between Academic and Professional Practice	-found ways to connect learning across social practices and academic practices
	-her personal, academic and professional interests "are very aligned".
	-was also able to connect a didactic unit created for a course to her professional practice teaching robotics in education
Barriers in Engaging with Online Learning practices:	-felt like she lacked more feedback/engagement from the professor and the perceived lack of interaction with the professor or tutor was considered a barrier or threat to engaging with the program
Conceptions of Impact of Online Learning across contexts	-feels her academic experience will help her, particularly her interest in teaching methods linked with robotics and educational research "in relation to my future as a professional, I would like to do a doctorate degree".
	-her experience has opened "greatly her mind, being online education, at the beginning I was closed to online training".

Table 5.9 Case #7

Emily (UOC)
Age: 26
Gender: Female
Study Status: Full-time Online Masters Student
Employment Status: Unemployed, searching for working in Public Education System
Previous Experience Studying Online: Use of Moodle in undergraduate degree at campus based university

Professional and Academic Trajectories	-is an early-career professional in primary education, with a focus on bilingual education. -has a four year degree in primary education (2009-2013) -had limited teaching experience (non-permanent contract) in a primary school before beginning the online masters in 2017 -chose the online masters as it was a flexible option and allowed her to look for work if needed
Learner Attributes	-identifies as a self-directed learning with a high level of intrinsic motivation, who enjoys to apply new technologies to her work and learning processes -"I chose this masters as I think it is very important to add ICT into the classroom". -believes that you need to "update yourself constantly because there are new methodologies in order to continue evolving, you cannot remain stagnant". -motivated by early career trajectory of finding a full-time job in public education, and preparing for public teacher exams.
Digital Learning Activities and Strategies	-began by clearly reading the learning activity outcomes and guidelines, explaining that she would "underline the essential points, and I would also create a calendar, I would always have it close, where I would highlight days that I would start and end each activity". -seeking out the tools and technologies necessary to complete the tasks/activities. -reading and then analyzing or applying that knowledge into a digital context visually, for example in a mind map, or in a visual presentation (i.e. Prezi) -making visual presentations impacted her learning: "you need to synthesize information, you have to work the information, you can't copy and paste, to design the project; objectives, contents, methodology etc. this makes us learn"
Frequency of engagement:	-dedicating Monday-Friday to her studies, she was able to closely follow the forums, and able to respond to colleagues questions or doubts. -studying full-time, she had a great deal of time to dedicate, and was able to work most mornings full-time, and then work more each evening
Engagement with Learning Resources	-used many synchronous communication and collaborative tools to complete her work, including google drive and WhatsApp, which was heavily used by her cohort and course groups -she enjoyed, and greatly used the tools offered by the virtual classroom, including the debate forums. -Very active on Facebook, WhatsApp, and Instagram and active on Moodle, Twitter and YouTube to support academic learning
Peer Collaboration and Social Support:	" in general, collaborating with peers went well, because in google drive, or in Prezi, we created documents and we could work according to our needs, and also were able to synchronously in order to advance our work" -"What was most difficult to achieve was a true debate in the forums" -felt part of a student-driven learning community throughout the academic year. -feels that peer collaboration has both positive and negative dimensions achieving support when you need it through various communication channels, however never really being able to disconnect, suffering from information overload.
Conceptions of Digital Learning Experiences	"Originally thought that group work would be complicated, being students from all over, however in the end I have left with a good impression in that aspect". -questions the effectiveness of some activities (i.e. creating a mind map) -studying online allowed her to be more organized, feeling that her learning was more "continuous" in online environments. -her conception of online learning had changed completely, explaining that "it seems to me that one can equally learn online than in a traditional context, I don't consider online better or worst, they are at the same level".

Engagement between Academic and Professional Practice	-feels that some of the activities she completed using digital tools may be used in her professional practice, " I can have my students make a presentation using Prezi, because I know how to manage it, I can show them how, y perhaps before I couldn't". -spends time on social media in order to pay attention to teaching opportunities, joining various 'interest' groups on Facebook in order to stay up to date on public exams for teachers as well as future teaching opportunities.
Conceptions of Impact of Online Learning across contexts	-has been better able to organize her work processes by using technologies such as digital calendars and collaborative work spaces explaining that "I think I improved the way I organized my learning. Before, I never organized a calendar with tasks, and now I always have one organized with tasks". -her experience in the master has given her knowledge and competencies that will directly impact her preparation for the public exam for teachers, as well as her future professional practice in the classroom

Table 5.10 Case #8

Isabel (UOC)

Age:30
Gender: Female
Study Status: Part-time Online Masters Student
Employment Status: Full-time University work in E-Learning Research and Development
Previous Experience Studying Online: no prior experience

Professional and Academic Trajectories	-is an early-career professional who has an undergraduate degree in primary education (2011-2015), and who has worked internationally in the US teaching Spanish (2015-16). -has worked as a research assistant at an online university in the fields of Education and ICT for two years. -developing her curriculum for finding a job as a public primary teacher -began to study the masters as a way to develop her C.V. to become a public school teacher, but also to potentially prepare for a future doctoral degree
Learner Attributes	-enjoys and misses face-to-face classes, particularly the lecture format and the opportunity to debate classmates and the professor in a live setting -was an active participant in the classroom, enjoying asking questions, debating and discussing the curriculum. -is motivated to participate as well as to be "in control" of her studies, and not let work pile up. -motivated by early career trajectory of finding a full-time job in public education, and preparing for public teacher exams. -potentially interested in PhD -identifies as an active and engaged learner, who believes that "education is advancing rapidly and on top of that new technologies advance even faster. It's something you cannot separate….one needs to adapt, update and be trained in this area (Education and ICT)."

Digital Learning Activities and Strategies	-“Basically, it's reading the material ... sincerely, not everything ... because it's more text, more experience ..in the end I'll look for what interests me ... I'm not going to read everything ... If I see that I have problems ... I am going to research for myself ... then, it is to read well, see what they ask for in the activity ... and start working ... first begin with a draft ... what is it that I have to do? ... where do I have to look for it? ... and then to develop it.” -evaluates and monitors her own work in relation to the pre-defined learning requirements found in the Learning Activity Document and rubrics. -developed monitoring and evaluation skills (i.e. metacognitive strategies), by revising her approach to learning if it was not impactful. -underscores that planning skills are essential. -engaged in academic activities in a continuous way, and not letting work get piled up.
Frequency of engagement:	-spending roughly 10h a week studying ”30% reading documents from the UOC, another 20% researching on my own, and 50% of the time in realizing the activity.”
Engagement with Learning Resources	-would have enjoyed more learning resources that were not only print: “there was nothing audiovisual, nothing audio based, therefore, the variety of resources and formats was something that I was missing”. -begins learning activities with “the bibliography, jumping from article to article, until I find what interests me, using the UOC library, Google Scholar, and other data bases”. -organizes her work through her computer’s workspace and using tools in the cloud (i.e. google drive etc.), organizing her work in different folders. -Very active on WhatsApp and Instagram and active on Facebook and YouTube to support academic learning
Peer Collaboration and Social Support:	-“if the activity was collaborative, it would imply much more interaction, however only online and through the tools the the university offered i.e. forums”. -feels as though she studied more independently than collaboratively in a group -felt that much of the interaction online was very much linked to assessment, -didn’t necessarily feel apart of a learning community, expressing that “actually, if they didn’t ask for group work, if the activity didn’t ask to evaluate the work of others, no one would enter to see how you completed the work” -“the community wasn’t a community, because a community needs to interact, and there was no interaction unless it was designed into the activity, and for more, this interaction needs to be more spontaneous.” -explains that she “she wants a sharing knowledge community, not a community to resolve simple doubts. In this sense, you are alone, no one recommends an article or a book”.
Conceptions of Digital Learning Experiences	-was unable to find a knowledge network thus far in her experience -feels that in the digital space, unlike in the face-to-face setting, the participation of students is very “individual, and they don’t need to share, so it’s me on my own, and that’s it. I do what they tell me and that’s it” -she explains that “perhaps it was because I was looking for the equivalent, of what I experiences in the physical campus, as such, looking for it here, yes there was space, but students didn't use it”. -In terms of learning design, she. feels that ”it is a good approach when the course activities are related to each other, and each activity asks for something greater or related with the previous activity.”

Engagement between Academic and Professional Practice	-is able to directly engage learning between her academic activities and her professional practice -explains that "the master has given her the theoretical base to realize that her reasoning was in the right direction, but now she has the technical reasoning and the scientific base to relate to what I do in my work". -feels that her professional and academic life are "two simultaneous things that are moving together, and that there is a lot of transfer between the two." -doesn't feel the program itself has explicitly facilitated learning transfer between academic and professional contexts.
Conceptions of Impact of Online Learning across contexts	-feels that her experience in the program will positively impact her professional trajectory, -hopes that her experience studying online will "open doors" -her experience has impacted her ability to engage in online communities. -is considering completing a doctoral degree after her experience in the Master.

Table 5.11 Case #9

Michael (U of E)

Age:30
Gender: Male
Study Status: Part-time Online Masters Student
Employment Status: Employed Full-time as Instructional Design Manager for a learning tech company
Previous Experience Studying Online: Limited experience with online platform Code-Academy

Professional and Academic Trajectories	-early-career professional that has experience working in journalism and most recently, has worked in corporate instructional design since 2013, specializing in workplace performance support in mid-level to large organizations -work at his current company led him to the field of e-learning and instructional design -motivated to engage in the M.Sc. in order to have a theoretical and conceptual underpinning to his work, in order to better meet the needs of his clients. -reported very positive and successful experience in his studies as a self-directed A student. -Undergraduate degree in journalism (2006-2010)
Learner Attributes	-motivated to study a Masters in order to perform better at his job as well as to better position himself for future employment -he is "generally an A student, and have always been an A student" -is internally driven to perform well in formal learning settings.his strengths have always been essay writing, strategically targeting courses that had essay assessment structures, as well as selecting classes that he is generally interested in. -recommended by current employment to study graduate program -studying online for future job security

Digital Learning Activities and Strategies	-begins each week reading course readings and taking notes using Evernote, writing summaries of the paper or important details that relate to the course work. -read forums throughout the week (roughly 30 minutes a day Monday-Friday), reading peer contributions and making relevant posts and comments. -uses a digital planning tool (i.e.: Evernote) in order to develop core academic skills of information literacy, literature review, academic research and writing skills.
Frequency of engagement:	-will engage 6-7 hours on Saturday, particularly when big assignments are due -weekly spending around 6-10 hours on assignments
Engagement with Learning Resources	-uses his Mac computer work space for completing most of his tasks -mostly uses text based editing tools to produce his assignments, working on his MacBook, however he also has made audio based assignments (podcast), and has also made some video assignments using Xbox, however these would not be routinely used. -Very active using Evernote as planning tool and active on Moodle, Facebook, Twitter, WhatsApp (messaging apps), Google Hangout, Skype to support formal learning.
Peer Collaboration and Social Support:	-has used strategic interaction with his peers to support his learning -has used both the formal forum discussion as well as more informal spaces such as Facebook groups, google hangouts and Skype in order to connect and chat with colleagues in the program. -shares assignments with others in these groups to get peer-feedback to improve his work -has developed networked connections and interactions with peers across academic, personal, and professional contexts using Twitter -hasn't built significant relationships with professors -recommend to those beginning the program to develop informal study groups to help support your learning
Conceptions of Digital Learning Experiences	-feels some course experiences were more self-directed, and others more teacher-facilitated. -found some experiences more isolating (learning analytics) then others (intro to online learning). -enjoyed how the assignments built on each other, enabling feedback to support the development of the major projects for each course. -admits that there hasn't been many notable differences (besides not physically going to the university) between his current experience and previous academic experiences -has been able to collaborate and learn from course colleagues from all around the world with a wide range of academic and professional trajectories.
Engagement between Academic and Professional Practice	-his professional and academic practices are intimately integrated, claiming "it's not clear where one ends and the other one begins". -he has developed a podcast series on workplace performance and learning and development, where he has developed a platform to discuss with industry leaders on topics that feed into both his professional life as an instructional designer, and into his academic practice in digital education. -has been able to incorporate conceptual and theoretical frameworks from his academic coursework, into his professional practice of designing courses (scaffolding into the proximal zone of development) for large technology clients.
Conceptions of Impact of Online Learning across contexts	-more inclined to take formal courses after his experience studying online. -impacted his ability for critical thinking. Being more critical of what he reads, considering motivation of authors and becoming more comfortable reading academic research. -program has given him a degree of confidence in his professional field

Impact in his professional life	-views his role in the company as a learning analytics specialist as continuing to grow, and hopes for professional advancement in his company and beyond.

Table 5.12 Case #10

Ashley (U of E)

Age: 48
Gender: Female
Study Status: Part-time Online Masters Student
Employment Status: Full-time self-employed Educator
Previous Experience Studying Online: No prior experience

Professional and Academic Trajectories	-is a senior professional who has been a professional stage and event manager for over 25 years, working extensively both home in the U.K. and in international contexts -progressively saw her career gain leadership roles in teaching and learning in her field of stage management -became frustrated because she didn't have a higher level graduate certificate which prohibited in some way her career progression -was allowed to enter current Masters based on her professional profile and extensive higher education teaching experience, without having an appropriate undergraduate degree. -Certificate in Stage Management -Various non-formal training experiences through professional practice
Learner Attributes	-is under pressure to finish the online masters through an expedited process because of career motivations and constraints, explaining that she needs to "have my Masters done by the time I've finished in America, because they want to talk to me about options about staying" -was motivated to get the most out of her program because it's a significant economic investment, as well as time investment, dedicating 10 or more hours a week to her studies. -was also motivated to improve her marks from her first year, when she was combining full time academic/professional work with her formal studies. -admitted to having "something to prove" in terms of getting good marks in order to potentially pursue a doctoral degree in the future.
Digital Learning Activities and Strategies	-has been extremely active user of Twitter, posting academic and professional content, and engaging in Academic twitter by developing her own Professional Learning network, following certain hashtags and influential professionals working in her fields of interest. -A typical week in a course would include a reading list on a certain topic, taking turns leading the group blog, accordingly she would ***"plow through the reading list"*** and often ***"spring off those papers and find some other papers"***. -She "would start to write, to develop an argument for her blog post". -A strategy she used to meet the learning requirements was to "worship at the altar of the learning outcomes. I always go back to the learning outcomes...always as you're doing the task or activity you try to really understand the learning outcomes and be like, Am I meeting those learning outcomes in this work?" -she "spent a huge amount of time researching papers, digging and digging either with Google Scholar or with the Edinburgh online library resource and to try know where that argument is going. And then you need evidence to back up what you're saying that you say."

Frequency of engagement:	-studying in the morning, roughly for 2 hours on a typical week, more or less know, for about 10 hours a week, and then building up to more work, particularly on the weekend, when there are major works due.
Engagement with Learning Resources	-using side chats to support her learning, often organized informally, including Facebook messenger and Skype. She has also used Discord as a favored messenger app among the students in the program. -admits that "the Internet in general has just been the most amazing tool and the way that you can, if you just keep digging, you know, you can find something. And maybe you'll find a newspaper article about something. -She also reports using cloud tools like google drive and docs to complete individual and collaborative tasks. -Very active using Moodle, Facebook, Twitter, Instagram to support academic learning, and active using WhatsApp (messaging apps), Google Hangout, Skype
Peer Collaboration and Social Support:	feels that "the communication with the other students has gotten better and better as I moved through the program, and because it's not that it's necessarily the same students that I'm engaging with. So I don't know whether it's because I got braver and kind of more engaged with people. But the first module was particularly lonely". -had an opportunity to meet a colleague who was visiting in her city on a work trip face-to-face, and found this helpful. - reported having support from her professional work environment while in Hong Kong, seeking advice and help on certain occasions. -feels that "it's just nice to know that you are not on your own, really. I think the Skype chat that we had on the global context was really valuable" -explains that she has "learned loads" from group work, particularly things she wouldn't have been able to pick up on her own. -would give others advice to become braver, earlier in the program, in asking questions and engaging in the course community.
Conceptions of Digital Learning Experiences	-admits that "the whole thing has been extremely positive and have really embraced this way of learning" -recognizes that most students are "working full time or raising a family or whatever it might be. So you do tend to prioritize the assessments" -recognizes that one of the affordances of a digital learning environment is the dialogue that can happen in archived forums. She explained that "when I first started, I was terrified to post everything in the discussion board". -has "dramatically" changed her views about the potential and effectiveness of online learning, particularly in her own discipline of stage management in the creative arts, where face-to-face learning dominates. -feels online learning and education can provide a flexible model of learning and respond to the needs of the learner and the industry.
Barriers to engaging	-found it challenging to develop some of the core academic skills, including managing and using bibliographic references, explaining "I still have a whole nightmare referencing something", as well as academic writing skills. -noted that following a MOOC as part of a social research methods course was challenging because "it was just a bit too independent".

Engagement between Academic and Professional Practice	-Her experience in this program has influenced her interest in applying online learning models to her own professional practice of stage management. -was actively able to use her learning experience in her Masters to support an online project to support practicing stage managers in the creative industries. -Her academic activity allowed her to make “a little six week course online that was was part of what I would do in workshops”. -her personal, professional and academic interests are very intertwined, and that one of her passions or “obsessions” is understanding how to support students who come from an Asian heritage when studying in the West. -engages in twitter more for academic work, explaining that “I didn't originally, but I do now. One of the things I'm particularly interested in is the use of the flipped classroom, Okay, let's go and stick flipped classroom in Twitter and see what comes up.”
Conceptions of Impact of Online Learning across contexts	-mentioned she’s “learnt a lot about the resources available” as well as being updated on contemporary theory on teaching and learning particularly in relation to online learning. - explains that “the other really important part of this course is it made me way less concerned about the technology. I'm way more confident in using the technology now, and just looking at setting up some podcasts, management podcast, you know, sort of in conversation with.... and, I would have never even thought about doing that kind of thing.”

Table 5.13 Case #11

Oliver (U of E)	
Age:47 Gender: Male Study Status: Part-time Online Masters Student Employment Status: Unemployed Previous Experience Studying Online: No prior experience	
Professional and Academic Trajectories	-Shifting career focus to digital education after first having career in T.V. working for 10 years as a head of editorial. -decided “a degree in digital education looked like a reasonable choice because I could then combine my pedagogical knowledge from bachelor degree as well as my TV experience”. -pursuing a degree in digital education in Edinburgh because “A degree of that type is not currently offered in Germany”. -Bachelor of Arts in primary education (2012-2016)

Learner Attributes	-identifies as a digital education scientist, senior TV. producer and philosophical oddball with an interest in the role of digital media in human development -intensely interested in digital culture, and as someone who flourishes in digital learning environments. -is a self-directed learner, who identifies as a creative and intellectual person who likewise publishes a wide range of digital content across a variety of platforms and modes (twitter, Instagram, personal blog, Facebook, formal graduate learning environment, and through text/video/photo/audio). -does not have professional work, and therefore considers his "professional work basically is the degree I'm working on" and that "I'm completely intrinsically motivated. It is not that I do it to, to gain a degree to then get a job to then make money out of a job." -is active across a range of digital spaces, showing versatility of use and high levels of creative production. He likewise has up-to-date professional social network profiles, as well as a personal blog for creative and intellectual posts. -motivated by interest in combining professional background (in digital video) and his academic interests in pedagogy -not specifically career focused
Digital Learning Activities and Strategies	-he essentially needs to "read text and write texts. In my current course introduction to social research methods, basically to get all the credits all that is required of me to do is to read relevant texts and produce three written text assignments". -he "reads the requirements as they are printed out online. Just try to understand what is asked and combine that with what I wanted to do and of course there is the option to get feedback from the tutors. So, that's possible too". -suggests "just follow the rules. Just do as they tell you", explaining that "in the course of things find your own approach to it".
Frequency of engagement:	-mentioned engaging more than twice a week, and less than daily, working between 2-3 hours in each session, depending on the workload. -estimates that he spends "20% writing? 30% reading and 50% thinking" in a typical work week.
Engagement with Learning Resources	he explains "basically all I need is my iPad and my Wi-Fi connection. I will access the relevant pages on university pages and the documents. I will then use it to write the assignment or to read the texts, highlight passages on my app, whatever, and send it, hand it in", -he uses "the Safari browser, very straightforward. I use Microsoft Word. I use the endnote app for referencing. I use the Google translator app for the words I don't know. I use Safari to access the university library (digital). I heavily use notability which is my my basic standard app for reading because I can I can do highlights. I can do bookmarks, I can do full text searches. This is where all my all my university textbooks from the past six years are on. And that's basically what I do". -Very active on Facebook, WhatsApp, Instagram to support academic learning, and active on WordPress/Blogger and somewhat active on YouTube, Twitter, Moodle (LMS) to support learning.
Peer Collaboration and Social Support:	-was involved in Facebook groups as well as opportunities to join Hangout or Skype sessions with tutors and course groups to discuss several points as to fulfilling the assignment requirements -expresses "however, it is not fundamentally important. I believe it can be done without all those things. It comes in handy at times but for me personally I would feel confident doing it without". -felt most of his work was completed independently and alone. -he uses peer collaboration and social support "on a more soft skills, social level. And not on say, like a hardcore intellectual academic learning level." - he benefits "most from the fact that I have the impression that they do actually care and that they are there and are happy to support and same for a couple of students I've met. So it is this feeling of safety of involvement, of connection that I benefit from, it is more important to me in my actual progress in my

	studies”
Conceptions of Digital Learning Experiences	-“one thing that strikes me still is that although it is digital education. It is very, very traditional. The only thing digital about it is that we access the texts at our preferred time and space, but it's still text”. -the program is “very theoretical” and that he does “however feel that it is of high quality, that I do profit from it and that the structure of the program is really good. And I get a good insight into all different aspects of digital education” -feels his experience learning in the program “is exactly what you could have been doing at a European University since Bologna had a university in I believe 1680. It is the very same working practice. I'm reading texts writing texts.” -feels that digital media, and in particular video, has significant implications for online learning, -Upon entering the program he “you feel kind of alone. You're not only physically detached, being among students. But also you feel socially detached because you don't touch it, don't see, you don't meet and this creates a sort of anxiety or hopelessness, which is what I'm saying that's good. But we've got the guidelines, you got the rules, just follow them just do as you're told. And this will give you the safety and the confidence to to develop your own approach”.
Engagement between Academic and Professional Practice	-recognizes that he at times has clear intentions for learning online in his free time, while other times not as clear. -he is “aware that the university is very keen on students to apply what they're learning online to their professional lives. Like, take this assignment and see what you would do if it was your job. So as I do not have a nine to five job right now, I can't do this.” -he also feels “the university is very active in trying to connect real life experience and real life work with university degree. For me, it doesn't work not because of the university, but because of the way my life set up right now.”
Conceptions of Impact of Online Learning across contexts	-admits that “I think the biggest effect it has it that it it changes or adds to my perspective”, explaining that “it gives me an intellectual theoretical foundation to the practical work I have been doing and I will be doing, you know, it’s like a theoretical, intellectual, philosophical framework for the practical procedures” -“it's also enlarged my vision of what can be done, what should be done and what maybe shouldn't. So it has had a great impact on my perspective of online study.” -“re-affirmed my expectations that it is possible, you know, you read about it and you hear certain school in America does this and a certain University has found out in a study that this and this can be done, and now having done it all, you know, I've seen it, I've experienced it, I know it can be done. So it's not that it has, like, really changed my view, but it has affirmed my hopes and aspirations” -he admits he doesn’t know the impact of his academic experience “I honestly have no idea because I might go on looking for a job connected with education. I might as well not. I have no idea what next year's going to be like. It is all feeding into my personality. It's all in me now. And it's going to stay in there. Hopefully, what is going to come out of it is an uncompleted question.”

Table 5.14 Case #12

Silvia (U of E)

Age:46
Gender: Female
Study Status: Part-time Online Masters Student
Employment Status: Full-time employment in Educational Publishing
Previous Experience Studying Online: Limited experience with MOOC's and other short online courses

Professional and Academic Trajectories	-works in an education and publishing consultancy as a mid-career professional with over 20 years of professional experience in education, teacher training, education materials development and educational publishing. -has worked globally on a range of educational publishing projects -Previous to her current online masters' she "had attempted two other masters" -a lack of local graduate options in her field of interest that offered flexibility motivated her to "look beyond" her own country -Undergrad in Linguistics (1990-1996) -Two other attempted Masters degree (campus based)
Learner Attributes	identifies as an interactive person when she learns, enjoying social interaction and peer support and engagement. -motivated by having begun masters in the past, and not finishing, -identifies as "kind of an all or nothing person. So the more engaged I get, the more motivated I get" -motivated by mid-career professional trajectory gain knowledge and skills relevant to her professional field. -is motivated by also looking to the future, possibly to "go on to a PhD", and therefore needs to develop a strong academic record. -motivated by the content of the Graduate program. -felt anxious that she would start something again and not finish it -identified digital education, as "an area that I need, that I would like to learn more about" and needed a "more academic background" in this field.
Digital Learning Activities and Strategies	-staying engaged in the course forums by encouraging people to "get over your shyness, if you have some shyness, practice, you know, making comments just push, push, push yourself a little bit out of your comfort zone" -tries to "flip the week" by preparing the week ahead and "posting on the forums, student discussion, either initiating or responding really helped me" -using "a digital mind mapping tool where as I do a reading, I kind of plug it into a visual and under themes, and then make links" as a learning strategy -wishes she "could be more efficient with writing academically" -uses a snowball technique to follow a research theme or research interests and has also "identified a few blogs that I follow", in order to stay up to date on topics in her field of interest.
Frequency of engagement:	-aim to do 2 hours a day, plus, probably 4-5 on the weekend if I've got an assignment it will be a lot more -reports spending about 60% of her time researching and reading, and 40% of her time writing and engaging in the course forums and debates. Her workload obviously increases near the end of the course for big assignments, perhaps adding an extra 20 hours of work.

Engagement with Learning Resources	-heavily used the library to access most resources, along with google scholar among other search engines. -heavily uses the cloud (google drive/docs) to organize her academic work, as well as Paperpiles her principle note taking and reference manager application -highly valued content accessed through scientific knowledge databases, open educational resources and university accessed institutional resources. -Likewise, search engines, text editing tools, knowledge organization tools and synchronous collaboration tools were most important in supporting her academic activities. -Very active on Moodle and WhatsApp to support academic learning, active with Discord (messaging), and somewhat active with Facebook, Twitter, YouTube, Pinterest, Instagram, Researchgate to support learning.
Peer Collaboration and Social Support:	-has felt that "interaction with the faculty has also been very positive, -in some courses, she has relied on Twitter for peer and networked interaction -live meet ups "have always been helpful" citing that she's always "left feeling like I've got a greater connection with the tutors, with my classmates or whoever's been part of it". -reports benefiting from "getting everybody else's point of view" in the digital forums and experiencing how students may be able to take away different things after reading the same reading.
Conceptions of Digital Learning Experiences	-has "really liked the one semester module, I have found that , so the four modules I've done so far have been quite varied, which is good", remarking that "It's interesting to see how distance online courses can be so varied, and the pedagogy of something can come through that." -an affordance has been that she's "been able to fit it in around my lifestyle" -"the biggest shift for me is also the fact that back in the day, if I wanted to access any resource I had to physically go to the library. All my notes, everything is on my computer, well, in the cloud. you know...I don't do very much at all offline, I mean, paper based." -A major affordance is the ability to participate in a program offered on a different continent, while maintaining her family and professional life at home -she reports being able to do "all sorts of things with my learning that is kind of across a blended physical virtual space"
Barriers to engaging	-has mentioned that the time and seasonal difference between her country and the University of Edinburgh has sometimes been a challenge, when her active months are Edinburgh's academically inactive months and vice-versa - wished there were more opportunities for deeper connections with classmates,
Engagement between Academic and Professional Practice	-reports being able to have "discussions with colleagues, and pick up things, my daily conversation is education, I'll ask questions, I'll raise things that will feed back into what I'm thinking about, so I'd say there's quite a lot of discussion." -when engaged in coursework, there is a fluid movement between her professional practice and academic tasks throughout her typical work day -admits to participating in online interest groups through social media for her informal interests (paint/draw/sketch) and recognizes that there is "there is a lot of learning through that interaction and that Facebook dynamic." -has been experimenting with playing different digital games informally -"I'm not a fan of Facebook…but if I dip into Facebook or Twitter feeds there's always something useful, I've had some really good learning...picked up interesting things."

Conceptions of Impact of Online Learning across contexts	-her experience in the academic program has impacted her “confidence at feeling like I've got an expert opinion, on various topics around digital education”. -has valued “bringing in tools, frameworks, having, being able to having had the separate space to think through things around educational product design, which is my work” -“I’ve come to really value the skill I’ve picked up about doing a literature review, or even accessing relevant articles and following a thread, and just kind of being able to scope what’s out there. One can get very overwhelmed with content, so I think that’s a good skill” -her experience in the program has allowed her to develop core academic skills such as academic reading, literature review and academic writing,

5.1.3 Cross Case Analysis & Profile Summary

The current case study research outlines the experiences of 12 students in 3 distinct online graduate programs. The following section will introduce the case-study participants through a cross case analysis, looking for patterns and common themes across the population. Here, the aim is to collectively view learner profiles with a cross-case analytical focus across the 12 participants, including their professional and academic trajectories as well as personal attributes while focusing on how they experience online learning across multiple contexts.

The below Figure (5.1) details some key socio-demographic information of the 12 case-study participants. As represented in the below image, participants are not restricted to a specific age, and represent a wide range of professional experiences and trajectories (from early career to mid-late career trajectories), as well as a range of previous experiences studying online, where 1/3 of students had previously studied an online or blended master, 1/3 had limited experience studying online, and the final 1/3 had no prior experience.

Figure 5.1 Cross-Case Profile at a Glance

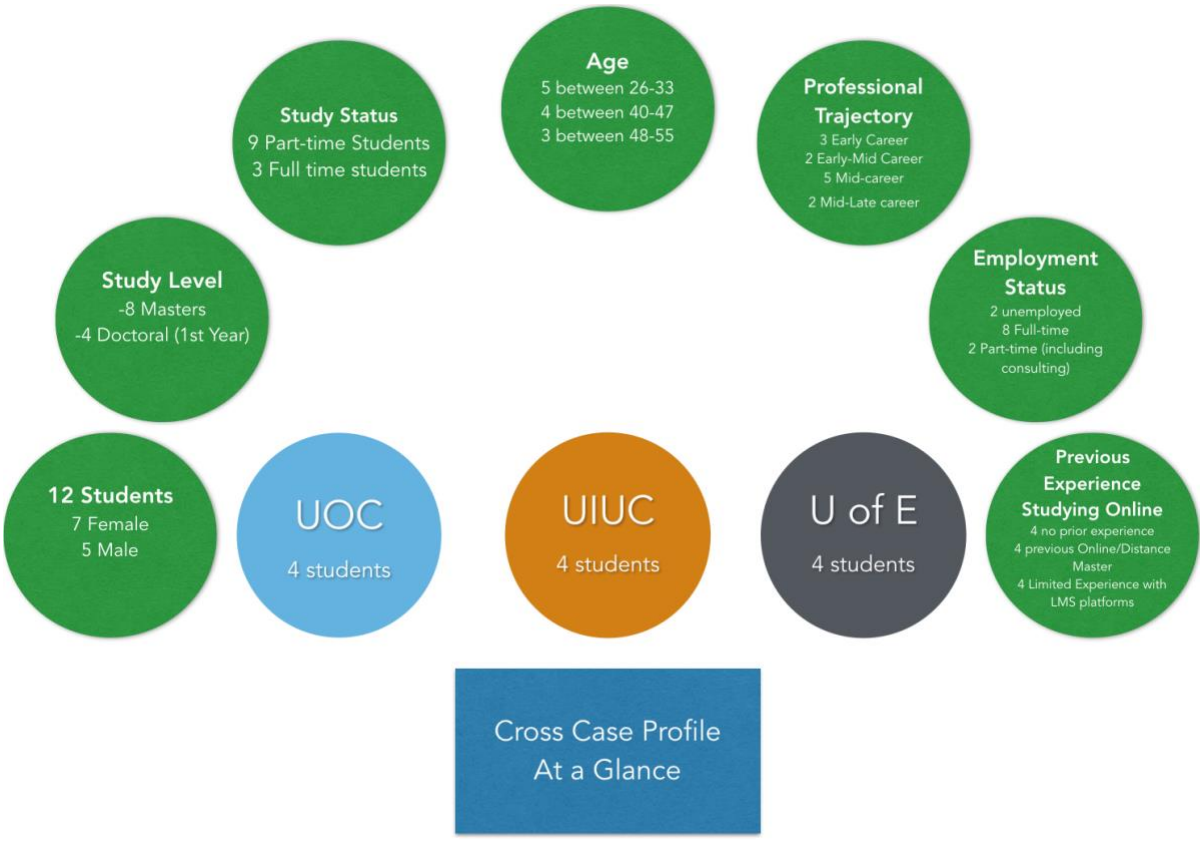


Table 5.15 further presents key comparative socio-demographic information across the 12 cases in more detail, including study status, previous experience both studying and teaching/working in digital contexts, as well as employment status during their year of academic study and recent professional trajectory, collected through interviews and complemented through online observation. Again, a range of experiences and backgrounds emerge across the profile, with 1/3 of participants having no prior experience studying online, while another 1/3 had limited experience and the final 1/3 had previously completed an online or distance masters (in one case having up to 1500 hours of complementary online training).

Table 5.15. Key Cross Case Comparative Socio-Demographic Information

Age Gender	Study Status & Level	Previous Experience Studying online	Previous experience Teaching or Working with Educational Technology	Employment Status (2017-2018 Academic Year) & Professional Trajectory

1. Jose (UOC) Age:29 Gender: Male	Part-Time Master	-Previous online/distance Master in Education -More than 1500 hours of complementary online professional training	-Teacher in Online Master program -Instructional designer -Lead teacher in E-learning educational consultancy	-Full time employment -4 years working in e-learning consulting company (2014-2018)
2. Lydia (UOC) Age: 33 Gender: Female	Part-Time Master	Limited experience studying online for exam preparation	No previous experience	-Casual part Time and full-time employment -Working part time in educational robotics as educator
3. Emily (UOC) Age: 26 Gender: Female	Full-Time Master	Use of Moodle in traditional Undergrad degree	No previous experience	-Unemployed, Full-time student -1 year experience of part time supply teacher work
4. Isabel (UOC) Age: 30 Gender: Female	Part-Time Master	No prior experience	1 year of experience working in E-learning research and development	Full time employment in E-learning research and development -2 years experience working as research assistant in university setting (2016-2018) -1 year experience working in USA (2015)
5. Matt (UIUC) Age:42 Gender: Male	Full-time Doctoral	No prior experience	10 years of teaching and developing online courses in college/university setting	-Full time employment --12 years in university settings: progressively moving from adjunct professor into academic leadership roles including Acting Vice-President of Academic Affairs. (2006-present) -Published professional writer (since 2001)
6. Rebecca (UIUC) Age: 52 Gender: Female	Full-time Doctoral	Previous online Master in Business Administration. Online teaching experience	Limited experience in online workshop facilitation in professional context as well as digital educational resource development	-Full-time employment -8 years experience working in language education and faculty development at a public higher ed. institute (2011-present)
7. John (UIUC) Age: 55 Gender: Male	Part-time Doctoral	Previous online Master in Business Administration.	Over 10 years experience as an online instructor, including curriculum development	-Full-time employment -Entrepreneur (15 years) photography (2000-2015) -Online instructor at arts institute (2012-present) -Journalist in Newspaper industry

8. Olivia (UIUC) Age: 40 Gender: Female	Full-time Doctoral	Previous online master in Human Resource Education	Over 10 years of experience working in online social collaboration using social software	Part-time consulting work and full-time family duties -Social learning consultant (5 years) (2013-present) -10 years of H.R. consulting experience with emerging technologies (2004-2014)
9. Michael (U of E) Age: 30 Gender: Male	Part-time Master	Limited experience with online platform Code academy	6 years in corporate e-learning development	-Full-time employment -6 years experience with E-learning consultancy as instructional designer (2013-present) -5 years experience in journalism and creative content (2008-2013)
10. Ashley (U of E) Age: 48 Gender: Female	Part-time Master	No prior experience	Limited use of Blackboard (LMS) in Work	-Self employed full-time employment -15+ years experience in Academic settings as head of learning/teaching: Lecturer in Stage Management (2000-2015) -Entrepreneur/consultant (2015-present)
11. Oliver (U of E) Age: 47 Gender: Male	Part-time Master	No prior experience	No previous experience Ed-tech, experience, however very experienced with digital media production	-Unemployed -10 years working in production for T.V. (2000-2010)
12. Silvia (U of E) Age: 46 Gender: Female	Part-time Master	Limited experience with MOOC's and other short courses	6 years of developing digital educational products and teaching online	-Full time employment -Director of product and development 2016-2018 Educational Publishing (2008-2015) English teacher (2003)

Information in Table 5.16 gives a comparative summary of each of the learner's profiles primarily based on learner interviews and complemented by and triangulated with online observation data. Each case is given a learner descriptor and describes how each approaches online learning through key digital learning strategies. These strategies will be further detailed in section 5.2.1.1. of this chapter. Additionally, the most salient features of students' conceptions of their experiences of digital learning are presented. Likewise, these will be further analyzed and presented in section 5.3.3. of this chapter. This table focuses upon the defining features of each learners' experiences, presenting them according to their individual and personally relevant approach to online learning.

Table 5.16 Summary of Participants Learning Strategies and Conceptions of Digital Learning

Learner Descriptor	Key Digital Learning Strategies	Conceptions of Experiences of Digital Learning
Matt Driven & Disciplined Academic: a creative writing novelist and online introvert who is motivated by Social Learning and Educational Innovation	-highly organized in academic planning using digital tools and disciplined to engage daily on interest-driven research & writing tasks. Connecting weekly updates to major works. Motivated by peer-feedback.	-metacognitive nature of digital learning that allows flexible and ubiquitous learning across his professional, academic and family life
Rebecca Engaged & Motivated Language Professional: Career Focused for rank advancement in Academic Contexts	-staying up-date on all weekly tasks by completing reading, writing, posting and responding early in the week. Connecting weekly updates to major works.	-extremely satisfied and excited to be engaged and "in-charge of her own learning" in the online program. Unlimited access to learning resources.
John Self-sustaining Learner: Passionate about teaching with new technologies in the creative and business industries	-meticulous planner and highly organized. Acts as mentor to other students, consciously building core academic skills (information literacy).	-enjoys transparency of online learning. -Professional identity development as a researcher
Olivia Community-Driven Social Learning Consultant: An Online Collaboration Specialist & Flexible Mother/Academic/Professional	-engaged in peer-feedback, course community building and meticulous planning, motivated by deadlines and connects weekly updates to major works and professional interests	-enjoys learning from peers and the ubiquitous nature of online learning and was able to discover herself more in the program
Jose Exceptional & Critical Online Learner: Passionate about E-learning Industry and Educational Innovation	-engaged in readings and research early in week, referring to activity rubric, posting work and responding to peers.	-online learning involves less direct interaction with teacher, more student-centred and student-driven learning.
Lydia Science & Robotics Driven Learner: Widely Interested & Career motivated, seeking full-time public teaching position.	-closely following activity document, work daily in the evenings to complete tasks, and organize work with checklists and calendars	-view of online learning has greatly changed and that online learning takes the same, if not more effort than campus-based university

Emily Early-career Motivated Bilingual Teacher: Career motivated with limited professional experience, seeking full-time public teaching position	-follows assignment guide carefully, underline key points, search for essential tools, and apply knowledge into digital presentation	-allowed her to be more organized and in control of her own learning -felt learning was more continuous
Isabel Early-career Motivated Bilingual Teacher: Career motivated with limited professional experience, seeking full-time public teaching position	-follows assignment guide closely, reading and writing, as well as evaluating and monitoring her own work. Continuous planning skills required	-lacked collaborative knowledge network within the program -enjoyed how course activities built upon each other
Michael Early-career Digital Influencer in E-learning Sector: A Global Connectivist combining the fields of journalism, professional training and development	-begins each week early by planning, reading, and note taking using digital tool, as well as reading and responding to peer posts.	-enjoyed how assignments built upon each other and collaborating and learning from peers around the world
Ashley Late-Career & Continuously Updating Academic: Bridging performing arts, International Education and Digital Learning	-meticulously following course guide and activity rubrics, completing reading lists, find coherent argument, and develop in written work. Engage in course forums	-extremely positive experience and has embraced the mode of online learning, enjoying nature of asynchronous dialog in course forums and will continue to work in this area in her own professional context
Oliver Intrinsically motivated & self-directed learner: Creative Intellectual, flourishes in digital learning environments and engages in digital culture.	-follows course guidelines (rules) and reads texts and write texts, understanding what is asked and following his own research interests	-finds digital education still very traditional i.e. reading texts and writing texts. Strongly feels that video has an important and essential role in digital education
Silvia Immersive Learner and Global Professional: Interested in Educational Research and Development	-being disciplined & staying up-to-date on readings and assignments while being engaged in course forums and course community, sometimes pushing herself outside her comfort zone to contribute.	-enjoyed the semester module model, and the variety of course pedagogies and connecting learning across physical and virtual spaces and professional and academic contexts.

5.2 Experiences of Learning in Online HE through an LE analytical Lens

5.2.1 Influence of the Academic Curriculum on Student Experiences of Learning

The following section highlights the characteristics of the academic curriculum identified and accessed from program documentation and triangulated with online observation of program websites and openly available courses. As detailed in the introductory section, the graduate program is the principle, yet not exclusive, context and/or setting of an individual's participation in online graduate work. As such, the prescribed academic curriculum, which features central learning tasks and activities, will be the principle, but not exclusive domain of a students LE in combination with other contexts of learning, such as professional settings and personal interests. The current research coincides with authors such as Jackson (2016) and Ellis & Goodyear (2013) who characterize the academic curriculum in terms of an ecology for learning. In this sense, the academic curriculum acts as a principle resource for influencing student learning activity. Accordingly, Table 5.17 outlines an extensive list of prescribed learning activities identified across the three program sites. The table represents examples of teacher designed learning activities that fall into a variety of categories. The majority of learning activities were evidenced, in one form or another, across all three sites, and only a small number were not evidenced at all sites. One cause of variation is due to the fact that the UOC model relies on an entirely asynchronous model of structured and guided interaction, while both UIUC and U of E have opportunities for regular or semi-regular synchronous video and audio meetings. Likewise, U of E have a few idiosyncratic activities not found elsewhere, including some courses that operate entirely in open platforms, using Life-stream blogs as a central part of course activity and assessment, and experimenting with digital games and simulations in educational contexts.

Table 5.17 Cross Site Program Activities

Prescribed Learning Activity Example	Program
• Active & In-Depth Forum discussions and debates • Producing a variety of critical analyses of texts (i.e. Literature Review, Critical & Personal Reflections, S.W.A.T. Analysis etc.) • Producing Digital Essays • Active Knowledge making through Digital Presentations • Developing multimodal knowledge representations • Online course building in Moodle • Individual and Group Research Projects • Developing Case-Studies in the field of E-learning • Publishing Works on Class Blogs, Wikis and Open Platforms • Disseminating Academic Projects through Social Networks • Designing Visual Presentations and Data Visualizations (i.e. Infographics, Conceptual Maps, Pecha Kucha, Posters) • Developing Digital Learning Project Proposals	-Across all Programs (UOC, UIUC & U of E)

• Writing Open reflections about integrating course concepts/knowledge into professional practice • Using Open Collaborative authoring/writing spaces (PB wiki, google docs, blogs) • Joint Knowledge curation and building through a Wiki/Blog/Course site • Peer-review • Digital Learning Resources Development • Reflective exercises/activities on current and potential professional practice • Independent and Autonomous study and research activity • Viewing/Listening to Weekly Audio & Video introductions to readings, activities, and new themes/blocks • Individual and Group blogging: blog Discussion Leaders (posting relevant content) and ensuing blog discussion on current course topics/themes • Group exercises/activities in digital environments • Planning, running and experiencing digital learning activities/events • Assigned weekly readings • Digital resource development (OER's, Online courses, and digital learning assignments) • Exploring and analyzing a range of digital learning environments (exchange of ideas and resources using social media and networks) • Reflective writing • Dyadic supervision meetings and work review (dissertation project) • Engaging in Twitter tutorials and chats • Peer review and Peer feedback exercises & activities • Guided reading • Self-directed navigation and exploration (on the web) • Receiving Tutor/Teacher formative feedback • Collaborative learning activities • Supervisor/student progress guidance and review • Viewing Video tutorials • Communicating and Collaborating through Social Software such as Skype, Google Chat, and Collaborate	
• Following program designed MOOC's • Moderated small and large group, in-depth (synchronous) discussion through video and text. (tutorials, seminars, group discussion etc.) • Structured talks/lectures	UIUC, U of E
• Several classes taught in an Open Access Format (WordPress or other open spaces) (3 courses) i. Digital futures for learning, ii. Education and digital culture, iii.)The digital student experience • Creation of life-stream blog • Game play and simulation (i.e. building and socializing in Minecraft and World of Warcraft)	U of E

5.2.2 Learning Strategies in Meeting Academic Requirements

Table 5.18 outlines **a range of formal learning strategies and practices identified through thematic analysis** accessed through interview data. To clarify how the term learning strategy is used, the current study refers to Ellis & Goodyear (2013) who conceptualize a learning strategy in the context

of online education as what students do to translate an academic learning task into learning activity. It is evident that the strategies identified in the below Table 5.18 fall into categories of academic engagement and core academic literacies, metacognitive strategies (including planning and monitoring learning), social collaboration, self-directed and networked learning.

Table 5.18 Learning Strategies in Meeting Academic Requirements

Staying up-to-date on course tasks (course readings, activities and communication with course participants in forums, debates, and chats)	
Matt, John, Rebecca, Olivia, Jose, Emily, Lydia, Isabel, Michael, Silvia, Ashley, Oliver	*"I think the first thing I realized early on, is that i need to stay up to date. so, that would mean a few things, one I need to make sure that I need to do the readings. And I try and do those throughout the week, but it's good to get in, and do at least one, say on a Sunday. I also try to flip the week, so the start of my next week was on a Saturday or Sunday, so I wasn't behind". (Silvia)*
Building Information and data literacy skills relevant for course tasks/requirements (browsing, filtering, curating and managing information/knowledge)	
Matt, John, Rebecca, Olivia, Michael, Silvia, Ashley	*"I've come to really value the skill I've picked up doing a literature review, or even accessing relevant articles and following a thread, and just kind of being able to scope what's out there*"(Silvia) *"I have been thinking a lot about how to organize note taking, I've adapted Evernote. So i've been trying to use Evernote, and think about how to organize my thoughts, create outlines for the works (assignments). How to actually read an academic article and pick information out of that article? How do I warehouse that, so it's more accessible, so I can use it for knowledge artefacts that I am creating, at work, or in the future dissertation." (Matt)*
Identifying and building connections and patterns from previous courses to current course	
Lydia, Ashley, Matt, Michael	*I think I've tried to hang on to the information of things that I've learned in the previous modules and not just go, Okay, that's done now. Forget that. Moving on to the next one"* (Ashley)
Time management in organizing weekly course tasks (early in week and throughout course) using digital calendar tool: being motivated by deadlines and course calendar	
Matt, John, Olivia, Jose, Emily, Lydia, Isabel, Michael, Silvia, Ashley	*"I have it (course calendar) marked in 17 places, in google calendar, in the study in front of me, I have it (course calendar) marked on the calendar in the living room. And I've got my husband, he has it marked in his calendar as well, in case I miss something".* (Lydia)
Metacognitive and self-regulation strategies (thinking about your learning while planning, monitoring, and evaluating course work in relation to rubric/evaluation criteria/learning outcomes)	
Matt, John, Olivia, Jose, Lydia, Isabel, Ashley	*"Another piece that i like is how the course has created these activities that activate my metacognition. So I feel like I'm spending a lot of time, thinking about my thinking, or thinking about the activities that I am doing".* (Matt)
Note taking, organizing and transforming course materials	

Matt, John, Rebecca, Olivia, Jose, Emily, Lydia, Isabel, Michael, Silvia, Ashley, Oliver	*"I will access the relevant pages on university website and the the (course) documents. I use the Safari browser, very straightforward. I use Microsoft Word. I use the endnote app for referencing. I use the Google translator app for the words I don't know. I use Safari to access the university library (digital). I heavily use noteability which is my my basic standard app for reading because I can do highlights. I can do bookmarks, I can do full text searches. This is where all my university textbooks of the past six years are on. I will then use it to to write the assignment or to read the texts, highlight passages on my app, whatever, and send it, hand it in. And that's basically what I do".* (Oliver)
Student directed course community building: seeking help from peers and social support through forums, debates and course community	
Matt, John, Rebecca, Olivia, Emily, Lydia, Michael, Silvia, Ashley, Oliver	*"In the more informal community that we have, for my immediate peers in our immediate doctoral programs, I feel like we're we're talking about the things that we want to talk about, as opposed to what the instructor wants to talk".* (Olivia)
Connecting micro-scale course tasks with macro-scale course tasks (weekly posts with final project)	
Matt, John, Rebecca, Olivia, Emily, Lydia, Isabel, Michael, Silvia	I'd write my weekly updates based on what I was finding and then i would also use their research to write the work (assignment), as well. I was kind of doing double duty, I was being more efficient about what I was actually doing. So it wasn't two separate projects, it was one single project. So that's basically how I learned, or conditioned myself to sort of shape all of this to be more efficient about it how I am going about learning" (Matt)
Engaging in academic/professional twitter and social network engagement	
Jose, Michael, Silvia, Ashley, Oliver	*"Twitter I tend to use much more for academic work in that sense. I didn't originally, but I do now. One of the things I'm particularly interested in is the use of the flipped classroom. Let's go and stick flipped classroom in Twitter and see what comes up and I literally just went, follow, follow, follow, follow, follow and I use Twitter in a much more academic way".* (Ashley)
Engaging with and learning from peer knowledge works through peer-review and peer-feedback activities	
Matt, John, Rebecca, Olivia, Jose, Emily, Michael, Silvia, Ashley, Oliver	*"Without question peer collaboration supported my learning. In many cases, the contribution of my peers with greater knowledge than myself who worked in groups together"*. (Jose)
Interest driven readings, inquiry & research activities	
Matt, John, Rebecca, Olivia, Jose, Michael, Silvia, Oliver	*"It's all interest driven, so, I mean, it definitely relates to the courses topic which is assessment for learning, but you know, there's people in the class, that are doing stuff about rubrics, well, that ship has sailed. Thank god the course isn't asking me to go do research on rubrics because, I'm not interested in Rubrics anymore, but I am interested in researching social learning analytics, so that's what I'm researching".* (Matt)

5.2.3 Complementary Activities with an informal focus

Outside of the academic assessment structure of each graduate program, a range of complementary informal activities that could support formal learning were identified. When participants reflected about their experience studying online, a range of activities were discussed that

could be categorized with more of an informal and self-directed focus. Here, one of the biggest challenges of researching boundary crossing learning is identifying where the boundary is by disentangling formal from informal learning along a continuum. The themes in this section have been identified with a more informal focus for their self-directed nature, and distance from an assessment structure or in response to a required learning task. Likewise, digital media offers an abundance of opportunity to connect informal practices with formal learning activities, including media production and interest-driven inquiry. The below Table 5.19 highlights salient themes identified in the interviews.

Table 5.19 Complementary Activities with an Informal Focus

Using social networks to engage with course themes once formal course has finished (i.e. strategic engagement with Twitter, Facebook, YouTube for academic/professional purposes)	
Rebecca, Olivia, Jose, Emily, Lydia, Michael, Ashley, Oliver, Matt	*"Have you found ways to continue learning about a topic or subject after the course has finished? Yeah, and that's where Twitter comes into play again, because in one of the early courses. I was very interested to look at Jose Carless, he's learning outcomes, and how it should be tied to assessment and I follow him on Twitter and he'll be writing a paper or he'll be going to a conference. And then I can click on the link. Neil Selwyn comes up all the time, you know, those kind of things. (Ashley)* *"So I'll follow people on Twitter for example, who I know will be posting things that I am interested in." Matt*
Connecting interest driven media engagement into academic or professional practice	
Matt, John, Rebecca, Jose, Michael, Silvia, Ashley, Oliver	*"I probably listen to around 10 hours of podcasts per week." (Michael)*
Engaging in interest driven new media production (audio/video, blogging)	
John, Michael, Silvia, Ashley, Oliver	*"I started a podcast outside work because I heard someone on a podcast say it was quite easy, and I looked up what 's the best microphone and how to you get good sound, how do you edit it. So I was always quite self-directed if I'm interested in learning something." (Michael)*
Searching for training/employment opportunities online (LinkedIn, Online communities of practice)	
Olivia, Jose, Emily, Lydia, Isabel, Michael, Silvia, Ashley, Oliver	*"You are also in Facebook groups to help look for employment and prepare for the public teachers exam, correct? (Researcher)* *Yes, I am in a group in my region, in fact I am in many different Facebook groups to prepare for the public exam." (Emily)*
Self directed & Interest Driven inquiry outside of course requirements	

Matt, John, Rebecca, Olivia, Jose, Lydia, Michael, Silvia, Oliver	*"I'm not much with social media actually, but i do i would say that I do spend time on YouTube. I'll look up YouTube video lessons for various guitar songs and guitar techniques and I'm also a potter I do pottery. I'll check out various websites and check out YouTube as well for online lessons and I think that ties in (to formal study) because I'm always finding ideas for presentation I'm always thinking about blogging". (John)*

In order to understand how strategies and practices were identified along a continuum of formal to informal **it is important to consider that formal strategies refer to** activities that are more directly tied to assessments directly linked to the academic curriculum and organizational structure of the program. In this sense, the influence of the faculty and program staff in their design of learning tasks is evident on student activity. In contrast**, those strategies identified with more of an informal focus** are characterized as interest driven, and likely part of everyday practices and self-directed routines. Likewise, these strategies may be connected to other contexts of learning, such as professional contexts or networked communities and interest groups. Although informal learning may account for a range of learning from self-directed to incidental, the experiences identified here often account for highly intentional and self-directed strategies that have been used to support academic learning. Although informal strategies may be indirectly linked to the curriculum and assessment structures, they are generally less proximal than strategies identified with a more formal emphasis.

5.2.4 Peer Collaboration and Social Support Structure

Student directed community building emerged as a significant strategy and component of student's learning ecologies. The graduate program learning community is shaped through intentionally designed group and collaborative tasks & projects that rely on using a variety of communication platforms (WhatsApp, Hangouts, Email, Messenger) where students seek help and social support from peers, often discussing struggles or problems they are facing in meeting the course requirements, sharing work in order to give or receive feedback or simply learn from peers informally, and provide moral support as an outlet to discuss challenges they've experienced in completing course requirements. Course community building also occurs through student initiated informal study groups, side chats, and text groups (i.e. Facebook groups or WhatsApp) where doubts are cast and resolved, and where learning resources and ideas are shared. Student directed community building can also take form in formal course forums and debate spaces, however most participants reported interacting informally outside of these spaces, often with 'like-minded' individuals. One student expressed "I think that's such an important piece of learning, being part of a community that's learning together". Study participants

also reported a need to develop peer-mentorship models in order to support those beginning the program navigate an often overwhelming process of initiating central learning activities and practices.

5.2.4.1 Advantages and Disadvantages of Online Learning through Peer Collaboration

Students reported both positive and negative experiences with peer collaboration and social support. In Table 5.20 below, a range of examples can be seen of positive experiences that were reported, including; finding motivation and accountability in program peer group through peer feedback and peer review activities; during participation in live synchronous sessions where social presence could be sensed and opportunity for informal meeting and interaction could unfold; in informal and student directed side chats through platforms such as Facebook groups, WhatsApp, Skype, and Discord; and engaging in peer mentoring. It is clear that advantages fall into categories of being motivated by peers, help seeking and mentoring, community building and communicating using a variety of messaging platforms.

Finding Motivation and accountability in program peer group	
Matt, John, Rebecca, Olivia, Emily, Lydia, Michael, Silvia, Ashley, Oliver	"I think, inherently that (forming social relationships) increases accountability. And I think when you have that increased accountability, that helps the external motivation. I think that's such an important piece of learning is being part of a community that's learning together. I think that that's everything. That's almost what you're paying for."(Matt)
Building informal side-chats and study groups to support learning activity and course assignments	
Matt, John, Rebecca, Olivia, Jose, Emily, Lydia, Michael, Silvia, Ashley, Oliver	"We'll share assignments. Generally speaking, not everyone feels comfortable with it, and I don't think everyone feels comfortable doing it, but I come from a journalism background. Working with an editor background, and I have the belief that nothing is ever not going to be improved by having someone else look at it. And to have them give you ideas, so I always share my assignments."(Michael) "There's normally a side chat. In Social research methods the side chat was in Facebook messenger group, and Global context the texting was in Skype. And now, in fact, there's a whole chat about a lot of the different courses in a program called Discord"(Ashley)
Engaging in peer mentoring supports learning and builds sense of community	
Olivia, Oliver, Matt, John, Rebecca, Ashley, Silvia, Michael	"We all talked about becoming mentors. We all decided that we want to start a mentor program as doctoral students to pass down what we know within the system, and also start creating more video tutorials and more written works that are comprehensive about how to use the CG scholar." (John)
Positive impact of student directed community building	
Oliver, Lydia, Jose, Michael, Silvia, Emily	*"Did you feel part of a learning community?" (Researcher* *"Yes, yes, yes," (Emily)* *"Do you think if was student led, or program led?" (Researcher)* *"I see it a more led by students, however it's true that the UOC was always interested that we interacted and contacted each other through the tools and forums they proposed."(Emily)*
Connecting with 'like minded' colleagues through common research and personal interests	
Oliver, Lydia, Jose, Michael, Silvia, Matt, Olivia, John, Rebecca	*"Using WhatsApp, we have a lot of groups, by class, and for the master as a whole. We've also been helping each other, resolving doubts or problems. Helping those out who you shared more 'feeling' with, exchanging works in order to see where you are at in comparison." (Lydia)*

Table 5.20 Advantages of Peer Collaboration in Online Higher Education

Negative conceptions of learning through peer collaboration were also reported when students sensed unequal workload between participants, a desire or need for more social collaboration, a lack of

continuity in forum participation, as well as being demotivated by lack of peer response to works and critical engagement and reflection in forum contributions. These themes are presented in Table 5.21 below.

Table 5.21 Disadvantages of Peer Collaboration in Online Higher Education

Disparity between contribution of participants	
Jose, Ashley, Olivia, John, Rebecca, Isabel, Matt,	*"In the cases where my colleagues were behind in their work, when we couldn't organize our schedules, you had to put forth an even greater effort, in order to combine their contribution as well. Contact them through different channels, try to convince them to complete their tasks, show some leadership by trying to lead the group, etc." (Jose)* *"Some students are more engaged than others. Some students are more committed, I guess, to the work than others, you can tell." (Rebecca)*
Online forum engagement is not continuous or conducive to 'real dialogue'	
Matt, Olivia, Isabel, Silvia,	*"I don't feel through the course communities that I've established that very well, again, because people post and move on... there is not that dialogue. We're fulfilling a requirement. And again, I'm equally guilty. Sometimes I will try to get a dialogue started. But when nobody checked, then I move on…I'm not going to force the situation." (Matt)*
Demotivated by lack of peer response to work	
Matt, Olivia, John, Ashley	*"Every student puts an update into the scholar environment, and I feel more motivated when people respond to my updates, so when people don't respond to my updates, then I start to question, hum, is my update not interesting, are people not interested in the same things that I am interested in, have I taken this topic in a direction that I shouldn't be taking it in. I start to reflect on why people aren't responding to this particular update" (Matt)*
Needing more 'expert' and 'impactful' feedback on academic work beyond peer-feedback	
Matt, Olivia, Isabel, Rebecca	*I know that the professors have this idea that you don't need an expert to provide feedback. I think that's true, mostly. I think you need a certain level of expertise in order to give meaningful feedback that's going to deepen the learners learning experience, if someone doesn't know anything about the topic, than there's really not a whole lot that they can give you. (Matt)*
Sense of isolation	

Matt, Ashley, Silvia, Isabel, Jose, Oliver	*"Yes there are spaces, forums, where you can consult, or ask, 'look, I have found this', however the participation of colleagues is in an individual line, they don't 'have' to share, and 'it's me only, and that's it, I'll do what they ask of me, and that's it'. This 'knowledge network', I have yet to find it". (Isabel)* *"Because you feel kind of alone. You're not only physically detached, being among students. But also you feel socially detached because you don't touch it, don't see, you don't meet and this creates a sort of anxiety or hopelessness" (Oliver)*
	Online social/academic engagement is linked to assessment structure
Olivia, Matt, Ashley, Isabel, Jose,	*"I'll be honest, we are just all focused on what we need to get done. And so even though we're collaborating in quotes, by commenting on people's stuff, we are really not collaborating. Again, it's a checkmark situation, and people are just trying to get through things."(Olivia)*

5.2.5 Learning Resources to Support Academic Learning

In order to complete the course tasks required of them, learners must engage with learning resources (artefacts, tools, technologies etc.). Given the disciplinary nature of the graduate program in Education, Digital Media and Technology, a common practice of browsing, evaluating and benchmarking essential digital tools and technologies to support learning activities was required. Beyond using those technologies prescribed or recommended by the program, students also must navigate and explore other technologies such as blogs, wikis, virtual worlds, familiar (Twitter) and unfamiliar (Discord) social networks, visual presentation (i.e. Prezi) tools as well as synchronous text and video chat. Engagement with these technologies forms an important component of student's experience of learning as they develop core academic skills and practices and complete course requirements in digital environments using digital tools. Students also reported using their personal digital devices as their central work space, including device hardware, software and operating systems as well as device storage structures and connectivity. As one student noted regarded technology use in their studies, confidence was gained throughout the program.

> *"I think the other really important part of this course is it made me way less concerned about the technology. I'm way more confident in using the technology now, and just looking at setting up some podcasts" (Ashley).*

Search engines and knowledge databases emerged as essential technologies, as did text based editing tools, planning and note taking tools (Evernote, Paperpal, Google Tasks etc.), collaboration and

communication tools, as well as cloud based tools (Google docs, Drop Box, etc.). Below, Table 5.22 presents cross case thematic results which emerged from the interview data.

Table 5.22 Identified Resources used to Support Academic Learning (Tools & Technologies & Content).

Organizing Themes	Basic Themes
Digital Learning Resources (Content)	Course Curriculum (course handbooks, syllabus, assignment guides, rubrics etc.)
	Course Content/Resources Facilitated by the Program (Reading/Viewing Lists)
	Further sources sought out by student on open web
	Open Educational Resources
	Content accessed on Social Media and Personal Blogs + Wikis (YouTube, Facebook etc.)
Digital Tools and Technologies	Collaboration and Communication Tools (email, WhatsApp, chat, Skype, hangout, etc.)
	Social Networks (Twitter, Facebook, Instagram)
	Knowledge Organization and Sharing Tools (Mendeley, Drop box)
	Virtual Learning Environment (Scholar, Moodle, Virtual classroom etc. including forums, blogs, and publishing platforms)
	Cloud Based Tools (Google suite, drop box, etc.)
	Text Based Editing Tools (word doc, open office etc.)
	Data Analysis Tools (SPSS, Excel etc.)
	Scientific databases (university digital library, google scholar, dialnet, etc.)
	Search Engines (google, yahoo etc.)
	Multimedia + Presentation Tools (Video, Audio & Presentation Editing and sharing tools)
	Planning and Note Taking Tools (Evernote, Paperpal, Word Docs, Google Calendar)
Personal Digital Device(s)	Device Workspace (Operating System)
	Device Storage Structure (Files, Folders, Drives)
	Device Connectivity
Offline Learning Resources/Artefacts	Printed course readings/materials/books(reading/highlighting) books
	Offline Assignment Drafting/Planning (Paper notes)
	Offline Note taking and planning (agenda/calendar/paper/pen)

5.3 Salient Factors Impacting Student Experiences of Learning

5.3.1 Professional and Academic Trajectories

As recounted in their current experiences in online HE, students draw upon past life experiences that have been developed throughout their personal, professional and academic trajectories. The current sections present themes identified through interview data in triangulation with online observation and documentation, in particular from available LinkedIn accounts. Identified experiences

can impact levels of readiness for study, including digital competency, particularly in relation to whether students have previous experience studying in online HE (as 1/3 of the population in this case-study did). Because of the nature of online graduate programs in this study, all students have both previous HE academic experiences (reflecting both positive and negative experiences), and past professional experiences across a variety of fields (education, journalism, business, publishing or the performing arts). The below Table 5.23 offers a broad view of the variety of trajectories that may be present across a particular graduate program.

Table 5.23 Cross Case Profile of Career and Academic Trajectory

ID/Uni	Academic Trajectory	Professional Trajectory
Jose (UOC)	-Master in Education Innovation and Research (distance mode) -experience studying English in the U.K. -more than 1500 hours of complementary online training	-4 years working in e-learning consulting company (2014-2018)
Lydia (UOC)	-Undergrad in Chemistry Post-graduate certificate in elementary education	-Beginning career as a public education teacher working short term contracts -Working part time in Educational Robotics
Emily (UOC)	-Undergraduate degree in primary education 2012-2016	-1 year experience of part time supply teacher work -early career
Isabel (UOC)	-Undergraduate degree in primary education 2010-2014	-2 years experience working as research assistant in university setting (2018-2018) -1 year experience working in USA
Matt (UIUC)	-Undergraduate degree in literature (1994-1998) -Master of Fine Arts (2001-2005)	-12 years in university settings: progressively moving from adjunct professor into academic leadership roles including Acting Vice-President of Academic Affairs. (2006-present) -Published professional writer (since 2001)
Rebecca (UIUC)	-Undergraduate degree in literature (1994-1998) -Master of Arts in ESL teaching (1998-2000) -Master of BA (Blended program) 2006-2008	-8 years experience working in language education and faculty development at a public higher ed. institute (2011-present)
John (UIUC)	-B.A. Journalism (1995-98) -M.B.A in Marketing (2011-12)	-Entrepreneur (15 years) photography (2000-2015) -Online instructor at arts institute (2012-present) -Journalist in Newspaper industry
Olivia (UIUC)	-M.Ed. in Curriculum & Instruction 2003-04 -M.Ed. in Human Resource Education 2001-03 -Began other PhD program (2 years)	-Social learning consultant (5 years) (2013-present) -10 years of H.R. consulting experience with emerging technologies (2004-2014)

Michael (U of E)	-Undergraduate degree in journalism (2006-2010)	-6 years experience with E-learning consultancy (2013-present) -5 years experience in journalism and creative content development (2008-2013)
Ashley (U of E)	-Certificate in Stage Management -Various non-formal training experiences through professional practice	-15+ years experience in Academic settings as head of learning/teaching: Lecturer in Stage Management (2000-2015) -entrepreneur/consultant (2015-present)
Oliver (U of E)	-Bachelor of Arts in primary education (2012-2016)	-10 years working in production for T.V. (2000-2010_
Silvia (U of E)	-Undergrad in Linguistics (1990-1996) -Two other attempted Masters degree (2000's)	-Director of product and development for Educational Publishing Company 2016-2018 Educational Publishing (2008-2015) English teacher (2003)

5.3.2 Learner Attributes

As detailed in the introduction, learner attributes refer to a range of personal traits influenced by previous life trajectories, level of readiness, current understandings, and capabilities and knowledge which individuals bring to a learning experience. In this regard, learner attributes emerged as a salient factor in the thematic analysis as a method of categorizing the personal idiosyncrasies, motivations, and identities of each individual learner. Learner attribute sub-themes identified within the thematic analysis included intentions, motivations and interests for studying online, as well as expressions of student agency and learner identity (i.e. lifelong learner, passionate about innovation, etc.) and finally the affective dimension which can be both positive and negative in experience. For example, students may be thrilled to be engaged, or experiencing anxiety, stress and hopelessness in attempting to meet course requirements. It is clear that as students enter graduate programs with widely varying professional and academic trajectories, they also enter with a broad range of learner attributes. Although these are not an exhaustive representation of all possible learner attributes, they represent what emerged in the data analysis from interviews. As such, Table 5.24 highlights the key characteristics of learner attributes which emerged from the interview data.

Table 5.24 Identified Learner Attributes

Intentions/Motivations/Interests for Studying Online	-Career Motivated (early, mid and late career)	"Part of it is about the credential for my profession" (Matt) "The number one most obvious and most significant change would be rank advancement". (Rebecca)

	-Curiosity and Passion for Education Innovation and New Technologies	"I am passionate about innovation, and this form of education called my attention, and that is why I am completing it".(Jose)
	-Interest in Studying online to understand perspective of the online learner	"I spoke to my wife, and she was like, if you are going to do a degree in digital education you should do it online. you should be the one who is kind of flying the flag of online learning" (Michael) "I wanted to be in the shoes of the people that I designed for, you know, I wanted to experience it." (Olivia)
Expression of student agency, and learner identity	-Feeling in charge of own learning	"Graduate courses that I took before were much more structured. And so now I am, I feel much more in charge of my learning."(John)
	-Identify strong sense of student agency	"I feel like I have a lot of agency because I am choosing what I want to write about, self-directed learning and research, researching all of these topics that sort of stretch into my practice" (Matt)
Affective Dimension of Learning	-Feelings of anxiousness, hopelessness and doubt	"You feel socially detached because you don't touch it, don't see, you don't meet and this creates a sort of anxiety or hopelessness.". (Oliver)
	-Feeling energized and excited	"I am extremely excited. I'm extremely motivated. I just decided on my focus topic for my dissertation, and I can't wait to get started." (Rebecca)

5.3.3 Affordances and Barriers of Digital Learning Environments

The below Table 5.25 presents results from the thematic network analysis related to the affordances of digital learning environments. Among the most salient affordance was the role of interactive and recursive feedback through forums and web publishing opportunities, followed by connecting learning across contexts, and in particular professional contexts of work where students can link course concepts or new technical and methodological competencies into their professional practice. On balance, participants reflected on more affordances than barriers to online learning, indicating that they found their experiences in online learning beneficial and effective, even though they did acknowledge certain threats or challenges.

Table 5.25 Affordances of Digital Learning Environments

Interactive recursive feedback through forums and discussion boards

Jose, Matt, Olivia, John, Rebecca, Michael, Ashley, Silvia	*"Without a doubt they've influenced me and supported me. In certain cases, by contributing new knowledge (in forums and interactions), because they had certain knowledge that I didn't have."* (Jose) *"Getting feedback on my work is helpful. It's also motivating. It's motivating to know that someone's going to read your work and provide you feedback that helps keep me motivated to complete the works and do a good job."* (Matt)
Connecting learning across contexts	
Isabel, Jose, Matt, John, Rebecca, Olivia, Lydia, Michael, Ashley, Silvia, Oliver	*"I picked my classes I've studied based on their impact in my professional life. So I tend to take the subjects that I think are going to be useful for me in my work. So one of the ways that I then use them would be in client proposals, clients would want to know why we're making certain design decisions, what the theory is behind it, that kind of thing."*(Michael)
Activates and promotes **metacognitive learning**	
Matt, John, Isabel, Ashley, Lydia, Emily	*"Another piece that I like is how the course has created these activities that activate my metacognition. So I feel like I'm spending a lot of time thinking about my thinking, or thinking about the activities that I am doing."* (Matt)
Limitless access to digital resources	
Rebecca, Silvia, Ashley, Olivia, Oliver, Michael, Matt	*"One of the things I like about being an online learner, most of the content, almost all the content is accessible online. You then you have the library resources and things like that, being able to do research on my phone."(*Olivia)
Ubiquitous and flexible learning (ability to work independently from anywhere/anytime)	
Matt, Olivia, Silvia, Ashley, Lydia,	*"It's that I can work when and where I want to. It allows me to not waste time, and that I can organize myself. At home I have internet, but if I go to my mother's village, I don't have internet, so with foresight and planning, I can think which activities I need to do and download the material and readings for those moments."* (Lydia) *"And so I've got a son in preschool. There's pockets of time. So I might have a bigger chunk in the morning to actually get some stuff done. But other times, it's 10 minutes here, 20 minutes, half hour there. And sometimes, you know, usually researching things on my phone, uh…while my son is at the park, or the pool. So I'm multitasking."(*Olivia) *"I think the flexibility has been really great. I've been able to fit it in around my lifestyle, I would not be able to fit it in, in terms of mixing work and personal commitments."* (Silvia)
Developing organizational skills using new tools/technologies	
Emily, Lydia, Isabel, Silvia,	*"In this sense, I think I improved my ability to organize my learning. Before, for example, I never organized my tasks with a (digital) calendar, and now I always have my work posted in a calendar to see exactly what I have to do."(*Emily) *"When I started studying this time I bought a reference manager (paperpal) but it links to google docs, which is what I use. And, I have everything on there, it's organized in that, and it's really helped me because in previous years I've cried over my references."(*Silvia)

	Open and transparent learning processes
Ashley, John,	*"I actually found the transparency of the online program to be so much better. A lot of times, when you go to a traditional college setting like I did, with each teacher, the syllabus changes and the syllabus may not map the class."(*John)
	Learning through Multimodal Representations
Rebecca, John, Michael,	*"This notion of multimodal learning and video, that's an area that I am getting more and more interested in and learning about and now starting to produce videos and produce audio files."* (Rebecca)

Below, in Table 5.26 results of the thematic network analysis are presented which identified barriers or threats to learning in digital environments. Some of these barriers relate to themes identified in the peer collaboration section of this chapter, related to learning designs which require intensive collaboration on certain academic tasks. In particular, some of the barriers identified include the role of emotions in learning, including the impact of anxiety, stress, fear of failure as well as lack of confidence and feelings of hopelessness. A barrier that affects most students is the reality of student engagement & interaction being highly linked to assessment, meaning that students often are not going above and beyond what is asked of them and what is linked to the assessment structure. This was likewise mentioned in terms of challenges with peer-feedback in terms of quality issues, reciprocity, and continuity of interaction throughout a course.

Table 5.26 Barriers of Digital Learning Environments

	Negative emotions in relation to learning (fear, anxiety, stress, lack of confidence and feelings of hopelessness)
Rebecca, Olivia, Silvia, Lydia, Ashley	*"When I first started, I was terrified to post anything in the discussion board. What if I don't sound very intelligent? What if I'm not as academic as the other people? I think, yeah, originally I was terrified."(*Ashley) *"The first class was very....I was very anxious, it was very intimidating, and it was very scary, because it was all new."* (Rebecca) *"I felt anxious that I would start something again and didn't finish."* (Silvia) *"Originally I was very reticent, with very little expectations."* (Lydia)
	Student engagement & interaction highly linked to assessment
Ashley, Olivia, Matt, Isabel,	*"But I do come a bit from the school of thought of, well, if it doesn't have a mark or it doesn't involve coming towards some assessment point, then why are we wasting time doing it?"* (Ashley) *"Because people post and move on... there is not that dialogue. It's more again, we're fulfilling a requirement."* (Olivia)

	Burnout over time commitment
Michael, Silvia,	*"So I kind of overdid it and I was doing Monday to Friday overnight I was doing a couple hours, all day Saturday. I just cancelled everything else in my life for that period of twelve weeks. Which is another reason that I've kind of reduced (study time), because I kind of overdid it last time."(*Michael)
	Challenges with peer feedback (quality issues, low engagement & reciprocity)
Olivia, Matt, Isabel, Silvia	*"I value peer feedback as well. But I would like to also hear from somebody who is an established scholar who's been publishing for many years to get their feedback. Until I hear from an established scholar to say, this is an excellent work you should publish…here are the five things you need to do to make this possible."* (Olivia) *"Like there were some people in some courses, who I really wanted to connect with to know more about, or to maybe make a connection and sort of , like I really wanted to hear more from them, but they kind of pop in, and then kind of disappear again, and I never had a way to just say, hey I really liked that, I'd like to hear more."* (Silvia)
	Lack of multimedia learning resources or updated resources
Jose, Isabel, Emily	*"They give an assignment, the majority of the resources, let's say 99.9%, is text (some have links to more text). There is no audiovisual, there is no audio. Therefore, this is what I was missing. The variety of resources and formats."* (Isabel) *"The materials from the Master are, the last article I read was from the year 2001 and 2006. I think in 15, or 12 years, a lot of things have happened in E-Learning."* (Jose)

5.4 Student Conceptions of Learning Across Contexts, Practices and Trajectories

The below sections detail student conceptions of their learning based on their lived experiences, analyzed predominately from the interview data. Particular attention is placed on learning across contexts with an emphasis on relating the professional domain with academic learning.

5.4.1 Professional Practice Impacting Academic Practices

A few transversal themes emerged as students reported the interplay between academic activities and professional practice. As reflected in Table 5.27 below, in relation to student motivations and intentions for studying in the graduate program, students often select their program as an extension of either their current professional context or future desired profession. Therefore, student professional practice is often directly related and aligned to themes within the academic program, selecting the program based on a 'resonance' with their own professional and personal interests, values and career motivations. As such, academic activities often become an extension of professional

practice, as articulated by one student who expressed “it's not clear where one ends and the other one begins” (Michael). Further, although academic programs introduce several new tools, technologies and practices to students, many participants report using similar tools and technologies across professional and academic contexts (i.e. video conferencing and messaging tools, and collaborative authoring spaces).

Table 5.27 Professional Practice Impacting Academic Practice

Past Professional Practice Impacting Current Academic Practice	
Michael, Matt, John, Ashley, Oliver, Jose, Silvia,	*“We’ll share assignments…I come from a journalism background and working with an editor background, and I have the belief that nothing is ever not going to be improved by having someone else look at it.” (*Michael) *“I process information through writing, so I really found that would be a benefit for me, you know, creating knowledge products and something that I was very familiar with doing, basically, you know I approach the world as a fiction writer and I sort of process the human condition through writing stories about sort of my existence.”* (Matt)
Professional practice involves online and remote collaborative and project based work	
Michael, Isabel, Matt, Silvia, Jose, Olivia, John,	*“My clients are scattered all over the world as are my peers in my program. So I think that's why it's very comfortable the program to me because that is how I work anyway.”* (Michael)
Professional practice requires professional updating in academic field	
Michael, Matt, John, Emily, Isabel, Olivia, Jose, Lydia	*“You have to update yourself constantly because there are new methodologies and you have to keep learning these methodologies to keep evolving.”* (Emily)
Professional context encouraged study in academic program	
Michael, Jose, Isabel, Rebecca	*“The program I'm doing now came as a result of a proposal by the company for which I'm working to train in e-learning.”* (Jose)

In several examples reported in the study, participation was encouraged or even paid for by institutions or business organizations intending to develop new capabilities among their workers. Likewise, many students are drawn to study programs in education and new technologies who have significant experience working in online and remote collaborative and project based contexts. This experience of working remotely with teams spread across geographic and cultural boundaries supports their adjustment to participating as an online graduate student with an emphasis on inquiry-driven,

social, collaborative and project based learning. Students also reported being motivated to engage in formal academic learning because their professional context requires professional updating in academic field.

A further engagement pattern between formal and informal learning included a tendency among students to apply their professional interests and experiences into course assignments and projects based on interest-driven research. For example, one case study participant from a Western background who was working in Asia recounted their "obsession" with understanding *"how to support students who come from China"* in order to *"support them in their learning when they come into a western style classroom" (Ashley).* This particular pattern of engagement exemplifies how professional practice can influence academic practice, which can in turn support further transformations in an individual's work context. Finally, as online education becomes an increasingly common phenomenon in higher education and professional development, many cases reported their intention to study online as a way to understand the perspective of the online student. This was particularly prevalent among those cases who are already working in the field of digital education who had never experienced studying online themselves. Again, there is a pattern of engagement where a practitioners' professional context impacts their engagement in the program and vice versa.

5.4.2 Academic Practice impacting Current Professional Practice

Table 5.28 below presents results related to how students connected learning from their academic activities to their professional contexts. Students reported intentionally connecting micro and macro-assignments (i.e. course project or dissertation) with professional practice. Likewise, study participants reported selecting courses based on the impact in their work life. Further, students commented on ways that they brought in themes from their studies to discuss with colleagues in their professional context, sometimes encouraging the use of OER's and newly discovered tools & technologies. Students also reported applying course concepts, underlying theories and valued perspectives into their work life. Students also reported taking independent study courses as a strategy to connect their academic activities more directly with their professional practice.

Table 5.28 Academic Practice Impacting Current Professional Practice

Selecting courses based on impact in professional practice

Matt, John, Rebecca, Olivia, Jose, Emily, Lydia, Isabel, Michael, Silvia, Ashley, Oliver	*"I chose learning analytics because I was increasingly involved in a platform development. So, I kind of took the course because it was something that I was already doing [at work] and I've kept doing that anyway, I've kept having conversations at work…it's just part of my role."(*Michael)
Professional practice increasingly grounded in academic research/concepts/perspectives	
Matt, John, Rebecca, Olivia, Jose, Isabel, Michael, Silvia, Ashley	*"One of the professional paths of this master, is actually what I am already doing professionally, so I've discovered things through the master which I have already been doing professionally, but at a deeper level. The master has given me the theoretical foundation to say 'my common sense was correct', however now I have the technical reasoning skills and scientific base for what I have already been doing."(*Isabel)
Intentionally connecting micro and macro course assignments (dissertation) with professional practice	
Matt, John, Rebecca, Olivia, Jose, Emily, Lydia, Michael, Silvia, Ashley	*"I mean, pretty much everything I research or write about, I tried to have it be something that I can turn around and either deliver to a client or adapt for clients to help me be more credible in my practice."* (Olivia) *"I think it's going to be dissertation looking at reporting and the platform that we've developed, so as well as giving me some data for my dissertation. It's also going to feed into the product development for the platform."* (Michael)
Discussing academic topics with colleagues in professional practice.	
Matt, Rebecca, Olivia, Jose, Isabel, Michael, Silvia, Ashley	*"And regards to motivation, my peer group at work, we spend a lot of time talking about a lot of this stuff, we'll talk about social learning analytics…and we'll have informal conversations at lunch where we are talking about it."* (Matt)

5.4.3 Impact of Online Learning Experiences Across a Continuum of Contexts and Practices.

Table 5.29 outlines the impact of online learning across contexts and practices, presented around 4 organizing themes. As the particular context of online graduate program under study often caters to early or mid-career professionals, some participants demonstrate extensive professional and academic experience.

Table 5.29 Impact of Online Learning Across Contexts

Organizing Themes	Basic Themes	Student quotes

Developing valued academic practices and perspectives	**Developing core academic skills in information literacy and knowledge management**	*"I didn't have a lot of background or experience with academic writing. So I'm definitely improving in that.... my research skills have improved; I actually feel like my research skills need to improve even more before I get into the dissertation."* (Ashley) *"I feel, I've come to really value the skill I've picked up about doing a literature review, or even accessing relevant articles and following a thread, and just kind of being able to scope what's out there."* (Silvia)
	Developing metacognitive learning strategies	*"Another piece that i like is how the course has created these activities that activate my metacognition. I'm spending a lot of time, thinking about my thinking, or thinking about the activities that I am doing."* (Matt)
	Critical reflection and engagement with how to improve digital learning environments	*"I feel like the overall concept of the tool is good, having used other social collaboration platforms, I tend to compare, then identify features that are missing. And so I do find that scholar is lacking some user experience, kind of usability features."* (Olivia) *"Another aspect would be if the program and LMS was a little better at helping people find each other who have similar interests."* (Matt)
Gaining confidence in disciplinary/academic practices	Entering program with anxieties, worries and being overwhelmed	*"Originally I was terrified. And I was like, I don't know whether to write anything down. So I felt a different kind of pressure. I guess than in a classroom."* (Ashley) *"I was very anxious, it was very intimidating and it was very scary, because it was all new."* (Rebecca)
	Developing confidence as program progresses	*"But we've got the guidelines, you got the rules, just follow them just like let's just let's just do as you're told. And this will give you the safety and the confidence to to develop your own approach."* (Oliver) *"And I think the other really important part of this course is it made me way less concerned about the technology. I'm way more confident in using the technology now, and just looking at setting up some podcasts."* (Ashley) *Online education opened my mind to new possibilities, at the beginning I was very closed, so for me it was a very large opening of the mind."* (Lydia)
Identity Development (Professional & Academic)	Identity change from professional/practitioner to researcher	*"First of all, I never would have thought of myself as a researcher, I've always been a practical person, I've always just put things into practice, and I will continue to do so. But this has influenced me in a big way into wanting to become a part of the research community."* (John)
Impact on Future professional practice and training needs	Impacting career advancement in current or new field	*"The most useful thing out of the degree will be getting my next job because now I am more qualified than I was."* (Michael) *"All the different things we're learning, it's just broadening my perspective and vision and it's helping me enter into different industries."* (Olivia)

	Identifying future training needs (i.e. doctoral degree, research skills, publishing opportunities, future online training) & Building awareness about future learning possibilities	*"My intention is to continue to look for training opportunities online."* (Emily) *"Maybe a doctorate, I'm not sure about that. But I'm not writing it off because I have just enjoyed the learning so much. I think no question about about it having an impact in some positive way personally and professionally."* (Ashley)

As students engage across a continuum of contexts and practices they also identified developing disciplinary practices, values, and perspectives in online learning and digital education. The curriculum attributes of each program have a central role in the development of these disciplinary practices, values and perspectives, based on the idiosyncrasies of each program, course and faculty. In particular, a dominant feature of each program is inquiry, problem and project based learning models that encourage learners to construct their own process of learning, to identify and explore educational problems, and discover resources, support and solutions for themselves. As such, students must develop core academic skills such as information management, critical engagement through academic writing with key conceptual and theoretical frameworks relevant in the field, inquiry-driven critical thinking, organization and planning, peer collaboration and help seeking as well as metacognitive practices such as planning, monitoring and evaluating one's own work.

Finally, students identified future learning needs and intentions as an outcome of their participation in the program. Students reflected clear intentions for career advancement in their current or new field. Many students expressed an openness to continuous learning, and identified specific training needs they may have in the future, for example improving academic research skills and gaining further academic publishing opportunities, as well as pursuing further graduate studies (i.e. doctoral studies). It was clear that student participation in the program impacted students' intentions for career advancement as well as future training needs.

5.5 Summary

Participant accounts of their lived experiences of learning in online HE were both personal, nuanced and highly contextualized. However, qualitative analysis of their experiences also demonstrates that there are many common areas of similarity and patterns of strategies and practices

to support learning across contexts. Emerging from the interview data, and complemented by program documentation and online observation, it was clear how the variety and variability of professional and academic trajectories impacts students experience of learning. Likewise, three central components of an individuals learning ecology (influenced by the ontological definition from the LE sensitizing model) in the context of online HE were analyzed through cross-case analysis. These central components include: (1.) learner activity, significantly, yet not exclusively influenced by the academic curriculum (2.) digital learning resources, including tools & technologies (both online and offline) as well as (digital & analog) content, and (3.) peer collaboration and social support. Key learning strategies were highlighted, understood as how students translate prescribed learning tasks into learning outcomes through learner activity. These include developing core academic skills through inquiry, problem and project based learning such as information management, critical engagement through academic writing with key conceptual and theoretical frameworks relevant in the field, critical thinking, organization and planning, peer collaboration and metacognitive practices (i.e. planning and evaluating one's own work).

Through their reflections about the advantages of peer collaboration in online learning, students showed that student-directed community building, help-seeking, and mentoring are effective strategies in supporting academic learning. Salient factors that impact student LE were also identified, including professional and academic trajectories, learner attributes, and the affordances and barriers of digital learning environments. Finally, student experiences of learning across contexts, practices and trajectories were discussed, highlighting the interplay between academic practice and the professional domain. This result is likely explained by the proximity of participant's professional trajectory to their field of graduate student (i.e. online learning and digital education). Moreover, the impact of online learning experiences was considered across a continuum of contexts and practices, including such factors as impacting career advancement in current or new field, developing confidence as a learner, and identity development.

Following, Chapter 6 will present the complementary quantitative findings that will then be integrated and interpreted through a mixed methods discussion in Chapter 7.

CHAPTER 6
QUANTITATIVE RESULTS

6.1 Introduction:

The aim of this chapter is to present a summary of findings from the quantitative strand which aimed to understand student experiences of learning in online higher education through a digital survey. The purpose of the survey, underpinned by an LE perspective, has been to examine student learning in and with the digital across a variety of practices and contexts—from formal to informal— in online higher education. Specifically, the survey was designed to collect information in relation to how students experience online learning across contexts, including; (1.) a range of online activities—from formal to informal, (2.) the use of digital resources—from digital tools and technologies to digital content), as well as (3.) a range of relationship interactions—from dyadic to networked forms of relationships-- used to support academic learning. Using a learning ecologies (LE) framework, the aim of the quantitative strand has been to analyze patterns and profiles of emergent learning practices in online higher education across multiple contexts and practices.

As is explained in the Research Methodology chapter (section 4.3), the purpose of quantitative data collection within this study is to provide a complementary role to the qualitative data, in line with the exploratory and interpretative nature of the research design. As such, a descriptive analysis is emphasized in this chapter. However, the results likewise allow for some advanced statistical procedures which will permit deeper insight through multivariate analysis into patterns of behaviours and profiles of learners based on an ecological perspective. The analysis has taken into consideration learner activities, learner resources, and relationship interactions used in support of academic learning. In this regard, the data analysis procedures presented in this chapter support the central research questions in the study, specifically in understanding: (i.) what digital learning practices and strategies students use to support academic learning across a continuum of contexts—from formal to informal; and (ii) what learner profiles can be detected among online HE students based on their experiences of learning across contexts.

Sections 6.1 to 6.6 will highlight the descriptive analysis while section 6.7 will detail a multivariate statistical analysis procedure (Principle Component Analysis, or PCA) in order to understand underlying patterns in student experiences and perspectives of online learning in higher education. Following, section 6.8 details an analysis procedure which employed a clustering technique to identify learner profiles based on the PCA solutions yielded. Cluster profiles reflect student perspectives on how

they engaged in online learning activities, relationship interactions and tools and technologies in support of formal academic learning across multiple contexts and practices.

6.2: Socio-Demographic Profile

This section will present the demographic profile that characterizes the population of students across three case sites within a specific graduate program in digital education or e-learning. Eight demographic categories were explored, including age, gender, employment status, work experience, study status, study level, percentage of program completed, and previous experience studying online. Across the three case sites, 178 students responded to the survey outlined in table 6.1.

Table 6.1 Student respondents across university sites

Academic Year 2017-18	Full Responses	Total of Population Sampled	Response Rate (%)
UOC	89	904	9.8%
UIUC	57	200	28.5%
U of E	32	132	24.2%
Total	178	1236	14%

Although there is a difference in response rate between the three institutions, the overall response rate was 14%, which is above the response rate of 10% aligned with similar online surveys completed at the UOC on student learning (Krull, 2018).

At a confidence level of 95%, the current research has been able to obtain statistically significant information for the student population across the three Masters' program at a maximum error margin of 7% (n=178, with p=q=50%).

Table 6.2 below presents results for age and previous work and online study experience. In relation to respondents age, the mean was 37 years with a standard deviation of 9.7 and with a range of 39 (youngest was 24 and the oldest was 63). This result is similar to online graduate students in the U.S. who's average age is 34 (Clinefelter et al. 2019). The average years of work experience is 14.1 with a standard deviation of 9.53. Here, the range is significant as some students will have 0 years of professional experience, while other students will bring upwards of 40 years of previous professional experience. The average number of years of previous experience of studying online is 2.6 years with a standard deviation of 3.04 with a range from 0 years to 15 years of previous experience on studying online. In this sense, a clearer picture emerges of the profile of an online graduate student where 66%

of the population will be between 27-47 years of age, with both broad professional experience as well as a range of previous experience studying online.

Table 6.2 Mean & Std. Deviation of Age and Previous Work/Online Study Experience

	n	Mean (Years)	Std. Deviation	Range
Age	178	37	9.7	29
Years of Previous Work Experience	178	14.1	9.53	40
Years of Previous Experience Studying Online	178	2.6	3.04	15

In table 6.3 below, we can see that gender was slightly biased toward female, representing 64.6% of the population, while males represented 35.4% of the population. Again, this is similar to the gender profile of learners in both U.S. and European contexts where gender is 60% female and 40% male (Owusu-Boampong & Holmberg, 2015) although slightly more biased toward female than in the US where gender of online graduate students is 54% female and 46% male (Clinefelter et al. 2019). In relation to employment status, 76.4 % of students were employed full-time, while another 16.8% were employed part-time. These results are similar to those reported by the National Centre for Education Statistics (NCES, 2019) who indicated that 71% of online graduate students are employed full time. Likewise, as is the case with the UOC where 80% of students who study have a job, according to UOC general information for the 2017-18 academic year (UOC, 2018). It is likewise similar to the data reported by the Distance Education in Europe Report, who report that 71% of students who are studying in a distance mode are employed full time (51%) and part time (19%) (Owusu-Boampong & Holmberg, 2015). As most represented an older profile, with a significant professional experience, a majority of students (78,7%) were studying part time. In terms of study level, 84.8% were studying at the Masters level and 15.2% of respondents were completing course work in their first year of a Doctoral program. In relation to program completion rate, responses were evenly distributed between those 25% completed or less, those between 25 & 50%, between 50 & 75%, 75-100% and those who have completed the program. Although the group with most responses were students who were between 75% and 100% completed (26.4%). In this sense, respondents reflect students across a range of study experience, from those in their first semester or year of the program, to those who have been studying over multiple years.

Table 6.3 Socio demographic profile

Demographic	Values	Frequency	Percentage
Gender	Female	115	64.6
	Male	63	35.4
Employment Status	Employed full-time	136	76.4
	Employed part-time	30	16.8
	Unemployed	12	6.7
Study Status	Full Time	38	21.3
	Part time	140	78.7
Study Level	Master	151	84.8
	Phd (1st year course work)	27	15.2
% of Program Completed	25% or less	36	20.2
	Between 25% and 50%	32	18.0
	Between 50% and 75%	23	12.9
	Between 75% and 100%	47	26.4
	Completed Degree	40	22.5

For the purposes of the current study, examining student learning across contexts, it is important to establish what the relation is between the current field of employment of online graduate students and the field of their academic program (in this case e-learning and online education). A majority of students work in a field related to their area of academic study, with a mean score of 4.05 on a five-point relatedness scale (1=not at all related and 5=very related) with a standard deviation of 1.062. In this regard, less than 3% of the population work in a field not at all related to the discipline of online education. In contrast, a majority of students study in a field related (29.2%) or very related (42.7%) to their professional practice, providing fertile opportunities for boundary crossing and connected forms of learning. This finding is significant as it relates to the central question of the study, which aims to understand how students link academic learning to other domains, with a particular focus on opportunities for connecting with the professional domain.

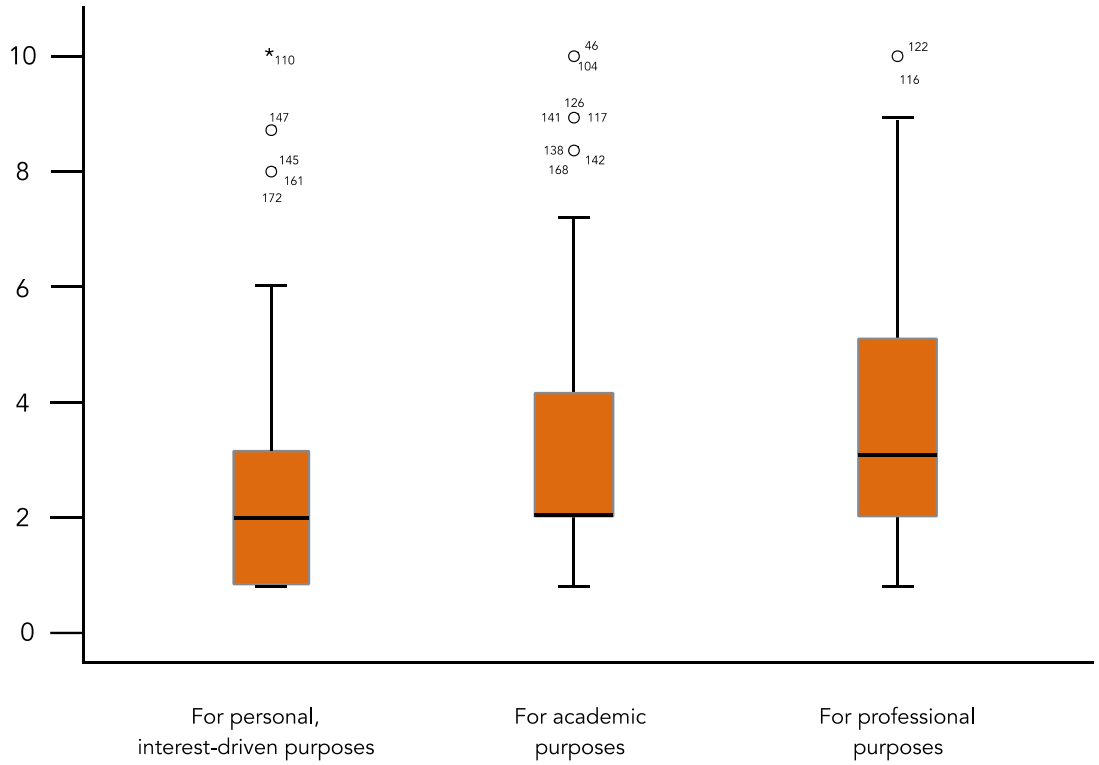
In comparison with several sources of socio-demographic data on online higher education students (i.e. NCES, 2019; Distance Education in Europe Report, 2014; Online College Students Report,

2019; and UOC Facts and Figures, 2018) several demographic traits of graduate students found in the survey, including gender, age, years of work experience and employment status, are accurately reflected in the population under study and can be considered representative.

6.2.1 Frequency of Time spent online

In responding to how many hours students spent online on a 'typical' working day across three distinct 'contexts', (i.e. for personal, academic and professional purposes) respondents spent an average of 2.4 hours online for personal purposes with a standard deviation of 1.86, 3.3 hours online for academic purposes with a standard deviation of 2.24 and 3.94 hours online for professional purposes. This trend was typical across the three dimensions of practice, spending more time online for professional practice and less time online for personal purposes. When taking into account the extreme values (i.e. outliers), participants spent an average of 6.9 hours online across personal, academic and professional practices on a 'typical' working day, relatively similar to the average American adult who spends 22.5 hours online a week, including 14.2 hours for professional purposes (Perrin & Kumar, 2019) as well the 24 hours online a week in the U.K., which is twice as long as 10 years ago (Ofcom, 2018). The survey results indicate that online HE students are spending a significant amount of time online each day across a range of formal and informal contexts, reflecting broader trends among working professionals who say the are "almost constantly" online (Perrin & Kumar, 2019). Implications for such an elevated frequency of online connectedness include the blurring of boundaries between digital cultures outside and digital practices within educational institutions (Greenhow & Lewin, 2016), including between the professional domain, academic practices, and everyday self-directed and interest driven activities. This result has implications for connected forms of learning where students apply knowledge and experience from one domain (i.e. academic) to another (i.e. professional). Below, Figure 6.1 presents a Box Plot graph which displays the distribution of data based on a five number summary. The hours are reflected along the y axis, while the x axis reflects the three domains of digital activity. The outliers (or extreme values) are also presented in the display. The interquartile range for personal purposes is between 1 and 3 hours, while for academic purposes it is between 2 and 4 hours, and for professional purposes between 2 and 5, reflecting a general tendency across the three domains.

Figure 6.1 Hours online on a typical day represented in a Box Plot

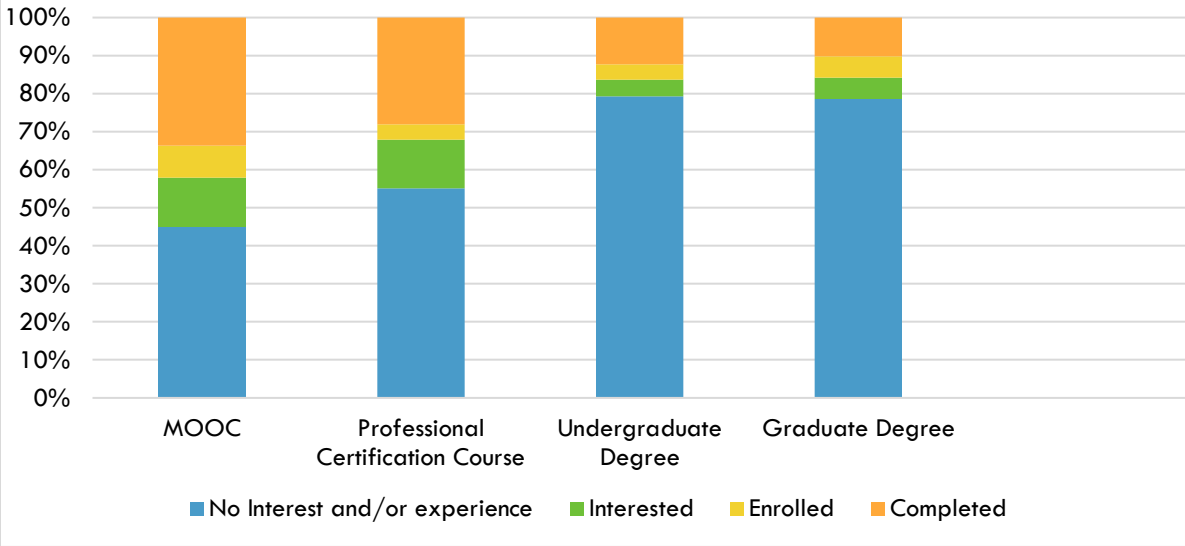


6.2.2 Previous Experience Studying Online

Given the demographic profile of students, with an average age of 37, working in a field closely related to the field of online education, with on average 14 years of previous work experience; the study was also interested in measuring what previous experience students had studying online across a range of scenarios. These included previous experiences completing undergraduate or graduate degrees, experiences with MOOCs, or a professional certification course. The experience of online learning most common was completing a MOOC (33.7%), followed by a professional certification course (28%). Further, a small perceptage (12.4%) of the population had completed an undergraduate degree while 10% of the population had previously completed a graduate degree through an online program, as can be seen in the Figure 6.2. These results indicate that the population of online graduate students tend to have previous experiences (and a small minority with significant experience) studying online across a range of educational contexts. Such experiences undoubtedly impact levels of student readiness to

engage in online graduate work, including current digital and academic competencies as well as knowledge around digital learning strategies and practices.

Figure 6.2 Previous experience studying online



6.2.3 Interest in Studying Online

In response to what motivated student interest in a fully online model of learning in HE, the sample means demonstrates that students were **most interested in combining academic study with professional and family life commitments** followed by the opportunity to build skills and competencies in the field of digital education, as seen in Table 6.4 below. These variables link with previously mentioned findings, that a **majority of students work full time in a field closely related to online education and digital learning**. Geographic flexibility and an innovative pedagogical model were also items that influenced students' interest in studying in a fully online mode. Further, concern for fully online study based on the reputation of the program itself, program affordability, and as a requirement or recommendation of a current employer were ranked with the lowest means on the scale. Results are, therefore, aligned with previous studies which demonstrate that nearly three-quarters (74%) of online college students (NCES, 2019) in an American context are motivated by career reasons for enrolling in a program, particularly at the graduate level (Clinefelter et al. 2019).

Table 6.4 Interest in Studying in a fully online model

	N	Mean	SD	Range

Professional & family life flexibility	178	4.79	0.486	
Opportunity to build skills in the field of digital education	178	4.42	0.8	4
Geographic flexibility	178	4.25	1.083	4
By innovative pedagogical model	178	3.88	1.077	4
Reputation of academic program itself	178	3.7	0.995	4
Affordability of the program	178	3.46	1.222	4
Requirement/recommendation of current employer	178	2.4	1.295	4

6.3 Digital Activities

6.3.1 Frequency of Everyday Digital Activities

The below Table 6.5 represents **the frequency of everyday digital activities across a range of contexts-from informal to organized informal**, derived and adapted from the LE sensitizing model and initial thematic analysis of qualitative data. This scale was designed to represent a range of phenomena in virtual contexts outside of formal academic requirements that students may engage in to support learning in academic contexts. The results demonstrate that the four most frequently engaged in activities are: (1.) browsing, search and filtering information and digital content, followed by (2.) communicating with peers and peer groups, (3.) browsing and viewing digital entertainment as well as (4.) interacting informally across personal social networks. The activities that students engage in least frequently include participating in online courses outside of current academic program, browsing and playing video games, and engaging in mentoring or coaching activities. The results demonstrate that there are commonalities between more formal practices and informal activities, including browsing and filtering digital content and communicating with peers. Again, these results point to a blurring of boundaries between formal and informal practices.

Table 6.5 Frequency of everyday digital activities

	N	Mean	SD	Range
Browsing, searching and filtering information and digital content.	178	4.74	0.56	4
Communicating with peers and peer groups (WhatsApp, groupme, messenger, discord etc.)	178	4.42	1.02	5
Browsing and viewing digital entertainment (i.e. netflix, hbo, social media).	178	4.41	0.88	5

Interacting informally across my Personal Social Networks	178	4.24	1.01	5
Sharing Content	178	3.78	1.05	5
Interacting more formally across my Professional Development Networks (LinkedIn, researchgate or academia.ed. etc).	178	2.77	1.33	5
Interacting with Online Interest Groups and Online Communities (i.e. Facebook groups, Meetup groups).	178	2.74	1.40	5
Browsing and playing video games.	178	2.13	1.37	5
Participating in Online Courses outside of my academic program.	178	2.12`	1.15	5
Engaging in Mentoring and/or Coaching and/or Volunteering.	178	2.01	1.30	5

6.3.2 Importance of Everyday Digital Activities in Supporting Academic Learning

The below Table 6.6, using the same survey items as Table 6.5, **explores the importance of everyday digital activities across a range of contexts-from informal to organized informal, in supporting academic learning.** This scale was derived and adapted from the LE sensitizing model developed during the research design phase of the study. Diverging slightly from the previous scale, students perceive that the 4 most important activities in supporting academic learning are (1.) browsing, searching, and filtering information and digital content, followed by (2.) sharing content, (3.) communicating with with peers and peer groups, and (4.) participating in Online courses outside of current academic program. The final four have a relatively close average mean score with interacting with online interests groups, engaging in mentoring or coaching and browsing and viewing digital entertainment as well as playing video games being perceived as the least important activities in supporting formal academic learning.

Table 6.6 Importance of Everyday Digital Activities in Supporting Academic Learning

	n	Mean	SD	Range
Browsing, searching and filtering information and digital content.	178	4.68	0.63	4
Sharing Content	178	3.89	1.16	5
Communicating with peers and peer groups	178	3.42	1.32	5
Participating in Online Courses outside of my academic program.	178	3.30	1.21	5
Interacting more formally across my Professional Development Networks	178	3.21	1.28	5
Interacting informally across my Personal Social Networks	178	3.08	1.31	5

Interacting with Online Interest Groups and Online Communities	178	3.06	1.31	5
Engaging in Mentoring and/or Coaching and/or Volunteering.	178	2.97	1.27	4
Browsing and viewing digital entertainment	178	2.73	1.37	4
Browsing and playing video games.	178	1.70	1.04	4

6.3.3 Frequency of Digital Practices in Supporting Academic Learning

The below Table 6.7 represents the **frequency of the sample for engaging in digital activities which support academic learning**. As is detailed in the literature review and explained in the methodology section, the survey instrument was influenced by the Digital Competence framework (Carretero, 2017) in relation to those formal skills or competencies most relevant for fully online academic learning. In this sense, the scale is attempting to measure the frequency of engagement in digital competency-based activities that are more related to formal learning in the context of an academic graduate program. As the results demonstrate, students engage most frequently in browsing, searching and evaluating information and digital content followed by managing information and digital content. This result emphasizes the essential role of inquiry driven learning with an emphasis on searching, evaluating and managing digital information and content, an essential skill required for knowledge work. Subsequently, communicating and sharing resources and content was likewise a frequent practice. This reflects the collaborative and social nature of online learning, particularly at the graduate level with a focus on inquiry and discussion. Sharing the range of middle values, the sample means were very close with a trio of related activities, including (a.) creatively using digital technologies by applying different tools and resources, (b.) collaborating in the co-creation of resources, information and knowledge, and (c.) integrating and elaborating digital content that others have created. At the bottom range of sample means, respondents placed activities which required potentially more creative engagement and technological problem solving skills than in other.

Table 6.7 Frequency of digital practices in supporting academic learning

	n	Mean	SD	Range
Browsing, searching and evaluating information and digital content.	178	4.61	.673	5
Managing information and digital content.	178	4.15	.929	5
Communicating and sharing resources and content.	178	4	1.02	5
Creatively using digital technologies by applying different tools and resources	178	3.46	1.15	5

Collaborating in the co-creation of resources, information and knowledge.	178	3.37	1.14	5
Integrating and elaborating digital content that others have created.	178	3.3	1.06	5
Creating and Developing your own digital content.	178	3.24	1.15	5
Protecting your personal data, privacy and devices	178	3.01	1.39	5
Identifying technological needs and solving technical problems.	178	2.96	1.27	5

6.4. Relationship Interactions

6.4.1 Student perceptions of online relationship interactions

When asked how important it is to their success as a student that they regularly interact with classmates (on a scale of 1-5 where 1=not at all important and 5=Very Important), the sample means demonstrates the importance of social support and peer interaction with a mean of 3.8 (SD 1.1). This finding is significant as it relates to the social dimension of learning online as one of the core units of analysis of the student and a central component of the LE construct.

The below Table 6.8 further explores the importance of online relationship interactions in supporting academic learning. The most important relationship interactions identified were obviously those directly linked with formal, institutional learning, including: (1.) interactions with teachers, (2.) small group interactions with university peers, and (3.) one-to-one interactions with university peers. From here, the responses move across a range of contexts, including to more informal relationships such as those with work colleagues, mentors, and peers outside of school and work. The least important relationship interactions in supporting academic learning as indicated by students were interactions across social networks and with online interest groups and communities of practice.

Table 6.8 Importance of online interactions in supporting academic learning

	N	Mean	SD	Range
Interactions with Teacher(s)	178	4.33	0.926	5
Small group interactions with university peers (i.e. study/research/class/project groups)	178	3.82	1.243	5
One-to-one interactions with university peers.	178	3.79	1.174	5
Interactions with Work Colleagues	178	3.75	1.203	5
Interactions with Mentors	178	3.36	1.25	5
Interactions with peers outside of school and work	178	3.11	1.312	5
Interactions across Professional Social Networks	178	3.01	1.292	5
Interactions across Personal Social Networks (friends, contacts, family)	178	2.94	1.337	5
Interactions within Online Interest groups and communities of practice	178	2.9	1.262	5

6.5 Digital Learning Resources

6.5.1 Digital Tools & Technologies

The below Table 6.9 explores the **importance of digital tools and technologies in supporting academic learning.** There is a very clear distribution of importance across the range of tools and technologies. Search engines, text editing and sharing tools, collaboration tools and knowledge organization and sharing tools constitute the most important tools in supporting learning according to the sample means. Conversely, data gathering and analysis tools and social networking systems constitute those tools viewed with less importance according to sample means. These results link directly to findings related to digital activities which support academic learning, particularly in browsing information and knowledge work, as well as the social dimension of learning through collaborative tools such as co-authoring technologies (i.e. google drive, dropbox etc.).

Table 6.9 Importance of Digital Tools & Technologies in Supporting Academic Learning

	N	Mean	SD	Range
Search Engines (i.e. google, bing etc.)	178	4.82	0.522	4
Text Editing and/or Sharing tools	178	4.71	0.594	4
Collaboration (synchronous & asynchronous) tools	178	4.50	0.811	5
Knowledge Organization and Sharing tools	178	4.29	1.096	5
Multimodal and Multimedia Editing and Sharing tools	178	4.19	1.046	5
Communication tools (i.e. whatsapp, skype, google hangout etc.)	178	4.13	1.184	5
Data Gathering and Analysis tools	178	3.64	1.200	5
Social Networking Systems	178	2.94	1.356	5

6.5.2 Digital Content

The below Table 6.10 explores **the importance of digital content in supporting academic learning.** Again, there is a very clear distribution of importance across the range of digital content adapted from the digital learning ecologies model. Among the variables most important was formal and institutionalized content facilitated by the academic program, content accessed in scientific knowledge databases, content accessed on institutional web sites as well as content accessed through open educational resources. In contrast, content perceived as less important was content sourced through personal websites, social media and through online games and virtual worlds. This finding demonstrates that learners use a wide range of courses of content as they engage in online education, giving insight into key strategies and practices for organizing learning in digital contexts.

Table 6.10 Importance of Digital Content in supporting academic learning

	N	Mean	SD	Range
Content facilitated by the academic program.	178	4.48	0.753	5
Content accessed in Scientific Knowledge Databases and Repositories	178	4.28	0.869	5
Content accessed on Institutional Websites	178	4.03	0.920	5
Open Educational Resources	178	3.85	1.047	5
Personal websites, Personal Blogs, and Wikis	178	3.35	1.165	5
Mass-media	178	3.29	1.231	5
Content accessed on Social Media	178	2.86	1.215	5
Online Games & Virtual Worlds	178	2.10	1.194	5

6.6 Impact of Digital Learning Experience

6.6.1 Student perceptions of impact of digital learning experience

The final survey dimension in Table 6.11 below represents **how students perceive the impact of their online learning experience with a particular emphasis on meta-learning capabilities**. The items of this survey dimension were derived from the affordances of e-learning ecologies framework by Cope & Kalantzis (2017). Here, the highest mean score from respondents' perceptions is related to how their online learning experience has prepared them for future learning and training needs as a lifelong learner. However, due to the proximity of mean scores and the limited difference between items, this survey dimension indicates that students viewed the impact of their experience in the program rather equally distributed across a range of meta-learning capabilities, including learning according to their own interests and needs, thinking and reflecting about how they learn, and learning from others through constructive feedback. Such results provide critical insight into the outcome of learning experiences for students in online HE programs at the graduate level. In particular, the results of this survey scale give insight into the impact of student learning in online graduate programs in relation to the traits of the academic curriculum, detailed in Chapter 5 (Section 5.1.1).

Table 6.11 Impact of Digital Learning Experience

	N	Mean	SD	Range
ability to be prepared for future learning and training needs as a lifelong learner	178	4.41	0.886	5
ability to learn according to your own interests and needs	178	4.34	0.920	5

ability to think and reflect about how you learn	178	4.30	0.972	5
ability to learn from others (i.e. teachers and/or peers) through constructive and formative feedback	178	4.29	0.916	5
ability to learn any time, any place	178	4.26	0.958	5
ability to learn by representing meanings through different modes	178	4.25	0.926	5
ability to learn through actively making new knowledge products or works	178	4.21	0.908	5
ability to learn through interacting and collaborating with your peers	178	4.20	0.976	5
ability to learn across the different contexts of your life	178	4.19	0.984	5

6.7. Principal Components Analysis:

As a procedure to make sense of the variables related to learner experiences in online higher education, a dimension reduction technique was performed, namely a Principal Component Analysis (PCA), to identify whether the different components of students experiences of online learning (sets of activities, relationships & resources) could be grouped into principal components. Components are linear combinations of variables which help reduce data complexity and support the analytical process (Guitert & al., 2018). The PCA procedure in the current study uses an orthogonal transformation to transform observations of possibly correlated variables into values of linearly uncorrelated (not directly observed) variables called principal components (Jolliffe, 2011). This transformation is such that the first principal component shows the largest possible variance, accounting for as much of the variability in the data set as possible, while each subsequent component has the highest variance possible-based on the constraint that it is orthogonal to the preceding components (Guitert & al., 2018). This procedure allows the identified high values of variable loadings to characterize the different components (Field, 2013). Variable loadings translate covariance/correlation between original variables and the components. As such, each component was characterized and defined based on an interpretation and synthesis of the associated variables. These analytical procedures have been repeated throughout each scale which was used across 4 global blocks.

The PCA was performed using SPSS version 23.00m and was completed across 4 global blocks in line with a LE sensitizing model, including: 1. digital practices to support academic learning across contexts, 2. online relationship interactions; and 3. digital (learning) resources; 4. impact of digital learning experience. Category 1 and 3 both used two scales which each warranted their own PCA. In total 6 PCA procedures were completed representing a total of 6 scales from the overall 4 global blocks which constituted the survey.

6.7.1 PCA Block 1a: Digital Practice Engagement to support Academic learning

The PCA for block 1 was related to the formal dimension of digital learning practices. After the removal of 1 variable, 8 items remained which provided an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy of 0.83 (minimum acceptability threshold is 0.6) and a significant Bartlett's test, $p < 0.001$), which means the sample was adequate for performing a PCA. The PCA resulted in 2 principal components with an Eigenvalue bigger than one, the rule of thumb for identifying the number of components. The two component solution accounted for 71.03% of the total variance explained, including (57.65%) for component 1 and (13.39%) for component 2.

The associated variables of the current PCA can be seen in the below Table 6.12, shown in the order of the highest loadings. Reliability analysis of the two component solution showed a Cronbach's α of 0.833 and 0.786 respectively. This confirms the finding that digital practices in online HE to be grouped into two distinct components, which have different activity structures and outcomes, yet are co-related throughout learning processes.

Table 6.12 PCA Block 1a. Frequency of Digital Practices in supporting Academic learning

Component 1	Component 2
Integrating and elaborating digital content that others have created. 0.827	Browsing, searching and evaluating information and digital content. 0.847
Creating and Developing your own digital content. 0.812	Managing information and digital content. 0.721
Creatively using digital technologies by applying different tools and resources 0.796	Communicating and sharing resources and content. 0.713
Identifying technological needs and solving technical problems. 0.792	
Collaborating in the co-creation of resources, information and knowledge. 0.708	
Component 1 = Creative and Collaborative Activities	**Component 2 = Browsing, Managing and Sharing Information/Content Activities**

Given that the loaded variables appear related to creative and collaborative practices using digital technology, the 1st component was named "Creative and Collaborative Activities". Given that the loaded variables appear related to lower order and everyday digital activities the 2nd component was named "browsing, managing and sharing information/content activities".

6.7.2 PCA Block 1b: Everyday Activities Across Contexts to Support Academic Learning:

The PCA for Block 1b was related to the more informal dimension of everyday digital practices and activities. After the removal of 3 variables, 7 items remained which provided an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy of 0.815 (minimum acceptability threshold is 0.6) and a significant Bartlett's test, $p < 0.001$), which means the sample was adequate for performing a PCA. The PCA resulted in 2 principal components with an Eigenvalue bigger than one, the rule of thumb for identifying number of components. The two component solution accounted for 65.25% of the total variance explained, including (47.67%) for component 1 and (17.54%) for component 2. This result identifies two clear groups of everyday digital practices which can characterize digital learning across contexts, relevant for understanding academic learning which unfolds across networked activities and contexts.

Each component was characterized and defined based on an interpretation and synthesis of the associated variables which can be seen in the below Table 6.13, shown in the order of the highest loadings. The two component solution showed a Cronbach's α of 0.808 and 0.703.

Table 6.13 PCA Block 1b. Importance of Everyday Digital Practices across contexts in supporting academic learning

Component 1	Component 2
Engaging in Mentoring and/or Coaching and/or Volunteering. 0.840	Browsing, searching and filtering digital content .799
Interacting more formally across my Professional Development Networks (LinkedIn, researchgate or academia.edu. etc). 0.832	Sharing Content .698
Interacting with Online Interest Groups and Online Communities (i.e. Facebook groups, Meet up groups). 0.798	Communicating with peers and peer groups (WhatsApp, messenger, discord etc.) 0.535
Communicating with peers and peer groups (WhatsApp, messenger, discord etc.) 0.545	Interacting informally across my Personal Social Networks. 0.532
Component 1 = Intentionally Networked Activities	**Component 2 = Everyday Browsing communicating and sharing activities**

Given that the loaded variables appear related to engaging in intentional activities across social groups and networks using digital technology, the 1st principal component was named "Intentionally Networked Activities". Given that the loaded variables that appear for component 2 are related to browsing, communication and sharing activities, the 2nd component was named "Everyday Browsing communicating and sharing activities".

6.7.3 PCA Block 2. Importance of Online Relationship interactions in supporting Academic Learning:

The PCA for Block 2 was related to digital relationship interactions in support of academic learning. From 9 items, an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy was 0.819 (minimum acceptability threshold is 0.6) and a significant Bartlett's test, $p < 0.001$), which means the sample was adequate for performing a PCA. The PCA resulted in 2 principal components with an Eigenvalue bigger than one, the rule of thumb for identifying number of components. The two component solution accounted for 66.07% of the total variance explained, including (52.19%) for PCA 1 and (13.88%) for PCA 2. Each component was characterized and defined based on an interpretation and synthesis of the associated variables which can be seen in the below Table 6.14, shown in the order of the highest loadings. The two component solution showed a Cronbach's α of 0.850 and 0.751.

Table 6.14 PCA Block 2. Importance of Online Relationship interactions in supporting Academic Learning

Component 1	Component 2
Interactions across Personal Social Networks (friends, contacts, family) 0.866	Interactions with Teacher(s) 0.779
Interactions with peers outside of school and work 0.792	Small group interactions with university peers (i.e. study/research/class/project groups) 0.777
Interactions across Professional Social Networks (professional associations, contacts, acquaintances) 0.782	One- to -one interactions with university peers. 0.737
Interactions within Online Interest groups and communities of practice (i.e. Facebook groups, meetups, interest group forums) 0.688	
Interactions with work colleagues 0.553	
Component 1 = Networked relationships across contexts	Component 2 = One-to-One and small group relationships in formal contexts

Given that the loaded variables appear related to socially networked interactions across a variety of contexts, the 1st component was named “Networked relationships across contexts”.

Given that the loaded variables appear related to dyadic and small group interactions in academic contexts, the 2nd component was named “One-to-One and Small Group relationships in formal contexts”. This demonstrates that findings within the relationships dimension can be reduced to two broad patterns; 1. Informal and networked interactions across contexts; and 2. dyadic and small group interactions in formal contexts. Accordingly, this finding contributes insight into how students experience learning across contexts, particulary from a socio-constructivist and connectivist perspective, linked to social theories of learning (Downes, 2010; Dron & Anderson, 2014).

6.7.4 PCA Block 3a. Importance of Digital Tools/Technologies in supporting Academic Learning

The PCA for Block 3 is divided into two categories related to digital resources that support academic learning, including; (i.) digital tools and technologies and (ii.) digital content.

The first category is characterized by digital tools and technologies and used 8 items. After removing 4 variables that didn’t load sufficiently, obtaining an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy of 0.699 and a significant Bartlett’s test, $p < 0.001$), which means the sample was adequate for performing a PCA. The PCA resulted in 1 principal component with an Eigenvalue bigger than one, the rule of thumb for identifying number of components. The one

component solution accounted for 57.96% of the total variance explained. The PCA solution component was characterized and defined based on an interpretation and synthesis of the associated variables which can be seen in the below Table 6.15, shown in the order of the highest loadings. The one component solution shows a Cronbach's α of 0.753.

Table 6.15 Block 3a. Importance of Digital Tools/Technologies in supporting Academic Learning

	Component 1
Multimodal and Multimedia Editing and Sharing tools	0.801
Social Networking Systems	0.788
Communication tools (i.e. whatsapp, skype, google hangout etc.)	0.764
Data Gathering and Analysis tools	0.687
Component 1 = Digital tools for Academic Production, Communication and Networking	

Given that, based on a dimension that initially had 8 items that became reduced into one component, and that the loaded variables appear related to social networking and communication systems that rely on multimedia and multimodal sharing tools, the 1 component solution in digital tools and technologies was therefore named "Digital tools for Academic Production, Communication and Networking". This finding demonstrates that essential tools for graduate work in online HE involve knowledge production tools with an important emphasis on social networking and communication.

6.7.5 PCA Block 3b. Importance of Digital Contents in supporting Academic Learning

The second category, 3b. is related to the importance of digital content used by students to support academic learning. The scale for digital content used 8 items that obtained an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy of 0.749 (minimum acceptability threshold is 0.6) and a significant Bartlett's test, $p < 0.001$), which means the sample was adequate for performing a PCA. The PCA resulted in 2 principal components with an Eigenvalue bigger than one, the rule of thumb for identifying number of components. The two component solution accounted for 56.10% of the total variance explained, including (37.12%) for PCA 1 and (18.98%) for PCA 2. The components were characterized and defined based on an interpretation and synthesis of the associated variables which can be seen in the below table 6.16, shown in the order of the highest loadings. The two component solution showed a Cronbach's α of 0.780 and 0.601, (minimum acceptability threshold is 0.6).

Table 6.16 PCA Block 3.b. Importance of Digital Content in supporting Academic Learning

Component 1	Component 2
Content accessed on Social Media (.820)	Content accessed in Scientific Knowledge Databases and Repositories (.832)
Personal websites, Personal Blogs, and Wikis (.776)	Content facilitated by the academic program (.775)
Online Games & Virtual Worlds (.719)	Content accessed on Institutional Websites (.566)
Mass Media (.677)	
Open Educational Resources (.600)	
Component 1 = Networked & Openly sourced Content	**Component 2 = Formal and Institutionally Sourced Content**

Given that the loaded variables for component 1 appear related to more openly sourced and socially networked forms of content, this component was named "Networked & Openly Sourced Content". Given that the loaded variables for component 2 appear related to more formalized and institutionally accessed content and knowledge, this component was named "Formal and Institutionally Sourced Content". This result provides insight into the importance of digital resources for learners across a range of contexts, highlighting that students do value resources that go beyond institutionally sourced material to more interest and inquiry driven sources of content.

6.7.6 PCA Block 4. Impact of online learning experience

The PCA for block 4 is related to student perceptions of the impact of the digital learning experience. This scale included 9 items that obtained an overall Kaiser-Meyer-Olkin (KMO) measure of sample adequacy of 0.928 (minimum acceptability threshold is 0.6) and a significant Bartlett's test, $p < 0.001$), which means the sample was adequate for performing a PCA. The PCA resulted in 1 principal component with an Eigenvalue bigger than one, the rule of thumb for identifying number of components. The one component solution accounted for 72.32% of the total variance explained. The rotated component solution provided factor loadings ranging from 0.810 to 0.890 as well as a Cronbach's α of 0.952. The component was characterized and defined based on an interpretation and synthesis of the associated variables which can be seen in the below table 6.17, shown in the order of the highest loadings.

Table 6.17 PCA Dimension 4: Impact of Online Learning Experience

Component 1
learn by representing meanings through different modes (0.890)
think and reflect about how you learn (0.881)
learn across the different contexts of your life (0.873)
learn from others through constructive and formative feedback (0.858)
ability to be prepared for future learning and training needs as a lifelong learner (0.848)
learn according to your own interests and needs (0.847)
learn through actively making new knowledge products or works (0.831)
learn any time, any place (0.813)
learn through interacting and collaborating with your peers (0.810)
Component 1 = Affordances of Online Learning

Given that the loaded variables are related to the action possibilities and potentialities of digital learning experiences; the component has been named "Affordances of online learning". This confirms the finding that experiences of formal online learning impact a wide range of learning capabilities and outcomes and that the affordances of digital learning cannot be grouped into reduced components.

6.7.7 Global PCA Results

The below table 6.18 provides a global view of the summarized results of the PCA across 4 dimensions yielding 10 overall components.

Table 6.18 Global PCA Results

Survey Block	Sub-dimensions of Survey Blocks	Component Solutions
Block 1. Digital Activity Practices across contexts	Block 1a. Frequency of Digital Competency Practices in supporting Academic learning	C1: Creative and Collaborative Activities C2: Browsing, Managing and Sharing Information/Content Activities
	Block 1b. Importance of Everyday Informal Digital Practices in supporting Academic learning	C3= Intentionally Networked Activities C4= Everyday Browsing communicating and sharing activities

Block 2. Relationship Interactions	Block 2. Importance of Online Relationship interactions in supporting Academic Learning	C5=Networked relationships across contexts C6= One-to-One and small group relationships in formal contexts
Block 3. Digital Learning Resources	Block 3a. Importance of Digital Tools/Technologies in supporting Academic Learning	C7= Digital Tools for Academic Production, Communication, and Networking
	Block 3.b. Importance of Digital Contents in supporting Academic Learning	C8= Networked & Openly Sourced Content C9= Formal and Institutionally sourced content
Block 4. Impact of Digital Learning Experience	Block 4. Impact of Digital Learning Experiences across contexts	C10= Affordances of Online Learning

6.8 Cluster Analysis

Components yielded from PCA were subsequently used for creating online learner profiles, using a clustering (segmentation) technique, on the basis of their perspectives and behaviors in regards to learner activities, relationship interactions, and resources used. This process was an attempt to differentiate among different groups based on student experiences of learning in online HE, underpinned by an LE framework. The cluster analysis was carried out using the standardized principal component scores resulting from the above mentioned PCA and the k-means partition method, following previous studies which have used similar analytical procedures (Kahan et al. 2017; Guitert et al., 2018; Poellhuber et al. 2019). Five component variables have been identified as suitable in order to respond to the purpose of the research, identifying and understanding student experience of learning across contexts from an LE perspective (detailed in Table 6.19). Specifically, components were identified from the central dimensions of the LE construct (i.e. digital activities, digital resources and relationship interactions). In the first block, two components which represent digital activities across contexts—from formal to informal--have been selected. Following, two components which represent digital resources across contexts (ie. Digital tools & technologies as well as networked and openly sourced content) have been selected. Finally, the networked relationships across contexts component was identified as suitable as it reflected a range of interactions in more informal settings, including in the professional domain. PCA variables identified in Table 6.19 which emphasis learning across contexts was therefore used for our final cluster procedure, with associated variable description.

Table 6.19 PCA Solutions used in Cluster Analysis

Block	PCA Solution	Variable Description
Digital Activities & Practices across contexts	Creative & Collaborative Activities	• Integrating and elaborating digital content that others have created. • Creating and Developing your own digital content. • Creatively using digital technologies by applying different tools and resources • Identifying technological needs and solving technical problems. • Collaborating in the co-creation of resources, information and knowledge.
	Intentionally Networking Activities	• Engaging in Mentoring and/or Coaching and/or Volunteering. • Interacting more formally across my Professional Development. • Interacting with Online Interest Groups and Online Communities • Communicating with peers and peer groups
Digital Learning Resources	Digital Tools for Academic Production, Communication, and Networking	• Multimodal and Multimedia Editing and Sharing tools. • Social Networking Systems • Communication tools (i.e. WhatsApp, skype, google hangout etc.) • Data Gathering and Analysis tools
	Networked and Openly Sourced Content	• Content accessed on Social Media • Personal websites, Personal Blogs, and Wikis • Online Games & Virtual World • Mass Media • Open Educational Resources
Relationship Interactions	Networked Relationships across contexts	• Interactions across Personal Social Networks (friends, contacts, family) • Interactions with peers outside of school and work • Interactions across Professional Social Networks (professional associations, contacts, acquaintances) • Interactions within Online Interest groups and communities of practice. • Interactions with work colleagues

In this regard, an ecological and connected view of online learning can be reflected in the clustering profiles created with an emphasis on digital activities, relationships and resources across contexts in supporting academic learning. These component variables have likewise been chosen as they represent many of the valued academic and disciplinary practices which are encouraged through inquiry driven, student-centred, and connected learning designs which were a feature of the case-sites selected within this study.

6.8.1 Online Learner Profiles: 4 Profile Solution

To determine the optimal solution, the analytical procedure tested four, five, six, and seven categories, comparing the quality of the different models and the meanings of the profiles produced. A classification model was sought in which the profiles would be qualitatively and meaningfully different,

underpinned by a LE analytical framework, while preserving the quality of the classification solution. As such, the meaningfulness criterion in Garson's (2014) three ways to assess cluster validity has been followed, including: criterion (or variable) validity, distance (or proximities), and meaningfulness.

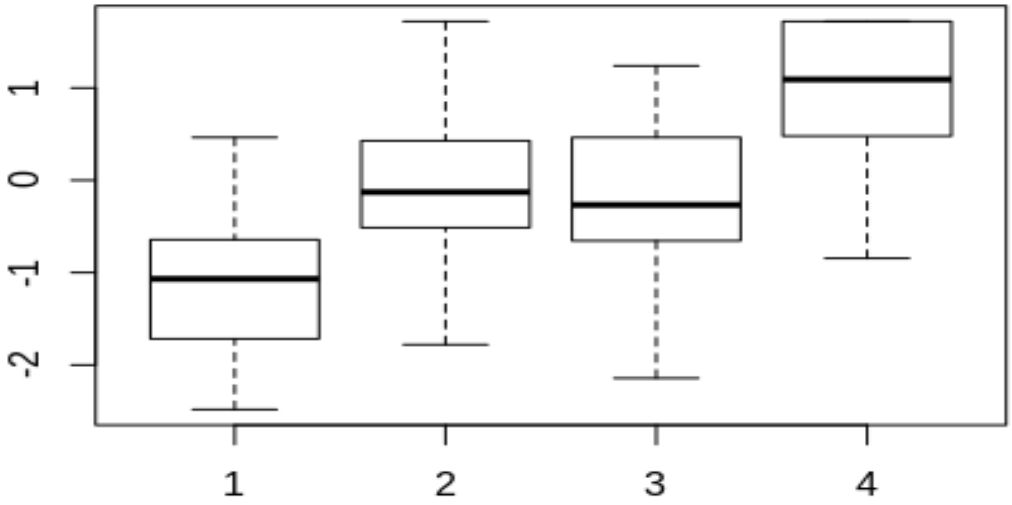
Accordingly, a comparative profiling of distinct clusters of learners based was characterized in relation to the component variables identified (i.e. digital activities, relationship interactions, and learning resources). The analysis procedure differentiated among 4 different groups that constitute a continuum in terms of student experiences of learning across contexts and practices. The 4 clusters are relatively evenly distributed across the sample population (n=178), where each cluster contains between 15%-31% of the population (see below table 6.20), with profile 3 having the highest representative sample (n=56) and profile 1 having the lowest representative sample (n=28) among the population.

Table 6.20 Profile Solution: profiles and averages of the principal component scores used as inputs in the cluster analysis

Cluster	N	%	Creative & Collaborative Activities	Intentionally Networked Activities across contexts	Digital Tools for Academic Production, Communication, and Networking	Networked & Openly Sourced Content	Networked Relationships across contexts
1	28	15.7	-1.12	-1.11	-1.51	-1.06	-0.99
2	48	26.9	-0.02	-0.50	0.20	-0.20	-0.74
3	56	31.4	-0.18	0.25	-0.18	-0.20	0.45
4	46	25.8	0.93	0.89	0.92	1.11	0.83

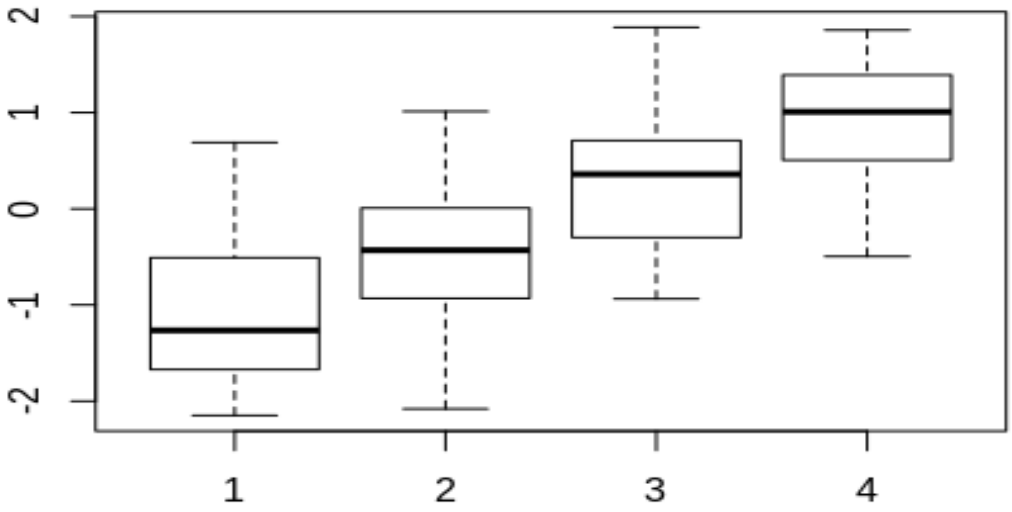
The below Figures (6.3-6.7) present the results of the hierarchical clustering analysis for each of the 5 component solutions. The cluster solution presented in Figure 6.3 represents the Creative and Collaborative Activities component which provided 4 clear groupings, where cluster 1 and 4 were at the extreme, while cluster 2 and 3 were closer in proximity. This result reflects a range of digital competencies necessary for productive knowledge work through learner activity. In particular, this result reflects 4 groupings of behaviour around creative digital content production, integrating content that others have made, and solving technological problems.

Figure 6.3 Creative and collaborative activities



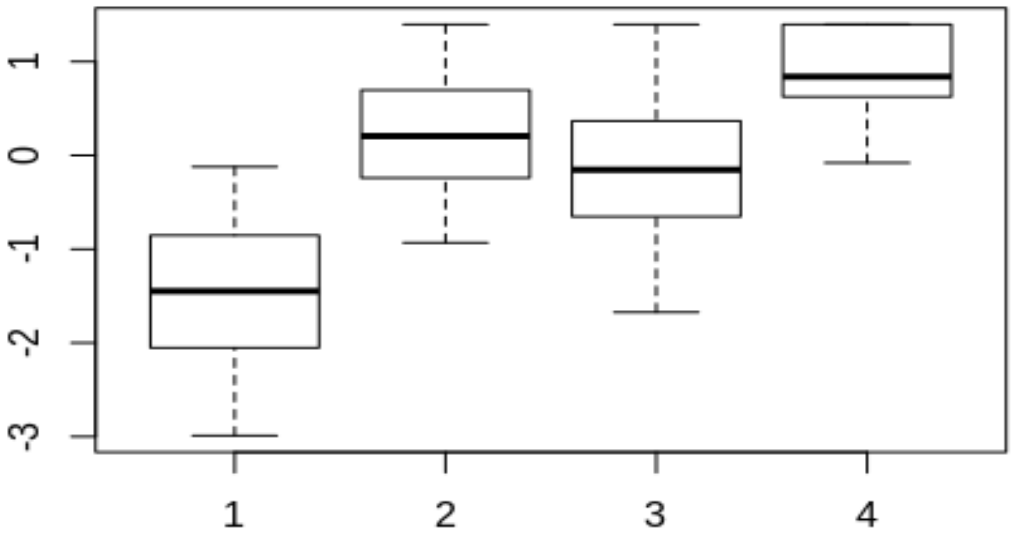
The cluster solution presented in Figure 6.4 represents the Intentionally Networked Activities component which provided 4 clear groupings, on this occasion there is an even distribution between cluster 1 and 4 along a continuum from low to high value. This result reflects a range of interest driven, self-directed and everyday learner activity across a range of contexts. In particular, this result reflects 4 groupings of behaviour around intentionally linking learner activity across a range of contexts to support academic learning.

Figure 6.4 Intentionally networked activities across contexts



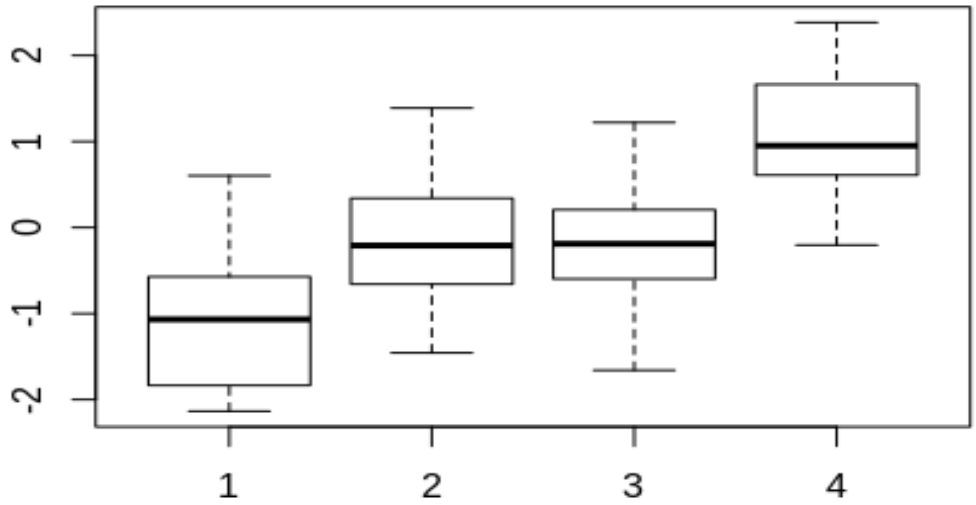
The cluster solution presented in Figure 6.5 represents the Digital Tools and Technologies for Academic Production component which provided 4 clear groupings, where cluster 1 and 4 were at the extreme, and again while cluster 2 and 3 were closer in proximity. This result reflects a range of tools and technologies necessary for productive knowledge making through learner activity. In particular, this result reflects 4 groupings of behaviour around the use of digital resources, particularly those essential for multi-modal knowledge production as well as communication and social networking.

Figure 6.5 Digital Tools for Academic Production, Communication, and Networking



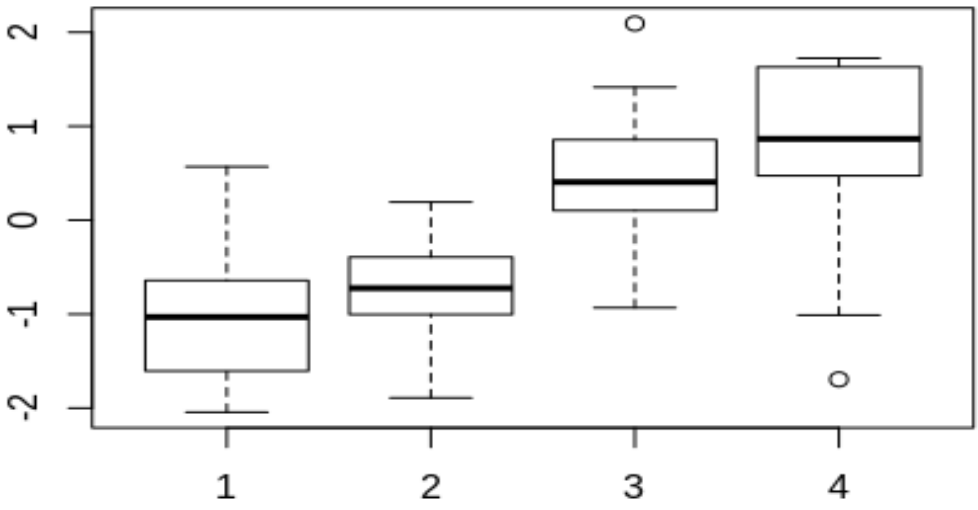
The cluster solution presented in Figure 6.6 represents the Networked and Openly Sourced Content component which provided 4 clear groupings, again, where cluster 1 and 4 were at the extreme, while cluster 2 and 3 were closer in proximity in the middle range. This result reflects learner activity which engages with digital content across a range networked sources to support academic learning. In particular, this result reflects 4 groupings of behaviour around the use of learning resources outside of formal contexts which can be linked to support academic learning.

Figure 6.6 Networked & Openly Sourced Content



The final cluster solution presented in Figure 6.7 represents the Networked Relationships across contexts component which provided 4 clear groupings, again, rather evenly distributed between cluster 1 and 4 along a continuum from low to high value. This result reflects a range of relationship interactions which have been used to support academic learning. In particular, this result reflects 4 groupings of behaviour which links or stretches social support across contexts into social media (personal and professional) as well as into relationships in the professional domain.

Figure 6.7 Networked Relationships across contexts



Below, a narrative account is given of the profile solutions in consideration of the component variables which underpin the clustering procedure. Cluster solutions have been named through an interpretive process and then compared with each other along a continuum of learner profiles, where at one end of the spectrum are **inactive networkers and limited tool users and creators** and at the other end are **knowmadic learners** who represent creative and collaborative networked learners. Among the identified learner profiles, adjacent profiles along a continuum are often less perceptibly different from each other, although the extremes of the 4 presented profiles are quite distinct.

1. Inactive Networkers, Limited Tool Users & Creators n=28. In comparison to the rest of the profile groups, the first profile, containing 15.7% of the sample, is characterized by significantly low scores across all five variables, thus making their engagement in creative and collaborative digital activities significantly low. Likewise, this cluster of online learners does not view engagement in networked activities across a range of contexts as important in supporting their academic learning. In particular, this cluster contains a significantly low value in their perception of the importance of those digital tools for academic production, communication and networking in supporting their academic learning, including the use of multimodal or multimedia editing or sharing tools, using data analysis and gathering tools or social networking systems. Additionally, they also contain a significantly low value in their view on the importance of the use of networked and openly sourced content in supporting academic learning. Finally, their perspective on the importance of networked interactions across a range of contexts in supporting academic learning is also significantly low.

Profile Keywords: scarce creators & collaborators, inactive networkers, limited tool use, limited activity across contexts

2. Tool User & Inactive Networkers n=48: This cluster represents 26.9% of the sample and is characterized by relatively low scores across the 5 variables, except for their perceptions of the value of digital tools for academic production, communication and networking. This cluster shares traits with Profile 1 in that they score very low in networked relationships across contexts in supporting academic learning. On average, this cluster of online learners is closer to profile 3 across most other variables, although containing a slightly lower value in intentionally networked activities across contexts. In creative and collaborative activities and networked and openly sourced content, this profile is very similar to profile 3, with neutral values in these variables, in comparison with profile 1 and profile 4. They can be characterized by limited networked practices and average digital tool and technology use.

Profile Keywords: low networked, average creator & tool user,

3. Lifewide Learner n=56

This cluster represents the most significant size profile amongst the population, containing 31.4% of the sample. This cluster profile exhibits a neutral engagement in creative and collaborative digital activities in supporting their academic learning yet above average in their perception of intentionally networked activity in supporting their academic learning as well as the importance of engaging in networked relationships across contexts in support of their academic learning. Overall, the evidence suggests that this cluster values engaging in activities and relationships across a variety of contexts to support academic learning. This profile has a neutral view, however, of the importance of digital tools and technologies for academic production, communication and networking, as well as the role of openly sourced and networked digital content in supporting their academic learning. Overall, this group exhibits characteristics of life-wide learners, valuing a range of activities and relationships across contexts in supporting their academic learning.

Profile Keywords: *Networked social support across contexts & networked activities across contexts, low frequency creator & collaborator, neutral value of tool use, neutral value of networked & openly sourced content,*

4. Knowadic Learner n=46 The last profile comprises 25.8% of the sample and in contrast to the rest of the clusters, this learner profile is characterized by the highest scores across all five variables, thus making their frequency of engagement in creative and collaborative digital activities in supporting academic learning significant. Knowmadic learners perceive their use of networked relationships across contexts to support learning as highly important. On average, these learners perceive the importance of using a range of tools and technologies for academic production, communication and networking, including multimodal and multimedia editing and sharing tools, social networking systems, and data gathering and analysis tools. Likewise, knowmadic learners show high levels of digital competency in the frequency of engaging in activities that integrate and elaborate content that others have created, while also creating and developing their own digital content and creatively using digital technology by applying different tools and technologies. Overall, the evidence suggests that this cluster exhibits characteristics of an active networked learner, creative and innovative in the way the engage in activities across contexts, capable of seeing value in networked relationships across a range of contexts in supporting their academic learning.

Profile Keywords: Open and Networked Learning across contexts, creative and collaborative activities, learning continuum, formal/informal practices,

6.9 Summary

This chapter has presented the results of the quantitative strand of a mixed methods study with a focus on both descriptive and multivariate analytical procedures. The chapter was organized into different forms of analysis, beginning with descriptive analysis, moving to more multivariate and reductive forms of statistical analysis including PCA followed by hierarchical cluster analysis. Initially, the socio-demographic data was presented and described. Following, the central dimensions of the survey were presented, underpinned by a LE analytical framework and developed around the survey blocks of 1. digital activities, 2. digital relationships and 3. digital resources used to support academic learning. A final survey block (4) was likewise presented regarding the impact of learning experiences in online HE.

In order to move beyond simple descriptive statistics, classical reduction techniques were used and presented, including Principal Component Analysis and Hierarchical Clustering. Ten component solutions were presented across 4 of the survey blocks. Five component solutions were used in a clustering procedure, identified as appropriate from a connected learning and LE perspective, in order to define profile solutions that characterize students' experiences of learning in online HE across contexts. The results of the clustering technique offer 4 distinct profiles along a continuum based on student views of their experiences learning in online higher education, including 1. Inactive Networkers, Limited Tool Users & Creators, 2. Tool User & Inactive Networkers, 3.Life-wide Learner and 4. Knowadic Learner. The following chapter (7) will discuss the implications of both the qualitative and quantitative results presented in chapter's 5 & 6, through both data interpretation and integration. The quantitative strand will be used to complement the primarily qualitative multi-case study findings.

CHAPTER 7
MIXED METHODS DISCUSSION

7.1 Introduction

This chapter discusses the findings presented in chapters 5 (qualitative) & 6 (quantitative). The discussion analyzes the main mixed methods findings in an integrative and complementary manner. The weight has been placed on the qualitative dimension of the study, whose initial results have been used developmentally to build and analyze the quantitative dimension of the study. A mixed methods approach in the context of this discussion has been used for the purpose of integration, complementarity and completeness. The overall goal of the mixed methods discussion, therefore, is to bring together a more comprehensive account of the phenomenon under study (Tashakkori & Teddlie, 2009; Fetters et al., 2013). By integrating results from different sources of data, including clearly indicating which findings are qualitative and which are quantitative, the study aims to build as complete a view as possible of student experiences of learning in online HE. Each of the following sections (7.2-7.5) clearly responds to a specific research question. As such, this chapter will interpret the central findings from the mixed methods study in relation to the existing literature of student learning in online HE, with a particular emphasis on a LE perspective.

7.2 Experiences of Learning in Online HE through a LE Analytical Lens

The current section responds to RQ1 in aiming to understand what digital learning practices and strategies students use to support academic learning across contexts in online HE.

7.2.1 Influence of the Academic Curriculum as an Ecology for Learning

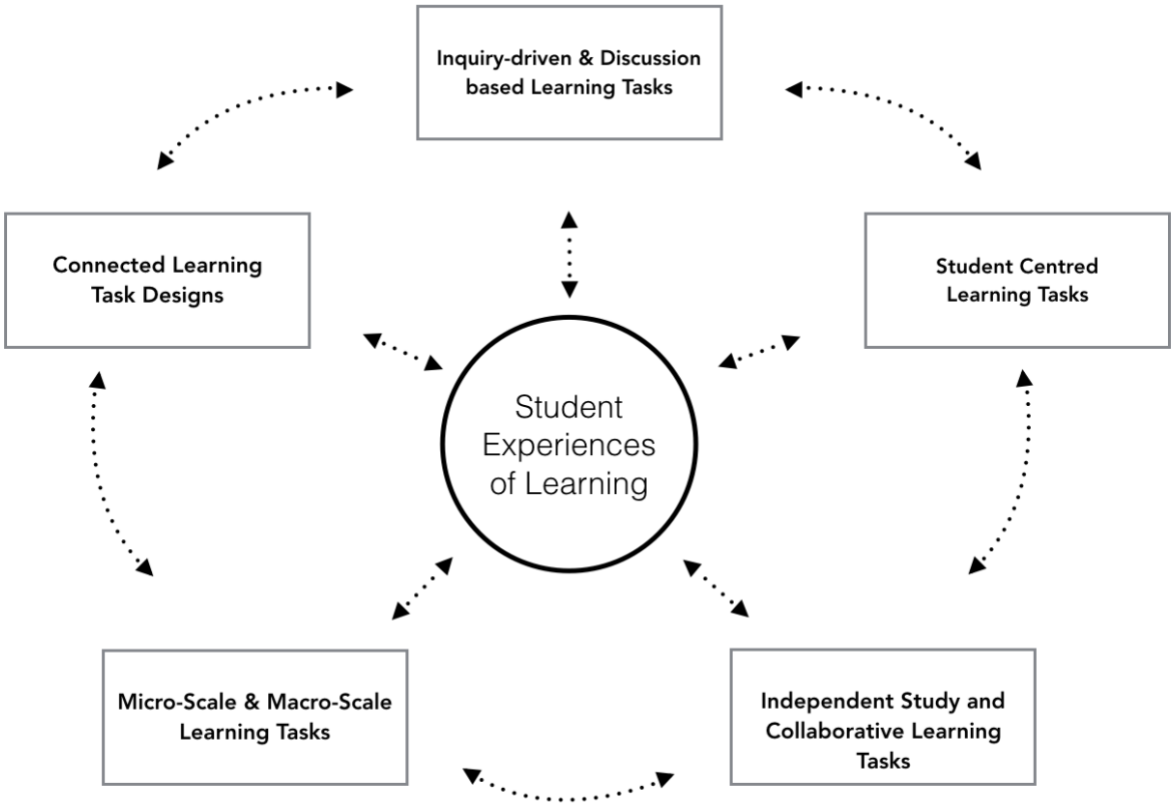
To understand student experiences of learning in the context of online HE, it is essential to consider the influence of the academic curriculum as a resource and context which shapes students' experiences of learning. The current section thus analyzes the core traits of the academic curriculum which have been identified as having a significant influence on student learning. Results have been accessed from the qualitative component of the study, specifically documentation and observation of the program sites across three distinct M.Ed. programs. Through **learner activity (i.e. actions undertaken by learners to achieve a certain aim)**, students interpret the **academic tasks (i.e. academic works or assignments to be undertaken by the student)** within the curriculum. Learner activity is in

response to those tasks or assignments within a course syllabus, guided by rubrics or other forms of continuous assessment criteria. Learner activity leads to learning outcomes through the task-activity nexus. Tasks within the curriculum are a resource themselves, which facilitate student activity (Ellis & Goodyear, 2013). Activity, as has been discussed, is a highly situated process strongly influenced by the social and physical resources and contexts available. The academic curriculum, and the tasks set within, set some, yet not all, of the social and physical learning resources on which students will use in highly diversified and individually distinct ways to support their academic learning, as captured in the below quote by Goodyear & Ellis (2013).

> *"Usually, it is the tasks which teachers set that have the strongest influence on students' activity. Of course, students rarely do exactly what they are told. Indeed, teachers often set tasks in such a way that some creative interpretation is necessary and so that students can adapt the task to create a better fit with their own needs and interests. In addition, there are likely to be numerous other influences on what students actually do and some of these will – from time to time – prove more powerful than what the teacher has set. Nevertheless, a crucial resource for students' learning activity is the task set by the teacher" (p.121).*

Before presenting student learning strategies and practices in section 7.2.2 it seems important in the current discussion to introduce the particular characteristics and attributes of the academic curriculum which influence student experiences of learning, offered across the three programs, as detailed in Chapter 5. It is important to consider that the academic curriculum is a significant, yet not exclusive, influence on student learning, particularly from a life-wide and lifelong perspective. As students interpret academic learning tasks, they must approach learning autonomously and actively through self-directed learning (Broadbent & Poon, 2015), acting in certain ways to meet course requirements while using a range of idiosyncratic learning strategies. Within the current study, three distinct academic curriculums have been analyzed through program documentation (UOC, U of E, UIUC). The results highlight 5 salient traits of the learning tasks found within the academic curriculum that influence student learning across contexts and practices which are highlighted in Figure 7.1 and discussed below. These include: i.) inquiry-driven and discussion based learning tasks ii.) task designs that facilitate student-centered and self-directed learning; iii.) tasks that fall along a continuum from independent study to collaborative group work and iv.) micro and macro scale tasks and their alignment; v.) connected learning tasks which relate academic activity to current or future professional practice.

Figure 7.1: Identified Traits of the Academic Curriculum Impacting Student Experiences of Learning



Inquiry and Discussion Based Learning Tasks

The academic tasks which students encountered across the three case-sites can be broadly characterised into two activity types, inquiry-driven and discussion-based learning designs, coinciding with previous studies on students' experiences of learning in online HE (Ellis & Goodyear, 2013). Both inquiry and discussion are particular attributes of graduate-level study which is itself characterized as knowledge work, defined as involving the capacity to advance and apply complex ideas across settings, often using theoretical and conceptual frameworks.

Moving across autonomous work and collaborative group projects as well as networked interactions, students engage in discovery-based, problem solving and peer-based learning designs. Inquiry is focused on a range of constructive research-based activities, including critical thinking and active learning, as well as through case-study, problem solving and project-based approaches that rely on active knowledge making. Examples of inquiry-driven learning tasks include producing a variety of critical analyses of texts (i.e. literature reviews, article critiques, S.W.O.T. analysis, essays, position papers) or broader projects such as building a digital learning module or e-portfolio.

On the other hand, discussion-based activities lead to collaborative community building, reflective practice and co-construction of knowledge through dialogue, interaction and meaning making. Discussion-based activities are a foundation of constructive and connectivist approaches to online learning, where forum debates and discussions are common. Collaborative tasks greatly influence the need for discussion and dialogue, and the use of social networks in online HE, such as Twitter, Whatsapp, or Facebook also impact the scale of discussion needed to complete academic tasks. Tasks such as collaborative authoring in virtual learning environments or on open blogs requires a high level of interaction and discussion.

It is important to consider that understanding inquiry and discussion based activity as separate or disconnected from each other lack any functional sense, as inquiry driven designs commonly require discussion and debate, and vice versa. For example, collaborative authoring or peer-review activities require a degree of both inquiry and discussion in order to complete successfully.

Student-Centered Learning Tasks

Although academic tasks are often structured through clear task design and guided by instructors, many of the activities require and encourage student-centered learning, aiming to develop learner autonomy and independence. In this line, student-centered designs are part of the broader debate about rethinking the roles of educators in HE (Siemens et al., 2015; Adams Becker et al., 2017). The results indicate learning tasks in the academic curriculum are characterized by student-centered designs which promote active learning, critical thinking, collaborative knowledge making and self directed learning. A clear explanation for such a result lies in the shift across HE toward promoting problem-solving where learners are encouraged to develop research skills, formulate clear research questions, and seek solutions to such educational problems. Student-centered designs likewise foster more personalized and contextualized learning, where learners are encouraged to make clear connections between academic work and the wider world. Such designs see teachers as "no longer the sole authoritative source of information and are expected to assist students in navigating the mastery of content and skills"(Adams Becker, 2017 p.34).

Traditionally, student experiences in the academic curriculum have been oriented toward theory-rich knowledge through transmission models of learning. However, authors such as Cope & Kalantzis (2010, 2017) and Jackson, (2013, 2016), argue that experiences in the academic curriculum can no longer be predominately focused on mastering theory, but on active and situated learning in socio-

cultural, physical and digitally mediated environments. For example, one case-study participant articulated the transformation of their role as a learner in the way their current online learning experience has been different from other academic learning experiences. She articulated how she felt she had greater control and direction over her learning, capable of following her own interests and needs, as exemplified in the following quote:

> *"The philosophy of teaching and learning (of the program) is different from the courses that I've done both in undergraduate and graduate courses that I took before that were much more structured. Now I feel much more in charge of my learning. Every week, I am looking for things, I am finding my own materials, I am finding my own interests and working on things that I am interested in. Going back to your first question of what motivates me.... I think that's huge for me, a huge motivation factor that keeps me engaged, because I'm working on things that I'm interested in. That was not my previous experience with learning" (Rebecca)*

The results which characterized the student centered and student directed nature of learning designs likewise relate to a shift in the balance of agency from teacher to student. This shift has been another transformation in online program designs within new learning environments (Kalantzis & Cope, 2012). Learner agency, including developing essential new learning competencies such as metacognition are highlighted in the qualitative results in Chapter 5, where students discussed the impact of their experiences of learning in online HE. Students' cited more control and direction over their own learning, exemplified in the following quote:

> *"I feel like I have a lot of agency because I am choosing what I want to write about, self-directed learning and research, researching all of these topics that sort of stretch into my practice" (Matt)*

A learner centered approach to curriculum design links well as a foundation for students to build awareness of their own learning ecologies (González-Sanmamed et al., 2018), developing learner agency, problem solving and metacognitive skills as they engage in non-linear and continuous learning across a range of contexts individually, in groups or in networks. Student-centered designs, therefore, have a potential to support emergent forms of learning which can serve to empower learner mobilities, viewing learning as "a series of boundary-crossings in and across social spaces (home, school, and peer cultures; in and out of school) and epistemic practices (formal, informal, authorized, unauthorized)" (Kumpulainen & Sefton, 2014 p.8). This trait, identified in the academic curriculum, has direct influence on processes of student learning by developing a range of connected learning practices driven by the needs and interests of the learner.

Individual and Collaborative Learning Tasks

As can be seen through the academic curriculum analyzed, there was a range of academic tasks that required both autonomous work completed in relative isolation of peers (i.e. an academic essay or the development of a digital learning module) and tasks that required relatively high levels of collaboration and team work (i.e. collaboratively authored group projects, group blogging, and peer review and feedback). The identification of many peer learning tasks in the academic curriculum can be explained as collaborative learning has been an emphasis of socio-constructivist and connectivist approaches in online HE for sometime (Dron & Anderson, 2014; Bates, 2015).

Likewise, some tasks within the academic curriculum require a phase of individual/autonomous work, followed by a phase in collaboration with others, for example in collaborative co-authoring, or in developing a group digital learning project. This emphasis across individual and collaborative dimensions can be linked to the work of social learning theorists, such as Lave & Wegner (1991), among others, who have demonstrated the situated nature (both physically and socially) of learning. Such socially and physically situated perspectives have demonstrated an influence in shaping both learning processes (strategies and practices) and outcomes. For example, program teams that recognize the distributed nature of cognition, understand that the learning a single individual can do on their own may be very different than what they can accomplish when collaborating with peers, and/or working with a range of digital tools, technologies and environments. Many course tasks, therefore, combine collaborative elements in the design as a way to empower and amplify student learning, as well as build communicative and collaborative work competencies essential in today's globally networked work force.

Micro & Macro Scale Learning Tasks

Each program across the three case-sites is based on a 12 week course model. Across each academic course, there is a broad variability within the scope and scale of each task required, particularly from those initial tasks at the beginning of the course to the end-of-course work or final project. Considering variables such as time and effort required, as well as the complexity and scale, among other factors, the tasks identified in the current study can be divided along a continuum from micro to macro. For example, certain course tasks can be completed in a few hours, such as course readings and forum posting. In contrast, other assignments range from 20 hours to upwards of 100 hours (i.e. dissertation or capstone project). Regular weekly assignments or continuous assessment tasks (i.e. readings and forum posts) are much smaller in scope than end of course or end of program

tasks (i.e., capstone projects, dissertations or e-portfolios). Macro tasks require engaging more intensely, and often over significantly longer periods of time. Larger macro assignments such as a 3000 word digital essay or capstone project will require more intense engagement in a range of activities, including more in-depth and complex use of resources, and if necessary, peer collaboration.

Micro-scale tasks generally build to larger macro-scale tasks such as a final course projects, dissertations, or E-portfolio or course-building in digital environments. As students engage in the program, they experience qualitatively different activities across a 12 week course timeline, as well as throughout a multi-year program timeline. Alignment between micro and macro-scale tasks can significantly influence the strategies and academic activities of program participants. The below quote from a case-study participant discusses strategic alignment between micro-scale tasks and micro-scale tasks.

> *"I organize my activity around creating the (final) work (the knowledge artefact)...Immerse my self in the content…I started to see themes and trends of different researchers. I'd write my (weekly) updates. based on what I was finding and then I would also use the (same) research to write the (final) work, as well…In a way I was like a painter. When you are a painter you do little studies first, then you build up to bigger projects…I would write 800 words of an aspect of it (a theme), and then that 800 words would usually show up in the (final) work, and I would just kind of massage it, and bring it out, and it would be part of the (final) work as well. It wasn't two separate projects; it was one single project." (Matt)*

As the results demonstrated students intentionally connect micro-scale course tasks with macro-scale course tasks (i.e. weekly readings and forum posts with capstone projects or dissertations). These findings reflect what researchers on student learning in HE refer to as constructive alignment (Biggs & Tan, 2007) whose central idea is that course learning tasks should be aligned in such a way so as that course objectives, learning tasks, and learning outcomes are explicitly linked, including the notion that the complete range of course learning tasks can be aligned in service of the overarching course learning outcomes and goals. Thus building linking initial course work to the final course projects, as well as final course work to major program research projects (dissertation, capstone projects etc.) is a common program characteristic and design strategy.

Connected Learning Task Designs

As evidenced in the learning activities designed by each graduate program presented in the qualitative results, there were explicit and connected learning designs linking academic activity to professional contexts. These include reflective exercises/activities on current and potential professional

practice, as well as a range of final course or program projects that strongly encourage linking student activity to current or future professional practice. Here, connected designs have acted as a conceptual organizing scheme for programs who aim to promote learning as an integrated and holistic process that stretches beyond formal and informal categories and communities (Kumpulainen & Sefton, 2014), making real-world application that can have meaning for individual learners.

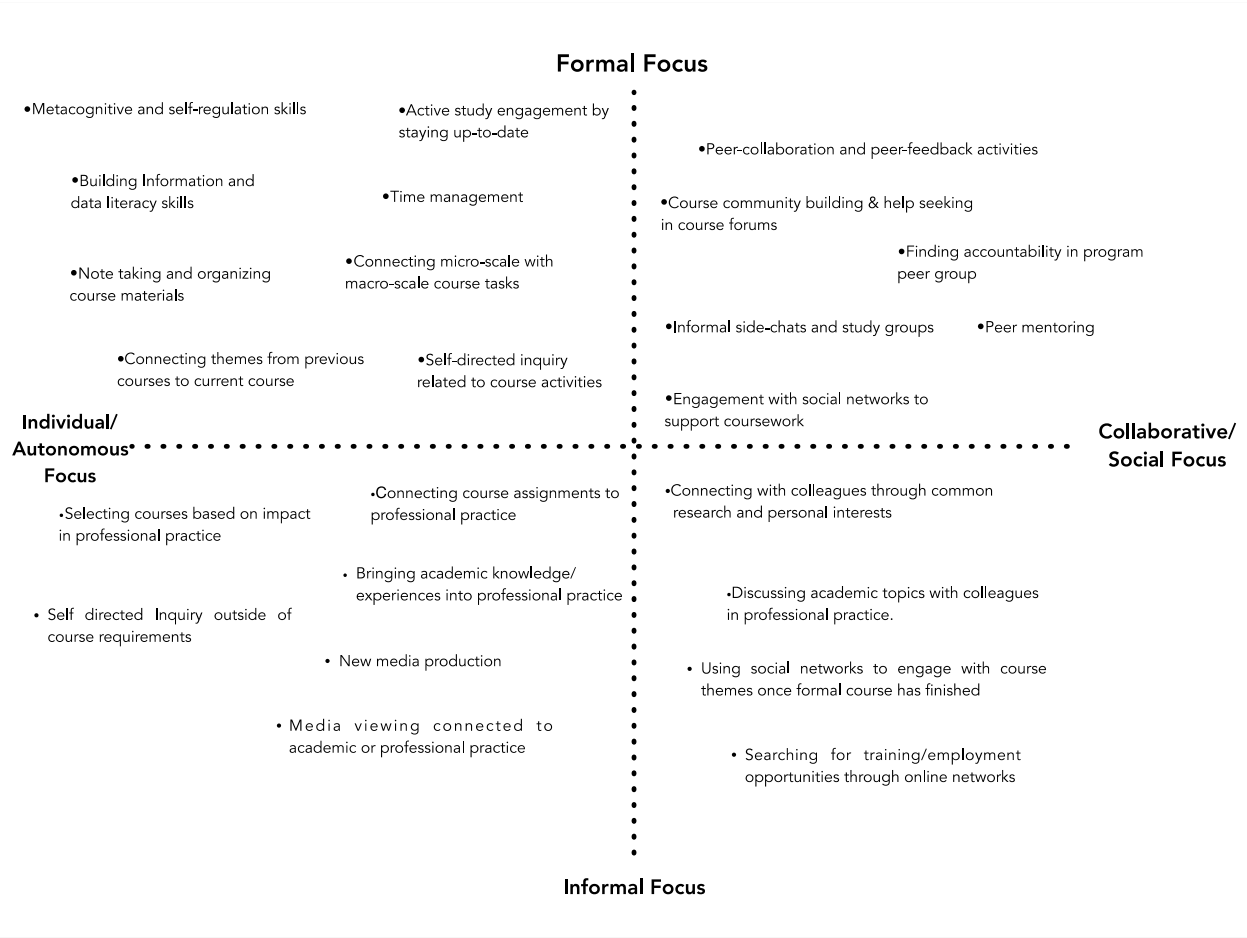
It is clear that in order to achieve a connected curriculum alignment of academic tasks with current or future professional practice should continue to be an explicit learning design choice by online HE programs. As such, the task design of linking academic activity to current or future professional practice, found across all three case sites, aligns with the literature on lifelong learning ecologies (Jackson, 2016; Gonzalez et al. 2018; Sangra et al. 2019) and designing a connected curriculum in an ecological university (Fung, 2017; Barnett, 2017). In particular, this design choice can support building connections and life-wide awareness about the elements and/or contexts that configure an individual's LE.

The above discussion has served to identify those qualities of task design found in the academic curriculum outlined above. Such designs have a significant influence on the task-activity nexus, defined by Ellis & Goodyear (2013) as "a way of describing what is happening when students translate tasks they are set into actual learning activity" (p.122). In this regard, the task-activity nexus is influential in shaping the range of strategies and practices students use to support formal learning, while likewise connecting learning across contexts and practices. As will be detailed in the below sub-section, students develop a range of strategies and practices across contexts that support their academic learning as they interpret the academic curriculum into learning outcomes their learning activity.

7.2.2 Characteristics of Learning Strategies and Practices Across Contexts

The following section analyzes results from the qualitative component of the study, specifically findings from the thematic analysis and cross-case analysis from the qualitative strand of the study. A range of learning strategies and practices were identified that students used to support their learning in meeting the requirements of the academic curriculum. The below 2X2 matrix, visualized in Figure 7.2, has been designed as a conceptual tool for analyzing student experiences of learning across contexts. Following Creswell et al. (2011) the use of displays allows researchers to ''be creative as they develop matrixes to fit their needs'' (p. 228). Here it is used as a tool to analyze the qualitative thematic results based on the lived experiences of students in online HE.

Figure 7.2: LE Matrix in Online HE: Identified Learning Strategies and Practices Across Contexts



In this matrix, the Y axis represents a 'focus' on formal or informal strategies and practices. At the top of the Y axis, formal strategies and practices refer to activities that are more directly tied to assessments and determined by the academic curriculum and organizational structure of the program. In this sense, the influence of the faculty and program staff in their design of learning tasks is evident on student activity, as they set the context and requirements for learning, including the individual or collaborative character of the task, and the resources available. Such tasks will likely involve the development of a knowledge artefact or product through a student-centered process of inquiry and discussion, by selecting and using a range of digital tools, technologies, and environments as well as being evaluated through continuous and formative assessment or through peer review approaches.

The bottom of the Y axis refers to learning strategies that can be characterized as more informal, interest driven, and likely part of everyday practices, interests and routines. Likewise, these

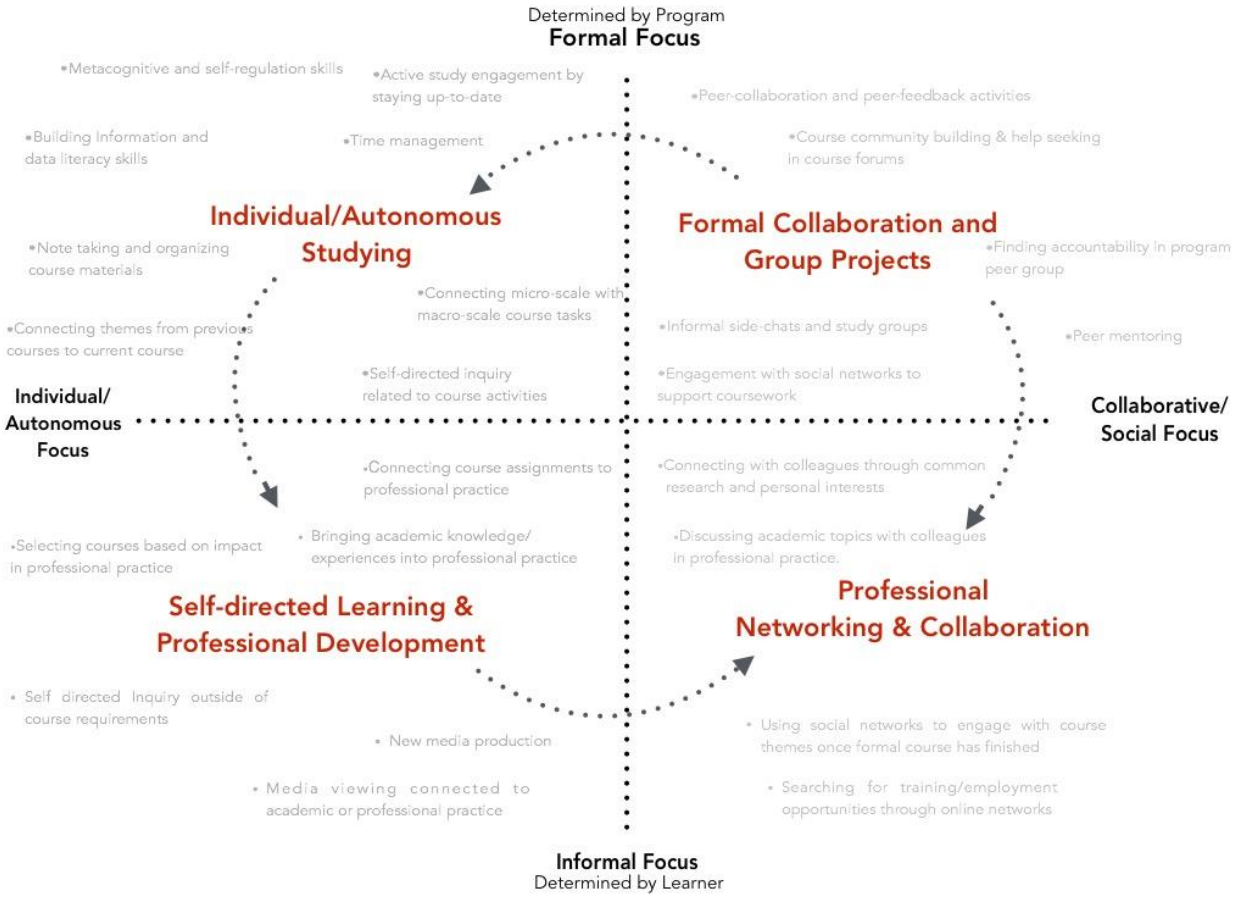
strategies may be connected to other contexts of learning, such as professional contexts or networked communities and interest groups. Although informal learning may account for a range of learning from self-directed to incidental, the experiences identified here account for highly intentional and self-directed strategies that have been used to support academic learning. Although these strategies may be indirectly linked to the curriculum and assessment structures, they are generally less directly related than strategies found in the formal quadrants.

The X axis represents a focus on the social dimension of learning, where the left represents individual and autonomous strategies, which often involve more self-regulated cognitive skills such as critical thinking, course planning, and other core skills required for completing academic tasks. The right end of the X axis refers to highly collaborative and social strategies that students use as they navigate the academic curriculum, involving communication and peer collaboration. At the far right end, strategies and practices are characterized by social interaction with a range of actors across both formal (teachers, peers, tutors etc.) and informal (work colleagues, social networks etc.) contexts.

The results highlight that key strategies emerged rather evenly across a range of practices according to formality and collaboration. However, as formal strategies have more direct relation to achievement on assessments, these practices often had more significance. Although the extremes between formal learning (highly linked to the curriculum and assessment structure) and informal learning (everyday, self-directed and interest driven; outside of assessment structure) may be quite different, adjacent elements at the boundary between formal and informal strategies may not be that distinct. For example**, building information and data literacy skills (identified formal learning strategy) through searching for, evaluating, managing and producing new knowledge for an academic task may likewise be developed as an informal practice through self-directed, everyday, and interest driven new media production** (**identified as informal practices and strategies across contexts**). Similarly, as Colley et al. (2003) argue, it is more sensible and accurate "to conceive 'formality' and 'informality' as attributes present in all circumstances of learning" (p.1). That is to say, students' experiences completing the requirements of the academic curriculum and course tasks can engage in activities in more formal circumstances and practices (forum debates with course colleagues and teachers), or in less formal circumstances and practices, such as discussing course themes with colleagues in the workplace or creating side-chats with 'like-minded' course colleagues in order to vent about the assignments, instruction or grading.

Deepening the analysis further, the below matrix visualized in Figure 7.3 represents the organizing categories, **identified here as conceptual zones of learning**, yielded through thematic analysis to characterize those strategies and practices presented in Figure 7.2, according to formality and collaboration. Identified conceptual zones of learning do not measure the quality or quantity of academic learning, nor the quality of the program or capability of teachers within the program. Rather, they describe and reflect the strategies and practices across contexts undertaken by students, recounted through interviews and corroborated through online observation, that support academic learning. As evidenced through the current research, students' experiences reflect a non-linear and iterative process as they link and stretch learning across different conceptual zones.

Figure 7.3 LE Matrix in Online HE: Conceptual Zones of Learning According to Formality and Collaboration



Accordingly, the top left quadrant has been named 'individual/autonomous studying' as it refers to strategies and practices that students develop mostly autonomously that directly serve the formal curriculum. These strategies are highly influenced by the digital learning environments in which much of the students' learning activities unfold. By way of example, students **inherently build information and data literacy skills** as they **search for, evaluate, manage and produce new knowledge in digital contexts.** Many strategies and practices identified relate to course planning. For example, **active study engagement, or staying up-to-date on course tasks** was a salient strategy identified. This involves scheduling regular study sessions in order to complete course readings, learning tasks, and communication with colleagues in course forums and debates. This strategy likewise is connected with **time management** in planning tasks and activities, supported by the affordances of digital tools such as digital calendars and note taking apps. Planning and time-management strategies also require the development and use **of metacognitive skills and self-regulation**, also noted as a strategy which supports academic learning. Other examples of mostly autonomous formal strategies involve note taking, organizing and transforming course materials as well as connecting micro-scale course tasks with macro-scale course tasks. **Critical thinking and inquiry** have also been identified as important in meeting the requirements of the academic activity, where strategies such as **connecting themes and patterns from previous courses to current course, and self-directed inquiry** beyond prescribed course activities and resources were noted by students as effective in meeting the course requirements.

Broadly speaking, the 'individual/autonomous studying' quadrant can be characterized by autonomous study which develops and requires core academic/professional skills and competencies. Student learning here can be inferred to be highly intentional and oriented toward achieving the best grades possible while interpreting the academic curriculum into learning outcomes through activity. Students engage in learning tasks in this quadrant mostly in response to the academic curriculum through inquiry driven processes such as problem solving and project development, where, as the results demonstrate, the balance of agency has shifted from instructor to student. Here, students have reported having more control and autonomy over their learning process. By way of example, **students often need to actively define and explore the problems and projects they would like to address in each course**, which often links and stretches their learning into other conceptual zones of collaboration and formality. Similarly, students are often encouraged to direct their own inquiry on a given subject or theme, and demonstrate possible solutions to a given educational problem. When demonstrating such task solutions, **students may begin in a zone of autonomous/individual study, and be asked to link and**

stretch learning actions and outputs across a range of contexts. Such boundary crossing experiences sees students apply knowledge and processes from one domain (i.e. formal/individual study) into another (self-directed, informal, networked).

The 'formal collaboration and group projects' named quadrant represents a learning process that requires a form of social interaction more directly linked to the academic curriculum and assessment structure. The strategies used here are found within a more formally constituted context within a structured course or across an entire program. As such, students are responding to course tasks through structured and assessed **peer-feedback, peer-review and peer collaboration activities.** Here, students identified **help seeking and community building through course forums** as a useful strategy. Others recounted finding motivation and accountability in their program peer group, which then impacted their engagement in the course tasks. More informally, yet still linked to meeting formal course goals, was engaging in **informal side-chats and study groups**, where assignments may be exchanged to receive informal peer-feedback as a way to improve the quality of their work. Linked to a common disciplinary practice in online HE, students also reported **engaging in social networks which had an academic focus** (i.e. Academic Twitter). This particular strategy is positioned close to professional networking quadrant because this strategy can also be used to meet both formal learning goals (i.e. completing course tasks) or informal learning goals (i.e. professional networking and relationship building).

The 'self-directed learning & professional development' quadrant represents a space for autonomous learning where students connect and navigate across a range of learning experiences largely outside of the curriculum. This quadrant can also be characterized by self-directed participation in learning processes. Due to its informal nature, many of the strategies and practices evidenced in this research **are linked with professional contexts of learning or based on interest-driven self-directed inquiry.** As can be seen, some strategies are positioned closer to the 'individual studying' quadrant, as such strategies can be used to achieve both formal and informal learning goals. This quadrant is characterized by stretching learning across multiple contexts, particularly from more formal learning scenarios to professional contexts. By way of example, this can be seen as **students' select courses based on impact in professional practice or by connecting formal course assignments to professional practice.** Likewise, research participants also identified applying course experiences and knowledge into their professional domain as e-learning consultants, academic administrators, primary school teachers or as educational publishers. Another important quality of this quadrant **is interest-driven learning**

processes such as self-directed media inquiry, social media engagement, and new media production which can be connected across domains of learning. Such processes, as discussed in previous studies by Greenhow & Lewin (2016) can contribute to reconceptualising the boundaries between social media and education, and formal and informal learning.

In the 'professional networking and collaboration' quadrant, strategies and practices are more determined by the learners' interests and goals than by the academic curriculum. In this conceptual learning space, learners build relationships and connections that further their professional goals and aspirations. By way of example, students will **connect with 'like-minded' colleagues through common interests (both personal and research).** Another strategy identified has been **applying academic and research topics to discuss with colleagues in their professional domain,** an indication of boundary crossing through connected learning (Ito et al. 2013, Kumpulainen & Sefton-Green, 2014). Further, in this space for learning, socially networked practices are used to support learning, for example, by engaging with course themes once the formal course has finished, or by searching for training/employment opportunities through online communities and groups.

As reflected in the empirical evidence, students' experiences of learning are such that they may be located in any of the conceptual spaces within the LE matrix, crossing and stretching into multiple contexts. One of the challenges noted by researchers in the area of connected learning is the challenge of conceptualizing what defines the boundary (Kumpulainen & Sefton-Green, 2014), and in turn questioning the nature of context itself (Arnseth and Silseth 2013). As students' experience and navigate the academic curriculum through both intentional curricular designs and self-directed inquiry and exploration, using an LE matrix can assist in helping to make inferences about how students select, participate in and navigate a wide range of learning scenarios amplified by digital and networked media.

Further, the positioning of the conceptual spaces on the matrix allows for meta-inferences to be made about the interrelations between the boundaries, and by extension, the boundary crossing activities and experiences of students. For example, the formal dimensions on the matrix appear to impact more to the informal dimensions, than vice versa. That is to say, learning processes in the 'individual/autonomous studying' space may appear to support 'self-directed learning and professional development' having an influence on more learner-initiated processes. Likewise, although 'individual/autonomous studying' has an influence on a students' capacity to communicate, collaborate

and execute group projects, inferences can be made about how processes within the 'formal collaboration and group projects' quadrant appear to be in service of developing both core individual academic/professional skills and competencies (i.e. 'individual/autonomous studying'), and the capacity to build relationships that further professional goals and aspirations (i.e. 'professional networking'). **Meta-inferences which identify boundary crossing experiences among students is a significant contribution of this study.**

7.2.3 Experiences of Student Learning in relation to LE Components

Experiences of student learning will now be discussed through a LE analytical lens, focusing an analysis on each component as it relates to learner activity. It is essential to recognize that in the lived experiences of students it makes no functional sense to isolate or disentangle the core LE components from each other. Yet for the purposes of interpretation and inference, there is value in understanding patterns and themes that emerge as each component in analyzed in interaction within an LE matrix as a method to identify and generate new insights. **The central components identified in the LE construct, as detailed in the initial sensitizing model from a socio-constructivist perspective, are learner activity, resources and relationships.** Thus, these components will be discussed in the current section by integrating the mixed methods data as a way to enhance the significance of each strand of data (i.e. QUAL + QUAN) (Guetterman et al. 2015) and to provide a better understanding of the phenomenon under study. Specifically, the LE Matrix in Online HE (presented in Figure 7.3) which yielded 4 conceptual zones of learning according to formality and collaboration has been used as an analytical tool to discuss the findings, with associated learning strategies and practices. When integrating the data, results have been assessed for congruence or incongruence, inferring whether one strand may expand, confirm, or contradict the other (Fetters et al., 2013). Through an LE perspective in online HE, the quantitative data provided a method to measure participants' views more objectively of their experiences studying online, while the qualitative data brought depth and nuance to the research through the lived experiences of case participants. As such, integrating these procedures enhanced the overall significance of the data, providing a more complete view.

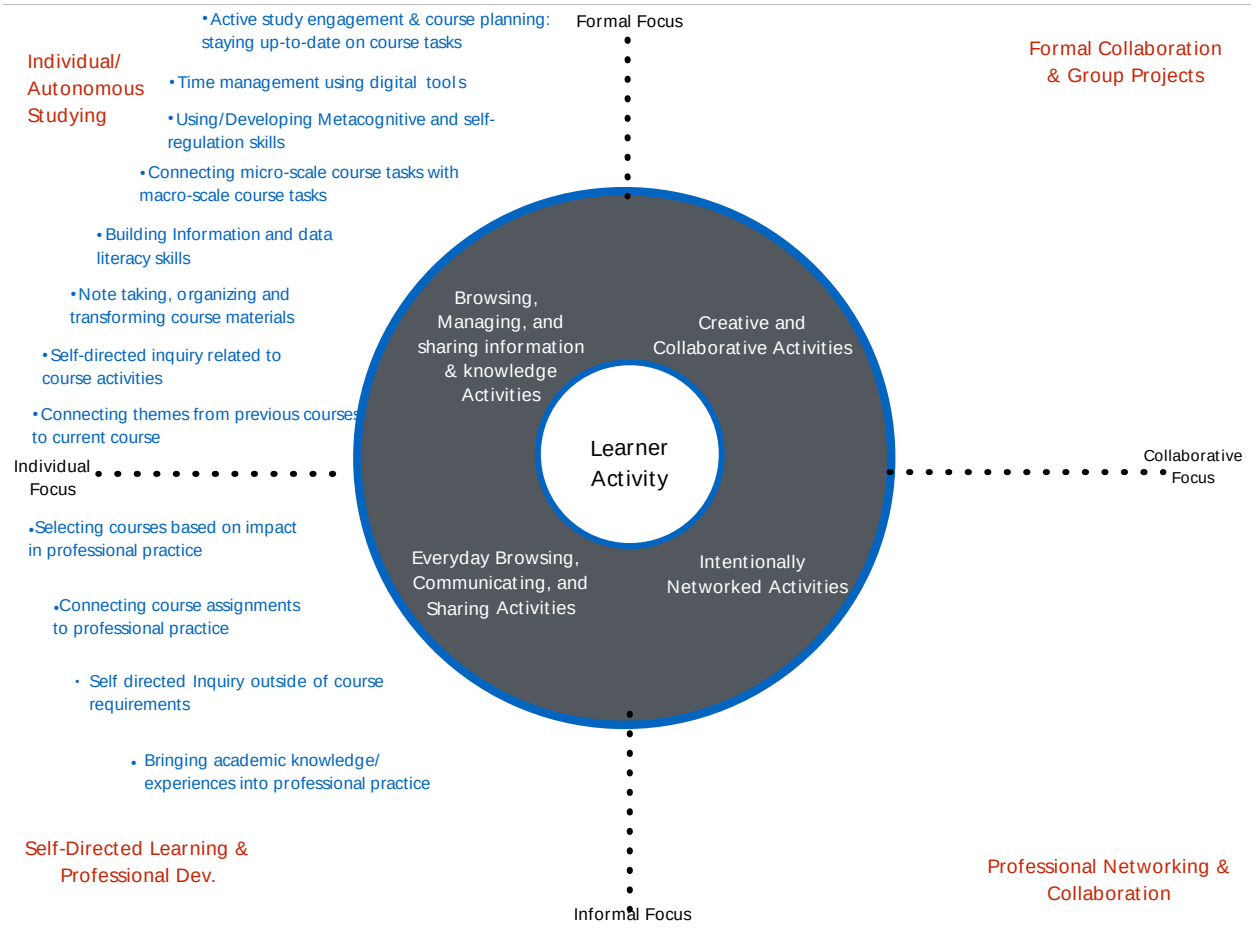
7.2.3.1 Learner Activity Across Contexts

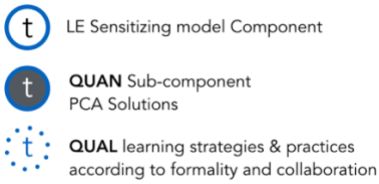
One of the salient analytical challenges of applying the LE construct to research is attempting to disentangle, define and characterize the central components that constitute an individuals experience of

learning. As can be seen in the current LE model presented in section 7.2, as well as supported by previous studies of student learning in online HE (Ellis & Goodyear, 2013), learner activity is key; a central component of an individuals' experience of learning. Activity is what the learner does, based on their intentions, motivations, readiness and capacity to act in the world. Learner activity, therefore, has a direct impact on the outcomes of student experiences of learning, and will be discussed here for its centrality as a core LE component. In online HE, learner activity may be done in response to a task in the context of an academic curriculum or course syllabus (i.e. task-activity nexus), and may or may not involve peer collaboration (i.e. individually, collectively, dyads, groups, communities, etc.), or, learner activity may be self-directed and interest-driven through engagement in online/offline communities and social/professional networks. Although most learner activity involves the use of digital tools, artefacts or other material resources, there are some instances of low resource use activities. For instance, critical thinking, course planning and conceptualizing or resolving educational problems. However, in the context of online learning more generally, many of these processes are highly supported by digital tools (i.e. digital calendar or note taking app). Given the digital nature of online learning, most activities involve some degree of digital tool/artefact use, as well as a notable amount of peer interaction.

Here, those learning experiences that are ***most linked*** to individual learner activity will be discussed, while experiences ***more related*** to peer collaboration and social support or digital learning resources will be discussed in their corresponding sections (i.e. Sections 7.2.2.2 and 7.2.2.3). As was established through the development of a LE matrix in Online HE, case-study participants reported navigating a range of **conceptual learning zones** according to formality and collaboration. The below Figure 7.4 visualizes through a joint display the LE matrix in Online HE developed through the qualitative strand, with a focus on the Learner Activity component (inner ring) which was developed through the quantitative strand. Each conceptual zone of learning highlighted in bold at the outer four corners of the display reflects a range of thematically analyzed strategies and practices which are highlighted in blue in the below visualization. This section will detail those activities analyzed through thematic analysis which largely fall into self-directed and self-regulated autonomous strategies for planning, time-management, evaluating individual work, and critical thinking in order to meet the demands of graduate course work in an online environment.

Figure 7.4 Integrated Joint-Display: LE Matrix with Learner Activity Component Focus





In the quantitative strand (in dark gray ring) the four identified PCA solutions reflect both formal approaches to online learner activity **(Browsing, Managing, and sharing information/knowledge Activities & Creative and Collaborative Activities)** and informal approaches to self-directed online learning **(i.e. Everyday browsing, communicating, and sharing Activities & Intentionally Networked Activities).** These PCA solutions confirm complementary strategies and activities which have been expanded from the qualitative results. Formal learning strategies identified through qualitative analysis are complemented in a confirmatory way through the range of activities identified in the quantitative

findings. In this sense, core autonomous strategies and practices both confirm and are expanded by many of the variables present in the LE Activity component PCA solutions. For example, active study engagement, time management, building information and data literacy, and note taking and transforming course materials as well as self-directed inquiry all require processes directly linked to the activity variables identified in the quantitative PCA solutions. This result may be explained by the fact that the digital survey was designed developmentally from the qualitative results to explore a complex phenomenon based, yet incapable of capturing all of the nuances and depth of student learning experience that can be captured through in-depth interviews. Here, data confirmation and expansion enhances the significance of the results, accounting for a more accurate and complete view of student learning across contexts.

Areas of discordance in the data integration include qualitatively identified strategies with a formal study focus, such as connecting micro-scale tasks to macro-scale tasks, connecting themes and patterns from previous courses to current course, as well as activating metacognitive and self regulation skills. Individual skills which focus on cognitive and metacognitive activity do not interface as easily to the developed PCA activity variables. Again, this is likely explained due to these themes being highly linked to self-directed processes of critical thinking and cognition, which are specific and idiosyncratic qualities unique to individual learners identified in the qualitative strand.

Comparison of the findings with those of other studies **confirm that many of the key formal learning strategies identified in the qualitative strand align to a range of studies on self-regulated learning (SRL) in online higher education**, which has attained a great deal of research attention in recent years (see Wang, Shannon, & Ross, 2013; Broadbent & Poon, 2015). In particular, 6 strategies identified in the current study have also been identified in a meta-analysis study of SRL by Broadbent & Poon, (2015), including; 1. metacognitive strategies; 2. time management; 3. peer learning; 4. help seeking; and 5. critical thinking by developing information literacy and knowledge management as well as 6. study organization strategies. As evidenced by previous studies on SRL in online HE, the very nature and design of online learning environments and processes heavily require more independence and autonomous work in order to meet the demands of the program, reflected in the results presented in the current study.

Informal strategies included everyday, self-directed and interest-driven socialized practices, in line with previous studies on informal learning using online tools and resources (Song et al. 2016).

Students also reflected on what Ito et al. (2013) would call **'connected learning' practices,** which sees students selecting courses based on impact in professional practice, connecting course assignments to professional practice, and applying knowledge from academic experience into their professional domain. Self-directed inquiry outside of course requirements was also identified as a practice which was linked to supporting academic activity, building critical thinking and information literacy skills.

As the visual joint-display of quantitative and qualitative data demonstrates, there are clear patterns of engagement that can be inferred through learner activity which moves across conceptual zones of learning. Specifically, **autonomous learner activity that is less formally constituted is frequently grounded in professional contexts and practice and can be characterized as self-directed and interest driven, while self-regulation is more detected in formally constituted learning practices.** These patterns may likely be explained by the dynamics between formal and informal learning, where formal learning places more emphasis on assessment structure linked with clear time frames, whereas informal learning is more interest-driven and self-directed. Inference can also be made that strategies within the formal conceptual zone shape and influence those practices that exist in the informal zone. This insight can can be useful for program teams, understanding that their learning designs and academic tasks have an important role in stretching and linking learning across multiple contexts, support forms of ecological and connected learning.

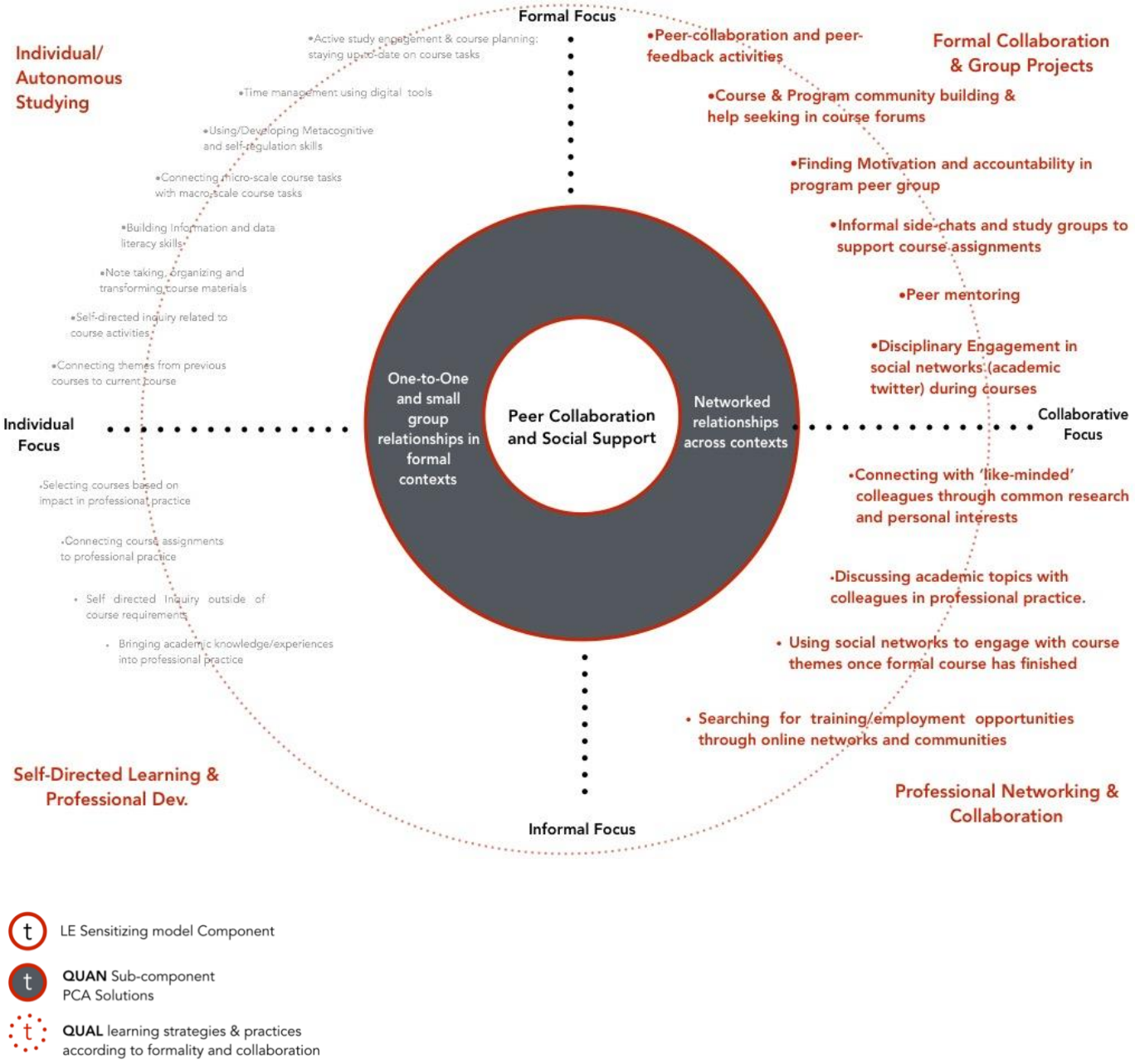
Evidence in this study has demonstrated that students engage in strategies and practices across a matrix of experiences, and that, as detailed in 7.3.2., the characteristics of the academic curriculum also influence such connected learning experiences, **stretching formal academic learning into more informal contexts.** Although research on formal and informal learning is not new, it is relatively new in the context of online HE (Czerkawski, 2016). Recently, Adams Becker et al. (2017) have articulated that integrating formal and informal learning is a significant yet solvable challenge in the context of technology integration in HE. This claim is particularly notable as Czerkawski (2016) concludes that HE students regularly use both formal and informal learning networks in online courses to support their learning, however, "online course design is usually not designed to consider informal experiences of the students" (p. 138). Recognizing student learning through a 'connected perspective' challenges program teams in shaping and supporting learning not only in one particular setting, but "within a matrix and continuum of several communities and contexts" (Kumpulainen & Sefton, 2014 p.8).

These results reflect those of Greenhow & Lewin (2016) and Czerkawski (2016) who also have explored the boundaries of formal and informal learning in education, yet the results of this study are significant as there has not been sufficient attention placed on researching learning across contexts and practices in higher education (Sangra et al, 2019). There likewise exists little evidence about the interrelationship between formal and informal uses of ICT in online learning (Cox, 2013) and some authors have argued for a need for empirical evidence which establishes what actual learning can be attained informally (Sangra & Wheeler, 2013). The dearth in the literature is likely due to the structural and procedural complexity of researching learning across a range of contexts, particularly in networked environments. Examining connected learning requires a coherent research design and clear study parameters as well as access to students as they engage in learning activities across a variety of contexts in their 'learner lives'. This procedure is further complicated by the methodological and analytical challenges of disentangling, defining, and analyzing learning experiences across boundaries and contexts in the academic and everyday lives of working professionals.

The range of both formally constituted and self-directed informal strategies and practices presented in this section have been able to generate insights into forms of connected student learning in online HE. In particular, the engagement patterns identified across conceptual zones of learning, specifically from formal to informal, provide evidence for how students navigate and experience learning in online HE. The range of practices and strategies presented can serve as a roadmap for linking academic practices to the wider world, in recognition of the fact that students regularly use both formal and informal learning networks and that learning takes place across parallel spaces and contexts across one's life (Barnett, 2017). Such an approach may lead to what Cobo and Marvovec (2011) call invisible learning, where the blending of formal, informal, and serendipitous learning can happen along a continuum of innovative and emerging contexts and practices.

7.2.3.2 Peer collaboration and Social Support

Figure 7.5 Integrated Joint-Display: LE Matrix with Peer Collaboration and Social Support Component Focus



Integration of the qualitative and quantitative results related to the LE component peer collaboration and social support is featured in the above joint display in Figure 7.5. The component visualization been created to represent the thematically identified learning strategies and practices resulting from the qualitative strand (here highlighted in bold orange) interfaced with social collaboration categories developed through quantitative PCA (between first and second ring), namely

'networked relationships across contexts' and '*one-to-one and small group relationships in formal contexts'.* Many of the variables identified in the QUAN strand were confirmed through the QUAL results, most **notably small group interactions, one-to-one interactions (i.e. peer mentoring), as well as many forms of networked interactions (social and professional), as well as interactions with work colleagues in professional contexts.** Through collaboration, students were required or encouraged to engage in a range of academic tasks. These include **group blogging, collaborative authoring, course forums and debates as well as co-constructing knowledge artefacts with a focus on applying learning outputs in authentic contexts** (i.e. professional domain or openly networked), in order to actively solve educational problems.

Navigating learning experiences across a range of conceptual zones, students reported **working individually and in combination with more intimate dyadic and small group dynamics, as well as with more networked interactions across contexts as they interpret the academic task into learner activity.** When responding to structured tasks highly correlated to the assessment structure, learning strategies identified included peer-collaboration (i.e. group projects, collaborative authoring) and peer feedback activities (i.e. peer-review), often explicit expectations of many programs. Finding motivation and accountability through peer interaction was also identified as a strategy, which links to course and program community building in formal spaces, for example course forums and program hubs. Moving across the continuum of formality, some learners reported engaging in more informal community building and help seeking to support their learning, including **sharing assignments for peer feedback in smaller groups through Whatsapp or other messaging platforms**.

Other strategies included more **networked interactions**, for example engaging with academic twitter to support course activities and research, as well as to stay engaged with course themes once the formal course has completed. In contrast, as findings in the cross case analysis suggest, **not all learners enjoy openly networked interactions to support their learning**, although it is a significant feature of many graduate education programs designs. Some learners are more comfortable, or prefer to be more of a voyeur in these scenarios. This result may be explained by understanding the attributes of each individual learner (i.e. interests, motivations, agency, affective dimensions, introversion/extroversion etc.) which has a strong impact on how students approach learning. Programs thus need to recognize that networked learning activities will impact student learning in highly differentiated ways. One case summed up this sentiment in the following quote:

> *"My default as a student is to be a wallflower, to kind of sit there and observe. And that's my default in a social media platform as well. I'm a voyeur, I'm not a*

participator. In moments when I am in a large group of people I become a voyeur. I don't become a performer, I'm an introvert, that's just who I am." Matt

Peer mentoring was another theme that emerged, where case-study participants reported being impacted by a sense of community belonging, particularly from more experienced students to those first entering the program. One case participant explained that "*we all talked about becoming mentors, we all decided that we want to start a mentor program as doctoral students to pass down what we know within the system*" (John), in order to help newer graduate students navigate the complexities of academic work in fully online environments. A possible explanation for this result is the disciplinary focus of each program located in educational technology and digital education. As the results demonstrate, such programs attract participants with extensive backgrounds in the fields of education and training with an emphasis on adult education, and many understand the benefit and advantage in engaging in peer learning and peer mentoring.

Peer mentoring emerges through community and networked relationships, through the interaction of students across cohorts and across different levels of experience within the program, switching roles from student, to professional, to mentor, colleague or mentee. This result likewise supports the idea of socio-constructivist learning, including Vygotsky's concept of zone of proximal development, where students may be able to achieve and perform at a higher level through the support of a knowledgeable other, catalyzing learning potential through what Peña-Lopez calls 'trans-learning and heavy switching' (2013). However, **the dearth of research on this topic in the literature, points to a strong need to consider how peer mentorship networks could positively impact student experiences of learning in online HE.** Especially considering that the integrated results confirm and expand the role of peer mentoring as an identified characteristic of the peer collaboration and social support component. In particular, peer mentorship research could focus on successful learning strategies experienced students have developed and shared with others, and on how to organize and support learning through digital technologies and program learning environments. Bringing peer mentorship to online HE graduate programs could also support more connected forms of learning and curriculum design, in line with ecological and integrated thinking in HE more generally (Fung, 2017; Barnett, 2017).

Results also indicated that students understand the importance and value of learning within a community. For example, when asked about their experience within a learning community within his program, one participant acknowledged:

"Being a part of a community that's learning together. I think that's everything. That's almost what you're paying for. I mean, you're paying for two things, you're paying for some guidance, some direction, some expertise, and you're paying for socialization. You're paying for an audience basically. Collaborators. People to go through the experience with". (Matt)

The centrality of building learning communities found in the QUAL strand can be linked to two frameworks for supporting student learning across contexts, including both socio-constructivist and connectivist approaches which support forms of networked learning (Dron & Anderson, 2014; Greenhow & Lewin, 2016). These frameworks are particularly useful as each have distinct features and characteristics which can support life-wide learning (Barnett, 2011) through a fusion of both formal (communities) and informal (networks) approaches.

Additionally, both positive and negative views were identified among case-study participants of their experience in peer collaboration. On balance, there were more positive experiences than negative, indicating that students generally benefited from and sought social support and collaboration in meeting the requirements of their program. For example, the quantitative survey results indicated that 69.7% of respondents viewed that regularly interacting is either important or very important to their success as a student, while only 13.5% of the population felt that it is either not important or only slightly important. By way of example, many used informal course community building as a learning strategy in meeting curriculum requirements, indicating **finding motivation and accountability** from social support of their program colleagues.

Although it was evident that peer collaboration offered advantages to student learning, being identified as a common learning strategy across a range of contexts, there were disadvantages identified which appear related to peer participation and engagement, linked to the dynamics of learning individually and collaboratively. Students felt there was a disparity of contributions from their peers, demotivated by lack of peer response, and that forum engagement was not continuous or conducive to 'real dialogue'. Students also reported feeling that peer engagement in forums and debates were highly linked to the assessment structure. Likewise, students also reported a sense of isolation, linking directly to a significant paradox identified in online adult learning (Cox, 2018), where participants often work alone, behind a digital screen yet simultaneously connected to a broad network of colleagues, often across international boundaries and cultures. This phenomenon has been described as being 'alone together' by Turkle (2011) and has been explored in a study by Cox (2018) who suggests that the

'alone together' paradox can support both informal and incidental online learning. Below, two student quotes reflect the 'alone together' paradox, which can be a reality among online learners.

> *"I do kind of feel isolated at times, although there is a lot of interaction that we have, at times I will feel that I am along on my own island and I only plug into that island on a screen" Matt*

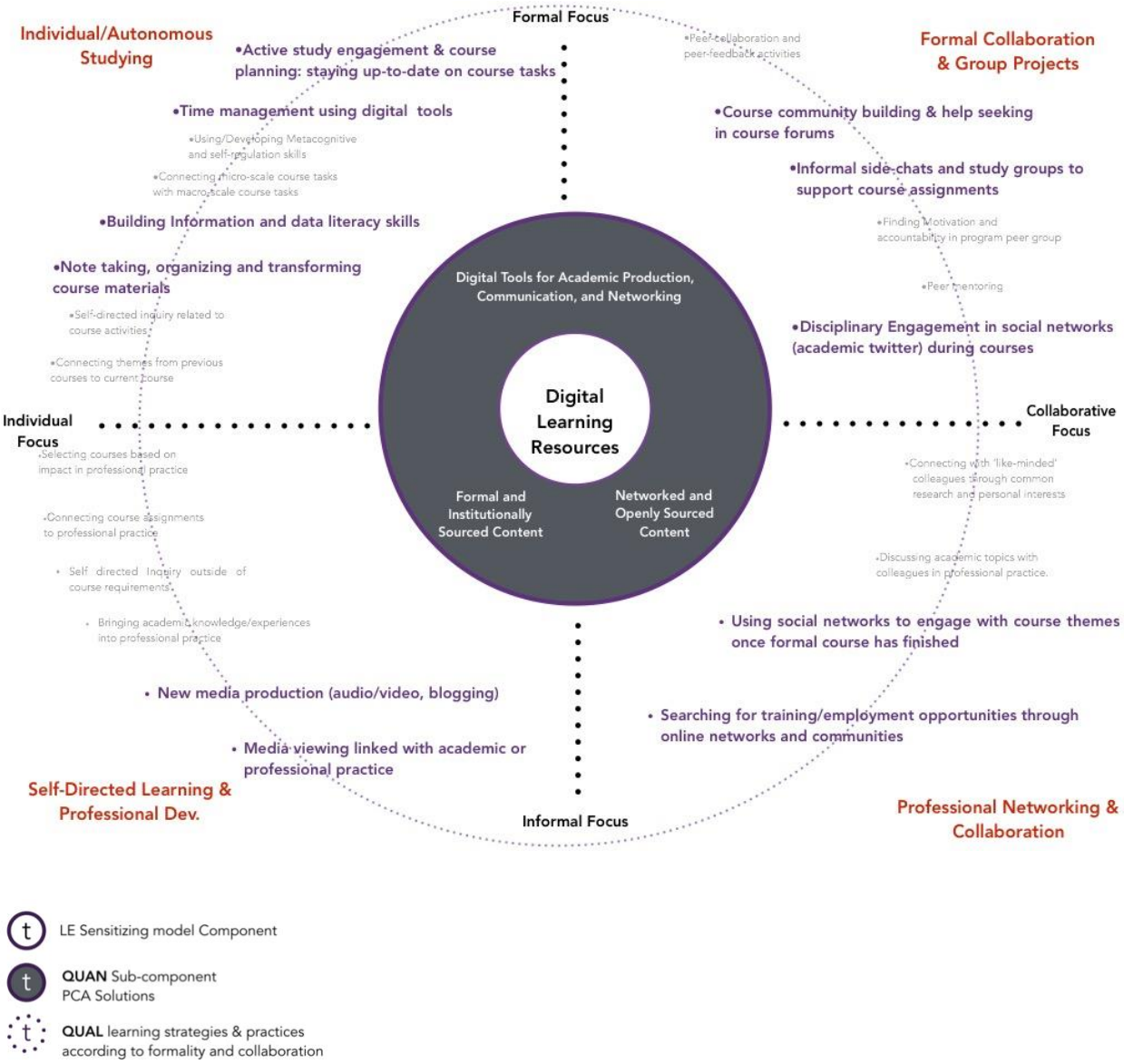
> *"There are a few people who are very active, I'd say there's like as far as names of people that I feel connected to, it's probably like five people, even though there's like 50 people in a course." Olivia*

These findings **demonstrate how students may be experiencing feelings of isolation**, and subsequently can be explored by program teams who could consciously raise awareness of the polarities of learning 'alone' and learning 'together' in online contexts, including the positive and negative qualities of collaborative and independent study. Building such awareness is indeed part of reaching the full potential of collaborative learning, an essential component of the LE construct. Exploring the polarities of collaborative learning in formal coursework may also help mitigate the sense of isolation and vulnerability that can occur in online learning environments, particularly in graduate programs with rigorous academic routines.

The integrated results on peer-collaboration and social support also bring empirical corroboration to current understandings of emerging pedagogies (Velatsianos, 2016) and boundary crossing learning. Many of the key features of emerging pedagogies, particularly the social dimension, can be identified in the results as students recount their experiences of learning collaboratively. In particular, the process of learning as co-constructed in knowledge communities and transferred and applied in real-world contexts (i.e. in the professional contexts of course participants) was acknowledged in the community oriented themes as an advantage of peer collaboration. Emerging pedagogies are continuous and collaborative and based on socio-constructivist and connectivist pedagogies where the learner actively participates in the learning process through not only self-regulation, but through social shared regulation (Gurung, 2013; Gros, 2016; Velatsianos, 2016), as can be seen in the current thematic results. Another quality of emerging pedagogies is that learning is differentiated according to students' needs and interests, and as evidenced in thematic results, students connected with like-minded course colleagues based on similar personal and research interests for collaboration and support, as well as used online networks and communities to search for employment and training opportunities.

7.2.3.3 Digital Learning Resources to Support Online HE

Figure 7.6 LE Matrix with Digital Learning Resources Component Focus



The Learning Resources component visualization in the above Figure 7.6 has been developed to integrate the sub-component categories developed through QUAN PCA, represented in the inner ring, interfaced with the QUAL findings on learning strategies and practices which have a particular focus on tool & technology use (in bold purple). The sub-components identified in the QUAN strand include i. Digital Tools for Academic Production, Communication, and Networking, ii. Networked and Openly

Sourced Content, as well as iii. Formal and Institutionally Sourced Content. The visualization is designed in recognition that learning resources and artefacts (both physical/material and digital/virtual) are not used in isolation, but through the selection by learners who are engaged in boundary crossing and emergent learner activity. Therefore, this section will discuss those strategies and practices that are highly tool and resource dependent, recognizing that most learner activity requires selecting, navigating and benchmarking a range of tools and technologies.

Results indicate that when the findings from the two sources are integrated through a joint display they primarily offer both confirmation and expansion. There is slight discordance as the qualitative thematic results demonstrated that students do use offline/physical resources to support learning, including printed course materials for reading, as well as for note taking and drafting assignments using pen and paper. As the quantitative scales within the survey focused on digital resources only, such an inconsistency may be explored in further research, accounting for the shifting nature between physical/material and digital/virtual resources.

As the PCA solution in the joint-display reflects, a range of Web 2.0 tools and technologies for multimodal and multimedia knowledge making were represented, with a significant emphasis on collaborative communication and social networking systems, as identified across both strands of data sources, pointing to similar a conclusion and giving greater credibility to the overall results. Additionally, in the thematic analysis, case participants identified personal digital devices, including device workspace, storage structure, and connectivity as important resources necessary for learner activity. These findings also reinforce the situated character of online learning in both physical and virtual contexts, mediated through both physical and digital tools, artefacts, and resources.

In order to respond to the academic curriculum **students must seek a range of educational content,** the majority of which is in text form through articles, chapters and books, however multimedia texts are also used such as video and audio. Much of the educational content is prescribed and accessed through the course LMS or the virtual library of the university, however, given the inquiry-driven research designs, it is expected learners will navigate, evaluate, read and assimilate information and content beyond what is prescribed or suggested in the curriculum, and, as several cases mentioned, sometimes not necessarily scholarly or academic content. Two broad digital education content categories emerged through the PCA, from networked and openly sourced to more formal and

institutionally sourced content. As one student responded to which resources she sought out or used to support her learning, she reflected in the below quote.

> *"As a starting point, obviously a lot of the suggested or prescribed readings for the course. Because it's post-grad as well, it's kind of expected to go beyond that, so you use that as a starting point. From that, I would probably use google scholar, and sometimes other search engines, not necessarily scholarly articles, access them through the library or through somewhere else. They are there, they are open, probably pick up twitter there as well, find interesting articles." Silvia*

The integration of separate qualitative and quantitative strands allows inferences to be made about how task designs in the academic curriculum influence how students will select and navigate a range of tools, technologies and content. By way of example, a text-based individual written reflection on a blog requires distinct resources than the design of a multimodal visual presentation or a collaboratively authored case-study or project proposal, and students will use tools and technologies accordingly, based on need, interests, motivations, and individual competency working in digital learning environments.

As was confirmed in the findings, when browsing and researching content through self-directed inquiry**, learners will engage across a continuum from more institutionally sourced, to more openly networked content, depending on the demands of the task and the interests, motivations and needs of the learner.** For example, to engage in guided weekly readings, students may use those prescribed texts from institutional sources and when approaching more independent and autonomous study and inquiry-driven learning, students will likely look for more openly networked content and resources across the web, using a range of search engines (i.e. google scholar) and social media platforms (particularly Twitter), as seen in the thematic network analysis presented in Chapter 5.

Clearly, as students engage in their coursework, they will be challenged to select, explore and benchmark new tools and technologies to assist them in meeting learning challenges to produce learning outcomes. Certain learning challenges, however, may cause problems for students as they feel overwhelmed by the variety and complexity of new technologies. It is important to consider that one of the impacts of students' experience of studying online is developing disciplinary confidence as the program progresses, including building awareness and experience in using a variety of new technologies for learning (see section 7.4.4), captured in the below quote:

> *"And I think the other really important part of this course is it made me way less concerned about the technology. I'm way more confident in using the technology now, and just looking at setting up some podcasts." (Ashley)*

In line with the literature of mobile learning in online HE, a recent international case-study (Krull, 2018) found that students access multiple devices (on average between 3 and 4) while demonstrating high levels of expertise in using their devices. Results of the study indicate that the use of multiple devices has a significant impact on changing study habits, including being able to study in more places, at more times, and being more connected and flexible in their learning. Krull (2018) likewise proposed a continuum of seamless learners, in order to characterize students' seamless experiences of using digital devices across contexts to support their learning in online HE. Capturing this view of flexible and seamless learning, one respondent reflected on her study habits in combination with raising a family, in the below quote:

> *"I've got a son in preschool. In the morning, I try to use that time to to study and then in the afternoon, I'm usually distracted with him. In the evening I'll try to work again, and there's pockets of time. While my son is at the park, or the pool, I'm multitasking. Most of the content, almost all the content is accessible online….Being able to do research on my phone…I can be tracking down what I'm looking for. Emailing it to myself…That's the other thing that helps to make progress, is the ubiquitous nature". Olivia*

As the results clearly show, **students engage across a range of conceptual zones of learning according to formality and collaboration, and the role of digital tools & technologies as well as digital content is both essential and evenly identified across all of these zones.** By way of example, **autonomous study** requires a range of tools and content that assist in course planning, critical thinking, note taking, and knowledge management and production, while **formal collaboration and group projects** requires a range of creative and collaborative tools that allow for effective communication and active knowledge making through multimodal tools. More informal learner activity requires professional networking and engagement in online communities and groups, as well as new media viewing and production. Such results reflect the rise of pervasive use of digital media tools and social software in everyday life, resulting in the challenge of complex and rapidly transforming work and learning environments. Such transformations are driving a new generation of learning resources (Downes, 2019), and leading to what some observers have defined as Education 4.0 in HE (Salmon, 2019), creating access to seemingly limitless digital resources available for self-directed and interest driven learning, particularly with the rise of OER's and OEP's in HE (Kalz et al., 2017). Stretching the use

of digital tools and technologies across a range of contexts of learning, therefore, should be an emphasis of online HE, benchmarking new digital skills and competencies across a range of scenarios.

7.3 LE Model in Online HE

The current section responds to RQ2 in aiming to understand what components configure the learning ecologies of online HE students.

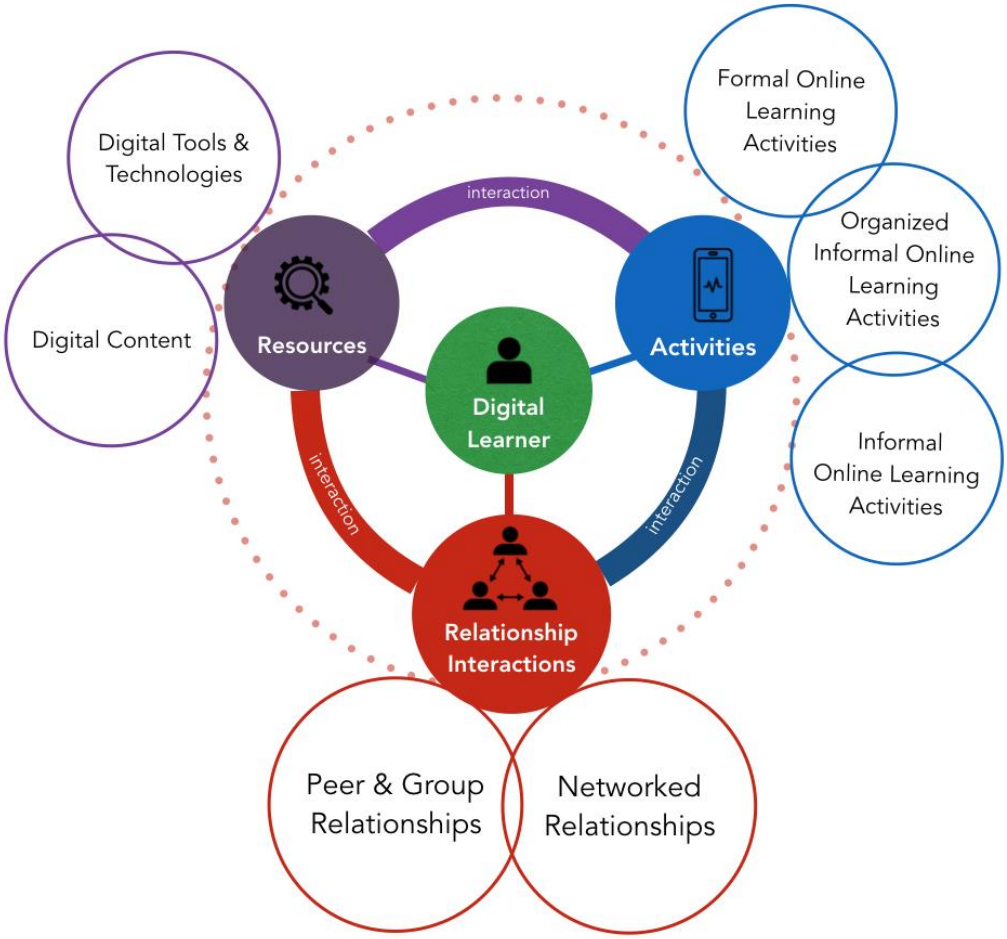
7.3.1. The LE Model: From Initial Sensitizing Model to Proposed LE model

Moving developmentally from **an initial sensitizing model to the current LE model** through a fully integrated MM design, including analysing and contrasting the evolution of the model, was one of the central objectives of the study. The proposed LE model represents an integrated and comprehensive conceptualization of a complex and multi-layered phenomenon; human learning that spans multiple contexts. In the initial phases of the study, developing an integrated sensitizing model served several purposes, including; **as a method to develop an ontological understanding of the construct; to define and characterize the units of analysis for the study; to build data collection instruments; and to guide and execute data analysis procedures by following an organizational scheme**. In this sense, the central components identified in the initial sensitizing model constituted the units of analysis (i.e. activity, resources, relationships) for empirical research. As presented in previous chapters, the rationale for developing a LE model as a framework for empirical work is motivated by trying to understand how students initiate, experience, navigate and participate in learning that spans multiple contexts and is amplified by a range of digital tools, technologies, and environments. Presenting the mixed methods results in the form of a proposed LE model in the current discussion is in agreement with Tashakkori & Teddlie (2009), who articulate that the most important step of a mixed methods study is "when the results (i.e. findings, conclusions) from the study's QUAN and QUAL strands are incorporated into a coherent conceptual framework that provides an effective answer to the research questions" (p.249). In this regard, this section will present the evolution toward a coherent model founded in empirical field work which addresses the central research questions and purposes of the study.

The below Figure 7.7 presents the sensitizing LE model which was used in the conceptualization phase of the study. This model comprised three central components outlined in the inner ring, with a range of sub-components developed and adapted to the context of student learning across contexts in online HE. Central features of this model is the learner as the central node of their own ecology, and

that learning emerges through the interaction of the central components leading to opportunities for learning. Here, in this model, the central components are clearly separated demonstrating clear distinctions between them.

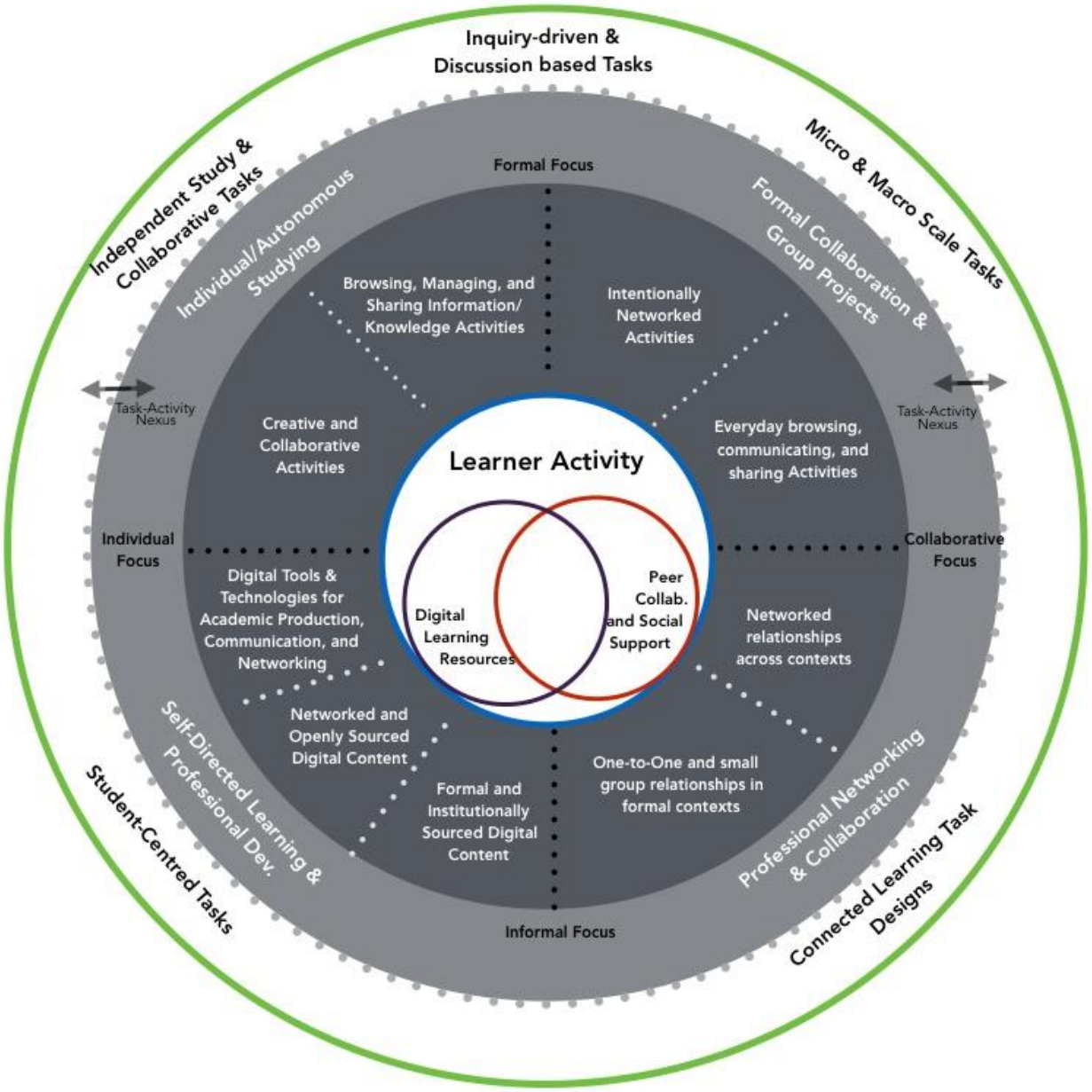
Figure 7.7 Initial Sensitizing LE Model



The sensitizing model will now be compared and contrasted to the proposed LE model, visualized below in Figure 7.8, using a joint display to integrate the mixed methods results. Differentiating from the initial model, the current LE model features four clear dimensions: **(1.)** *Central LE Components developed from sensitizing model,* **(2.)** *Sub-components of the Central components yielded from PCA solutions from the quantitative strand* **(3.)** *learning strategies and practices according to formality and collaboration developed from qualitative strand and* **(4.)** *Thematic Traits of the Academic curriculum that influence learning activity through a task-activity nexus developed from the*

qualitative strand. The boundaries represented here in this model are designed to be fluid, reflecting the mobile, integrated and interconnected character of ecological systems. The central components include **Learner** Activity, representing those activities and strategies identified by students in supporting academic learning across both formal and informal, everyday contexts. The **Learner Activity** component is positioned at the center of the model, claiming centrality as student activity drives both resource use and peer collaboration, and as such is the primary influence on what a student does to learn. Positioned within Learner Activity is Peer Collaboration and Social Support and Learning Resources, likewise positioned as central components. These components are understood as being features of learner activity. By way of example, learner activity across contexts may occur with or without others, and may occur with or without the use of tools and/or artefacts. However, given the structural complexity of online HE, learner activity likely involves a variety of both collaboration and resource use.

Figure 7.8 Proposed LE Model in Online HE



LE Sensitizing Model Components

QUAN Sub-component PCA Solutions

QUAL learning strategies & practices according to formality and collaboration

QUAL traits of Academic Curriculum

As can be seen, both models share three central components (learner activity, resources and relationships), however in the current model, the primacy of learner activity is emphasized, understanding that both peer collaboration and digital learning resources are components which are operationalized and used through learner activity. As such, in the current model, the components of peer collaboration and digital learning resources are placed within the core component of learner activity. Another similarity between the two models, influenced by the coherence of an exploratory research design, is the underlying theory and ontological definition that has been used to support the LE construct. Both models maintain consistency in both the theoretical (socio-constructivist) and the conceptual and empirical definitions (ontological) used to support the construct of LE, as has been detailed in the literature review and in line with previous studies (Barron, 2006; Esposito, 2014; Jackson; 2016). Specifically, the current model uses the ontological definition of LE as both 'contexts for learning' and as 'sets of elements' to describe the units of analysis (i.e. activities, learner resources, peer collaboration and social support) of a LE. These ontological definitions align with previous studies which focused on technologically mediated learning linked with socio-constructivist approaches (Barron, 2006; Esposito, 2015; Sangrà et al., 2019 a). Under this view, framing the LE construct as 'contexts of learning' and 'sets of elements' supports the idea of a range of social contexts—from formal to informal--where the learner can interact and build knowledge through social interactions and available resources. Maintaining theoretical and ontological coherence is an important step in overcoming one of the central issues facing the LE construct in reaching its full potential; namely the diversified, incoherent and fragmented ways it has been both defined and applied in educational research.

When contrasting the two models, there has been expansion through integrating the mixed methods findings, including nuance in the terminology used for developing each component. Further, the current model has been expanded by adding emergent dimensions resulting from the qualitative strand, including representing **the task-activity nexus (Ellis & Goodyear, 2013)** by adding the following dimensions: **(1.) conceptual zones of learning strategies and practices yielded through thematic analysis (grey ring) and (2.) salient traits of the academic curriculum through thematic analysis of academic learning tasks (outer white ring).** These expanded elements of the proposed LE model have been discussed at length in section 7.2. Expansion can be explained through iterative analytical and integrative work which has allowed for more precise and nuanced terminology to emerge in defining LE components, subcomponents and additional factors which impact student experiences of learning. By way of example, through principal component analysis, subcomponents have been determined through

variable reduction techniques, offering insight into the underlying structure of a particular LE component (i.e. networked relationships or intentionally networked activities).

The most **significant differences** lie in the sub-components identified in each model. Again, the nuances in the identification of sub-categories is derived through both quantitative PCA and qualitative thematic analysis. The sensitizing model was developed through abduction as an attempt to reason to the best possible explanation of the phenomenon under study. In contrast, those components and sub-components identified in the proposed model have been expanded and derived through rigorous analytical and integrative processes as outlined in the methodology and results sections. In contrast with the sensitizing model, the most notable differences come from the learner activity component section, where more precise, detailed and multi-layered dimensions of activities have been identified through both PCA (quantitative) and retrospective accounts of learners' lived experiences (qualitative). Through thematic analysis of students' learning strategies and practices, a range of conceptual zones of learning have been identified, according to formality and collaboration. Finally, through qualitative thematic analysis of the academic curriculum, salient traits of academic tasks have been identified which have significant influence on student experiences of learning, visualized inside the outer green ring. Both of these salient factors which influence students' experiences of learning will be detailed in further sections.

Further, the proposed LE component model aims to integrate previously opposed learning processes and attributes along a continuum, rather than positioning them as opponents. Most notably, the LE component map integrates and accounts for the breaking down of a traditional dichotomy of formal and informal learning which has been used to conceptualize contemporary learning (Raffaghelli, 2019). As such, identified learning strategies and practices have been thematically categorized into conceptual zones of learning which emerged from qualitative thematic analysis (grey ring). These conceptual zones reflect a range of learning scenarios according to formality and collaboration represented along X and Y axis.

There are a range of caveats to consider when interpreting the proposed LE component model. Firstly, the identification, categorization and isolation of the central components and sub-components is principally done for analytical and empirical purposes. That is to say, as an integrative framework to analyze how students experience learning across contexts in online HE. Each LE component is intimately and inseparably linked through networks of interactions and relations and thus isolating each component would "lack any functional sense" (González-Sanmamed et al., 2019 p.1647). **Thus, *Learner Activity* has been placed at the center claiming centrality in relation with peer collaboration and**

digital learning resources. For example, learner activity across contexts develops through the interaction with a range of learning resources, while simultaneously relying on degrees of peer collaboration or social support. Although some tasks may be completed autonomously, many academic tasks within the curriculum require interacting with a range of social actors (peers, work colleagues, teachers, online social networks etc.). Further, peer collaboration as a LE component can be simultaneously characterized as both an activity or as a learning resource.

Secondly, the particular LE model developed in this study is explicitly linked to the broad context of emergent learning in online education, and more specifically to the context of online HE within the graduate education in the social sciences. As such, the proposed model would likely need to be adapted in order to be appropriate for researching learning in other contexts (i.e. K-12 public school, workplace learning, etc.). For instance, although activities and resources may be similar between adult and non-adult learners, there are potential differences between the range of relationship variables between these same two populations. This model has likewise been developed in the context of graduate knowledge work in the social sciences, and therefore may need to be adapted, particularly in relation to the characteristics of the academic curriculum in order to be applied in other fields (i.e. health sciences, chemical engineering, business, etc.).

Thirdly, although the model is designed for the context of online learning and digital education, the current study, influenced by socio-cultural and situated perspectives, sees learning as situated in ever-shifting physical and virtual contexts mediated by tools and cultural artefacts. Accordingly, as students engage in learning activities it is understood that they will be ever-shifting between digital and analog, or virtual and physical environments and contexts. Although the proposed model emphasises learning in digital contexts, it is clear that the digital domain is not the only sphere or context of learning in an individuals' life. Despite these caveats, the current study aims to account for a network of interactions and emergent activities in an integrated and interconnected way. As such, the model aims, in a small way, to contribute to the construct of LE in becoming closer in reaching its full potential of supporting educational innovation and empowering emergent forms of learning in contemporary society.

In reference with other models, the LE Component model presented extends and builds upon definitions and conceptualizations found in the LE literature (Barron, 2004, 2006; Jackson, 2016; Sangra et al. 2019) yet likewise differentiates itself as situated in the specific ecology of learning of online HE. For example, Jackson offers an LE framework relevant for traditional campus based university learning by conceptualizing an LE model with nine central components (2016), including past and future learning

ecologies; relationships; resources; contexts; spaces; affordances; the 'whole-person and processes, which refers to the actions students engage in within a learning event. Although these LE components are comprehensive and experientially rich, offering a broad conceptual account of learning and development throughout an individuals' lifespan, the limitation of such a model lies in its operationalization in empirical research.

The proposed model is most similar to Barron's (2006) confirming the central components as activities, relationships and resources. Barron articulates an ontological definition of a LE as "the set of contexts found in physical or virtual spaces that provide opportunities for learning" (2006 p.195). However, the findings differentiate from Barron's study as it examines a distinct LE context (i.e. Online HE) and population under study (adults), which can offer nuanced results on emergent forms of self-directed and self-sustaining learning across multiple contexts.

An advantage of the propposed LE model is that it has been developed through empirical field work, including an innovative and integrated mixed methods design with application in real world educational processes. The model is capable of being methodologically applied to research both educational processes (teaching & learning) and products (online HE programs & services). It can be used by a range of stakeholders in the educational process, including program design teams, instructional designers, as well as individual learners as a way of diagnosing learning needs and empowering self-directed learning processes. Likewise, through the use of data integration, both in the research design phase, and in the data analysis and interpretation phase, the LE model was developed through mixed methods results that are greater than the sum of the individual qualitative and quantitative strands, and capable of accounting for a more comprehensive view of the phenomenon under study.

In contrast, an obvious critique or limitation of a LE model can be made from a reductionist perspective. In particular, as the current study explores a complex and multi-faceted phenomenon of human learning, identifying and analyzing components of an individual's LE may be critiqued as ontological reductionism. That is to say, the process of reducing an individuals learning ecology into definable and categorical components subscribes to a belief or assumption that the phenomenon of human learning consists of a minimal number dimensions.

7.4. Learner Attributes & Profiles in Online HE

The current section responds to RQ3 in aiming to understand what learner profiles can be detected among online HE students, based on their experiences of learning across contexts. Learner

attributes and profiles are discussed in light of both quantitative and qualitative findings. The current section aims to identify a range of learner profiles based on student experiences of learning across contexts in supporting academic learning, one of the central objectives of the study. The cluster profiles are based on student views of their learning experiences in relation to LE components, while the cross-case learner attributes have been thematically developed through qualitative analysis.

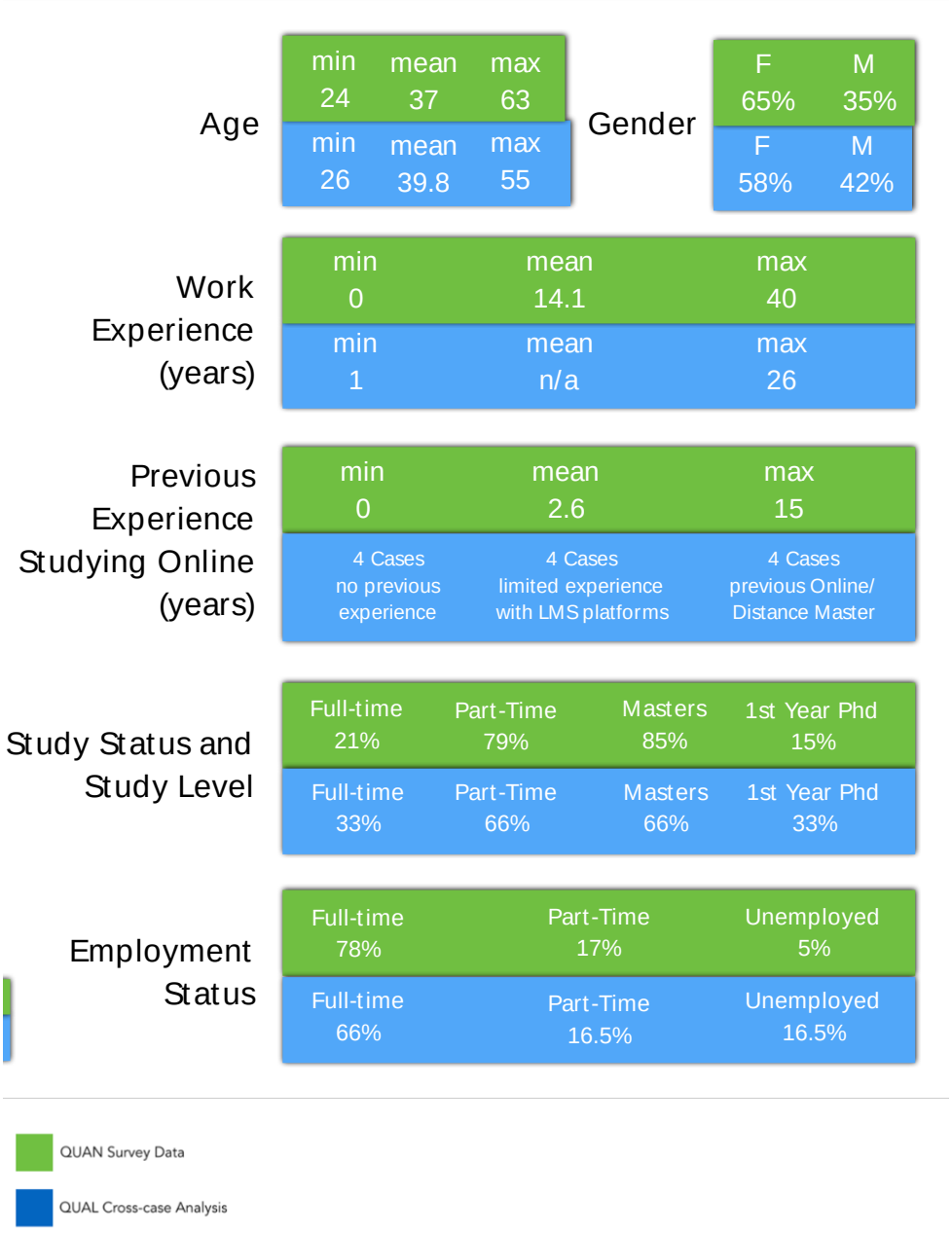
7.4.1 Professional and Academic Trajectories

Mixed methods data integration allows inferences to be made through a narrative account which weaves both strands of findings together, demonstrating that online graduate education programs tend to have a wide and varied profile in relation to professional and academic trajectories represented in the population. That being said, there is a general socio-demographic profile that characterizes participants in such programs. On average, the majority of students (46%) will have a range of professional experience between 6 and 20 years (m=14.1 years), be employed full-time (76.4% of the population), while the most common age range is between 24-43 (72% of the population) with an average age of 37. That being said, as such programs attract lifelong learners, 27% of the population can represent mid to late career profiles between the ages of 44 to 69. Likewise, students generally have previous experience studying online, on average 2.6 years, and 12.4% have completed an online undergraduate degree, while 10% have a previous graduate degree completed online. These findings align with previous studies of online and distance higher education who characterize learners as diverse in age and work experience, and confirming that the majority of students work as well as study (Schneller & Holmberg, 2014; Krull, 2018; Clinefelter et al. 2019). Further, the qualitative case-study data allows us to have a more nuanced and in-depth view of learners' previous experience online. By way of example, participants represented a range of experience where 4 cases had no prior experience, 4 cases had limited experience, and 4 cases had previous online graduate degrees.

The below Figure 7.9 integrates both strands of results by using a side-by-side comparison joint display (Guetterman al., 2015) representing the academic and professional trajectories among the quantitative survey data and the qualitative case-study data. The display demonstrates complementarity across many of the variables by integrating statistical generalizability (quantitative) with analytic generalizability (qualitative), confirming that the case study participants are, in general lines, representative of the population under study. Incongruence between the case-study and the

broader population is found in the study level, where 33% of cases were 1st year Doctoral students completing course work, compared to 15% of the population more broadly. It can be seen that 78,7% of survey respondents were studying part time, while 84.8% were studying at the Masters level and 15.2% of respondents were completing course work in their first year of their Doctoral program. The distinction and qualitative differences between between Doctoral students and Masters students in how they experience learning is also important to note. This is particularly true as doctoral students are preparing for more intensive and rigorous research projects, over a longer period and likely to have more intensified and demanding experiences studying online (i.e. longer hours of study and dedication and larger projects and assignments) then their Masters counterparts.

Figure 7.9 Side by Side Comparison Display of Academic and Professional Trajectories



In line with the literature of online university students' motivations (NCES, 2019), the qualitative evidence demonstrated that career advancement was a significant factor among case-study participants. The career advancement factor could range from developing curriculum in order to secure a public teaching job early in your career (as in 2 cases from UOC), to developing mid-career

opportunities and even advancing in a later-career trajectory, for example, working in academic contexts. In the quantitative strand, professional and family life flexibility was also identified as the most significant factor in choosing to study a fully online model in HE, indicating that students appreciated the ability to work and study simultaneously.

Although the literature has at times characterized this population of student as intrinsically motivated and capable of employing cognitive strategies necessary to succeed online (Styer, 2007) including having a strong academic self-concept, exhibiting fluency in the use of online learning technologies and self-directed learning skills (Dabbagh, 2007), it is important to consider that not all students will demonstrate such characteristics. As has been discussed, some students may lack basic learning skills and even confidence or a strong sense of agency in learning. As online HE becomes a more popular, accessible and flexible choice for busy professionals, there may be disparities in the experiences, capabilities and competencies among students that may need to be addressed when designing the academic curriculum, particularly at the onboarding initial phase of the program.

The thematic network analysis likewise identified both previous positive and negative experiences with studying online. Such previous experiences can impact students' choice of program of study and interest or motivation in studying online. As could be expected the qualitative results suggest that previous experiences may lead to a lifelong interest in e-learning for professional development, where students fall "in love with with the concept of e-learning" (Olivia). Previous negative experiences or challenges in formal education, both online and in campus based institutions, may likewise influence students to have greater feelings of anxiety and doubt as they enter the program. Again, effective program introduction and on-boarding in the critical stages of entry into the program could mitigate some of these issues. For example, some students may be entering a graduate program after previous attempts to obtain a Masters degree were unsuccessful. Other past negative experiences were linked to online learning models that were based on transmission models with exam based assessment structures, where the learner felt there was little impact on her learning, as exemplified by Lydia who expressed she "completed a preparation course online… I read the information, I filled out the tests, that was the experience. 660 hours of formal courses…I did not learn anything".

The mixed methods results show that the population of online graduate students represent a heterogeneous and diverse population with a wide-range of previous professional and academic experiences, in both traditional university settings and in online education contexts. The variability of these past trajectories will have an explicit impact on students' experiences of learning, and in particular learning across contexts. For example, how learners in early, mid, and late career trajectories connect

learning into their professional domain, as evidenced in the cross-case analysis, will vary depending on the current professional context, and the motivations, interests and needs of the individual learners. Certain learners will be encouraged and sometimes economically sponsored to study through their current employer, while others may be unemployed at the beginning of their professional career, trying to build their resumes and gain points which go toward calls for highly competitive public positions in education.

As can be inferred from the qualitative results, individual trajectories are a major influence on student readiness and capability. As such, it is important to recognize the diversity and variability of individuals' academic and professional trajectories and capabilities, using such diversity to enrich the experiences of students, while mitigating some of the potential deficits that may exist in basic academic and study skills that some students may lack as they enter the program. Students unique patterns of readiness, previous professional and academic experiences, interests and needs should be considered when programs design educational activities, and the learning process itself may also be differentiated on a variety of levels. By way of example, as Haniya & Roberts-Lieb (2017) articulate, a variety of characteristics of a learning experience can be differentiated through intentional task design, including learning resources/content, the process itself, the product or outcome, as well as the learning environment.

7.4.2 Integrating Learner Attributes & Profiles

The quantitative strand of data collected in this research aimed to understand how students experience learning in online HE, through their views on the activities, resources and relationships they used to support academic learning across contexts. Advanced quantitative procedures, including PCA and a hierarchical cluster analysis presented in Chapter 6, yielded quality solutions in the identification of four learner profiles. This analytical procedure involves data transformation by qualitizing quantitative data (Fetters et al., 2013) by "converting quantitative data into narrative representations that can be analyzed qualitatively" (Onwuegbuzie et al. 2011 p.1263). Here, profiles were differentiated and identified on a profile continuum in terms of student experiences of learning in online HE, from 'inactive networkers and limited tool user and creators' to 'knowmadic learners' who actively engage in a range of activities and practices across contexts to support their learning. The qualitizing process reflected here is a popular way of transforming quantitative data through narrative profile formation by creating narrative descriptions from numeric data (Onwuegbuzie et al. 2011) and then compared or integrated with qualitatively accessed data (Fetters et al., 2013). As has been detailed in other sections,

the complex and multifaceted phenomenon of student learning operates on a continuum, from formal to informal, collective to independent, self-directed to teacher-directed and ever shifting between physical and digital scenarios across multiple contexts. Accordingly, among the identified learner profiles, adjacent profiles along a continuum are often less perceptibly different from each other, although the extremes of the 4 presented profiles are quite distinct, as is represented in Table 7.1 below.

Table 7.1: Continuum of Learner Profiles based on Qualitized Numeric Data From Student Experiences of Online Learning Survey

	Creative and Collaborative Activities (i.e. integrating content, creating your own content, applying different tools & resources in solving problems, collaborating in the co-creation of resources & knowledge)	**Intentionally Networked Activities** (i.e. mentoring, volunteering, online communities and interest groups, interacting with peers)	**Digital Tools for Academic Production, Communication and Networking** (i.e. multimodal editing tools, social networking systems, communication tools and data analysis and gathering tools)	**Networked and Openly Sourced Content** (i.e. content accessed on social media, personal websites, blogs, wikis, online games/virtual worlds,mass media and OER's)	**Networked Relationships Across Contexts** (i.e. online relationships with peers inside and outside of work and across professional social networks)
1. Inactive Networkers, limited Tools users & Creators (15.7%)	low engagement	low engagement	low digital tool use	low use of networked and openly sourced content	low relationship engagement
2. Tool User and Inactive Networker (26.9%)	slightly lower than average engagement	low engagement	average digital tool use	average use of networked and openly sourced content	low relationship engagement
3. Lifewide Learner (31.4%)	comparatively low engagement	above average engagement	below average digital tool use	average use of networked and openly sourced content	above average relationship engagement
4. Knowmadic Learner (25.8%)	significant engagement	comparatively high engagement	Above average digital tool use	significant use of networked and openly sourced content	significant relationship engagement

It is likewise important to note that there is a particular dearth of research on attributes and profiles of learners in online HE using mixed methods techniques, particularly from an integrated and connected

perspective. Although much attention has been given to defining learner profiles and analysing learner experiences in MOOC's, often from a quantitative behavioural engagement perspective (Saadatmand & Kumpulainen, 2012; Kahan et al., 2017; Poellhuber et al., 2019), there has been little attention on how students experience or navigate learning across contexts. Recent quantitative studies have dealt with learner behavioural engagement through univariate analysis (i.e. pdf lecture slides viewed, or total comments written), profiling MOOC users through cluster analysis and defining a range of profiles including; self-assessor, serious reader, active/independent and active/social (Poellhuber et al.,2019) as well as disengagers, offline engagers, online engagers, moderately social engagers and social engagers (Kahan et al., 2017). Kahan et al.'s study, for example, is limited by using a univariate analysis, where the units of analysis are focused only on singular activity and and specific behaviour (i.e. downloading course reading, viewing video, completing quiz), without considering the complexity and interconnectedness of learning in online environments. Such studies likewise ignore the role of peer collaboration and social support. Below, in comparison with the literature, a narrative summary of learner profiles yielded by qualitizing numeric data through cluster analysis and data transformation is detailed.

1. Inactive Networkers, Limited Tool Users & Creators

At the inactive end of the profile continuum, the profile of inactive networkers, limited tool users & creators is most closely linked to disengagers or serious reader (Kahan et al., 2017; Poellhuber et al., 2019) in the literature. This profile is furthest from profile 4, yet less perceptibly distinct from profiles 2 & 3.

2. Tool User & Inactive Networkers

This profile is similar to active/independent or online engagers in the literature (Kahan et al., 2017; Poellhuber et al., 2019), using a range of tools yet engaging slightly lower than average in creative and collaborative activities.

3. Life Wide Learner

The Life Wide Learner profile is perceptively similar to both profile 2 and 4, and exhibits attributes similar to active/social and social engagers in the literature (Kahan et al., 2017; Poellhuber et al., 2019). This profile is noted for using open and networked sources of content for learning, and using networked relationships across a range of contexts to support their learning.

4. Knowmadic Learner

At the active end of the profile continuum, the Knowmadic Learner is perceptively similar to profile 3, particularly in their networked activities, content, and relationship interactions, and very distinct from profile 1. It exhibits attributes similar to active/social, social engagers (Kahan et al., 2017; Poellhuber et al., 2019), as well as what Cobo and Marovec (2011) characterize as 'knowmadic worker'. Likewise, the knowmadic learner exhibits traits linked to the developmental stage of creative appropriation presented in Sharpe and Beetham's developmental model for effective e-learning (2010).

Thinking about the concept of 'knowmads' can be traced to Moravec (2018) who first contemplated the attributes of knowledge nomads in a networked society on a blog post in 2003 as a PhD student. In particular, the 'knowmadic worker' profile identified by Cobo and Moravec (2011) who detail a range of attributes can be compared with the attributes evidenced in the mixed methods findings. Although not all traits were corroborated through empirical evidence, many were. By way of example, Moravec's (2018) 'knowmadic workers' are not restricted to a specific age and as the integrated mixed methods results demonstrate, learners in online HE are likewise not restricted to a specific age, reflecting a varied range of academic and professional trajectories, and by consequence, a broad age range, from 24 to 63 years old. Another attribute is that *knowmads* are highly motivated to collaborate, and are natural networkers, navigating new organizations, cultures, and societies: many cases demonstrated high motivation to collaborate and by their mere participation in their respective degrees, they demonstrate navigating new organizations, cultures and societies. Most online learners, for instance, are navigating a new university organization as they enter their studies, experiencing new academic and disciplinary perspectives, and some are adapting to academic work in an entirely new national or international context or society.

Knowmadic workers equally use new technologies purposively to help them solve problems and transcend limitations. Throughout the thematic analysis, students reported discovering, evaluating and benchmarking new technologies purposively to help them solve problems and meet required learning outcomes. Others mentioned self-directed inquiry and production using new technologies, for example by producing podcasts or videos. Another noted attribute is **being** open to sharing what they know, and invite and support open access to information, knowledge, and expertise from others. Through forum contributions, open blogging, peer-feedback, group projects and informal community building, several case-study participants demonstrated an openness to sharing their experiences and current understandings and in some cases engaged in informal peer-feedback on written assignments in order to improve their work and support their learning.

A further attribute includes developing habits of mind and practice to learn continuously, and as students recounted their learning strategies and practices, it was evident they had developed routines and habits of mind for continuous learning. Further evidence has been demonstrated in the mixed methods results, particularly the socio-demographic profile of learners, this particular trait was visible in participants longer career trajectories who had been engaged in professional updating for more than a decade, some having previous graduate degrees as well as experience with other forms of professional

learning in online contexts. Developing continuous habits of learning is in line with previous studies that have demonstrated that online learners develop learning practices over time and developmentally (Sharpe & Beetham, 2010; Sharpe, 2017; Krull, 2018).

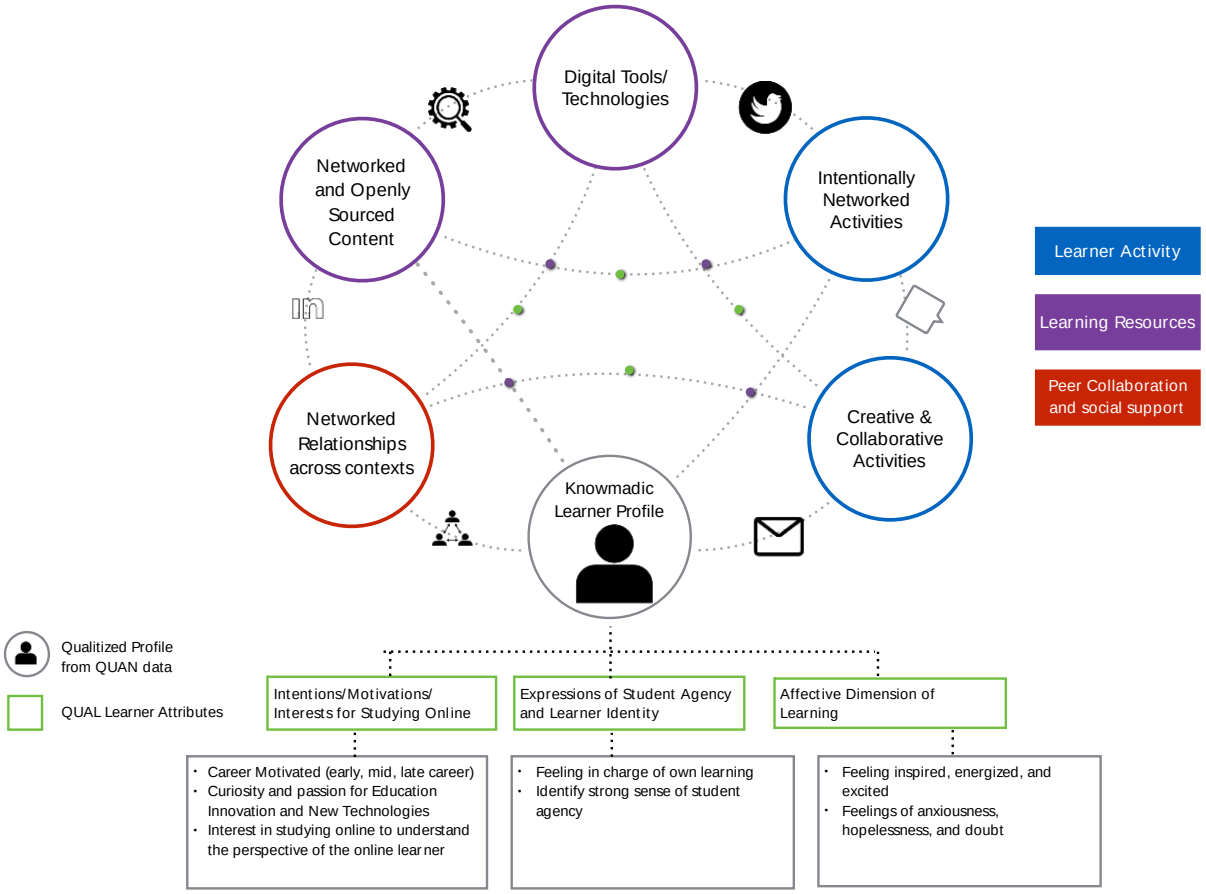
Moving now to qualitatively accessed data, learner attributes have been identified through thematic analysis that can be integrated and compared with the qualitized numeric data. Learner attributes identified in the qualitative thematic analysis in chapter 5 have been integrated through a joint-display with qualitized learner profiles from the quantitative strand in Figure 7.9. Although not exhaustive of the entire range of possible individual traits, the joint display links three clear lines of learner attributes; including **(1.)** interests and motivations; **(2.)** student agency and learner identity; and **(3.)** the affective dimension of learning, including experiencing both positive (energy, excitement, inspiration) and negative (anxiety, hopelessness, and doubt) emotions with a qualitized learner profile yielded from quantitative numeric data. In the qualitative strand, the individual attributes relate to the LE dimension Jackson (2016) refers to as the 'whole person', where an individuals learning ecology is "self-motivated, self-directed, and self-regulated" (p.73). Inferences can be made about how individual will, agency, and integrated thinking allow learner attributes to be put into action through planning, reflection and task execution, essential processes of learner activity.

The evidence presented in this thesis reflects how individual learner attributes, including those identified above, help (or hinder) learners as they set out to meet their learning goals through activity. Learner attributes can also be understood as an essential dimension of how students engage in their learning experiences, and can contribute to an understanding of how attributes such as those identified in this study (i.e. intentions/motivation/interests; agency and learner identity; and affective dimension) can shape a learner's profile as they engage in online study.

Below, in Figure 7.10, a joint display of a network map represents a knowmadic learner profile in the context of online HE, integrated with qualitatively accessed learner attributes. The display has been inspired by Moravec's (2018) visualization of a knowmadic worker. As has been explained, the 'knowmadic learner' lies on one end of a continuum of learner profiles, where the other end contains the profile of 'Inactive Networkers, Limited Tool Users & Creators'. To complement the mostly qualitized display from numeric data, findings from the qualitative strand are also integrated into the display, relating learner attributes as an influence on how students experience learning through a range of strategies, relationships, tools and practices. In this display, we profile the **knowmadic learner** over

other profiles as it has been identified as an archetype profile for online learners from a connected, ecological and boundary crossing perspective. This profile, therefore, should encouraged and enabled by programs through innovative and connected learning designs. Effective designs to build skills and competencies developmentally of knowmadic learners will, as the results suggest, foster creative, innovative learners who can work collaboratively across contexts to solve pressing educational problems and generate new opportunities for learning and professional development.

Figure 7.10: Integrated Joint Display of Knowmadic Learner Profile with thematically identified Learner Attributes



7.5. Student Conceptions of Learning Across Contexts in Online HE.

The current section responds to RQ4 in aiming to understand how students conceive of their experiences of learning across a continuum of contexts—from formal to informal—to support academic learning in online HE. This section discusses findings primarily from the qualitative strand through a narrative account. When possible, quantitative data will be weaved into the discussion in a complementary manner. This section likewise responds to one of the research sub-questions, namely; to identity how students conceive of their experiences of learning across a continuum of contexts—from formal to informal—to support academic learning in online HE. The current study contextualizes students' experiences of learning in HE unfolding in what Ellis & Goodyear (2013) term an 'ecology of learning', analysing findings in an integrated and connected way while emphasizing connections with 'the wider world'. Following, the current section will explore salient factors which impact student experiences of learning, as identified in the qualitative thematic network analysis, including; **i.**

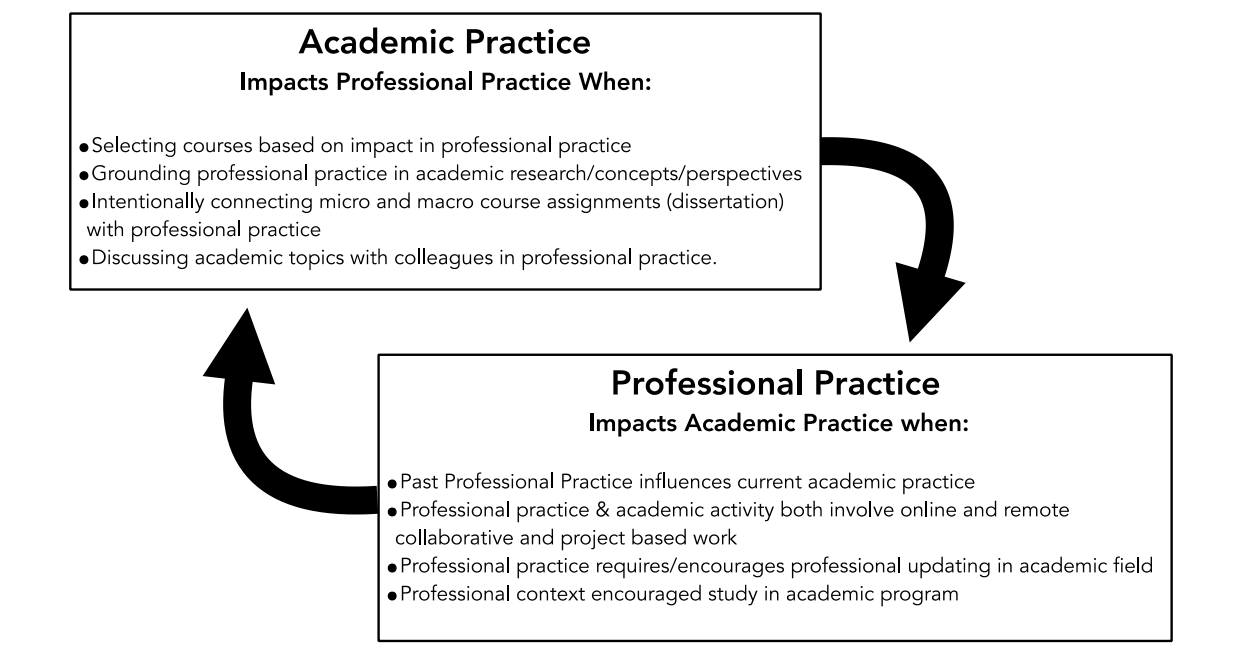
engagement between academic learning and professional practice, ii. affordances and barriers to digital learning, and iii. impact of online learning experiences across contexts.

7.5.1 Engagement between Academic Learning & Professional Practice

The thematic network analysis offered key insights into engagement patterns between the professional and academic domains, a key objective of the study presented in Figure 7.11 below. The display presents organizing themes emerging from the qualitative strand visualizing how the academic domain relates to the professional domain in the form of a graphic feedback loop, useful for explanatory purposes (Hooper, 2019). This process of engagement between professional and academic domains is also reflected in the LE Matrix in Online HE, specifically represented in the 4 distinct conceptual zones of learning in Figure 7.3. In particular, engagement between these two domains occurs across the 'Y' axis between formal (academic) and informal (workplace and socialized learning). The evidence demonstrates that in many instances, past professional trajectories can impact current academic experiences, particularly when past fields of professional practice are in the educational, creative and publishing industries, such as journalism, educational publishing, educational consulting or fiction writing, as demonstrated in the cross case analysis. Such professional trajectories can influence how students self-regulate, set goals, as well as monitor and evaluate their own learning processes, as one participant articulated:

> *"The planning piece of it (studying), and self regulation and sort of setting, I think it's really helpful for me, I did this as a fiction writer, and I also do it in the doctoral program, which is setting goals." Matt*

Figure 7.11: Feedback Loop between Academic & Professional Practice



Academic practice impacting professional practice is largely possible because, as the current findings demonstrate, a majority of participants are balancing academic study with either **full-time employment (78%)** or **part-time employment (17%).** Many students have a range of previous academic experience, including at the graduate level and in previous online degrees. Likewise, the results also demonstrate that 70% of respondents work in a field either **very related (42.7%)** or **related (27.9%)** to the field of e-learning and online education. This result shows a notable trend of students having clear opportunities for connecting and applying knowledge and experience from their academic setting to their professional domain. This reality, coupled with curricular designs which regularly link academic tasks to professional contexts (either current or future) is a fertile context for stretching and linking learning across multiple domains.

Another factor that has contributed to the intimacy between academic and professional practice in online HE has been the pervasiveness of digital technologies across all facets of contemporary life, including socialized and work life. This phenomenon has contributed to a growth of globally distributed, remote, collaborative and project based digital work environments. In this sense, online learners may be experiencing similar digitalized work flow processes in both their professional domain and in academic practice, exemplified by the following quote by Michael who expressed that his "clients are

scattered all over the world as are my peers in my program. So I think that's why it's very comfortable, the program to me, because that is how I work anyway".

Several cases (Emily, Isabel, Jose, Lydia, John) reported the need to constantly up-date and actualize professional credentials, and in some cases, professional contexts encouraged and financially supported study within the academic program (Michael, Jose, Rebecca). Such circumstances will continue to emerge as rapidly transforming society requires continuous professional updating through lifelong learning, shifting the focus of agency from institutions and teachers toward learners, requiring continuous updating in order to enhance skills and competencies (Cendon, 2018; Blaschke & Hase, 2019). For online HE programs, this means a shift from educating younger students with little to no professional experience, to navigating and accommodating a wide range of learners re-entering HE at different phases of their lives with varying professional backgrounds, levels of readiness, and learning paths.

Conversely, academic experiences may also impact current professional practice, for example, as students select programs and specialized courses based on an impact in their professional domain. Students also reported professional practice increasingly grounded in the disciplinary perspectives and conceptual frameworks of their programs (see Figure 7.5), causing an immediate impact in their professional life. For example, when asked how she links her academic experiences to her professional context, one case replied with the following quote:

> *"I mean, pretty much everything I research or write about, I tried to have it be something that I can turn around and either, deliver to a client or adapt for clients to help me be more credible in my practice." (Olivia)*

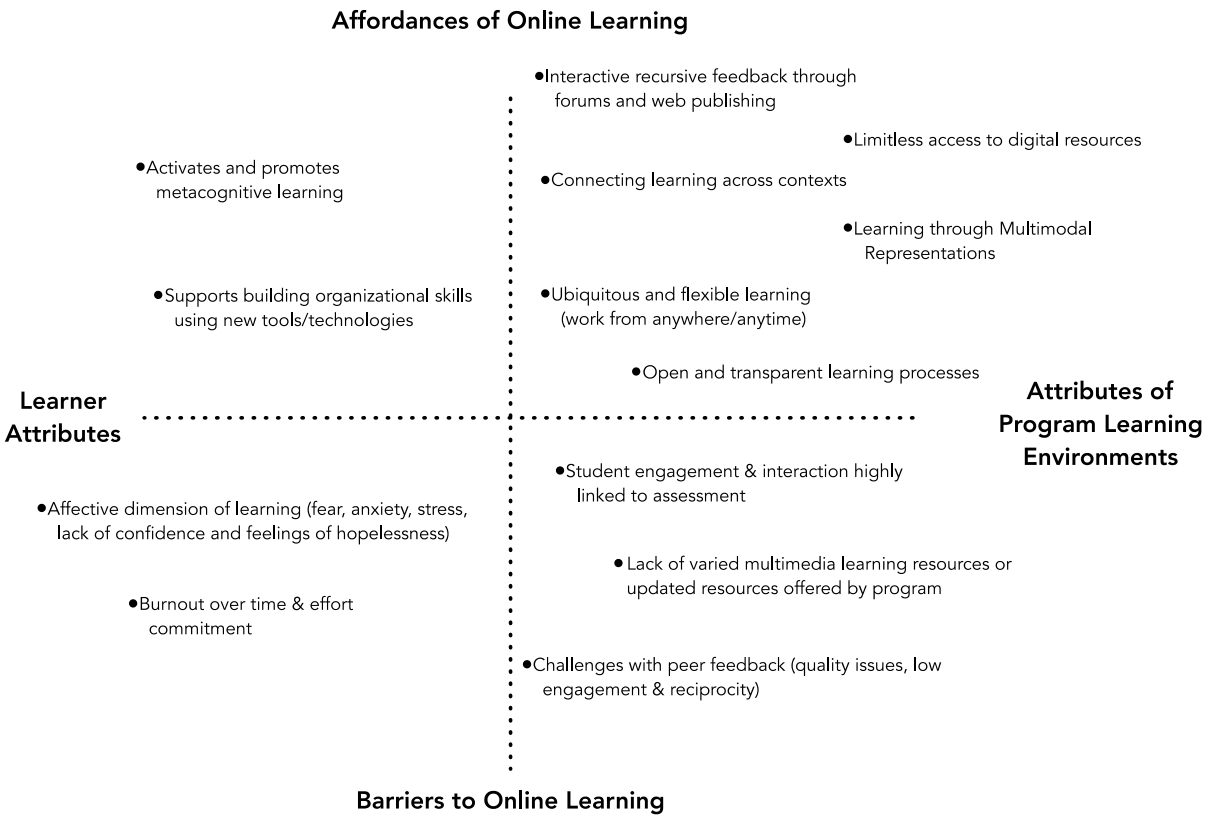
Another engagement pattern reported by many cases was intentionally connecting micro and macro course assignments with their professional practice as a learning strategy, selecting courses such as (social) learning analytics which can be linked with both their current and future workplace activities. As these results demonstrate, professionals engaged in online HE at the graduate level often experience a continuous mixing of formal and informal networked learning practices (Cope & Kalantzis, 2010; Czerkawski, 2016). As some authors have argued (Boud & Brew, 2013), academic practice should be designed and viewed as a form of professional practice. Given such realities, it can be argued that online HE has a unique opportunity, and is in a distinctive position, to explicitly blend both professional

learning with academic learning. This unique position is in contrast to traditional campus based programs where engaging academic learning with workplace learning and professional practice has been a longstanding challenge for many universities (Fung, 2017; Barnett, 2017). Given the clear potential for integrating academic and professional learning, online HE programs should consider carefully how to build connections across contexts and focus on applying disciplinary knowledge to real-world problems and scenarios, amplifying and stretching learning into professional domains.

7.5.2 Affordances of and Barriers of Online Learning

This sections relates to one of the objectives of the study, to detect and analyze the affordances of learning across contexts and practices in online HE. As students recounted their experiences in online HE through interviews, participants identified a range of both affordances and barriers to engagement with digital learning environments that were personally meaningful in their own experiences A 2X2 quadrant, visualized in Figure 7.12 Presents findings from the qualitative strand which identify the affordances and barriers students' reflected upon in their experiences of studying. In this matrix, the top of the Y axis represents affordances of online learning (understood here as 'action possibilities') and the bottom of the Y axis represents barriers to online learning (understood here as circumstances/obstacles that may prevent action/progress). The left end of the X axis represents a 'focus' on learner attributes, while the right end of the X axis represents a focus on attributes of the program learning environments, such as access to learning resources, (i.e. tools, technologies and content) and program learning processes (peer interaction and feedback).

Figure 7.12: 2X2 Quadrant of Affordances and Barriers of Online Learning



On measure, there were more affordances identified (8) then barriers (5), signifying that case participants may have benefited more from their digital learning experiences than felt threatened by them. Nonetheless, barriers do need to be considered, particularly for building pedagogical designs that support and empower student learning and mitigate threats to engagement. Interactive and recursive feedback from peers as a motivating factor which held them accountable in their learning was an identified affordance among case-study participants, confirming previous studies such as Anderson (2004) who has articulated that one of the most significant affordances of the Internet for pedagogical designs is an amplified capacity for interaction. Clearly, online programs heavily feature peer interaction as a pedagogical design to support student inquiry and research, however it is important to note empirical evidence supports students viewing peer interaction as beneficial in their experiences as a student. This result is likely explained by traits of the academic curriculum previously identified, which

emphasize peer collaboration and interaction, influenced by socio-constructivist and connectivist approaches to online HE.

Although the rapid uptake of the term affordance in education research in digital environments has been both problematic and pragmatic (Evans et al, 2017; Arenas, 2015), the current research uses the term as synonymous with an 'action possibility', allowing users to undertake tasks in their environment (McLoughlin et al., 2007). Because of the nature of online higher education and the possibility for students to study part-time in combination with full-time work, there is increased opportunity to flexibly connect learning across contexts from academic to workplace scenarios, as was identified as a further affordance. This result indicates that students identify that connecting learning across contexts and out into the world is a clear advantage and possibility while pursuing a graduate degree in online HE.

A third identified affordance was that students viewed their experiences as facilitating metacognitive learning. Metacognition has been identified in the literature as a self-regulated learning strategy with positive correlation to academic achievement in online higher education (Broadbent & Poon, 2015), as well as an affordance of digital learning environments (Cope & Kalantzis, 2017). Students also identified ubiquitous and flexible learning (ability to work from anywhere and at anytime), as well as learning through multimodal representations as key affordances of their experiences studying, in line with Cope & Kalantzis' framework for new learning and assessment in digital environments (2017). Limitless access to resources and the ability to develop organizational skills using new tools and technologies was likewise identified, in line with Sharpe's (2017) developmental model of practices and attributes of successful digital learners. For example, when asked how online learning has been different from previous experiences, one student responded:

> *"The biggest shift for me is the fact that back in the day, if I wanted to access any resource I had to physically go to the library and stand in front of the photocopier, or smile sweetly at the short line librarian to get access to everything. I do have a paper book that I write down in, but all my notes, everything is on my computer, in the cloud."(Silvia)*

As students reflected on their experiences, they identified new affordances that they explored in their online graduate program, including learning through open and transparent processes such as open web publishing and collaborative authoring as well as exploring the potentialities of new open-sourced technologies. One participant note that they *"actually found the transparency of the online*

program to be so much better" (John) than previous experiences of university learning. These experiences of learning are in line with conceptualizations of emergent learning ecologies in digital contexts as outlined by Williams et al. (2011). They defined affordances as the product of interactions between a person and their environment, and that learning is the process of exploring, benchmarking and mastering new affordances. It is clear that online programs do need to continue to empower and engage students through connected and open designs that allow students to explore, benchmark and master new affordances and potentialities that are offered through online learning.

Although there is great discussion on the threats and barriers to student learning in MOOC's (Shapiro et al. 2017; Schuwer et al, 2015), in contrast, there is little research on barriers to student learning in online higher education more generally, bringing a spotlight on the need for more research in this area. The current study established several themes identified as barriers to engagement in online learning, including the affective dimension which was most pronounced. These included feelings of anxiety, stress and lack of confidence. Additionally, some barriers, appeared contradictory, as students discussed limitless access to resources as an affordance, while an identified barrier was a lack of prescribed multimedia or multimodal resources within the course curriculum. This result might be explained by the dominance of print in academic programs, where scientific articles, chapters, and text books still hold dominance as they have for over a century. One participant reflected on this challenge in the program by explaining:

> *"One thing that strikes me still is that although it is digital education. It is very, very traditional. The only thing digital about it is that we access the texts at our preferred time and space, but it's still text" (Oliver)*

Burnout over time & effort commitment was also identified, particularly among students combining full-time work and part-time study. A pertinent observation can be made here that certain courses or program tasks may overburden students, even though it is not the intention of faculty of course instructors. This is important, however, to reflect upon when designing the curriculum and course guides, in terms of providing resources for students to overcome such challenges or barriers. Previous studies, for example, have identified effort regulation as a learning strategy positively correlated with academic outcomes (Broadbent & Poon, 2015), and therefore could be emphasized by program staff as an essential self-regulation strategy for students to develop as they engage with their program, by offering specific examples or tasks that may develop this specific study competency. This may be particularly suitable for students when combining part-time study with full-time work over

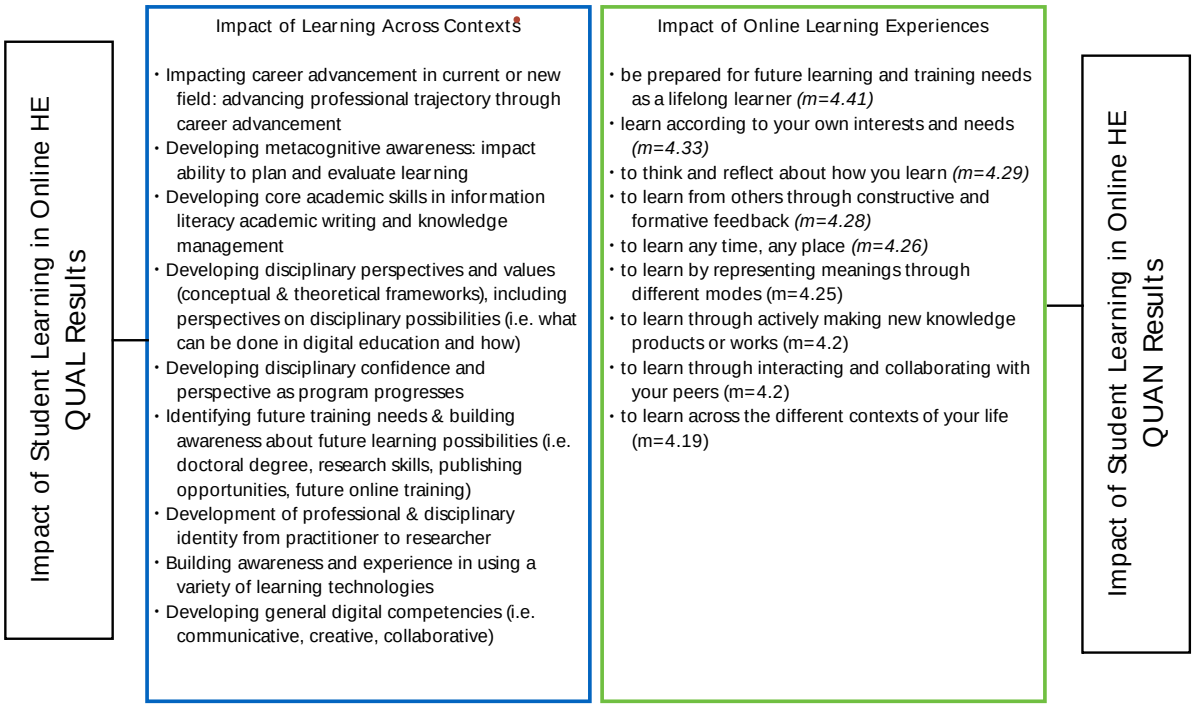
longer periods. Students also identified the challenge of peer interaction being highly linked to assessment and a lack of a 'true' community feeling. Linked with this theme was the challenge of receiving low quality peer feedback and a lack of 'feedback' reciprocity. **Again, these barriers could be mitigated through promoting and emphasizing both 'feedback' literacy (Carless & Boud, 2018) and good 'course citizenship' practices in program and course guides, including scaffolding what 'quality' feedback might look like.**

7.5.3 Impact of Online Learning Experiences Across a Continuum of Contexts and Practices.

The section integrates through a side-by-side display (statistics & themes) mixed methods findings related to how experiences of learning in online HE impacted students. In line with ecological and connected perspectives on learning, the current study coincides with Ellis & Goodyear (2013) in understanding **that learning outcomes depend on what students actually do to learn**. That is to say, the impact or outcome of learning depends on learner activity. The most salient themes to emerge in the qualitative analysis are developmental. The most frequently identified impact was related to developing new skills in relation to career advancement and professional aspirations, as presented in Figure 7.13. This result is similar to various studies on student motivation for studying HE through an online mode (Schneller & Holmberg, 2014; Clinefelter et al. 2019), where 93% of students join a program to fulfill career aspirations. In particular, graduate students are primarily motivated to earn more money, start a new career more aligned to their interests, or to achieve a promotion in their current profession (Clinefelter et al. 2019). To illustrate this finding, when asked about the impact of their experience studying online HE, one student (Rebecca) replied that "the number one most obvious and most significant change would be rank advancement".

Figure 7.13: Joint side-by-side display (statistics & themes) mixed methods findings on Impact of Learning Experiences

Skill & Competency Development
Building awareness of disciplinary and professional possibilities



Beyond career advancement, many of the thematic results on the impact of student learning were developmental, including developing metacognitive strategies for planning and evaluating one's own learning. Developing disciplinary values, perspectives and practices in digital education was likewise identified in the thematic analysis. For example, the valued disciplinary practice of developing core academic skills of information literacy, academic writing and knowledge management were identified. These skills are essential elements of inquiry driven research in higher education (Cope & Kalantzis, 2017; Barnett, 2017; Fung, 2017; Ellis & Goodyear, 2013), particularly through programs in education with socio-constructivist orientations which focus on knowledge work, peer collaboration and assessments that are designed for application in broader contexts, and being published for wider audiences. Additionally, thematic results indicated that students developed an awareness for future training needs and learning trajectories that may or may not be online, including many cases who were interested in potential doctoral study. Building such an awareness of elements and contexts that make up an individuals' LE and future learning trajectories can be an effective strategy for self-directed

learning (González-Sanmamed et al. 2018) and can indeed move learners toward self-determined learning along a pedagogy-andragogy-heutagogy continuum (Blaschke & Hase, 2019).

When integrating the thematic results with the quantitative results (presented in Figure 7.13) there is a notable level of complementarity. For instance, advancing career trajectory and identifying future training needs identified in the qualitative results is highly related with being prepared for future learning and training needs as a lifelong learner, identified in the quantitative strand. Developing metacognitive awareness, likewise, is directly linked with the quantitative results of thinking and reflecting about how you learn. To learn according to your own interests and needs as well as through constructive peer feedback, as identified in the survey, is linked with developing disciplinary perspectives and values, which value both differentiated and self-directed learning as well as collaborative learning. Notably, not all quantitatively tested variables were identified in the thematic analysis, based on student views of learning. These include learning across the different contexts of your life and learning from others through constructive feedback. A potential explanation lies in a lack of awareness around connecting learning across contexts within academic programs, a longstanding challenge for universities (Fung, 2017).

7.6 Summary

The integration of quantitative and qualitative results allows for a more comprehensive account of student experiences of learning across contexts, including impact of student learning. Mixed methods integration offered a more complete picture of the phenomenon under study through a range of integration techniques, including integrated narrative accounts, data transformation, and joint visual displays. The MM discussion was structured in accordance with the central research question and associated sub-questions. In this regard, the qualitative and quantitative findings have been integrated in order to respond to: i.) the strategies and practices students used to support academic learning across contexts, ii.) the central components of an individual's LE in the context of online HE, iii.) the identification of learner profiles through and analysis of the activities and strategies students use to learn across contexts, and iv.) student conceptions of their experiences of learning across contexts in online HE. The following chapter (8) will conclude the thesis by summarizing the key findings and implications of study, while presenting both limitations of the research and future lines of study.

CHAPTER 8
CONCLUSION

8.1 Introduction

The current research set out to explore the lived experiences of student learning across contexts and practices in online HE through a mixed methods multiple case study design. The purpose of the present research was guided by an emergent problem in higher education in understanding how students connect, link and stretch learning across multiple contexts mediated through digital technology, particularly across formal and informal contexts. The concluding chapter summarizes the research context and findings before presenting the implication and contribution this study makes to educational theory and practice. Recommendations for future lines of inquiry and research are also presented.

8.2 Summary of the Research Context and Key Findings

As learners face the challenge of rapidly changing and increasingly complex study and work environments, online HE has become an increasingly popular solution for working professionals. Many learners are motivated to advance their career trajectories and employability through professional development. Fully online graduate programs attract students who need or desire to update and enhance their skills and competencies as lifelong learners, often choosing to combine online graduate work with professional commitments. As learners engage in online HE in the social sciences, students are stretched into networked and collaborative learning scenarios, encouraged to explore, navigate and benchmark a range of digital learning resources, tools and technologies. Although online education has an impressive, robust and global research agenda, substantive findings and rigorous research about how students experience learning across multiple contexts in online HE has been limited. In response to this identified gap in the literature, the research is guided by the following question: **how do students experience learning across contexts —from a Learning Ecologies (LE) perspective—to support academic learning in online HE?**

The multiple case study was developed across three sites of fully online graduate level programs (masters or 1st year doctoral students) at the UOC, UIUC and U of E in the interdisciplinary field of educational technology and digital education. Each site was chosen for a range of criteria, most notably for innovative program designs which included openly networked learning scenarios as well as inquiry-driven, problem based, collaborative and student-centered approaches. 12 students were selected purposive and convenience sampling with a broad variability of professional and academic trajectories as well as from a range of socio-cultural and geographic regions. The case study participants were the

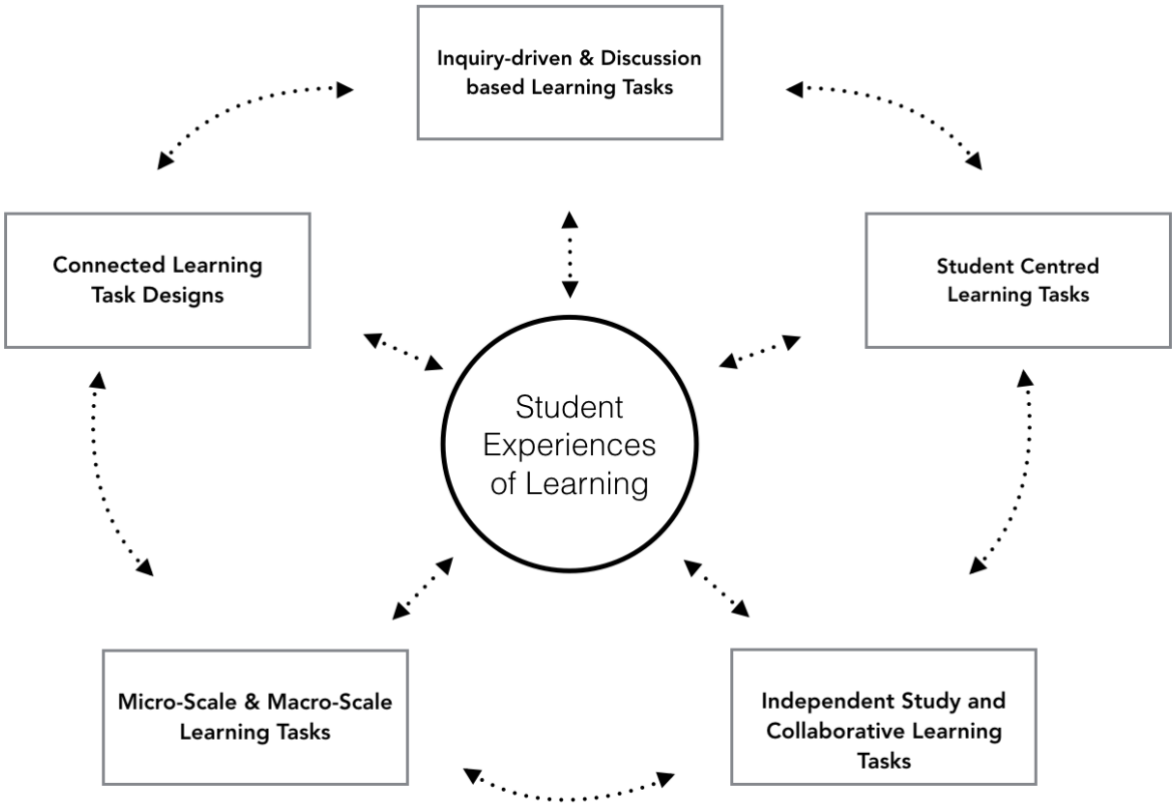
'bounded' case and reflected an emerging profile of online learners unrestricted by age and geographic boundaries, who are re-entering educational processes in various phases of their professional lives. To complement the qualitative case-study findings, an online survey was designed and disseminated across the population of the graduate program at each case site. Aside from gathering pertinent socio-demographic information, the survey aimed to capture student perspectives on their behavior in their previous year of study (2017-2018), based on the central components of the LE construct (i.e. activities, relationships and resources) in digital contexts. The central purpose of the study was to understand student experiences and conceptions of learning across contexts as they engage in an online graduate education program. An emphasis was placed on the digital experiences and processes of learning, with an understanding that human learning is a complex, ever-shifting phenomenon situated across virtual and physical environments and resources.

8.2.1 Student Experiences of Learning in Online HE through a LE Lens

- As discussed in Chapter 7 section 7.2.1 **the academic curriculum** was identified as a significant, yet not exclusive influence on student learning across contexts. Other areas of influence on student learning include the domain of professional practice as well as autonomous or socialized everyday practices, including self-directed inquiry mediated through digital technology.

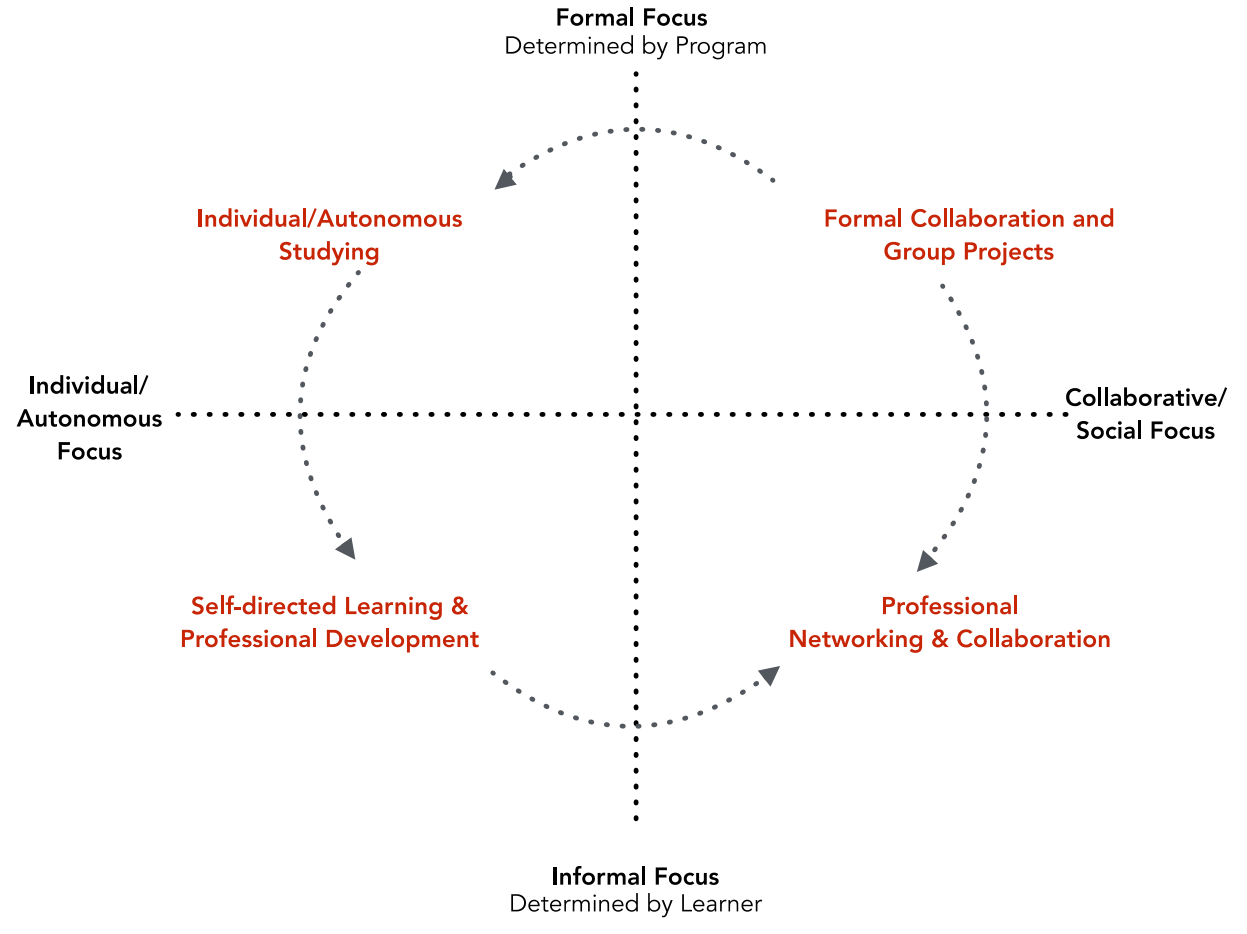
- **Five core traits of the Academic curriculum** were identified that had a significant influence on student experiences of learning, identified in Figure 8.1 below.

Figure 8.1 Identified Traits of the Academic Curriculum



- As discussed in Chapter 7 section 7.2.2, **four conceptual zones of learning were identified within a LE matrix in the context of online HE**, reflected in Figure 8.2 below. Conceptual boundaries and contexts represent zones where experiences of learning (i.e. strategies and practices) unfold according to formality and collaboration. Students navigate these fluid and dynamic zones based on a range of factors including their previous professional and academic trajectories, motivations, interests and intentions, in response to the demands of the academic curriculum and their interpretation of learning tasks, as well as in relation to their current professional practice.

Figure 8.2 LE Matrix in Online HE: Conceptual Zones of Learning



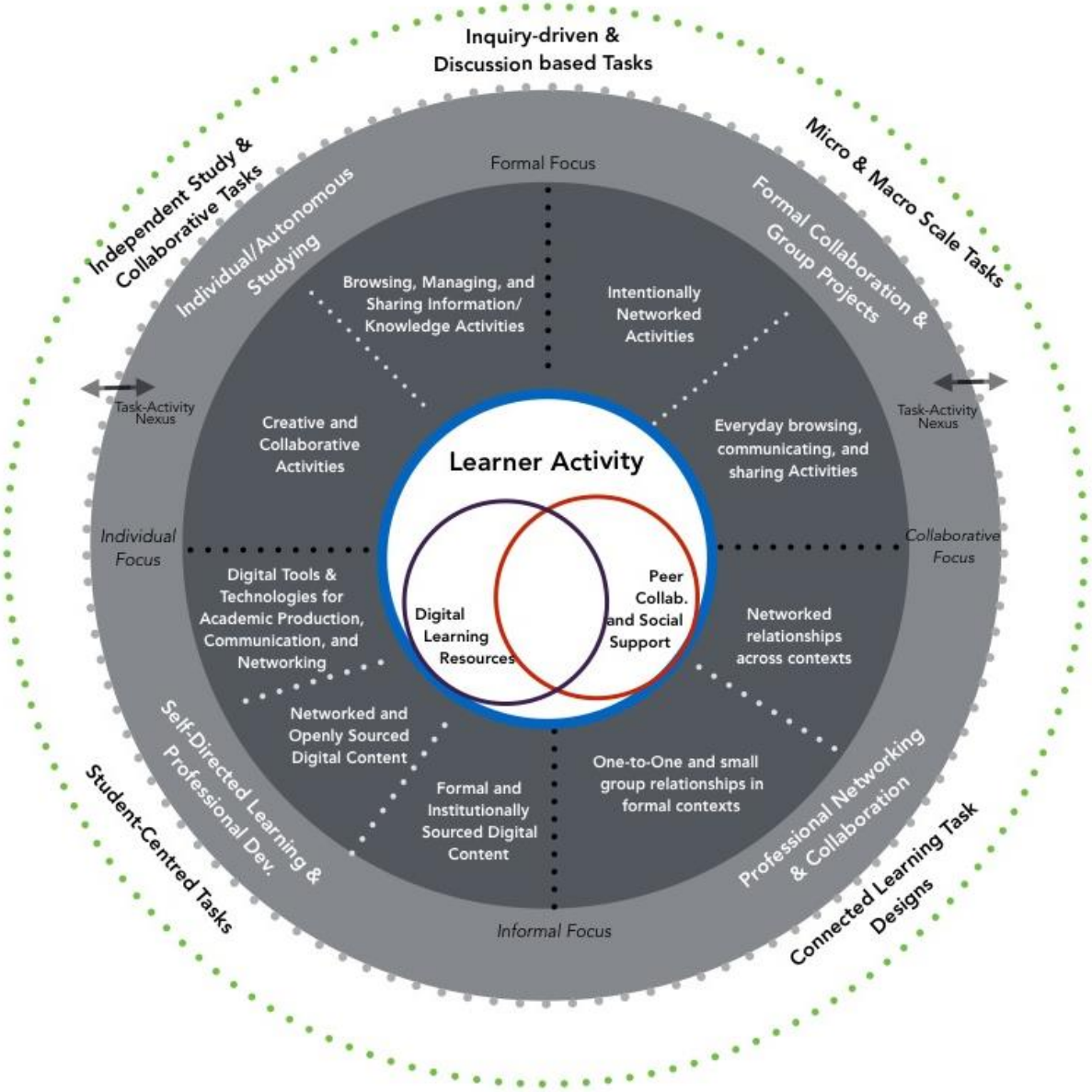
- As a majority of students worked in a professional field either related to, or very related to the field of educational technology and online learning**, linking and stretching learning from formal zones to informal zones along a continuum was more enabled based on this proximity**. Movement across these conceptual zones could be considered forms of boundary crossing activity and connected learning along a continuum, that is to say, where knowledge and experience from one domain is applied in another.
- **A range of strategies and practices were identified across the 3 central components of the LE construct,** including: 1. Strategies and practices that had a focus on autonomous, self-directed learner activity which involved self-regulated and metacognitive strategies across both formal and informal contexts; 2. Strategies and practices with an emphasis on peer collaboration and social support across a continuum of formality; and 3. Strategies and practices that had an emphasis on digital technologies tools and resources.

8.2.2 LE Components of Online Higher Education Students

- A major result and contribution of the current study was the development of a current LE model in the context of online HE through a fully integrated mixed methods design, discussed in Chapter 7 section 7.3. Beginning with an initial sensitizing model, the study used coherent alignment between ontological, epistemological and methodological dimensions throughout the research design to build a model in response to the guiding research question of how students experience learning across contexts.

- **The proposed LE model,** presented in Figure 8.3 below, **extends previous conceptualizations in the literature** (Barron, 2006; Jackson, 2016) and features three clear dimensions: (1.) the first dimension of the model presents **the central LE components** which were yielded through the sensitizing model, including **the centrality of Learner Activity in relation to Peer Collaboration and Digital Learning Resources.** Sub-components were then yielded through principle component analysis within the quantitative strand, and include a range of activities, relationship interactions and digital resources which students used to support academic learning across contexts; (2.) the second dimension characterizes learning strategies and practices according to formality and collaboration through thematic network analysis, identifying 4 conceptual zones of learning by representing a LE matrix. **The Y axis of the LE matrix represents a 'focus' on formal or informal strategies and practices, while the X axis represents the social dimension from autonomous to collaborative learning along a continuum.** The LE matrix is a conceptual tool to identify and analyze where student experiences of learning unfolded in the context of online HE, reflecting boundary crossing and connected forms of learning; (3.) the third dimension of the model represents **the thematic traits of the Academic curriculum that influence student experiences of learning through the task-activity nexus.**

Figure 8.3 Proposed LE Component Model



- **The component which claims centrality by being positioned in the center of the model is Learner Activity**. Learner activity can be completed with or without resources or with or without peer collaboration, and in this regard drives both resource use and peer collaboration. As such, Learner Activity is the primary influence on what a student does to learn. Positioned within Learner Activity is Peer Collaboration and Social Support and Learning Resources, likewise positioned as central components and understood as being features of Learner Activity. Given the structural complexity of online HE, Learner Activity likely involves a variety of both collaboration and intensive digital resource

use. Even within a group project where collaborative work is inherent, there will be certain processes of learning where an individual learner will need to work autonomously in order to prepare their contribution.

8.2.3 Learner Attributes & Profiles in Online HE

- As discussed in Chapter 7 Section 7.4, the three case sites identified a heterogeneous socio-demographic profile of lifelong learner re-entering university after a range of professional experience, not restricted by age (with an average age of 37) and often with a range of professional experience (14 years on average) influencing their level of readiness for engaging in the program. Students are studying at early-career, mid-career and late career phases in their professional trajectories. Roughly 3/4 of the population is employed full-time allowing for significant boundary crossing learner activity between academic and professional domains. Students likewise bring a range of previous experience studying online, some previously having completed other masters or undergraduate degrees, as is the case among 1/4 of the case study participants. In line with the literature, the findings demonstrate that students are motivated by career advancement opportunities as they complete their graduate degrees. The variability of these past trajectories will have an explicit impact on students' experiences of learning, as individual trajectories are a major factor on student readiness, capability and strategy development.

- Through advanced quantitative categorizing techniques, 4 learner profiles were detected based on learner perspectives on their experiences of studying across contexts. Among the identified learner profiles, adjacent profiles along a continuum are often less perceptibly different from each other, although the extremes of the 4 presented profiles are quite distinct. In line with the purpose of the current research, profiles 3 & 4 account for archetypal and highly desired profiles for graduate knowledge work in online HE as they characterize valued disciplinary perspectives and behaviors in the field of digital education. Profiles were differentiated on a continuum accounting for the below profiles:

  (1) *Inactive Networkers and Limited Tool User*

  (2) *Tool User and Inactive Networker*

  (3) *Lifewide Learner*

  (4) *Knowmadic learner*

- Qualitatively identified learner attributes complement and suitably integrate with detected profiles. Detected learner attributes are not exhaustive or representative of the range of possible attributes among the entire population, however they reflect a range of possible individual traits, including **(1.) interests and motivations for studying online; (2.) expressions of student agency and learner identity; and (3.) the affective dimension of learning,** including experiencing both positive emotions (energy, motivation, inspiration) and negative emotions (anxiety, hopelessness, and doubt).

8.2.4 Student Conceptions of Learning Across Contexts in Online HE

- As discussed in Chapter 7 Section 7.5, Combining full or part time work with online studies enables opportunities for connected learning and engagement between academic practice and the professional domain. A range of experiences were detected where formal learning impacts processes in professional practice and vice-versa, demonstrating engagement between academic learning and the professional domain. Past professional trajectories may impact current academic practice, and academic practice may impact professional practice when (1.) students strategically select course with impact in their work-life, (2.) grounding academic research/concepts/experiences into professional activity, (3.) intentionally connecting academic tasks with their professional domain.

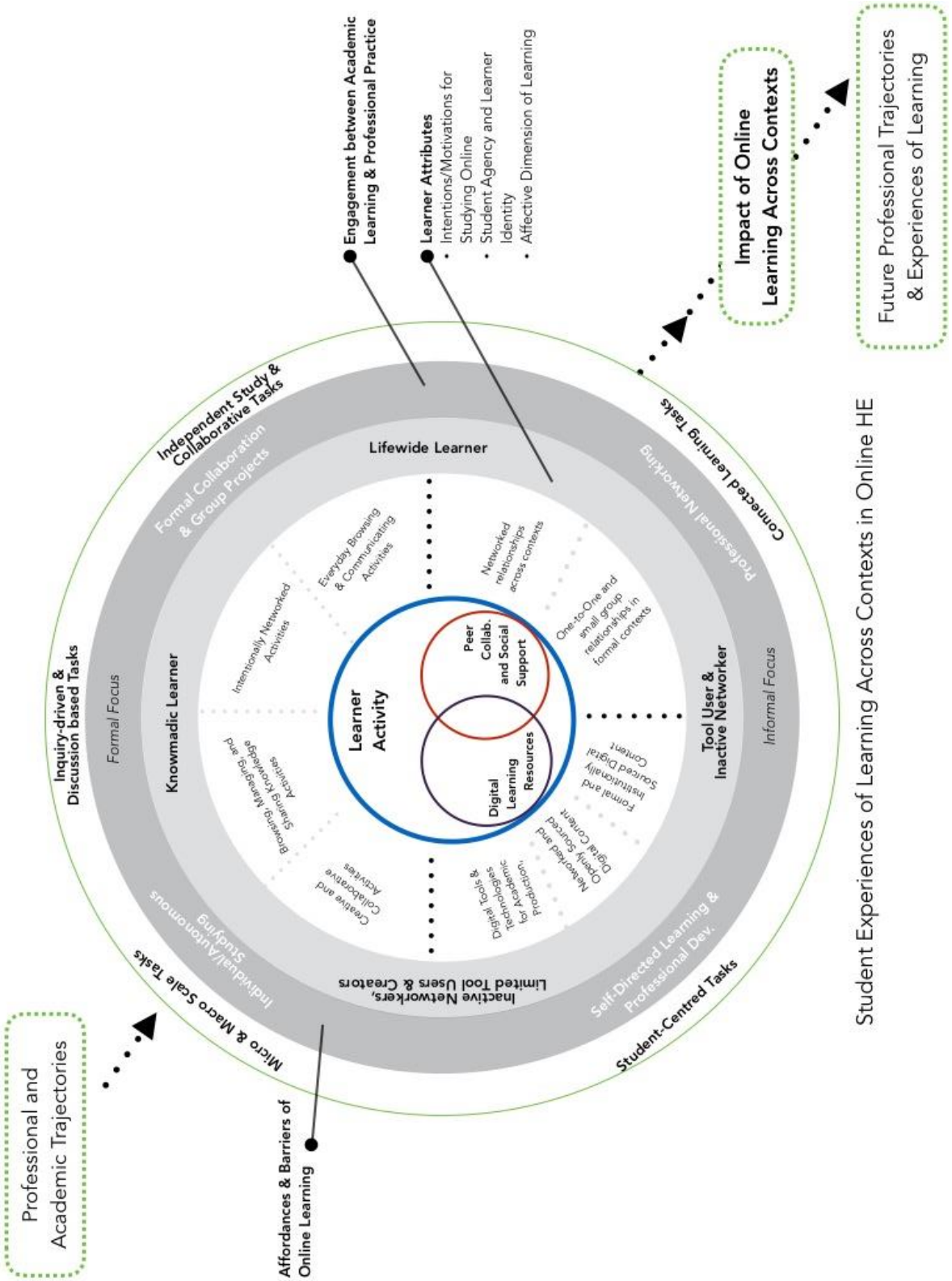
- Students identified a range of both affordances and barriers in their experiences of studying online. On measure, there were more affordances identified then barriers, reflecting that case participants may have benefited more from their digital learning experiences than felt threatened by them. Interactive recursive feedback, limitless access to digital resources and connecting learning across contexts were some of the affordances detected which were enabled through the attributes of the program learning environments. Affordances detected which were more enabled through individual learner attributes included that experiences of learning activated metacognitive learning as well as supports building organizational skills using new technologies. Barriers included challenges with peer interaction and engagement being highly linked to the assessment structure and issues with quality of peer feedback. Barriers related to individual learner traits included burnout over time and effort commitments and a range of affective dimensions including anxiety, fear, stress and lack of confidence etc.

- A range of outcomes based on student experiences of learning were identified, many of which related to developing new skills in relation to career advancement and professional aspirations. Other impacts of the program include developing metacognitive awareness as well as core academic skills in information literacy, academic writing and knowledge management. Building disciplinary confidence in digital education and building an awareness and experience in navigating and evaluating a range of new learning technologies were also identified as outcomes of program engagement. Further, developing general digital competencies was also identified including using digital technologies for creative, collaborative and communicative purposes.

8.2.5 Overall Conclusions: How do students experience learning across contexts and practices, from an LE perspective, in the context of online HE.?

- Understanding human learning across multiple contexts is a complex question. To facilitate understanding student experiences of learning in online HE, and in response to the general guiding research question, the study proposes a LE Path Diagram with a range of dimensions and components that were revealed to be significant in the learners' experiences reflected in Figure 8.4 below.

Figure 8.4 LE Path Diagram Reflecting Student Experiences of Learning in Online HE



- The results obtained using a LE analytical framework have demonstrated the effectiveness of this construct for analyzing learning across multiple contexts. Complex social realities require complex research designs. This is reflected in the current sequential exploratory mixed methods design and associated research findings. Despite the limitations and risks of applying a LE perspective, including ensuring reliability and trustworthiness when accounting for a multiplicity of variables, this lens was necessary to understand emergent forms of learning. In this regard, the application of a LE analytical framework was capable of accounting for a more comprehensive and holistic view of student learning from a lifewide perspective. Alignment between ontological, methodological and applicative dimensions was necessary throughout all phases of the research. The strength of a LE perspective, therefore, lies in its ability to account for the multiple contexts and variables that support individual learning across contexts driven by learner activity. The integrated results contribute to a better understanding of emergent learning practices in the context of online HE.

- The LE Path Diagram in Figure 8.4 summarizes the key research findings through a range of dimensions and variables which have been summarized previously in this chapter, building on the LE model presented in Chapter 7 Section 7.3. The visual diagram features the centrality of learner activity which drives an individual's LE within an open, dynamic and fluid system spanning multiple contexts. In particular, the interaction between learner activity and the requirements of the formal academic curriculum are fundamental. This process is represented through the task-activity nexus. Through this act of interpretation, learner activity is translated into strategies and practices, which lead to learning outcomes. Strategies and practices have been identified as taking place across four conceptual zones of learning according to formality and collaboration. These zones combine to form a **LE matrix in the context of online HE**, and results indicate that students move across these zones based on the demands of the curriculum in combination with the idiosyncratic attributes (academic and professional trajectories, intentions, motivations, learner agency) and profiles of each individual learner. Some learners, for example, are more comfortable and motivated to produce and share academic work through openly networked interactions across contexts (i.e. knowmadic learner), while others prefer more introverted scenarios and formal interactions (i.e. tool user and inactive networker).

- **An important conclusion of the current research, however, is that fluid transitions across the four detected conceptual zones along a continuum of learning contribute to innovative and connected forms of boundary crossing and lifewide learning**. Such forms of learning across contexts support the development of skills and competencies not only for ensuring employability in contemporary society, but for developing lifelong learning competencies capable of shaping future career trajectories. Likewise, learner activity which unfolds in the '**formal collaboration and group projects'** zone appears to reinforce strategies and practices in the **'individual/autonomous studying'** zone, which focus on self-regulated planning, time-management, and learning strategy development (i.e. connecting micro and macro tasks).

- Similarly, **the results also indicate that the design of the academic curriculum, identified through 5 core traits in the above diagram, has significant influence in linking and stretching student learning along a continuum from formal to informal zones,** in combination with the intentions and motivations of each individual learner. Programs, therefore, have a responsibility to engage learners across a range of zones through a connected curriculum approach (Fung, 2017). Such boundary crossing learner activity can enhance and integrate learning opportunities through application in real world and authentic scenarios, guided by the interests, needs and motivations of each individual learner. In this regard, emergent and innovative forms of online learning, such as those identified in the study, can support both autonomous self-directed and inquiry driven learning, as well as collaborative forms of networked learning and professional development across informal contexts. Such fluid transitions between zones of learning can also support academic learning, as well as engagement between academic practice and the professional domain, a longstanding challenge in HE.

- The findings confirm that learning is a situated and personal process, and that building awareness of the mechanisms of one's own LE can enable and empower forms of boundary crossing and connected learning. Such forms of learning can support linking academic practices to the wider world, and achieve more meaningful and connected forms of student learning outcomes over short term and long term learning trajectories.

- **The profile of an online learner is varied and heterogeneous, reflecting lifelong learners re-entering educational processes at various phases of their professional lives (i.e. early career,**

mid-career, or late career). Professional and academic trajectories were identified as factors that impact students' experience of online learning. Learners are principally motivated by career advancement opportunities afforded by developing new academic skills and competencies in digital education and educational technology.

8.3 Implications for Educational Practice and Theory

- The proposed Learning Ecologies model in Online HE **contributes to the knowledge base of emergent pedagogies and networked learning in digital contexts.** It is capable of being used as a conceptual tool for both researching and designing educational processes (student learning) and products (curriculum, instructional design, and program development). **The LE model has direct implications for the knowledge base on the LE construct,** including contributing substantive evidence of how learners navigate the continuum between formal and informal learning in online HE (Van Noy et al., 2016; Sangra et al., 2019). The model emphasizes networked, boundary crossing and connected forms of learning and thus contributes to this emergent field of study (Ito et al., 2013; Kumpulainen & Sefton-Green, 2014) as well as to broader traditions of research on student experiences of learning in HE generally (Biggs & Tang, 2007), and in online HE specifically (Ellis & Goodyear, 2013). Moreover, **the current research likewise contributes to research in online HE by characterizing 4 conceptual zones of learning according to dimensions of formality and collaboration through a LE Matrix.** Using a biological metaphor, the model reflects a holistic, dynamic and fluid process of learning, which through both self-regulation (metacognition) and social-self-regulation (i.e. teacher and peer feedback) strives to maintain equilibrium through innovative forms of learning across contexts.

- To achieve a more effective and impactful educational experience in online HE**, forms of boundary crossing & lifewide learning should be encouraged and enabled through program development and curriculum design.** Online graduate education seems to be a fertile context to support and enable forms of lifewide learning as participants regularly combine full time professional work with part time study. In contrast with programs that focus learner activity mostly in highly formal contexts disconnected from wider world applications through transmission models, the current research argues for learner activity in transition across zones of learning. In this sense, the conceptual potential of the LE construct can be more realized through "supporting learners by raising their awareness of their own learning ecologies, thereby

empowering them and encouraging them to engage in agentic practices" (Sangra et al., 2019 p.2) The **findings reveal that online learning is enhanced and enabled when students transition fluidly between a range of conceptual zones of learning.** Thus, programs have the opportunity to develop tasks which recognize and facilitate a range of designs that enable learning to be stretched and linked to informal zones of learning, including a recognition and acknowledgment that online learners regularly blend formal and informal learning networks to support learning in online HE (Czerkawski, 2016).

- A connected curriculum requires more complex, and potentially challenging learning designs which may be difficult to operationalize and involve more uncertainty in contrast with traditional transmission based tasks. By understanding that learning is a dynamic and fluid process in ever-shifting contexts (analog/digital, formal/informal/, individual/collaborative) with fluid boundaries that may be difficult to disentangle, designs can feature building core academic competencies. **Such competencies may stretch learners' practices across contexts and challenge students to develop and benchmark new strategies by navigating new tools and technologies and in collaboration with peers for social support.** Recognizing that students use a range of networks and strategies when studying, one outcome over time may indeed be learner development. In this regard, a *limited networker* and *low tool user* may develop over time into a *knowmadic learner.* In this regard, programs could benefit from developing curriculum and learning tasks that may enable forms of student learning characterized by the *knowmadic learner profile* identified in this study. Such a profile may be considered an archetype of a connected and boundary crossing learner, not restricted by age and highly motivated and capable of productively collaborating across organizations, cultures and networked societies.

- **In order to support learners in developing valued disciplinary practices, skills and perspectives in the field of digital education, programs should design tasks where learners are encouraged to creatively and collaboratively use technology purposively to solve real-world educational problems in authentic settings.** Through connected designs, an implication of the current study is that learners should be encouraged to apply knowledge and experiences from formal academic settings to domains in the wider world. Online learners in HE should be encouraged through intentional learning designs to openly share what they know, support open access to

knowledge, and invite feedback from peers, teachers and expertise from others in order to generate new opportunities for learning. In this regard, developing and encouraging peer mentorship networks, both within cohorts and with alumni networks, may be a valuable program strategy for supporting student development and social support. Developing both habits of mind for continuous learning through intentional strategies and practices is another essential recommendation, including awareness raising about how to self-generate opportunities for learning across contexts. In this regard, clear course and program learning guides should be available to students, offering successful and productive learning strategies and practices necessary for developing core academic skills and competencies, including recommendations for tools and technologies which facilitate such practices (i.e. knowledge management tools, collaborative authoring tools etc.).

- **The results also highlight the importance of supporting lifelong learning in online HE**, enabling students who are re-entering formal learning at various stages of their life and professional career. As online HE continues to be a flexible and popular choice for busy professionals, disparities may emerge among the capabilities and levels of readiness for learners. Professional and academic trajectories will play a significant factor in this regard. A further implication of the current study, then, relates to the significant challenge in online HE of the diversity factor which characterizes a heterogeneous student population unrestricted by age**. One such solution is providing educational equity through differentiated instructional designs based on interest-driven, inquiry and problem-based research according to students' professional contexts, current capabilities, needs and interests (Cope & Kalantzis, 2017).** For example, an early career student with limited professional experience will arguably have different needs and interests than their older colleague who may have 20 years of professional experience and previous graduate study. To support such forms for differentiated learning, teachers can be trained to enable boundary crossing and connected forms of learning, encouraging peer collaboration and digital learning strategies and engagement across professional and academic scenarios based on interests and needs. In this regard, academic tasks should be linked to the real-world current or future professional domains of students, and these domains may vary widely based on individual career trajectories. The results, therefore, emphasize that lifewide and differentiated learning can support and empower student learning ecologies.

- Based on the results, educational experiences should not only be assessed on the efficiency of preparing students for solving narrow and isolated forms of problems linked to a pre-defined assessment structure, but also in their potential for preparing students for recognizing and generating future learning opportunities and experiences across a range of contexts developed through self-directed inquiry and self-regulated learning strategies.
- Through a fully integrated mixed methods research design, **methodological contributions have also been made which have advanced integration techniques in the field of educational research.** Methodological implications are distinct from the substantive results and their contributions to the field. Specifically, the current research has demonstrated innovation in data integration techniques by linking a LE sensitizing model through an exploratory sequential multiple case study design toward the development of a proposed LE model visual joint display. Such a research design required a coherent and developmental procedural process for conceptualizing, collecting data, developing qualitative and quantitative strands and integrating the designs and findings at multiple levels. The chosen mixed methods approach was designed to rigorously and analytically explore emergent and complex social phenomenon across multiple contexts mediated through digital technology. Through mixed methods integration at the design, methodology and data integration and interpretation levels the study was able to construct a novel visual joint display, in line with the paradigmatic assumptions of the research, and the ecological and connected perspective of the thesis. Integrating mixed methods results in a discussion is a well-established practice, however using a visual joint-display to link to theoretical models has received relatively little attention in the literature. In this regard, such a process has been identified as "the most challenging element to execute in mixed methods research" (Bustamente, 2019 p. 162). Accordingly, the contribution that the current research has made offers a viable pathway for future research to consider similar innovative designs, particularly in the field of educational research in digital contexts.

8.4 Publications, Presentations and Research Activity Associated with Current Study

In the context of a three-year doctoral grant at the UOC (2016-2019) the researcher has had a range of opportunities to publish, present and engage in a variety of research activities which have supported the current study. The researcher worked closely with the Edul@b research group having an opportunity to train and develop within the group regular and continuous research activity. Below are a

list of essential research outputs and activities which have contributed to knowledge sharing and building within the current study.

Publications:

Peters, M. & Guitert, M & Romero, M. (2019). Learning Strategies Across Contexts in Online Higher Education: A Learning Ecologies Perspective**.** World Conference of Online Learning (Nominated Best Full Paper Award)

Peters, M. & Romero, M. (2019) Lifelong Learning Ecologies in Online Higher Education: Students' Engagement in the Continuum Between Formal and Informal Learning. British Journal of Educational Technology May, 2019. **https://doi.org/10.1111/bjet.12803**

Peters, M. Guitert, M & Romero, M. (2018) A Digital Learning Ecologies Conceptual Framework in the Microsystem of Online Higher Education. Conference Proceedings: Exploring the Micro, Meso and Macro. Proceedings of the European Distance and E-Learning Network 2018 Annual Conference. Genova, 17-20 June, 2018. ISBN 978-615-5511-23-3 http://www.eden-online.org/wp-content/uploads/2018/06/Annual_2018_Genova_Proceedings.pdf

Presentations

Peters, M. (2019/11). Learning Strategies Across Contexts in Online HE: A learning Ecologies Perspective. World Conference on Online Learning. Dublin, Ireland.

Peters, M. (2018/10). Student Engagement in the Continuum Between Formal and Informal Learning in Online Higher Education. Eden Research Workshop Phd Symposium, Barcelona, Spain.

Peters, M. (2018/07). Generating Opportunities for Learning in Online Higher Education. Learner Conference, Athens, Greece.

Peters, M. (2018/07). The Contribution of Digital Learning Ecologies in Online Higher Education. EDEN Conference, Genoa, Italy.

Peters, M. (2017/07). A Digital Learning Ecologies Perspective in Qualitative Research. International Qualitative Research Workshop. Transformative and Inclusive Social Research. Malaga, Spain

Research Activities:

Additionally, the researcher was able to complete a 3-month research stay at the Centre for Research in Digital Education in order to present preliminary findings and collect data from the case site of the M.Sc. in Ditial Education at the University of Edinburgh. A summary of the research stay can be viewed here. As a visiting researcher, there was many opportunities to assist seminars related to

research in digital education, as well as present preliminary findings in a researcher seminar organized at the end of the stay.

At the UOC, the researcher had many research meetings and seminars with the research group **Edul@b** as well as with the doctoral community in the Education and ICT stream of the doctoral school. A range of seminar presentations where made at various workshops, seminar, and symposia.

8.5 Limitations of the Study

It must be acknowledged that every study is limited in some way and therefore several limitations need to be recognized here. A range of methodological limitations were discussed in relation to the mixed methods design in Chapter 4. In this regard, the most obvious limitation is the use of a multiple case study design. Many authors have noted the lack of representativeness in case study designs which may influence issues of reliability, validity and generalizability (Yin, 2009; Creswell, 2009). Following an exploratory and interpretive paradigm, the research results should not be considered as exhaustive or universally applicable. The population under study refers to graduate students with significant academic and professional trajectories, and may not be generalizable to younger students at the undergraduate level. Despite attempts for research integrity, legitimation and addressing reflexivity, the nature of exploratory, qualitative and interpretive social research is prone to observer bias, particularly where the investigator is one of the key research instruments (Cohen et al. 2007).

Further, using a LE construct as an analytical framework has inherent limitations and risks, foremost being that it is easy to misinterpret findings, attributing general value to a highly contextualized and idiosyncratic event, behavior or experience. In this regard, there is inherent risk in isolating and disentangling the components of an individuals learning ecology as these elements/dimensions are linked through networks of interactions and relationships. Theoretical and methodological complexity was likewise noted as a challenge and potential limitation as the LE construct has been used and applied in social research over the last 20 years in fragmented and diversified ways. To mitigate potential limitations of the study, special attention was paid to paradigmatic coherence of the construct throughout all phases of the design, including alignment between the ontological, methodological and epistemological dimensions of the study.

Additionally, **a range of caveats need to be considered in relation to the proposed LE model,** including; (1.) isolating and disentangling components within a LE model is principally done for analytical

and empirical purposes, lacking any functional sense to treat these components in isolation as they are linked and intimately connected through networks of interactions; (2.) the proposed model reflects experiences of student learning in online graduate education in the social sciences, and as such would need to be adapted in order to be appropriate for analyzing learning across a range of adult or youth contexts; (3) although the model reflects phenomena of learning in online and digital contexts, it is influenced by socio-cultural and situated perspectives, which sees learning as situated in ever-shifting physical and virtual contexts by mediating tools and cultural artefacts. In this sense, it is clear that the digital domain is not the only sphere or context of learning in an individual's life.

Further, the study reported experiences of learning across multiple contexts mediated by digital technology, a structurally and logistically complex process. A range of challenges emerge when researching learning across contexts from an ecological perspective, including clarifying what defines the boundary from one learning scenario to another, and disentangling the general processes of learning more generally (i.e. activity, social interactions, resource use, etc.). As an exploratory and interpretive study, the findings are considered exploratory and capable of offering insight into emergent and complex phenomenon. Further research on learning from an ecological perspective could therefore aim to investigate the complexities, barriers and enablers involved in processes of lifewide and connected learning across a range of contexts mediated through digital technology.

8.6 Future Lines of Research

The increasing relevance of and opportunity for lifelong learning and professional development through online HE signifies an ever-present need to understand how academic learning is being connected and applied to the wider world. In this regard, the current research reveals a need for a range of next steps. **Future research should continue to focus on the relationship between formal and informal learning across multiple contexts with an emphasis on understanding the complexities, barriers and enablers involved in this process**. Such research could **focus on understanding how forms of connected and boundary crossing learning can be empowered and supported through innovative learning designs in online education**. In this regard, the study has revealed the potential for further research into how adult learners engage with connected and lifewide forms of learning across multiple contexts.

The LE construct has many potential applications in both research and practice unrestricted by academic discipline or sub-discipline. In particular**, language teaching and learning seems to be an**

ideal domain that may be able to fully exploit the potential of ecological and connected forms of learning. This is particularly true given the essential role of self-directed and self-regulated forms of language learning are to achievement. Further, language learning, especially in a multi-cultural and globalized society, has immense application and potential in relation to professional development. The case of bilingual education in Spain in particular, and Europe in general, is a clear example. In particular, research could address successful strategies and practices of language learners who have developed self-directed, informal and socialized learning routines mediated through digital technology. Research could focus on how everyday informal language learning can be linked to academic or professional domains through boundary crossing activities. **The full potential of the LE construct as applied to language learning mediated through digital technology has yet to be realized.**

As this research was focused on student experiences of learning across contexts, **the findings demonstrate a potential for further research to better understand experiences of teaching practices and professional development through an ecological perspective.** As such, a particular emphasis on practitioner views of enabling and empowering forms of lifewide and connected learning may be a potential line of research. Similarly, examining peer-mentorship networks in online HE among both students and teachers may be valuable, given the dearth in the literature. Indeed, the LE construct has been regularly used to investigate forms of teacher professional development mediated through digital technology (Sangra et al., 2013), in particular at the UOC through the Edul@b research group.

The use of the LE construct as an analytical framework has been a productive approach to researching the complexities and connectivity of online HE. However, **it would be useful for further research to consider longitudinal studies on the trajectories and transitions of online HE students on how their experiences of learning had prepared them for future trajectories of learning and professional practice.** Such research could likewise focus on how their experiences of learning have developed or changed over time.

Future research which seems necessary as a result of the current study could **include using a similar mixed methods research approach with the LE construct across different populations in HE, including at the undergraduate level and in on-site contexts across a range of disciplines which may work under different learning paradigms (health, medicine, physical sciences etc.).** In this regard, future research could also consider how forms of connected and boundary crossing learning across multiple contexts may lead to increased quality of educational programs and assessment structures.

Likewise, there is room for research to consider the relationship between identified learner profiles and student achievement. For example, do knowmadic learners achieve higher results on pre-determined assessment structures than do lifewide learners?

Finally, the LE model proposed here is based on the integration of mixed methods findings, and thus contributes to both a theoretical and empirical evidence base on student learning in online HE. That being said, **further research development is needed for the LE construct** with an emphasis on the lived experiences of online learners, including theoretical development such as robust LE models across different contexts, consensus on existing concepts and definitions, as well as the development of complex mixed research methods and instruments**. More attention should be paid to coherence between the ontological, methodological and applicative dimensions of the LE construct** for researching learning with and in the digital, capable of integrating a variety of themes and concepts into a robust theoretical and empirical knowledge base.

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APPENDICES

Appendix A: Case Study Protocol Research Agreement

Research Title: The Contribution of Digital Learning Ecologies in Online Higher Education

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Open University of Catalonia (UOC)

The following case-study protocol will serve as a frame of operation and include all the necessary elements that will guide the overall planning, methodology and research interventions associated with the case-study research titled "The . The objective of the case study protocol is to ensure a consistent and coherent planning process and a common structure for how to construct the cases as well as to clearly inform participating institutions the scope, process as well as interventions of the study.

1. Purpose and objectives of case-study

The aim of the current multi case-study research is to analyze and make visible the contribution of digital learning ecologies to the development and process of formal learning opportunities of graduate students in online higher education. The research will use Barron's definition of a learning ecology "as the set of contexts found in physical or virtual spaces that provide opportunities for learning. Each context is comprised of a unique configuration of activities, material resources, relationships, and the interactions that emerge from them" (2006 p. 195). The research will aim to analyze the ways online graduate students shape and configure their digital learning ecologies as well as how they approach and conceive of learning in networked online higher education across formal, non-formal and informal scenarios (a continuum of formality). Following, this research aims to contribute recommendations for improving pedagogical practices in online HE through a digital learning ecologies framework.

The purpose of the qualitative case-study research will be to examine student's experiences and conceptions of online learning using a Digital Learning Ecologies Analytical framework in higher education settings. The study will examine a.) the components students configure in their digital learning ecologies, b.) the strategies they use to approach and connect their learning across formal, non-formal and informal digital scenarios, and c.) student conceptions of their learning across formal, non-formal and informal digital scenarios.

This multi-case research has selected three universities from which to study online learning in the digital age as a method to understand student experiences of online learning within global, intercultural and inter-linguistic contexts. Master of Education programs in Spain, the U.K. and the U.S.A. have been selected based on their profile as leaders in online education while offering dynamic and innovative educational programs from both traditional and open university models.

Research Objectives and Questions

Main Objective: To analyze the contribution and conceptual potential of a learning ecologies framework in online HE in order to provide recommendations for improving pedagogical practice.

Research questions

The following questions have been formulated in order to meet the aforementioned research objective:

How do students experience learning across contexts—from formal to informal—in online HE?

a. What components configure the digital learning ecologies of higher education students?

b. What strategies and practices do students engage in to support their learning across contexts?

c. How do students conceive of their experiences of learning across contexts—from formal to informal—to support academic learning in online HE?

2. Research Design

The research design will follow a constructivist and interpretivist paradigm using a predominantly qualitative multi case-study approach. The design will also utilize some embedded quantitative data

collected through a digital survey that will allow data triangulation and provide "a supporting role to the study" (Creswell, 2007 p. 208). Emerging digital ethnography techniques will also be used, including a variety of methods to collect data, including email, video, or text chat documents, video data collection and participant observation in social networking sites, online communities and open learning platforms, among others.

Unit of Analysis and focus of study:

The unit of analysis refers to the major entity that will be analyzed in the study. Studying learning in the digital age is a difficult task given the velocity, complexity and connectedness of our networked times. The primary unit of analysis, or focus of the study, will be the student and their associated learning ecologies, including the components of their ecologies understood as the variety of activities, resources, relations and interactions that emerge from them. This may include formal (i.e. M.Ed program) and informal (i.e. the social web) sets of digital contexts that provide opportunities for learning. In order to analyze student learning ecologies, all open digital contexts that offer learning opportunities will be observed and reported, including the comprehensive details of each Master's program. This will require developing documented case reports on each university program detailing the pedagogical model, curriculum, course design, learning environments and assessment strategies.

Field methods for student participation in the Case-Study will include the following, in chronological order:

a.) Purposeful participant selection with each university site based on convenience and criterion sampling (Feb. 2018).

b. Pre-observation in-depth interviews with 5 case-study participants from each university site designed to gather data on student's experiences of online learning. (March. 2018)

c. Digital Ethnographic Observation techniques (observation in informal & open social media platforms, twitter, Facebook, linkedin, blogs, instagram,. as well as in formal & open institutional learning environments (LMS, VLE, wikis, etc.). (March-June)

d. Digital Survey of the entire Master's program to construct a global view and diagnosis of the student body learner profile. (April/May)

e. Post-observation in-depth interviews with 5 Participants from each university site to corroborate results from pre-observation interviews, and digital ethnographic observations based on their experiences of online learning. (June 2018)

Analysis Procedure

The research design will feature four sequential phases of the research that are directly linked to the purpose, rationale, and research questions, represented in the table below.

Phase	Associated Actions	Results/Product of the Analysis
1.) Conceptualization of Digital Learning Ecologies in Higher Education	-Review of Literature and development of theoretical framework	-Theoretical framework chapter for Digital Learning Ecologies in Online Higher Education
2.) Diagnosis of Student Digital Learning Ecologies components + affordances	-Operationalizing of Digital Survey to student body for each M.Ed Program -Descriptive Statistical analysis of survey results -Select student participants for case studies at each M.Ed program	-Create report for each university site based on the prevalent situation (from survey results) for each program of study -Selection of 15 student cases
3.) Multi Case- Study (15 Student Participants as individual cases)	-Pre-observation interviews using qualitative discourse analysis -Digital Ethnographic observation techniques in virtual scenarios (Content Analysis). -Post-observation interviews using qualitative discourse analysis -Triangulation of results between interviews and observations.	-Individual Case Reports based on student case-study
4.) Data Analysis: Contrasting the prevalent situation with the individual case- studies.	-Compare and contrast (triangulation) between the dominant situation collected in the digital surveys and the completed case-study reports -Identify the contribution of digital learning ecologies to student learning, transferable to other HE contexts.	-Case Reports from each university sites contrasted with individual student case reports -Recommendations on the contributions of digital learning ecologies in online higher education.

Case Selection

Student participants will be chosen for their diversity to allow for the study to explore a variety of practices, beliefs, conceptions, and approaches to learning in digital environments, explaining the critical mediating factors of the phenomenon being studied. The selection of participants will be purposeful and based on convenience sampling; criteria for selection will be based on who can best inform the research questions and enhance understanding of the phenomenon under study. Variables such as academic achievement, digital competency, age and gender will also be considered. Further, participants may be recommended by professors or faculty within the university based on the above mentioned selection variables and criteria. Participant selection criteria will be defined later in the development of the study, by the fall of 2017.

Case-study Schedule

1. Case-study Student Selection	Feb. 2018
2. Pre-observation Interviews	March 2018
3. Digital Ethnography	March-June 2018
4. Digital Survey	April/May 2018
5. Post-observation Interviews	May/June 2018

3. Letter of intent for collaboration and participation in a research project between the University of Illinois Urbana Champagne M.Ed in Learning Design and the Open University of Catalonia.

Doctoral Candidate: Mitchell Peters

Research Supervisors: Montse Guitert & Marc Romero

The objective of this letter of intent is to establish the collaborative areas of work and exchange and the bases upon which such interaction will occur between the University of Illinois Urbana Champagne and the Open University of Catalonia research group Edul@b directly related to the activities of the research project “The Contributions of Digital Learning Ecologies in Online Higher Education” by the doctoral candidate Mitchell Peters.

The intention and interest of participation in this research collaboration is to develop a case study of the M.Ed in Learning Design and Leadership with the objective of analyzing the role and potential of the digital learning ecologies of online graduate students in order to provide recommendations for improving pedagogical practice in online HE.

The University of Illinois is initially committed to work in the research activities and interventions as outlined in the Case-study Protocol. The participation of the University of Illinois online M.Ed in Learning Design and Leadership is described and summarized in the Case-study protocol that outlines the framework and design of the research project. Once the project is approved by the ethics committee from both institutions, the participation of the University will be formalized.

Data collected through the participation of the University of Illinois will be used in the doctoral thesis of Mitchell Peters and may be presented in conferences and scientific publications. Individual contributions will always remain anonymous and research ethics (as elaborated by both the ethics committee of the U. of Illinois and the UOC) will be strictly adhered to.

I have read the preceding information and have had the opportunity to ask questions about the Case-study protocol and details of the research interventions. The University of Illinois online M.Ed in Learning Design and Leadership voluntarily consents to be a participating institution in this study.

University of Illinois Urbana Champagne

Signature:_____

Printed Name:_____

Date:_____

Appendix B: Case Study Participant Informed Consent and Information Sheet

Informed Consent Form and Research Information Sheet
Researcher: Mitchell Peters
Research Supervisors: Dr. Montse Guitert, Dr. Marc Romero
Dear Prospective Participant,
My name is Mitchell Peters and I am writing from the UOC in Barcelona, Spain, where I am completing my doctoral studies under the supervision of Montse Guitert and Marc Romero. We are writing to enquire about your potential participation in a study whose objective is to research student experiences of learning in online higher education across formal and informal contexts. The project is titled "The Contribution of Digital Learning Ecologies in Online Higher Education". This informed consent document will detail important features of your potential participation in the study, including your rights as a participant. The study will follow the principles of Responsible Research and Innovation, including Ethics and Integrity as research design principles, and openness and transparency as fundamental to the balanced communication of the research methods, results, conclusions, and implications of the study.
The benefits of the research will include:
• To better understand how students approach and conceive of learning in online HE across formal and informal contexts.
•To identity key success factors and learning strategies that HE students use to connect and activate the different components of their digital learning ecologies.
• To develop recommendations on the contribution and conceptual potential of digital learning ecologies for student learning in online HE.
Your participation would include:
• An in-depth pre-observation interview (1 hour maximum) discussing your experiences of digital learning as a graduate student in online higher education. You will be asked open-ended questions about your experiences of learning in virtual contexts across formal and informal scenarios. You will be asked about your approach learning in virtual contexts (the strategies and actions you follow and the resources you use) as you navigate formal and informal scenarios of learning. Interviews will be conducted online using Google Hangouts or Skype. They will also be recorded and transcribed for later analysis.
• Period of online observation on the open web. Through an online observation informed consent process, you will have the right to voice which online platforms or websites will and will not be used for observation and data collection, across the virtual scenarios you interact with. During observation, data will be collected and later analyzed.

- An in-depth post-observation interview (between 30-60 minutes) discussing your experiences as a graduate student in online higher education. This interview will serve to corroborate

information and data collected in the first interview and throughout the observation. Again, you will be asked open-ended questions about your experiences of learning in virtual contexts across formal and informal scenarios.

- Completing 1-2 online surveys about your experiences as an online student.
  What are my rights as a participant in this study?
  Your participation in this study is voluntary and you are under no obligation to consent to participation. If you choose to participate, you will be given an information sheet detailing the study and your role within it, as well as a consent form that you must sign. You are free to withdraw from the study at any point, without any consequences and without giving a reason. In the event that you decide to withdraw from the study, all information you have provided (including recordings) will be destroyed and omitted in the final document.
  Unfortunately there is no renumeration or material benefits from participating in this study. An objective of the study is, however, to provide recommendations for higher education institutions in to improve pedagogical practice in the design and delivery of online higher education, and your participation will contribute to this end.

CONSENT TO PARTICIPATE IN THIS STUDY

I, (participant name), confirm that I have been informed about the nature, procedure and potential benefits and as well as my rights as a participant in the research study outlined in the above information sheet.

I confirm that:

- I have read and understood the study as outlined in the information sheet.
- I have had sufficient opportunity to ask questions and am prepared to participate in the study.
  • I understand my rights as a participation and that my participation is voluntary and that I am free to withdraw at any time without consequence or penalty.
- I am aware that the findings of this study will be processed into a research report, journal publications and/or conference proceedings, but that my participation will be kept confidential and anonymous.
- I agree to the recording of the interview through audio recording.
- I have received a signed copy of the informed consent agreement.
  Participant Name & Surname_ (please print)
  Participant Signature___
  Researcher Name & Surname_____ (please print) Researcher

Signature_____Date_____

Comprehensive Research Information Sheet Purpose of Study & Research Objective:

The purpose of the qualitative case-study research will be to examine and understand student's experiences and conceptions of learning using a Digital Learning Ecologies Analytical framework in higher education settings. The general aim of the study is to research student experiences of learning in online higher education (HE). Specifically, the research aims to analyze student experiences of learning in networked online higher education across formal and informal contexts. The study will examine a.) the components students configure in their digital learning ecologies, b.) the strategies they use to approach and connect their learning across formal and informal digital scenarios, and c.) student conceptions of learning across formal and informal digital scenarios. We consider that you might be an appropriate participant in this study given your participation thus far in the program and your professional and academic background and experience.

Why am I being invited to participate?

You have been invited to participate in relation to your experience and profile as an online graduate student, based on purposeful and criteria sampling. Likewise, your availability and willingness to participate are an important rationale for your invitation. Additionally, we are seeking individuals that are particularly knowledgeable about the phenomenon of interest in this study, in this case, experiences of digital learning in higher education. The ability to communicate experiences and points of view in a reflective manner are also an important part of your invitation to participate. We are looking for, where possible, a diversity of backgrounds and points of view to allow for the study to explore a variety of experiences and conceptions of learning in digital environments.

Research Methods and Intervention used to achieve this purpose include:

This study will use a qualitative research design using a multi-site case-study methodology. Additionally, digital ethnography techniques will be used to observe participants in virtual environments in the context of online higher education.

Interviews will be audio recorded and transcribed for data collection and analysis. The recordings will be exclusively used for the purposes of this study. Individual contributions will always remain anonymous and research ethics (as elaborated by the ethics committee of the UOC) will be strictly adhered to.

Purpose of data collection:

The data collected from the interviews, digital observations and digital survey will be used in writing a qualitative research report, which will be elaborated under the supervision of research co-directors and presented in the defence of the doctoral thesis of Mitchell Peters at the UOC. Research reports and publications in journals or conference proceeding may also be presented, however all participant information will remain anonymous.

Ethical Concerns, Anonymity & Confidentiality:

The current study has received ethical approval from the Research Ethics Committee at the UOC (comite_etica@uoc.edu). If you wish to receive a copy of the approval documents, you may ask to do so (mjosephp@uoc.edu).

You are encouraged to ask questions or raise concerns at any time about the nature of the study or the methods that are used. Contact me anytime at the following email address: (mjosephp@uoc.edu). Likewise, if you have concerns about the methods used in the research, you may contact my supervisors Dr. Montse Guitert (mguitert@uoc.edu) or Dr. Marc Romero (mromerocar@uoc.edu) at any point. Similarly, you may also contact the Research Ethics Committee (comite_etica@uoc.edu) at the Open University of Catalonia.

Because of the nature of the study, examining student experiences in online higher education, there are no expected negative outcomes for participating in the study. There may be minor discomfort or inconvenience from responding to questions during an interview, however, the nature of the study will not be of a sensitive or emotional nature.

Likewise, participation will remain anonymous and there will be no risk of being identified by others for your participation in the study. Your participation and identity will remain anonymous and confidential, and no one apart from the researcher and his supervisors, as well as coordinating faculty at the host institution, will know about your involvement in this research. Outputs from the research may be submitted for publication, including research reports, journal articles or conference proceedings, however your participation will always remain anonymous and confidential, and you will not be identifiable in these reports.

Data Protection

Data collected in this study, primarily in digital form, will be stored by the researcher for a period of 7 years on a password protected computer in a restricted access building. Future use of the collected data will be subject to further Ethics committee review and approval if applicable. The information will be destroyed and digital data will be permanently deleted after a period of 7 years.

Participant access to Research Results and Findings

Participants may contact Mitchell Peters (mjosephp@uoc.edu) for information regarding research outputs, however, all direct participants and faculty will receive an email link to access the final copy of the thesis.

Thank your for your valued contribution, including taking the time to read and understand the information and details of the research project, as well as your role as a participant in the study.

Best Regards,Mitchell Peters

Appendix C: Student Interview Protocol

First Student Interview Protocol

Student:	Interview Date/Time:

Opening the interview:

- Introduction and Purpose of Interview: to provide information about student experiences of online learning in higher education across formal and informal contexts, including information about the strategies and conceptions students have of learning across a continuum of learning formality.
- Ensure the consent form has been understood and that there are not any questions.
- Remember to ask for permission to audio record the interview

Background as Online Student: Trajectory of Education and Training experience before beginning the online program

1. Can you briefly talk about your background and trajectory of education and training as well as what drew you to study online? What was your original interest or motivation for studying at this level? For example, what features were most important to you?

2. As an online student, in your most recent school year, what has impacted you the most about the online learning experience? i.e. what features or characteristics have led to positive or negative experiences. What has been special about it for you?

Interaction of Experiences Across Contexts in Online Learning

3. I want you to think about how you have gone about studying and learning during the most recent school year. I want you to think about a typical week of study, within a specific course, with specific learning activities. Can you talk about how you go about addressing a specific learning challenge or activities. For example:

- What activities or actions would you do to complete the course requirements in a typical week? What kind of activities were you required to do? How did you do these activities? How did you make sure to meet the requirements?

- What resources would you seek out or use to complete such a task, including both institutional resources or those available on the open web? Which tools or technologies were most useful? What felt right about them i.e. what did they allow you to do?

- What types of interactions would you have, online or offline, with classmates or those outside the program, to support you completing such a learning task? For example, what relationships do you rely on most when preparing a learning activity or task? How do networked forms of interactions impact your formal learning experience (i.e. social networks, blogging, etc.)?

- Did you study mostly alone or mostly together? Did you engage in group projects? Did you feel part of a learning community?
- Did you learn mostly at home, at work, or in another environment?

4. In a typical week, can you talk about the frequency with which you engage in learning activities and interactions that are related to specific online learning tasks? For instance, do you log in online and interact daily, a few days a week, or perhaps concentrated on just one day a week.

5. How have you approached learning online differently than you might approach a face-to-face learning environment? Can you perhaps give examples of how you managed this shift from traditional face-to-face to online learning. How might the interactions, activities and resources be different in an online context?

6. Beyond your program of study, in a typical week, what extracurricular activities or interactions do you engage in that might lead to opportunities for learning (listening to a podcast, youtube tutorial, digital article, writing a blog post)? Outside of your course studies, do you have clear intentions of relating or connecting your everyday experiences, in your free time, to learning within your graduate program? Can you perhaps give me an example about how your everyday experiences online, outside of work or study, (including experiences, practices, and activities in digital spaces) connect with or relate to your learning in this graduate program? What are the key activities or interactions that you use to generate or create opportunities for learning in these contexts? Do you have clear intentions when you are engaged in everyday activities or interactions in your free time online (i.e. information searching, killing time, being entertained, keeping in touch with people)?

7. How do you think the way you've organized your learning in this online graduate program, has prepared you for future learning experiences? How often do you find ways to continue learning online after the formal course experience is over? For Example: Can you think of a time in this program when learning in a formal course has led to the self-directed or self-initiated pursuit of knowledge once the formal course is over?

Ending Questions:

- Is there anything else you think I should know to understand your experiences better as an online learner?
- Is there anything that you might not have thought about before that occurred to you during this interview?
- Is there anything you would like to ask me?

Closing the Interview:

- Thank the participant for their participation
- Ensure there is nothing more students would like to say or share before ending the interview
- Remind about upcoming observation and further observation informed consent process
- End interview

Second Student Interview Protocol

Student:	**Interview Date/Time:**

Opening the interview:

- Introduction and Purpose of Interview: to provide information about student views, experienced events, and actions related to online learning in higher education across formal and informal contexts, including information about the strategies student's use and the conceptions they have of learning across the multiple contexts of their lives.
- Ensure the consent form has been understood and that there are not any questions.
- Remember to ask for permission to audio record the interview

- Online Learning Strategies

1. You mentioned studying 4-6 hours a week on your masters program, can you talk about what motivates you, or what is your interest in dedicating so much time to your studies? What are you

thinking and feeling while involved in this process? Could you talk about how you divided that time (research/information seeking, reading, writing, interacting with colleagues etc…

Hours/Percentage/Task

2. What do you think are the most important ways to connect what you learn in your online masters with your professional life? How do you think the university could support you in this? And in your personal life? How have you found ways to connect what you learn in your program with your professional practice?

3. How, if at all, do you think your study habits or behaviours have changed or developed, if at all, after participating in the program? Have you connected these changes into your professional/personal life? Can you tell me about what skills or competencies, if any, you have developed through this experience that you can apply in other parts of your life (mentioned critical thinking in interview)?

4. You mentioned that _____ has been helpful in your experience as a learner…Looking back on your experiences, how do you think these relationships and interests supported your learning? Who has been the most helpful or valuable to you during this time? How have they been helpful? Have the interactions been more one-to-one or more group or network oriented?

5. After your experiences in the program, what advice would you give someone who is beginning to study an online masters about how they should actively organize their learning? What strategies or habits do you recommend others to follow? What do you think are the most important ways to organize your learning in your online graduate program?

6. Looking back on some of your experiences in different courses, are there things that you would do differently in terms of how you approached or organized your own learning? In terms of planning, completing learning activities, meeting course requirements? Are there particular resources that you wished you would have developed skills in using?

7. Looking back, thinking about your study habits and behaviours, can you think of certain learning strategies you have developed as an online learner that you've used to meet and/or exceed the course requirements?

• Experiences of Learning:

8. Can you tell me about a learning requirement or activity that you thought was particularly well designed? What was special about it? How did it challenge you? What was the assessment, and how did you ensure you met the requirements (i.e. what actions where involved in this process?

9. What has your experiences as an online learner allowed you to do, that you think was not possible in more traditional forms of learning?

10. Tell me about how your views of online learning may have changed, if at all, from before entering the program up until now?

11. Where do you see yourself in 5 years, and what type of training/learning needs do you think you might have then? What type of impact do you think your learning in this program might have on you in the next 5 years?

Ending Questions:

- Is there anything else you think I should know to understand your experiences better as an online learner?
- Is there anything that you might not have thought about before that occurred to you during this interview?
- Is there anything you would like to ask me?

Closing the Interview:

- Thank the participant for their participation
- Ensure there is nothing more students would like to say or share before ending the interview
- End interview

Appendix D: Table of Survey Design Influences

Table of Survey Design Influences

Section	Questions	Qualitative Data Analysis or Conceptual Frameworks influencing Survey Design
Section 1: Demographics (Personal Background	Q1:Age Q2:Gender	• Krull (2018)
Section 2: Demographics (Professional background)	Q3:Employment Status Q4:Years of Work Experiences Q5: Relation of work to study	• Krull (2018)
Section 3: Interests for for studying online and frequency of activity	Q6: Frequency of digital activity Q7:Interest for studying online	• Theme developed from Qualitative Analysis of Interview data and Program Documentation • Vuorikari et al. (2016) • Magda & Aslanian (2018)
Section 4: Demographics: (Academic Background)	Q8: Study Status Q9: Level of Study Q10: Percentage of program completed Q11: Engagement and satisfaction with online study Q12: Years of experience studying online Q13: Experience of studying online	• Krull (2018)
Section 5: Digital Activities	Q14: Frequency of Online Activities Q15: Importance of Online Activities Q16: Number of hours online daily Q17: Frequency of Online Activities to support formal learning	• LE Conceptual Model • Vuorikari et al. (2016) • Van Noy (2016) • Colley et al. (2003) • Smith & Anderson (2018)
Section 6: Digital Relationships Interactions	Q18: Importance of interaction with classmates Q19: Importance of online interaction types	• LE Conceptual Model • Qualitative Analysis of Interview data and Program Documentation • Magda & Aslanian (2018)

Section 7: Digital Resources	Q20: Importance of digital tools & technologies Q21: Importance of digital content	• LE Conceptual Model (Bower, 2016)
Section 8: Impact of Digital Learning Experiences	Q22: Views on impact of Digital Learning experiences (i.e. affordances)	• Cope & Kalantzis (2017)

Appendix E: Student Survey Instrument

Student Experiences of Learning in Online Higher Education

This survey is designed to understand your experiences as a learner in online higher education, specifically trying to understand how you organize your learning across the different contexts of your life.

Thank you for your interest and availability to participate in this study. The objective is to understand student experiences of learning in online higher education. Specifically we are trying to understand how students organize their learning online to generate opportunities for learning across a variety of contexts, both formal and informal. Your experience and perspective will be highly valued.

The survey should take no longer than 15 minutes. All responses will be confidential and anonymous and the data collected will be analyzed both descriptively and statistically and will only be reported in aggregate form.

This research is based out of the Open University of Catalonia, in Barcelona, Spain, conducted as part of a doctoral dissertation by Mitchell Peters. If you have any questions or doubts or need more information on this study, please contact Mitchell Peters at mjosephp@uoc.edu

Thank you for your collaboration.

Survey

Section 1 Personal Information

Q1. What year were you born?

yyyy

Q2. What is your gender?

Female

Male

Prefer not to say

Other: I identify as:

Section 2. Professional Background

Q3. What is your current employment status?

1. Employed full-time
2. Employed part-time
3. Unemployed and currently looking for work
4. Unemployed and not currently looking for work
5. Full time Student
6. Self-employed

Q4. How many years of work experience do you have?

[ ] years

Q5. How closely related is your current field of employment to the field of e-learning and online education?

1. Not applicable
2. Not at all related
3. Slightly Related
4. Moderately Related
5. Related
6. Very Related

Section 3. Interest in Studying Online

Q6. In the last year, on a 'typical' day in your life, about how often did you engage in the following digital practices.

1=never; 2=once or twice a month; 3=once or twice a week; 4=about once a day; 5=several times a day

Browsing, searching and evaluating data, information and digital content.	1 2 3 4 5
Managing information and digital content.	1 2 3 4 5
Communicating and sharing resources and content	1 2 3 4 5
Collaborating in the co-creation of resources, information and knowledge.	1 2 3 4 5
Creating and Developing your own digital content.	1 2 3 4 5
Integrating and elaborating digital content that others have created.	1 2 3 4 5
Identifying technological needs and solving technical problems.	1 2 3 4 5
Creatively using digital technologies by applying a variety of tools and technologies	1 2 3 4 5
Protecting personal data, privacy and devices.	1 2 3 4 5

Q7. Your interest in studying through an online & distance higher education model was motivated by.

the flexibility it offers with your professional and/or family commitments.	1 2 3 4 5
the geographic flexibility of studying in a program unavailable in your region.	1 2 3 4 5
the affordability of the program.	1 2 3 4 5
the opportunity to build skills and competencies in the field of education and digital technologies.	1 2 3 4 5
a more innovative pedagogical model than a traditional university program.	1 2 3 4 5

the reputation of the program itself.	1 2 3 4 5
a requirement and/or recommendation from your current employer.	1 2 3 4 5

Section 4. Academic Background Information

Q.8 In the past year, what has been your study status ?

full time

part-time

Q9. Indicate the level of study of your current academic program.

Undergraduate

Masters

Doctoral

Q10. What percentage of the program have you completed so far?

- 25% or less
- Between 25% and 50%
- Between 50% and 75%
- Between 75% &100%

Q11. Consider the following prompts and then choose the answer that reflects you most accurately.

1= strongly disagree; 2=disagree; 3=neither agree nor disagree; 4=agree; 5=strongly agree;

1. I have been actively engaged in my academic studies.
2. I have enjoyed my experience studying in a fully online graduate program.

Q12. Not counting your current program, how many years experience do you have studying online?

_____ years

Q13. Outside of your current academic program, what experience do you have studying fully online?

	Interested	Enrolled	Completed
Undergraduate degree			
Graduate Degree (different than current degree)			
Massive Open Online Course			
Professional Certification course (project management certificate, digital marketing certificate etc.)			
Micro-credential (mini-degrees or certifications in a specific topic area)			
Learning Apps (i.e. duolingo, udacity)			
Other			

Section 5. Online Engagement

Q14. In the last year, when you are not studying for your program, indicate the frequency with which you have engaged in the following online activities.

1=never; 2=once or twice a month; 3=once or twice a week; 4=about once a day; 5=several times a day					
Browsing, searching and filtering information and digital content.	1	2	3	4	5
Browsing and viewing digital entertainment (i.e. netflix, hbo, social media).	1	2	3	4	5
Interacting informally across my Personal Social Networks.	1	2	3	4	5
Sharing Content.	1	2	3	4	5
Browsing and playing video games.	1	2	3	4	5

Communicating with peers and peer groups using apps such as whatsapp, groupme, messenger, discord etc.	1 2 3 4 5
Interacting more formally across my Professional Development Networks (linkedin, twitter or academia.ed. etc).	1 2 3 4 5
Engaging in Mentoring and/or Coaching and/or Volunteering.	1 2 3 4 5
Interacting with Online Interest Groups and Online Communities (i.e. Facebook groups, Meetup groups).	1 2 3 4 5
Participating in Online Courses outside of my academic program.	1 2 3 4 5

Q15. In relation to the previous question, when you are not studying for your program, indicate which online activities you consider important in supporting learning within your formal academic program.
1= strongly disagree; 2=disagree; 3=neither agree nor disagree; 4=agree; 5=strongly agree;

Browsing, searching and filtering information and digital content.	1 2 3 4 5
Browsing and viewing digital entertainment (i.e. netflix, hbo, social media).	1 2 3 4 5
Interacting informally across my Personal Social Networks.	1 2 3 4 5
Sharing Content.	1 2 3 4 5
Browsing and playing video games.	1 2 3 4 5
Communicating with peers and peer groups using apps such as whatsapp, groupme, messenger, discord etc.	1 2 3 4 5
Interacting more formally across my Professional Development Networks (linkedin, twitter or academia.ed. etc).	1 2 3 4 5
Engaging in Mentoring and/or Coaching and/or Volunteering.	1 2 3 4 5
Interacting with Online Interest Groups and Online Communities (i.e. Facebook groups, Meetup groups).	1 2 3 4 5
Participating in Online Courses outside of my academic program.	1 2 3 4 5

Q16. On a typical “working” day, estimate the number of hours, on average, you spend online each day.

For professional purposes directly related to your professional obligations.	☐ hours
For personal, interest-driven purposes.	☐ hours
For academic purposes directly related to your academic course requirements.	☐ hours

Q17. In the last year, indicate how frequently you have engaged in the following activities to support your formal academic learning.

1=never; 2=once or twice a month; 3=once or twice a week; 4=about once a day; 5=several times a day

Browsing, searching and evaluating data, information and digital content.	1 2 3 4 5
Managing information and digital content.	1 2 3 4 5
Communicating and sharing resources and content	1 2 3 4 5
Collaborating in the co-creation of resources, information and knowledge.	1 2 3 4 5
Creating and Developing your own digital content.	1 2 3 4 5
Integrating and elaborating digital content that others have created.	1 2 3 4 5
Identifying technological needs and solving technical problems.	1 2 3 4 5
Creatively using digital technologies by applying a variety of tools and technologies	1 2 3 4 5
Protecting devices, personal data, and privacy	1 2 3 4 5

Section 6. Online Relationship Interactions

Q18. How important is it to your success as a student that you regularly interact with classmates in your online program?

Not important
Slightly Important
Moderately Important

Important
Very Important

Q19. During the last school year, indicate the importance of the online relationship interactions you have had to support your formal academic learning.

Interactions with Teacher(s)	1	2	3	4	5
One-to-one interactions with university peers.	1	2	3	4	5
Small group interactions with university peers (i.e. study/research/class/project groups)	1	2	3	4	5
Interactions with Work Colleagues	1	2	3	4	5
Interactions with peers outside of school and work	1	2	3	4	5
Interactions with Mentors	1	2	3	4	5
Openly networked interactions facilitated by your academic institution.	1	2	3	4	5
Interactions across Personal Social Networks (friends, contacts, family)	1	2	3	4	5
Interactions across Professional Social Networks (professional associations, contacts, acquaintances)	1	2	3	4	5
Interactions within Online Interest groups and communities of practice (i.e. Facebook groups, meetups, interest group forums)	1	2	3	4	5
Interactions within communities of practice	1	2	3	4	5

1= Not important; 2=Slightly Important; 3=Moderately Important; 4=Important; 5=Very Important

Section 7. Digital Resources

Q20. During the last school year, indicate the importance of the digital tools and technologies which you have used to support your formal academic learning.

1= Not important; 2=Slightly Important; 3=Moderately Important; 4=Important; 5=Very Important

Search Engines (i.e. google, bing etc.)	1	2	3	4	5
Communication tools (i.e. whatsapp, skype, google hangout etc.)	1	2	3	4	5
Multimodal and Multimedia Editing and Sharing tools (Youtube, Movie Maker, Prezi, Slideshare, Padlet, etc.)	1	2	3	4	5
Text Editing and/or Sharing tools (Word, Google Docs, Pages etc.)	1	2	3	4	5
Collaboration tools (synchronous & asynchronous) including email, forums, messenging apps etc.	1	2	3	4	5

Social Networking Systems (Facebook, LinkedIn, Twitter etc.)	1 2 3 4 5
Data Gathering and Analysis tools (surveymonkey, spreadsheets, google forms etc.)	1 2 3 4 5
Knowledge Organization and Sharing tools (dropbox, google drive, mendeley, zotero, etc.)	1 2 3 4 5

Q21. During the last school year, indicate the importance of the types of digital content you have used to support your formal academic learning.

Content facilitated by the academic program.	1 2 3 4 5
Content accessed in Scientific Knowledge Databases and Repositories (digital libraries etc.)	1 2 3 4 5
Open Educational Resources (MOOC's, Webinars, Presentations /audio/video)	1 2 3 4 5
Content accessed on Social Media	1 2 3 4 5
Content accessed on Institutional Websites (Research Institutes, government agencies)	1 2 3 4 5
Content accessed on Personal websites, Personal Blogs, and Wikis	1 2 3 4 5
Online Games & Virtual Worlds	1 2 3 4 5
Mass-media (i.e. Digital Newspapers, Radio, T.V. & Movies)	1 2 3 4 5

1= Not important; 2=Slightly Important; 3=Moderately Important; 4=Important; 5=Very Important

Section 8. Digital Learning Experiences

Q22. Have your experiences as an online learner this past year helped you to develop your ability to...

1=strongly disagree; 2=disagree; 3=neither agree nor disagree; 4=agree; 5=strongly agree;

learn any time, any place?	1 2 3 4 5
think and reflect about how you learn?	1 2 3 4 5
learn according to your own interests and needs?	1 2 3 4 5
learn from others (i.e. teachers and/or peers) through constructive and formative feedback?	1 2 3 4 5

learn through interacting and collaborating with your peers?	1 2 3 4 5
learn by representing meanings through different modes (i.e. text, image, video, audio)?	1 2 3 4 5
learn through actively making new knowledge products or works?	1 2 3 4 5
learn across the different contexts of your life (i.e. personal, professional, and academic)?	1 2 3 4 5
be prepared for future learning and training needs as a lifelong learner?	1 2 3 4 5